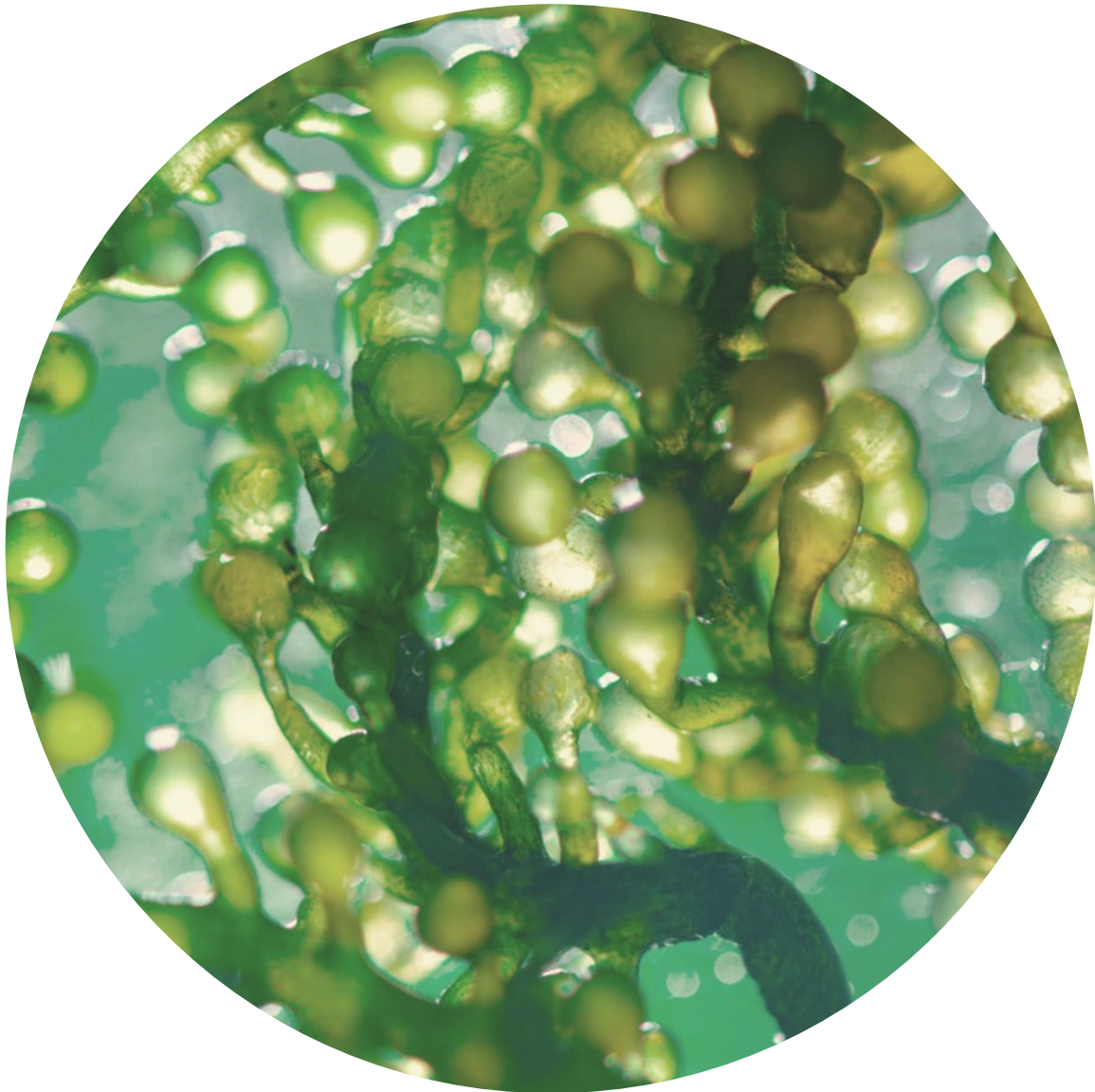


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alberta
Association for Life Sciences Industry



Life Sciences in Alberta

State of the Industry (SOI) 2023

Important Notice

This document summarizes the results of a survey of life sciences companies in Alberta for general information only.

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All monetary values are listed in Canadian dollars unless otherwise stated.





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Executive Summary

Introduction

The BioAlberta State of the Industry (“SOI”) report is a biennial survey of life sciences companies and executives in Alberta. The SOI captures both a current snapshot and a longitudinal view of the industry. The SOI report provides a review of the current status and trends related to the nature, health, economic contribution, innovation, and outlook of Alberta’s life sciences industry. The intent of this report is to stimulate dialogue, provide a current snapshot of the industry, and offer directional support for business leaders and government agencies. A fundamental long-term objective of the report is to help the Alberta life sciences industry grow.

Background and Methodology

The SOI 2023 saw a 52.2% response rate from the 391 companies which received the survey.

Please note: While this report represents a snapshot of the Alberta life sciences industry and is intended to promote dialogue, it is not a full statistical representation of the sector and is not backed by scientific analysis or statistical methodologies. Readers are cautioned from extrapolating or interpolating the data presented in this document.



Where are we Now?

This year’s SOI report identifies several trends in life sciences, including increased convergence, investment in and application of artificial intelligence (“AI”), and growing activity in psychedelic therapies. Furthermore, the onset of COVID-19 has been a catalyst for research, development, manufacturing, and digital health tools and platforms.

Impact of COVID-19

In May 2023, the World Health Organization declared an end to COVID-19 as a global health emergency.¹ Given the duration of the pandemic and its impacts on the life sciences sector, questions related to the COVID-19 pandemic were included in this report, as in the 2021 SOI report. Respondent data provides a view of the shifting impact of the pandemic on businesses, and on the industry as a whole, over the past two years.

Survey respondents continue to access a spectrum of government funding sources, although at lower levels than in 2021 as some programs wind down. The data depicts a clear subset of companies of various sizes that have pursued government support more than others. A number of companies noted substantial business growth due to the development and commercialization of COVID-19 related tests, vaccines, or therapies. Companies also report more

¹ World Health Organization. (2023, May 5). Statement on the fifteenth meeting of the IHR (2005) Emergency Committee on the COVID-19 pandemic. Retrieved from [https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-coronavirus-disease-\(covid-19\)-pandemic](https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic)

optimism today than two years ago about their ability to develop new products and services, both for COVID-19 and otherwise.

Access to capital has become more difficult since 2021 as companies face a more challenging investment climate today. Finding and retaining talent remains a significant challenge, and a number of companies also cited the challenge of managing ongoing supply chain disruptions to their business.

Overview of Companies

Alberta's life sciences organizations are part of a thriving sector responsible for close to \$2.0 billion in revenue. Counting direct, indirect, and induced Alberta employment, the sector is expected to be responsible for 23,300 jobs this year.² Within the industry, more companies describe themselves as manufacturers (43.6%) than service providers (25.5%), while more than half (54.4%) of surveyed companies indicate a focus on research and development ("R&D"). Looking at life sciences subsectors, 33.8% of survey respondents operate in medical technology, diagnostics, and devices, while 22.1% are in health biotechnology and pharmaceuticals, and an equal number (22.1%) are in digital health.

More than a third (35.8%) of respondents were established since 2019. In terms of company life cycle, a similar percentage (34.3%) are at the emerging phase, while nearly half (48.0%) identify as growth phase companies. One in seven (14.2%) identify as maturity phase.

Most Alberta life sciences companies locate in cities, with slightly more of these in Calgary (43.6%) than Edmonton (38.7%). A total of 9.8% locate in Southern Alberta, primarily in Lethbridge.

Advancing Enterprises

This year's report defines a new category of life sciences business, called an "advancing enterprise." These companies have not quite achieved the scale of multinational enterprises ("MNEs") but represent a notable portion of the life sciences ecosystem and serve as the foundation of a growing sector. Examples of this include a \$15 million partnership deal between Providence Therapeutics and Northern RNA Inc. to bring novel products to market, as well as one of the largest biotechnology licensing deals in Canadian history, through a partnership between multinational pharmaceutical Eli Lilly and Company ("Eli Lilly") and Entos Pharmaceuticals, to expand development of Entos' Fusogenix PLV technology.

Research and Development Spending

Surveyed companies increased spending on R&D by 32.2% from 2020 to 2022, reaching \$327.3 million last year. In terms of cash on hand, businesses operating with less than five months of cash declined to 27.5% from 35.6% two years ago, while companies with 12 or more months of cash remained steady at 23.5% this year (23.6% in 2021).

Human Resources

The data indicates that smaller businesses dominate the industry, with 51.0% of companies employing fewer than eight people, and just one in 20 (5.4%) with a payroll exceeding 50 employees. These findings align with other survey results showing that the industry composition skews to younger companies at the emerging and growth life-cycle phases.

² A combined induced and indirect economic multiplier of 3.9 has been extrapolated based on historical data from Statistics Canada; Statistics Canada. 2022. Input-output multipliers, provincial and territorial, detail level. December 13. Accessed May 4, 2023. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610059501>.

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Although smaller, these companies may be big job creators, with plans to add more than 1,800 new positions this year, representing a 44.3% increase in direct industry employment over 2022. Surveyed companies forecast providing total direct employment of 5,992 people in 2023. More than a quarter of employees (26.9%) at surveyed companies hold a PhD, and 23.2% have achieved a Master's degree. Companies note that the most challenging roles to fill are business development (27.5%), roles in regulatory affairs (24.5%), and other sales roles (20.6%).

Revenue

Surveyed companies forecast 55.5% revenue growth this year, having delivered revenues of \$1,883.6 million in 2022.

Revenue data describes an industry primarily composed of many smaller, younger businesses. More than one in three (38.9%) respondents report 2022 revenue below \$1.0 million. Less than half that number (15.4%) recorded \$1.0 million to \$50 million at the top line last year, and just 2.6% generated revenues exceeding \$50 million. Notably, 31.2% of surveyed companies preferred not to disclose their revenue. Companies noted most of their 2022 revenue being earned in the Alberta region and/or in the USA.

Financing

Capital raised by the Alberta life sciences industry peaked in 2020 at \$1.5 billion and declined to \$588.8 million in 2022, a reflection of the more difficult investment climate over the past year.

Most companies seeking capital are looking to government sources (60.3%), with venture capital (37.3%), corporate investment (34.3%), and angel investors (26.5%) identified as other significant prospective capital providers. About a quarter (25.5%) of companies intend to modify their capital structure with more debt, although this figure is lower than the 2021 level of 29.8%.

Nearly two-thirds (64.6%) of companies seek pre-seed or seed stage funding, with another 36.4% anticipating completion of a Series A funding round before 2025. Only 4.0% of companies are planning an IPO.

Multinational Enterprises: Impact on Alberta's Life Sciences Sector

The 2023 SOI report performed a separate analysis of the impact of MNEs on Alberta's life sciences sector. The impact of MNEs remains significant, with many companies contributing to the product landscape in Alberta by propelling drug candidates through clinical trials, including Merck, Eli Lilly, Pfizer, Roche, and Sanofi, among others.

Most MNEs that responded to the 2023 SOI survey have smaller or virtual offices in Alberta. Pharmaceutical and medical device MNEs are active in Alberta in many ways, including partnerships with research institutes; partnerships with biotechnology companies; making use of expertise, infrastructure, and services for clinical trial sites; and contributing to education and the sales and marketing activities for their global products.

Partnerships Across the Sector

Partnerships within the life sciences ecosystem generate value by supporting sustainable research and innovation. This can take several forms, such as MNEs providing capital to support the full development of, and market access for, made-in-Alberta life sciences technologies. For example, in 2021 the Alberta Cancer Foundation announced a partnership with the

University of Calgary and Alberta Health Services to raise \$250 million toward construction of the Calgary Cancer Centre, envisioned as Canada's largest and most ambitious stand-alone cancer centre.³

Opportunities and Issues Facing the Industry

Alberta's life sciences companies have steered their businesses through an unprecedented period of challenges and opportunities.

To continue to grow and lead, nearly half (44.6%) of respondents seek improved support for the commercialization and scaling of businesses within Alberta and beyond, while one in three (33.8%) want to see an expanded set of incubators and accelerators to provide this support. A total of 42.6% of companies want to strengthen their connectivity and partnerships with other members of the broader ecosystem that fuels the Alberta life sciences industry.

The most important issue facing the industry is access to funding, according to respondents. A total of 80.4% of respondents identified sustainable funding for research and commercialization as important or very important, with some respondents describing challenges obtaining capital to develop a research project with commercial potential. This may reflect investor perceptions of risk in life sciences innovation, such as long development and regulatory approval cycles. In addition, 78.4% of respondents support improving the investment environment with such globally competitive mechanisms as match-funding models and enhanced venture capital. Further, 74.0% of respondents want to see the return of the Investor Tax Credit program.

Access to top talent is also on company agendas, with 81.4% of respondents stating that access to highly qualified personnel is important or very important. In qualitative feedback, companies identified a need to support smaller businesses to access large prospective customers, such as public healthcare institutions, health insurers, and universities.

A strong sense of pride also emerged in comments, with respondents identifying the potential to develop a life sciences ecosystem that is globally recognized as exemplifying success.

³ Alberta Cancer Foundation. 2021. UCalgary, Alberta Cancer Foundation and Alberta Health Services announce \$250-million fundraising campaign – OWN.CANCER. October 5. Accessed April 26, 2023. <https://www.albertacancer.ca/partnering-to-own-cancer/#:~:text=The%20%24250-million%20OWN.CANCER%20campaign%20partners%20Alberta%20Health%20Services%2C,the%20Calgary%20Cancer%20Centre%20achieve%20its%20full%20potential.>

Background and Methodology

The overall purpose of this report is to provide an overview of the life sciences industry in Alberta and to further understand trends, opportunities, and challenges that the industry faces.

In early 2023, Deloitte and BioAlberta developed and distributed a survey to various stakeholders and leaders of life sciences companies in Alberta. These included private companies, public companies, institutions, foundations, and small and medium enterprises.

The 2023 SOI survey was adjusted from the 2021 report with questions added to the survey to further understand company location, regulatory approvals in place for company products, and companies seeking investment, to name a few. Subsectors were also adjusted for clarity by adding digital health (categorized as Health IT in 2021) and psychedelics.

The set of subsectors in this year's report was expanded from the 2021 SOI report due to market activity, growth, and active organizations. The 2023 SOI subsectors are:

- Agricultural Biotechnology (including animal health)
- Cannabis
- Digital Health (including virtual care, tele-medicine, and AI / machine learning)
- Environmental Biotechnology
- Health Biotechnology & Pharmaceuticals
- Hemp
- Industrial Biotechnology & Bioprocessing (also referred to as biofuels, biorefining, clean technology)
- Medical Technology, Diagnostics & Devices
- Natural Health Products
- Plant Protein & Functional Ingredients ("PPFI")
- Psychedelics

The survey was sent to 391 companies across Alberta. Data from 204 organizations was used, equating to a 52.2% response rate. In some cases, and due to privacy, certain companies have chosen to remain anonymous by either not answering all of the questions and/or providing a numeric range in specific responses. This resulted in some partial responses from which data was still used in the aggregate analyses. Furthermore, where required, data presented in this report were rounded to the nearest 0.1%.

To mitigate outlier data, government organizations and MNEs — companies with an international presence and without headquarters based in Alberta — were not considered as part of the aggregate analysis.

Reported transactions in the life sciences sector in Alberta are considered between January 1, 2021 and March 9, 2023, as per Table 4 and Table 5 in Appendix A.



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This report is a representation of the feedback received from participants in an aggregated, non-associable format. Survey results are reviewed, analyzed, and presented in this report for general information only and are intended to stimulate dialogue, provide a current snapshot of the industry, and offer directional support for business leaders and government agencies to help the life sciences industry in Alberta. Caution should be used in extrapolating these results to the entire population of companies in the industry.

It is important to note that the number of respondents vary by year and, as such, some data will show higher or lower than expected values. Where possible, the data has been normalized.

In recognition of the global potential of Alberta's life sciences industry, the Canadian Trade Commissioner Service's regional office in Alberta was a part of this collaboration for the first time. We also want to thank our partners in the life sciences sector across Alberta who helped to circulate this survey and encouraged their members to respond, the organizations who filled out the survey, and the life sciences ecosystem, which continues to support the growth of the industry.

Where are we Now?

Since the SOI 2021 report, the industry has seen significant movement across multiple industry subsectors.

The life sciences sector has evolved, with AI and machine learning advances at the forefront. Pharmaceutical, biotechnology, medical devices, and medical technology companies are increasing the use of AI and machine learning to aid in the development of new therapeutics, devices, and diagnostics across all disease areas, modalities, and indications.⁴ Access to and generation of data is also becoming a critical need for companies in the industry globally.⁵

A number of AI companies in the Alberta landscape completed the SOI 2023 survey, each focused on developing novel AI and machine learning products for use in the life sciences, healthcare, and/or patient care. The industry has also seen notable funding opportunities rolled out to support this growth, such as the Government of Alberta/Alberta Innovates \$30 million investment in the Alberta Machine Intelligence Institute (“Amii”) to develop AI talent, support research and commercialization, and enhance Alberta’s AI ecosystem.⁶

The pandemic was a catalyst for digital health (e.g., virtual care platforms and tools), whereby organizations adapted to the evolving needs of patients and COVID-19 restrictions. This shift is providing patients with more flexibility and options to access care, whether virtual or in-person.⁷ The industry has seen a rapid increase in virtual care and digital health platforms, and the integration of digital health tools across the health system is expected to continue in a post-COVID-19 era.^{8,9} An example of this trend is the recent acquisition of Wello, a Calgary-based virtual health company, by Maple.¹⁰

Alberta’s government also continues to invest in clinical research in COVID-19, such as a \$55 million grant for the University of Alberta to support research in prevention and treatment methods of COVID-19, including \$15 million for vaccine projects and \$10 million for an antiviral drug study.¹¹

The evolution of Alberta’s life sciences industry has also been shaped by government policy. For example, Alberta’s improved readiness, relative to other provinces, to adopt routine genome-based testing is attributed to policy choices that led to improved integration and centralization of laboratory services.¹² In terms of funding new drugs, Alberta’s time-to-patient metrics — measured as the time between a drug’s approval and the public reimbursement listing date — remains low and indicates the province’s commitment to ensuring adequate reimbursement policies for Albertans.¹³ The province has also made policy changes and, with the Alberta Cancer Foundation, contributed to \$15 million in funding to allow for

⁴ Alberta Machine Intelligence Institute. (n.d.). 2021/2022 Impact Report. Alberta Machine Intelligence Institute.

⁵ Deloitte. 2023. Digital medtech, FemTech, GeriTech among topics at J.P. Morgan. February 2. Accessed May 1, 2023.

<https://www2.deloitte.com/us/en/blog/health-care-blog/2023/digital-medtech-femtech-geritech-among-topics-at-j-p-morgan.html>.

⁶ Alberta Machine Intelligence Institute. (2023, March 22). Amii receives \$30M in funding from the Government of Alberta and Alberta Innovates. Retrieved from <https://www.amii.ca/latest-from-amii/goa-2023-announcement/>.

⁷ Deloitte. (n.d.) Accelerating the path to health system integration Next steps in a post-COVID-19 world. Deloitte. Accessed April 17, 2023.

⁸ BioAlberta. 2021. Life Sciences in Alberta: State of Industry 2021. Edmonton: BioAlberta.

⁹ Deloitte. (n.d.) Accelerating the path to health system integration Next steps in a post-COVID-19 world. Deloitte. Accessed April 17, 2023.

¹⁰ Cision. 2022. Maple Acquires Wello. January 12. Accessed April 18, 2023. <https://www.newswire.ca/news-releases/maple-acquires-wello-851404350.html>.

¹¹ University of Alberta. 2021. New provincial research funding for U of A aims to create made-in-Alberta vaccine and drug development pipeline. December 1. Accessed April 14, 2023. <https://www.ualberta.ca/folio/2021/12/new-provincial-research-funding-for-u-of-a-aims-to-create-made-in-alberta-vaccine-and-drug-development-pipeline.html>.

¹² Huserreau, D., Villalba, E., Muthu, V., Mengel, M., Ivany, C., Steuten, L., . . . etc. (2023). Towards the routine use of genome-based testing in Canada’s largest regions: A State of Readiness Progress Report. Ottawa.

¹³ Morse Consulting. (2023). 2023 Edition of CRaFT Report and NEW Health Canada Priority Review & Project Orbis Sub-Report.

CAR T-cell therapy within Alberta, a cancer treatment that previously required travel outside the province, as a step towards better recovery and patient care.¹⁴

In the 2021 SOI report, therapeutics and cannabis showed increased market growth and activity. This year's report also includes activity within the psychedelics space, partially due to greater awareness and focus on mental health and wellness.¹⁵ In 2021, Jim Parker, a natural gas trader, committed \$3.0 million in funding to create the Parker Psychedelic Research Chair at the University of Calgary, promising a new source of R&D in the subsector.¹⁶ In 2022, the Government of Alberta became the first in Canada to approve the regulation of psychedelic therapies, a decision that followed a cascade of new products, local companies, and government funding initiatives to support growth in this area.¹⁷

There remains cautious optimism around the life sciences industry globally, with COVID-19 restrictions easing and new technologies emerging, such as AI and next-generation therapies.^{18,19} However, challenges remain consistent with inflation, rising consumer costs (e.g., prescriptions), and economic uncertainty post pandemic.

With the province's resilience and several subsectors showing growth in the last two years, despite the challenges, there is optimism surrounding the life sciences sector in Alberta, where bold moves will likely take place over the next two years with COVID-19 restrictions easing and the world moving to a "newer normal."

¹⁴ CBC. (2023, April 23). Alberta now offering life-saving T-cell cancer treatment. Retrieved from <https://www.cbc.ca/news/canada/calgary/car-t-cell-cancer-treatment-alberta-1.6000210#:~:text=The%20first%20patients%20to%20receive,Cross%20Cancer%20Institute%20in%20Edmonton>.

¹⁵ McKinsey & Company. 2021. Feeling good: The future of the \$1.5 trillion wellness market. April 8. Accessed April 27, 2023. <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/feeling-good-the-future-of-the-1-5-trillion-wellness-market#/>.

¹⁶ Globe and Mail. 2021. Natural gas trader takes on mantle of research chair, funds academic research of psychedelics. June 16. Accessed April 14, 2023. <https://www.theglobeandmail.com/canada/alberta/article-natural-gas-trader-takes-on-mantle-of-research-chair-funds-academic/>.

¹⁷ CTV. 2022. Alberta to support psychedelic therapies for mental health treatment. October 5. Accessed April 14, 2023. <https://edmonton.ctvnews.ca/alberta-to-support-psychedelic-therapies-for-mental-health-treatment-1.6098166>.

¹⁸ Deloitte. 2022. 2023 Outlook for Life Sciences. December 6. Accessed May 1, 2023. <https://www2.deloitte.com/us/en/blog/health-care-blog/2022/2023-outlook-for-life-sciences-inflation-talent-ai-are-top-issues-for-biopharma-and-medtech.html>.

¹⁹ Alberta Machine Intelligence Institute. (n.d.). 2021/2022 Impact Report. Alberta Machine Intelligence Institute.

Impact of COVID-19

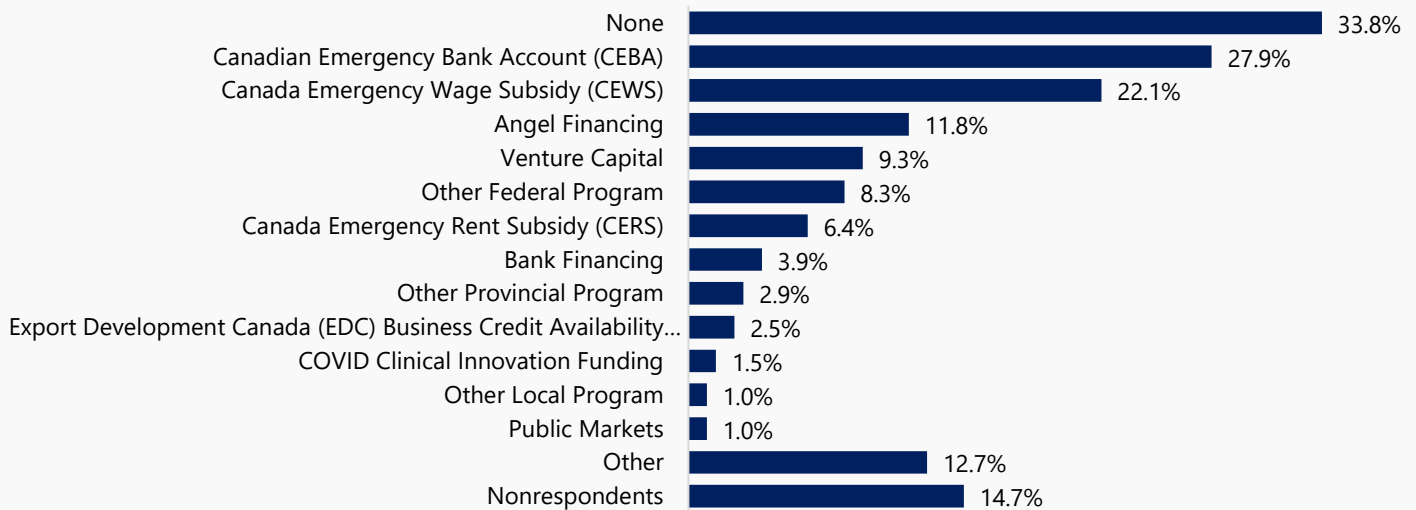
Since the publication of the 2021 SOI report, COVID-19 has continued to shape the life sciences industry, though COVID-19's effects have evolved. In the initial years of the pandemic, life sciences companies were on the front lines, innovating, developing, and producing new diagnostics, vaccines, and therapies with unprecedented collaboration, coordination, and speed. Governments unlocked capital to support this mission, and private-sector dollars followed closely, attracted by rising valuations in a climate of low interest rates.

Today, lower demand for pandemic solutions and the challenging investment climate are testing the industry.

During the initial months of the pandemic, governments and other organizations introduced a variety of emergency financing programs to support businesses. As seen in the graphs below, companies leveraged traditional and pandemic-specific funding sources to grow and scale their businesses.

What new funding sources have you accessed during COVID-19?

New Funding Sources during COVID-19



Note: The chart above adds up to greater than 100.0% because some organizations selected more than one option.

This year's survey added two new response options to this question: "None" and "COVID Clinical Innovation Funding". More than a third of respondents (33.8%) have not accessed any new funding sources since the start of the pandemic, while a small minority (1.5%) accessed clinical innovation funding programs related to COVID.

In 2021, federal programs were the most significant new funding sources identified in the survey, led by the Canada Emergency Bank Account ("CEBA", 26.1%), and the Canada Emergency Wage Subsidy ("CEWS", 22.2%). This year's survey indicates a moderate reduction in companies accessing such federal programs, with the most significant reduction in a single program seen in the Canada Emergency Rent Subsidy ("CERS"), which declined to 6.4% from 14.0% two years ago. The CERS program's final claim period ended in October 2021, although retroactive claims are still being processed. The

percentage of surveyed companies accessing the CEWS program remains virtually at its 2021 level (22.1% today versus 22.2% in 2021), while use of the CEBA program grew slightly to 27.9% today from 26.1% two years ago.

Fewer companies are accessing provincial and local programs, with a sharp decline at the provincial level — 2.9% today, down from 8.7% in 2021, as well as a reduction in the use of other local programs, which landed at just 1.0% of companies today from 2.9% in the 2021 SOI report. The subset of companies that do access provincial and local programs are distinguished by how aggressively they pursue funding, accessing significantly more COVID-19 funding programs and government financing programs than the average survey respondent. This subset represents a range of revenue levels, headcounts, and years since inception.

Companies also report a significant decline in the use of “other federal programs,” down to 8.3% from 17.9% two years ago. A number of federal programs that were set up as temporary funding lifelines for companies have since closed or scaled back. Some examples of programs that companies named as recently leveraged include HASCAP loans, the Regional Relief and Recovery Fund, and the National Research Council of Canada’s (“NRC”) Innovation Assistance Program. Beyond its role providing temporary COVID-19 relief, the NRC provides a range of ongoing funding programs, including the Industrial Research Assistance Program (“IRAP”), which was also cited as a federal funding source by several companies this year.

At the other end of the spectrum, more companies looked to angel investors and venture capital firms this year. Venture capital more than doubled as a new funding source to 9.3% from 4.3%. The use of angel investors also increased, providing funding for 11.8% of companies compared to 7.2% in 2021.

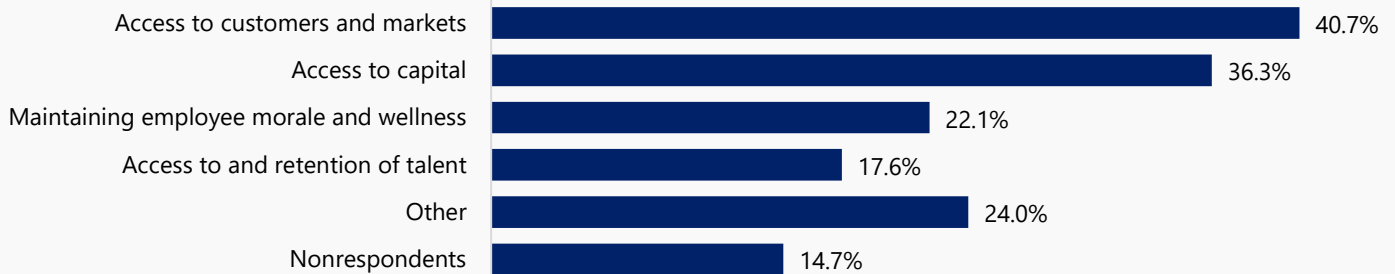
Companies that selected an “other” choice were invited to type an expanded answer. A selection of these responses is provided below.

Table 1. Examples of “other” responses for funding sources (in alphabetical order)

Alberta Innovates	Innovation Assistance Program	PrairiesCan
Business Development Bank of Canada	National Research Council of Canada	ReMAP
Canada Biomedical Research Fund and Biosciences Research Infrastructure Fund	National Research Council of Canada - Industrial Research Assistance Program (NRC-IRAP)	Regional Relief and Recovery Fund
Highly Affected Sectors Loan Credit Availability Program (“HASCAP”)	Pandemic Preparedness	Strategic Innovation Fund/Regional Innovation Ecosystems

What have been the key business challenges that you have faced due to the global pandemic?

COVID-19 Business Challenges



Note: The chart above adds up to greater than 100.0% because some organizations selected more than one option.

Three years after the initial shock of COVID-19, businesses remain challenged by the pandemic's effect on their ability to access customers and markets, which remains largely unchanged at 40.7% today, compared to 41.2% in 2021. Companies also report difficulty accessing capital, rising to 36.3% from 32.8% two years ago.

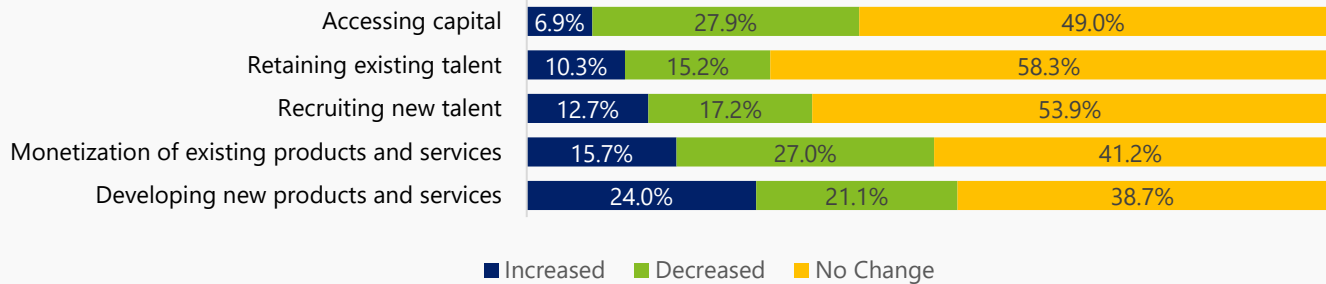
Since the 2021 SOI report, companies report less concern about employee morale and wellness (down to 22.1% from 27.0%). This may be due to demand falling below supply as employees require less wellness support today than during the period of peak case fatalities, lockdowns, and school closures.

Slightly more companies are concerned about accessing and retaining talent – up to 17.6% from 15.2% in 2021. The interval between surveys may smooth out what has been an unprecedented battle for talent in which the power balance shifted firmly in favour of workers. This year's survey took place during a cooler labor market, which may explain the uptick rather than surge in the percentage increase.

More than 24.0% of companies selected "other" and were asked to type an expanded response. Several companies stated that they are challenged by supply chain issues, while cost inflation, government delays/shutdowns, and remote work were also noted by more than one company. Of interest, several companies stated that COVID-19 has created no business challenges for them, and some noted that they have experienced benefits, such as revenue growth resulting from commercializing solutions to pandemic challenges.

How has COVID-19 impacted your business?

Impact of COVID-19



Note: A total of 16.2% of respondents did not provide an answer to this question.

Companies were asked to identify whether the pandemic increased, decreased, or caused no change to each of five aspects of their business, as noted in the chart above.

More companies are having difficulty accessing capital, with only 6.9% of respondents to the 2023 survey stating that COVID-19 has increased their capability in this area, down 15.4% since 2021. The endpoints of the survey interval mark relatively historic extremes in the cost of money, with interest rates near their all-time low during the 2021 survey versus the unprecedented pace of monetary tightening over the past year. Further, some emergency COVID-19 relief programs in place during the 2021 survey have since terminated.

The ability of companies to monetize their existing products and services has deteriorated somewhat, with 15.7% of 2023 respondents stating their capability has increased as a result of COVID-19, down 8.3% since 2021.

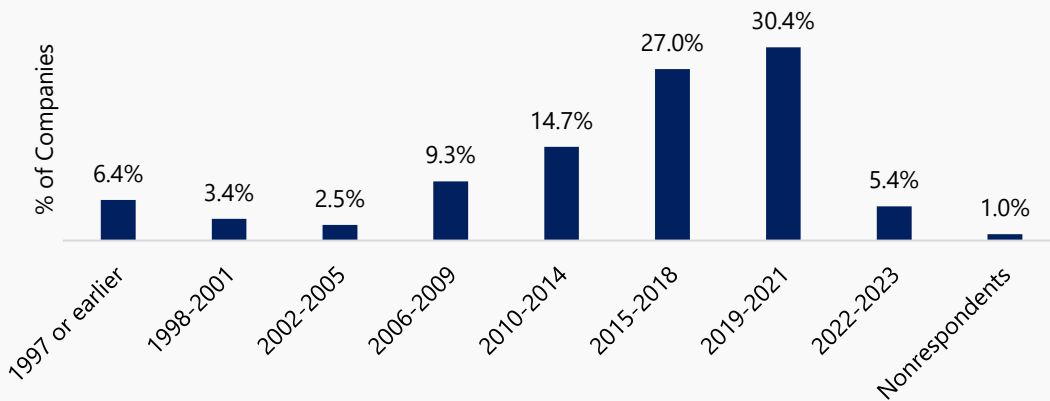
Recruitment and retention have remained somewhat difficult since the 2021 survey. Among 2023 respondents, 12.7% state that their ability to recruit has increased due to COVID-19, down 6.1% from 2021, while 17.2% state this capability has decreased, down 5.7% since 2021. The ability to retain employees was largely unchanged, with 10.3% of 2023 respondents stating this capability has increased, down 0.6% from 2021, while 15.2% state this capability has decreased under COVID-19, up 0.3%.

Innovation remains on a positive trajectory, with 24% of companies in this year's survey reporting an increased ability to develop new products and services, and 21.1% stating this capability has decreased. Both metrics are lower than in 2021, with the number of companies reporting a decreased capability declining more than those reporting an increased capability.

Overview of Companies

When was your company established (year)?

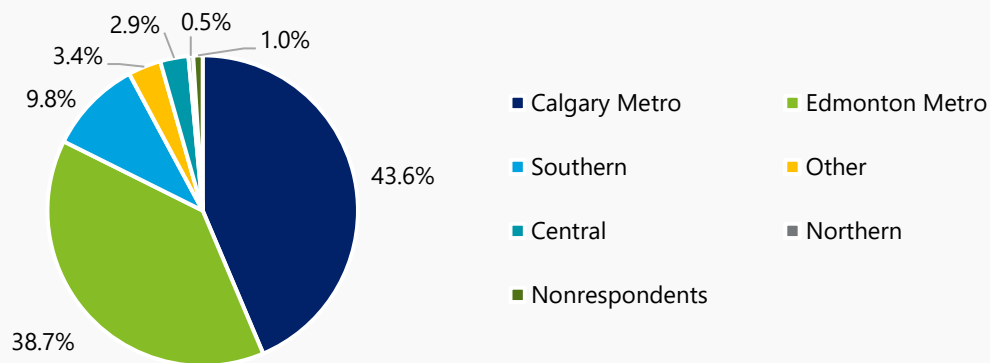
Year Established



More than one-third of companies (35.8%) were established since 2019, indicating that the industry has partially recovered from the beginning of the pandemic. Five percent (5.4%) of companies that responded to the survey were established over the last year (2022-2023). This may be due in part to recent transactions in the landscape (summarized in Table 4 and Table 5 in Appendix A) and the survey being administered early in the 2023 calendar year, pending a count of companies that will be established over the course of 2023. It is expected that this number will grow, as there is optimism about the future of the industry. It is further expected that there will continue to be an increase in new and budding start-ups due to the province’s continued investment the life sciences sector.

Where in Alberta is your company located?

Company Location



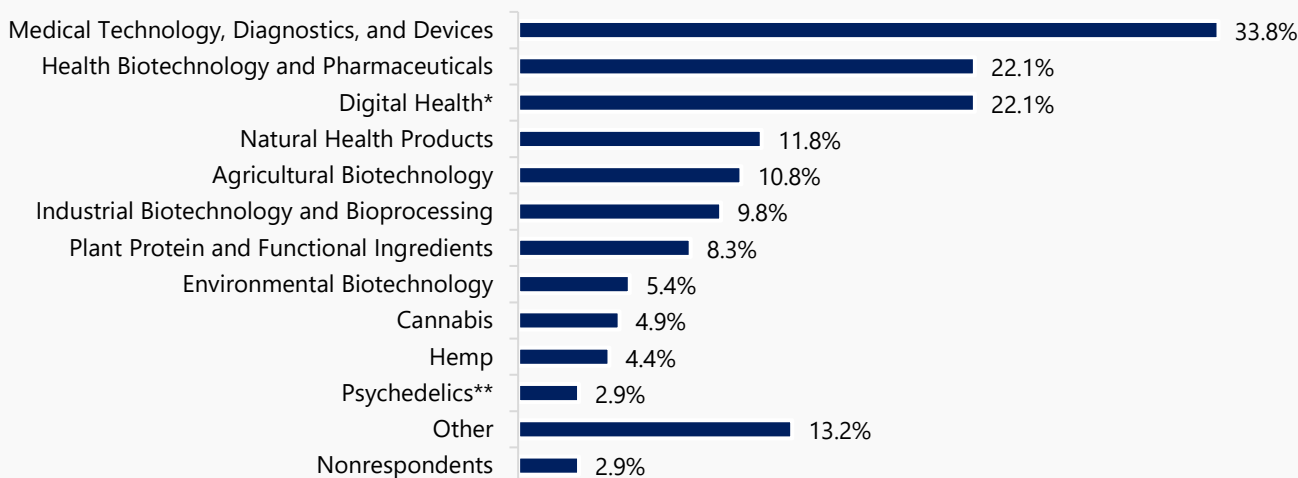
This year, the SOI report evaluated company locations at a more granular level to develop a comprehensive view of the landscape.

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Similar to previous SOI reports, most life sciences companies are based in Calgary (43.6%) and Edmonton (38.7%). Within the Calgary Metro region, most companies are located in the city of Calgary (98.9%), with 1.1% located in Airdrie. For the Edmonton Metro region, most respondents are located in the city of Edmonton (87.3%) or other neighboring regions including Beaumont, Leduc, Spruce Grove, and St. Albert. In the Southern region, most companies are in Lethbridge (75.0%), with others scattered across Medicine Hat, Okotoks, Vulcan, and Chin. Regions with the least company presence were the Central (2.9%) and Northern (0.5%) regions.

In which subsector(s) of the industry would your company be classified?

Subsector Classification



Note: The chart above adds up to greater than 100.0%, as some organizations indicated their focus in multiple subsectors.

**Health Information Technology (IT) in SOI 2021 has been updated to Digital Health in SOI 2023*

***Psychedelics is a new subsector evaluated in SOI 2023*

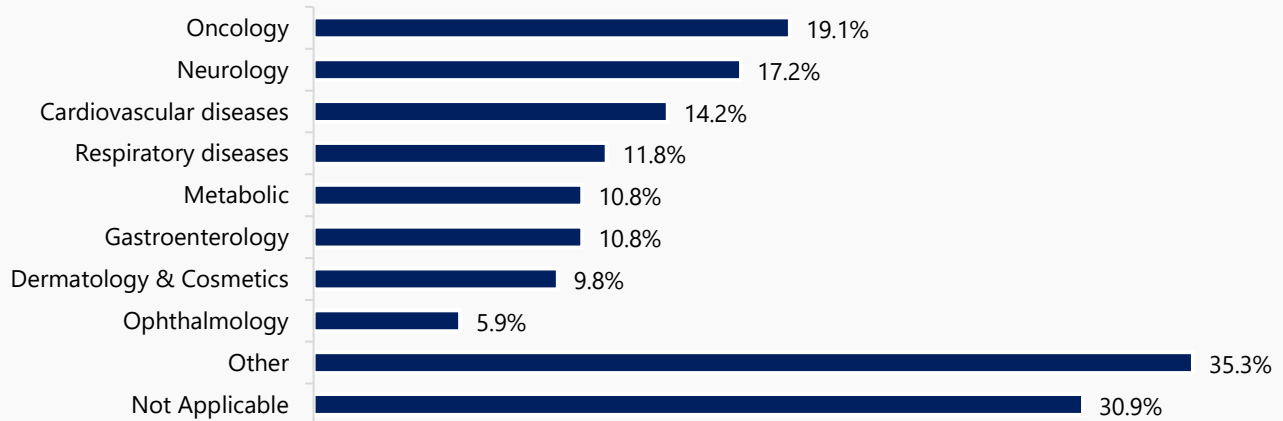
The medical technology, diagnostics, and devices (33.8%) subsector remains the largest in the province, followed by health biotechnology and pharmaceuticals (22.1%), digital health (22.1%), other (13.2%), and natural health products (11.8%). The data suggests that "other" includes focus areas such as venture nanotechnology, precision medicine, mental health and psychological services, contract research and consulting services, as well as healthcare and patient education, among others. A total of 2.9% companies did not provide a response to this question.

The overall ranking of subsectors by size remains similar to rankings from the 2021 SOI report, where medical technology and devices ranked first (21.6%), followed by health biotechnology and pharmaceuticals (20.1%), other (13.2%), and health information technology (IT) (11.6%). The SOI 2021 report indicated fewer cannabis organizations in the overall landscape compared to other subsectors. The 2023 survey reflects a similar trend with cannabis companies making up only 4.9% of companies that responded. See Appendix A, Table 4 and Table 5, for additional details of major cannabis-sector transactions. In addition, companies that begin R&D efforts prior to releasing a product continue to face challenges in

raising capital given R&D's high-risk nature, involving longer payback periods and a lower probability of success during clinical trials.²⁰

Based on the subsector selected, which disease(s) do you focus on?

Company Focus (Diseases)

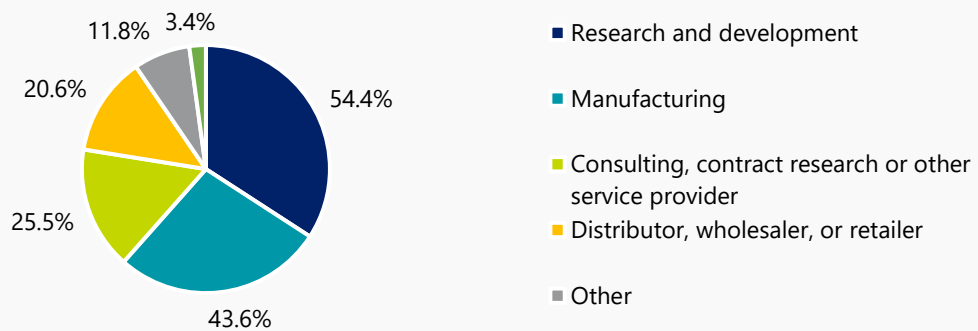


Note: The chart above adds up to greater than 100.0%, as some organizations indicated their focus in multiple categories.

Participating companies that do have a disease focus largely noted "other" (35.3%), oncology (19.1%), neurology (17.2%), or cardiovascular diseases (14.2%) as their area of expertise. Nearly a third of companies responded "not applicable" to the question, indicating no specific disease focus in the life sciences space. The data in "other" includes infectious diseases and immunology, hematology, nephrology, microbiology, orthopedics, and obstetrics.

In which category(ies) would your company be classified?

Company Categorization



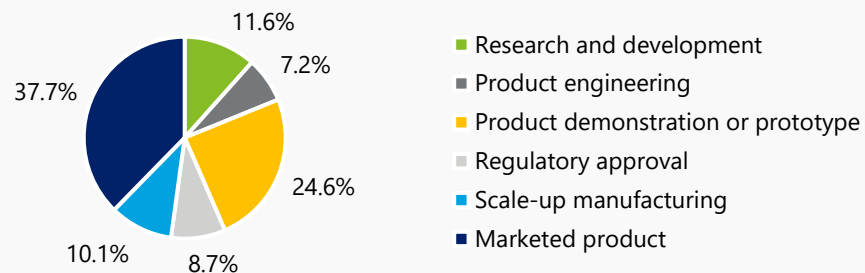
Note: The chart above adds up to greater than 100.0%, as some organizations indicated their focus in multiple categories. Distributor, wholesaler, or retailer was a new response option in the 2023 survey.

²⁰ Edmonton Global. 2023. Driving a Thriving Life Sciences Sector. Edmonton Global.

Over half of the respondents noted R&D (54.4%) as the category that best represents their business, up 19.8% since SOI 2021, followed by manufacturing (43.6%), up by 19.9%. This suggests that new companies in Alberta may be more focused on the R&D and manufacturing spaces compared to other categories. These categories were followed by consulting, contract research or other service providers (25.5%), and other (11.8%). Data for “other” includes IT and software, marketing, and field-building classifications. A total of 3.4% of companies did not provide a response to this question.

For your medical technology and devices product, in which phase of development is your lead technology?

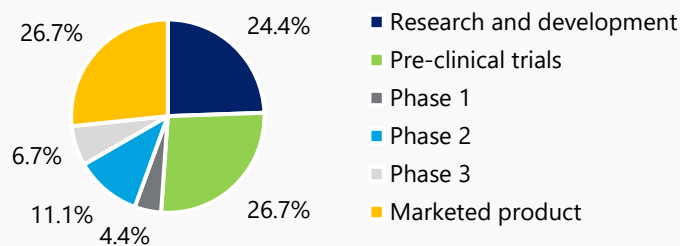
Lead Medical Technology and Devices Product Development Phase



Of companies that selected the medical technology and devices product subsector, most noted that their lead product is in the marketed products (37.7%) stage. The second-highest lead product phase for companies in this subsector is in the product demonstration or prototype (24.6%) stage, down 2.3% from 2021. Scale-up and manufacturing is at 10.1%, up 4.1% from 2021. R&D (11.6%) and regulatory approval (8.7%) have both decreased notably since 2021 — by 4.8% and 4.7%, respectively, while product engineering (7.2%) decreased marginally by 0.3%. The data suggests that a developed and mature medical, diagnostics, and devices subsector exists across the Alberta landscape, with most products reported by companies at prototype or marketed-product stages.

For your health biotechnology and pharmaceutical product, in which phase of development is your lead product?

Lead Health Biotechnology and Pharmaceutical Product Development Phase



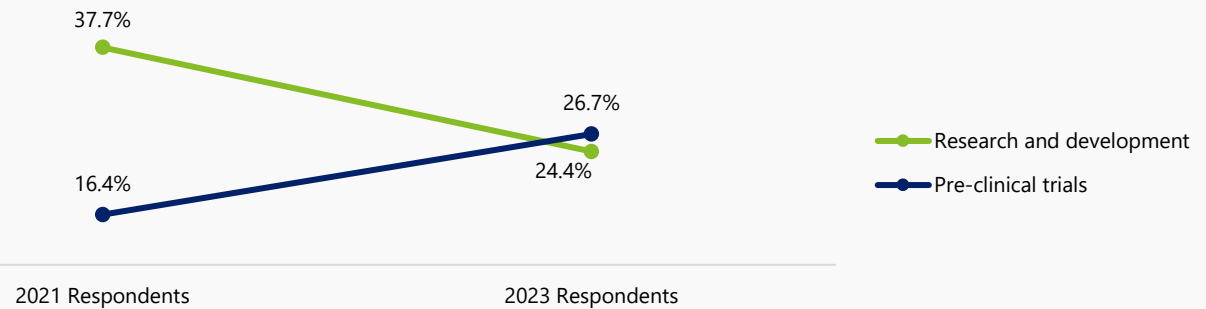
Of companies that operate in the health biotechnology and pharmaceutical subsector, most reported products equally split between pre-clinical trials (26.7%) and marketed products (26.7%), followed by R&D (24.4%). This ranking is different than the 2021 reporting, where data indicated that this industry was focused on R&D (37.7%), down 13.3% in 2023, and pre-clinical trials (16.4%), up 10.3% in 2023.

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Just 4.4% of companies that selected this subsector reported that their lead product is in phase 1, down 0.5% from 2021. A total of 11.1% of companies reported their lead product in phase 2, up 4.6% from 2021, and 6.7% of companies reported their lead product in phase 3, up 3.4% from 2021.

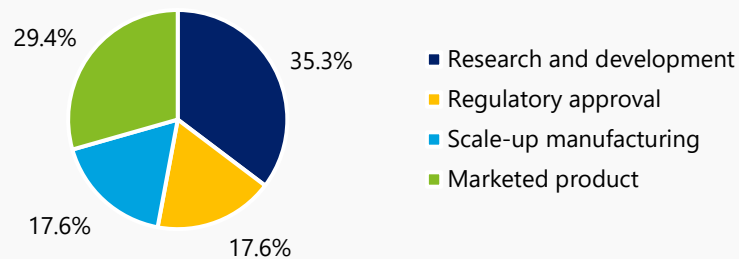
The data suggests that, since 2021, companies with products in this subsector are reporting fewer lead products in early phases such as R&D. Instead, these companies are reporting an increased number of products in more mature phases, such as pre-clinical trials, demonstrating multiple high-potential products in the pipeline which may soon feed into phase 1 trials and onwards.

R&D and Pre-clinical Trials Year-Over-Year Change (SOI 2021 – 2023)



For your plant protein & functional ingredients (PPFI) product, in which phase of development is your lead technology or product?

Lead PPFI Product Development Phase

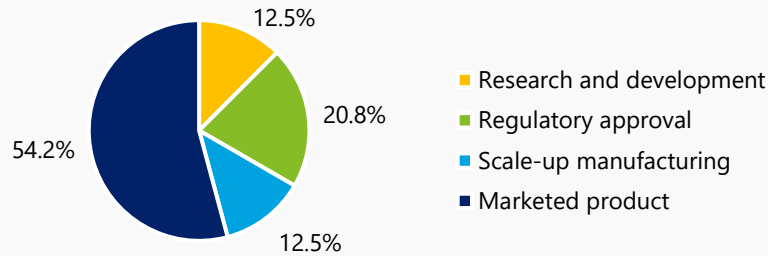


Note: New for the 2023 SOI report, responses by product development phase for three subsectors are presented separately: PPFI; natural health products; and agricultural biotechnology. In the 2021 SOI report, these subsectors were combined for the presentation of product development phase data.

Companies that selected the PPFI subsector reported most lead products in the R&D (35.3%) and marketed product (29.4%) phases of development, which contrasts with companies in agricultural biotechnology, where products are primarily focused on the marketed product stage followed by R&D. Some companies operating in this subsector also reported lead products in the scale-up manufacturing (17.6%) and regulatory approval stage (17.6%), a large increase from the 2021 SOI report, where companies reported zero PPFI products in the regulatory approval process.

For your natural health product, in which phase of development is your lead technology or product?

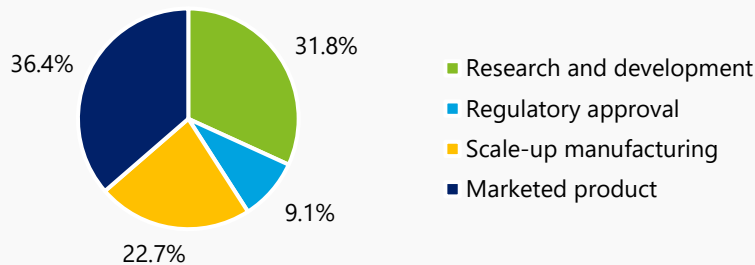
Lead Natural Health Product Development Phase



Companies selecting the natural health product subsector reported a notably higher number of marketed products (54.2%) compared to companies in the agricultural biotechnology and PPFI spaces. Others reported regulatory approval (20.8%) as the second-highest phase, followed by an equal split between R&D (12.5%) and scale-up manufacturing (12.5%). The regulatory approval stage has experienced a marked increase in products in this subsector compared to the 2021 SOI reporting, where zero companies reported products in the regulatory approval stage.

For your agricultural biotechnology product in which phase of development is your lead technology or product?

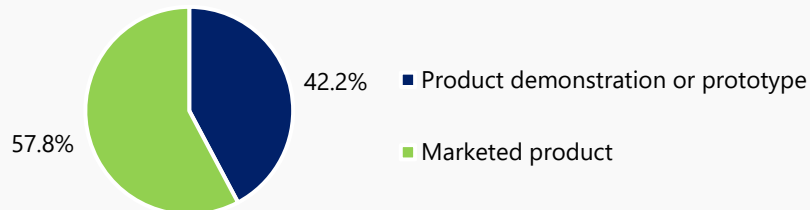
Lead Agricultural Biotechnology Product Development Phase



Of companies operating in this subsector, most have their lead product in the marketed product (36.4%) and R&D (31.8%) development phases, followed up by a subset in the scale-up manufacturing (22.7%) phase. Companies also noted a 9.1% increase in lead products in the regulatory approval phase compared to the 2021 survey results, which saw no products reported in this development phase.

For your digital health product, in which phase of development is your lead technology or product?

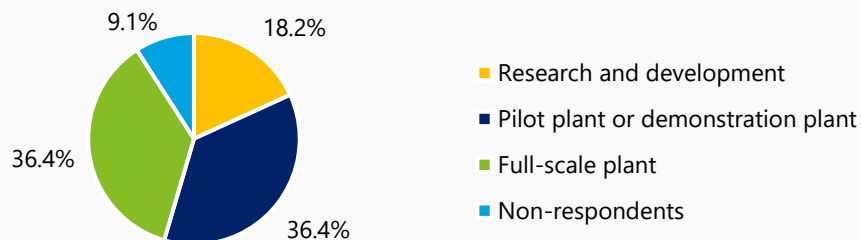
Lead Digital Health Product Development Phase



Companies operating in the digital health space mostly reported their lead product in the marketed product (57.8%) phase, as opposed to the product demonstration or prototype phase (42.2%). This varies from the 2021 reporting where the two phases were equally split. The 7.8% increase in marketed products in the 2023 survey, in comparison to 2021, may be attributed in part to continued strong investment in healthcare across the province as well as the maturity of several digital health tools, platforms, and applications developed over the last three years in response to the COVID-19 pandemic.^{21,22}

For your environmental biotechnology product, in which phase of development is your lead technology or product?

Lead Environmental Biotechnology Product Development Phase



Note: New for the 2023 SOI report, responses by product development phase for the environmental biotechnology subsector are presented separately. In the 2021 SOI report, these were combined with results for the industrial biotechnology and bioprocessing subsectors.

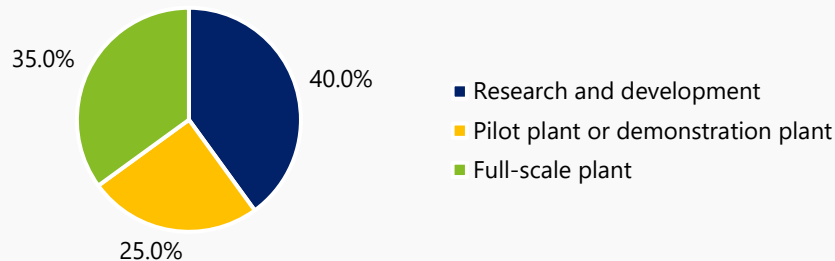
Companies that selected the environmental biotechnology subsector noted an even split of lead products in the pilot plant or demonstration plant (36.4%) and full-scale plant development (36.4%) phases, followed by R&D (18.2%). A total of 9.1% of companies that operate in this subsector did not provide a response to this question.

²¹ International Telecommunication Union. 2021. How COVID-19 accelerated digital healthcare. April 7. Accessed April 17, 2023. <https://www.itu.int/hub/2021/04/how-covid-19-accelerated-digital-healthcare/>.

²² Deloitte. (n.d.) Accelerating the path to health system integration. Next steps in a post-COVID-19 world. Deloitte. Accessed April 17, 2023.

For your industrial biotechnology or bioprocessing technology product, in which phase of development is your lead technology or product?

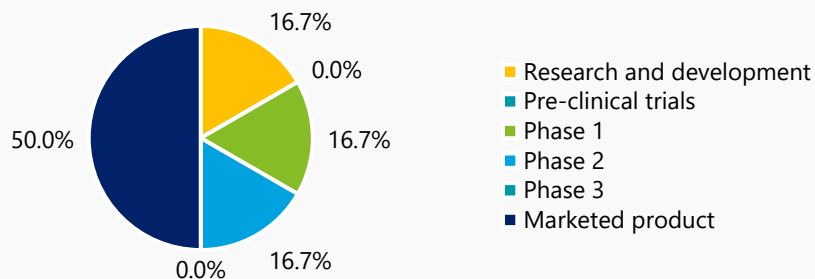
Lead Industrial Biotechnology or Bioprocessing Biotechnology Product Development Phase



Most companies that selected this subsector reported a lead product in the R&D phase of development (40.0%), followed by some in the full-scale plant (35.0%), and the pilot plant or demonstration plant phases (25.0%).

For your psychedelics product, in which phase of development is your lead product?

Lead Psychedelic Product Development Phase



Note: This is a new question to the SOI 2023 report which was not evaluated in the previous survey.

Six survey respondents reported operating in the psychedelics subsector. Half of these companies noted that their lead product is in the marketed product phase, with a single respondent at each of the R&D, Phase 1, and Phase 2 stages. Given the provincial government's recent decision to regulate psychedelic therapeutics and additional funding in this space, the subsector can expect to see an increase in R&D and products.^{23,24}

Of companies that selected this subsector, zero noted products in the pre-clinical trial or Phase 3 phases of development. One company that indicated it operates in this subsector did not provide a response to this question.

Across the Subsectors

Across industry subsectors, companies show an overall trend of product maturity towards pre-clinical and clinical trial and marketed product phases, indicating a positive outlook for the future of the industry. Two subsectors — medical

²³ CTV. 2022. Alberta to support psychedelic therapies for mental health treatment. October 5. Accessed April 14, 2023. <https://edmonton.ctvnews.ca/alberta-to-support-psychedelic-therapies-for-mental-health-treatment-1.6098166>.

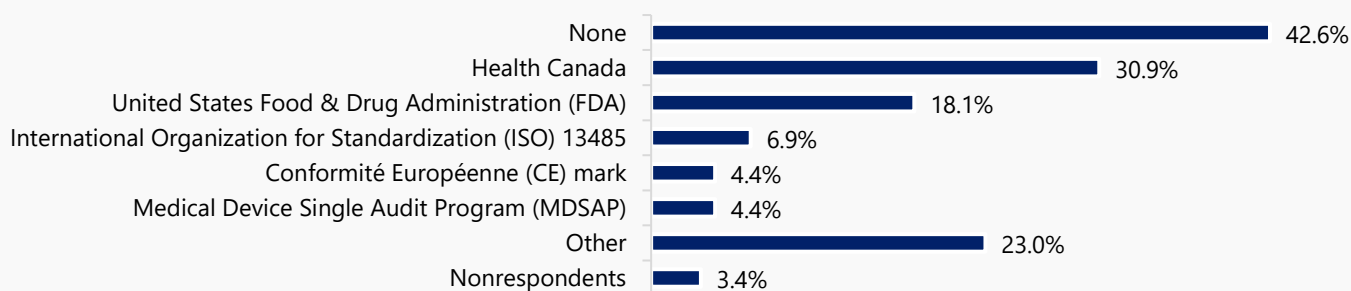
²⁴ Globe and Mail. 2021. Natural gas trader takes on mantle of research chair, funds academic research of psychedelics. June 16. Accessed April 14, 2023. <https://www.theglobeandmail.com/canada/alberta/article-natural-gas-trader-takes-on-mantle-of-research-chair-funds-academic/>.

technology, diagnostics, and devices; and digital health — also reported the highest number of products in the marketed product phase. Of the PPFI, natural health, and agricultural biotechnology subsectors, the agricultural biotechnology subsector appears to be the most mature given that the highest proportion of companies in this subsector reported products in the marketed-products phase.

Companies in the environmental biotechnology and the industrial biotechnology and bioprocessing subsectors reported products in a variety of phases, with most products in environmental biotechnology in the pilot plant and/or demonstration plant phase. Products in the industrial biotechnology and bioprocessing subsector were in the R&D and full-scale plant phases.

Do you have regulatory approvals in place?

Regulatory Approvals



Note: This is a new question to the SOI 2023 report which was not evaluated in the previous survey. The chart above adds up to greater than 100.0%, as some organizations indicated multiple regulatory approvals.

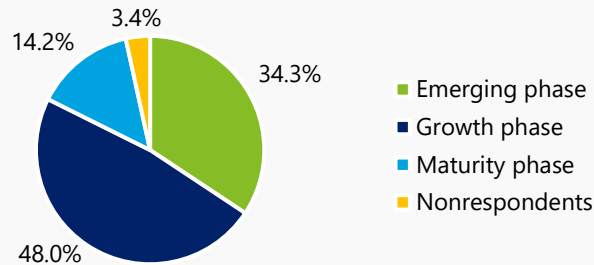
The majority of companies noted no regulatory approvals (42.6%) in place. Of companies that do have approvals, Health Canada (30.9%) and other (23.0%) ranked the most common. Data from “other” respondents included HIPAA, PHIPA, CPSA, ISO 27001, CFIA, and a number of additional national and international approval processes summarized in Table 2 below. Responses also suggest that fewer companies have ISO 13485 (6.9%), MDSAP (4.4%), and/or CE mark (4.4%) approval. A total of 3.4% of companies did not provide a response to this question.

Table 2. Example of “other” responses to regulatory approvals in place (in alphabetical order)

Canadian Food Inspection Agency (“CFIA”)	Health Insurance Portability and Accountability Act of 1996 (“HIPAA”)
College of American Pathologists	International Organization for Standardization (“ISO”) 27001
Clinical Laboratory Improvement Amendments	Israel Medical Device Registration and Approval
College of Physicians and Surgeons of Alberta (“CPSA”)	Iran Ministry of Health and Medical Education
Current Good Manufacturing Practices (“cGMP”)	Pest Management Regulatory Agency
AEP Environmental Protection and Enhancement Act	Systems and Organization Controls 2
General Data Protection Regulation	Toxic Substances Control Act
Good Manufacturing Practices (“GMP”)	UK Conformity Assessment

How would you classify your company in its life cycle?

Company Life Cycle Stage



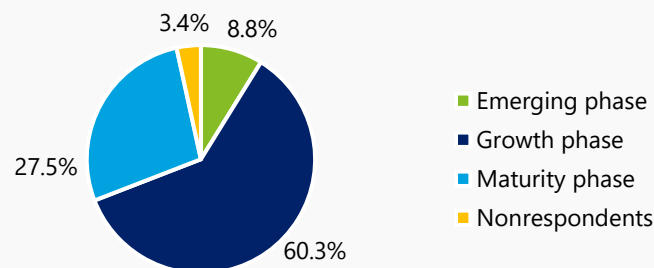
Consistent with previous SOI reports, the following definitions were leveraged for this survey and report:

- Emerging phase is defined as radically new products with frequent changes; high technical uncertainty but broad R&D focus.
- Growth phase is defined as gradual increase in process innovation; at least one stable, high volume product design emerges.
- Maturity phase is defined as mostly process innovation aimed at cost reduction; incremental product innovations.

The distribution of company life cycles illustrates a similar view from the 2021 SOI results. Most companies (48.0%) reported being in the growth phase, down 0.8% from the previous report. Emerging phase companies (34.3%) are down 4.2% from 2021, and maturity phase companies (14.2%) are up 1.5%. A total of 3.4% of companies did not provide a response to this question. The data suggests a higher percentage of companies in the emerging phase, which is consistent with the high (30.4%) number of companies formed in the last three to four years (2019-2021). These are expected to progress toward the growth phase in the coming years.

What phase do you expect your company to be in by 2024?

Forecast Life Cycle Stage



Similar to the previous report, most companies anticipate that by 2024 and beyond their business will be in the growth phase (60.3%). However, a higher proportion of companies anticipate being in the maturity phase (27.5%) by 2024, up 13.8% from the previous report, and 8.8% of respondents reported that they will be in the emerging phase by 2024. A total of 3.4% of companies did not provide a response to this question.

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With a notable increase in companies expecting to move into the maturity phase by 2024, the data indicates many companies in the growth phase may be in, or will soon be approaching, the semi-maturity phase. This alludes to the maturity and progress of the Alberta life sciences sector as a whole, and a positive outlook for growth of the sector.



Advancing Enterprises

We have defined “advancing enterprises” as companies that are not MNEs, but rather are on the rise and progressing in the Alberta landscape, making up a notable portion of the life sciences ecosystem and serving as the foundation of a growing sector across the province.

Advancing enterprises are actively contributing to the industry through a number of financings, including (but not limited to) Hepion Pharmaceuticals’ raise of US\$88 million to accelerate drug development, and QuestPharma’s sale of Bioceltran Investment to the founder of Bioceltran for sale proceeds of \$300,000.^{25,26} Syantra and Future Fields have also raised significant capital, with Syantra beginning 2022 with a major milestone by securing \$6.8 million in Series A fundraising, and Future Fields starting 2023 with a US\$11.2 million round of funding from multiple venture capitalists and government contracts.^{27,28} From a manufacturing perspective, Providence Therapeutics and Northern RNA Inc. announced a multi-year partnership for Northern RNA Inc. to provide plasmid DNA, messenger RNA (“mRNA”) Cap Analogs, and Good Manufacturing Practices-certified manufacturing support to Providence, as part of a deal valued at over \$15 million, demonstrating the industry’s ability to jointly bring novel products to the global market.²⁹ The Canadian Critical Drug Initiative (“CCDI”) provided \$80.5 million in federal funding to support the development of an integrated research, development, and manufacturing cluster in Edmonton.³⁰ This includes an upgrade to the Biotechnology Business Development Centre as well as the commitment to build a new 40,000 square foot manufacturing facility. Gilead Alberta ULC continues to be an anchor tenant in the Alberta life sciences industry, with the largest pharmaceutical manufacturing facility in Alberta.

From a drug development perspective, a number of significant advancements have been made in Alberta including the following examples:

- Hepion Pharmaceuticals’ commencement of two Phase 2 clinical trials³¹
- Entos Pharmaceuticals’ deal with Eli Lilly valued at \$400M+³²

²⁵ TapRoot. 2021. Hepion Pharmaceuticals raises US\$88.4M to accelerate drug development. February 24. Accessed April 18, 2023. <https://edmonton.taproot.news/news/2021/02/24/hepion-pharmaceuticals-raises-88m-usd-to-accelerate-drug-development>.

²⁶ Quest PharmaTech Inc. 2022. Quest PharmaTech Announces Sale of Bioceltran Investment and Photodynamic Therapy Technology License. September 28. Accessed April 18, 2023. <http://questpharmatech.com/wp-content/uploads/2022/09/NR28092022.pdf>.

²⁷ Syantra Inc. 2022. Syantra Raises \$6.8M in Series A Fundraising. January 20. Accessed April 26, 2023. <https://www.syantra.com/syantra-announces-series-a-fundraise>.

²⁸ Future Fields. 2023. Future Fields Lands \$11.2M USD to Turn Flies Into Modular Cleantech Bioreactors That Fuel the Biomanufacturing Revolution in Medical R&D, Pharmaceuticals, and Cultivated Meat. February 22. Accessed April 26, 2023. <https://futurefields.io/pages/2023-funding-announcement>.

²⁹ Providence Therapeutics. 2021. Northern RNA and Providence Therapeutics Announce Multi-year Agreement to Provide Essential Raw Materials and GMP Manufacturing in Support of Providence Therapeutics mRNA COVID-19 Vaccine Candidate, PTX-COVID19-B. September 14. Accessed May 3, 2023. <https://providencetherapeutics.com/press-details/northern-rna-and-providence-therapeutics-announce-multi-year-agreement-to-provide-essential-raw-materials-and-gmp-manufacturing-in-support-of-providence-therapeutics-mrna-covid-19-vaccine-candidate-ptx-covid19-b.html>.

³⁰ University of Alberta. (2023, March 17). Drug manufacturing facility gets green light thanks to federal dollars. Retrieved May 2, 2023, from <https://www.ualberta.ca/folio/2023/03/drug-manufacturing-facility-gets-green-light-thanks-to-federal-dollars.html>.

³¹ Hepion Pharmaceuticals. (2022, August 31). Hepion Pharmaceuticals Announces Initiation of Phase 2b ‘ASCEND-NASH’ Trial. Retrieved from <https://hepionpharma.com/news/hepion-pharmaceuticals-announces-initiation-of-phase-2b-ascend-nash-trial/>.

³² Entos Pharmaceuticals. 2022. Press Release: Lilly and Entos Pharmaceuticals Enter into Research and Collaboration Agreement to Support the Development of Innovative Therapies in Multiple Neurologic Indications. January 6. Accessed April 18, 2023. <https://www.entospharma.com/news/press-release-lilly-and-entos-pharmaceuticals-enter-into-research-and-collaboration-agreement-to-support-the-development-of-innovative-therapies-in-multiple-neurologic-indications>.

- Pacylex obtaining fast-track designation from the US FDA for its lead therapeutic³³
- Oncolytics Biotech making several positive clinical announcements regarding the development of its technology³⁴
- Providence Therapeutics' advancements of its mRNA COVID-19 vaccine and its mRNA rabies vaccine³⁵
- Ceapro Inc.'s progress on extending its technology platform through ongoing research & development into potential therapeutics³⁶

An emerging leader in Alberta's life sciences sector

Entos Pharmaceuticals



Entos Pharmaceuticals is an emerging industry leader in Alberta's life science landscape through its success in developing new genetic medicines with its leading-edge Fusogenix proteolipid vehicle (PLV) technology platform.

In 2022, an agreement between Entos and Eli Lilly was finalized to grant Eli Lilly exclusive rights to the Fusogenix PLV technology for further development to ultimately target conditions of the central and peripheral nervous systems.³⁷ As part of this deal, Entos received an initial payment of \$50 million, and is eligible to receive up to \$400 million, per program, in potential developmental and commercial milestones, and royalty payments upon success of any products developed from the various programs partnered with Eli Lilly.^{38,39}

³³ Pacylex. (2022, November 22). Pacylex Granted FDA Fast Track Designation for PCLX-001 for the Treatment of Relapsed or Refractory Acute Myeloid Leukemia. Retrieved from <https://pacylex.reportablenews.com/pr/pacylex-granted-fda-fast-track-designation-for-pclx-001-for-the-treatment-of-relapsed-or-refractory-acute-myeloid-leukemia>.

³⁴ Oncolytics Biotech Inc. (2023, May 25). Oncolytics Biotech® Announces Positive Randomized Phase 2 Data from BRACELET-1 Metastatic Breast Cancer Trial Demonstrating Pelareorep Drives ≥50% Improvements in ORR and mPFS in an ASCO Annual Meeting Abstract. Retrieved from <https://www.oncolyticsbiotech.com/press-releases/detail/599/oncolytics-biotech-announces-positive-randomized-phase-2>.

³⁵ Providence Therapeutics. 2023. Providence Therapeutics Presents Phase 2 Data on its mRNA COVID-19 Vaccine Candidate PTX-COVID19-B at the 2022 World Vaccine & Immunotherapy Congress. November 28. Accessed May 26, 2023.

<https://providencetherapeutics.com/press-details/providence-presents-phase-2-data-at-the-2022-world-vaccine-and-immunotherapy-congress.html>

³⁶ Ceapro. 2023. Ceapro Inc. Presents Encouraging Results from Research Collaboration Study with McMaster University Evaluating PGX-Processed Yeast Beta Glucan for Interstitial Lung Diseases. May 23, 2023. Accessed June 20, 2023. <https://www.ceapro.com/news/press-releases/detail/247/ceapro-inc-presents-encouraging-results-from-research>.

³⁷ Lilly Investors. 2022. Lilly and Entos Pharmaceuticals Enter into Research and Collaboration Agreement to Support the Development of Innovative Therapies in Multiple Neurologic Indications. January 6. Accessed April 26, 2023. <https://investor.lilly.com/news-releases/news-release-details/lilly-and-entos-pharmaceuticals-enter-research-and-collaboration>.

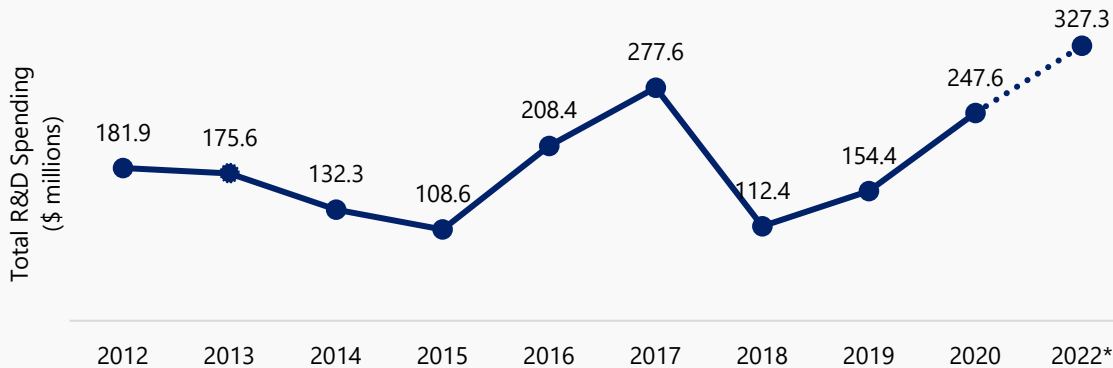
³⁸ Lilly Investors. 2022. Lilly and Entos Pharmaceuticals Enter into Research and Collaboration Agreement to Support the Development of Innovative Therapies in Multiple Neurologic Indications. January 6. Accessed April 26, 2023. <https://investor.lilly.com/news-releases/news-release-details/lilly-and-entos-pharmaceuticals-enter-research-and-collaboration>.

³⁹ Entos Pharmaceuticals. 2022. Press Release: Lilly and Entos Pharmaceuticals Enter into Research and Collaboration Agreement to Support the Development of Innovative Therapies in Multiple Neurologic Indications. January 6. Accessed April 18, 2023. <https://www.entospharma.com/news/press-release-lilly-and-entos-pharmaceuticals-enter-into-research-and-collaboration-agreement-to-support-the-development-of-innovative-therapies-in-multiple-neurologic-indications>.

Research and Development Spending

How much is your company spending on research and development?

Total R&D Spending



Note: The line between 2020 and 2022 is dotted to indicate an insufficient year of information (i.e., 2021). This is due to the fact that no SOI survey was administered in 2022 to capture information about R&D expenditures incurred by the participants in 2021. Any values under \$100 CAD were also excluded as outliers for this question. The data contained in the above table includes data from publicly traded companies that did not respond to the survey. The publicly available information gathered from these organizations (which are listed under “Companies with publicly available information” in the Industry Participation section) was collected from Capital IQ.⁴⁰

The industry is seeing a continued increase in R&D spending across participating companies, with 2022 representing the highest level of R&D spending (\$327.3 million) reported by SOI surveys. The data suggests that companies continue to invest heavily in R&D to maintain a healthy product pipeline; however, the industry continues to struggle to generate capital for R&D efforts.⁴¹

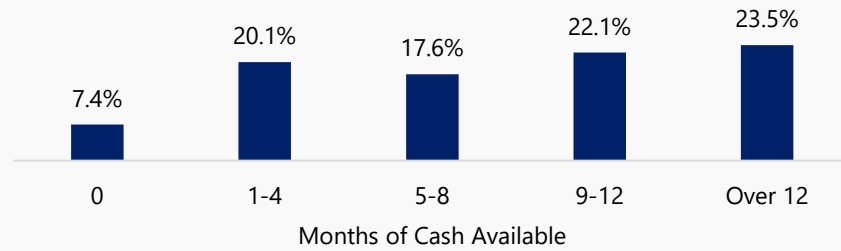
Of respondents, 10.3% chose not to disclose this information. Additionally, 8.3% of total participants did not respond to this question.

⁴⁰ Capital IQ. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

⁴¹ Edmonton Global. 2023. Driving a Thriving Life Sciences Sector. Edmonton Global.

How many months of cash do you have available?

Months of Cash Available



Note: A total of 8.3% of respondents did not provide an answer to this question and 1.0% of collected responses were considered outlier data entered in error.

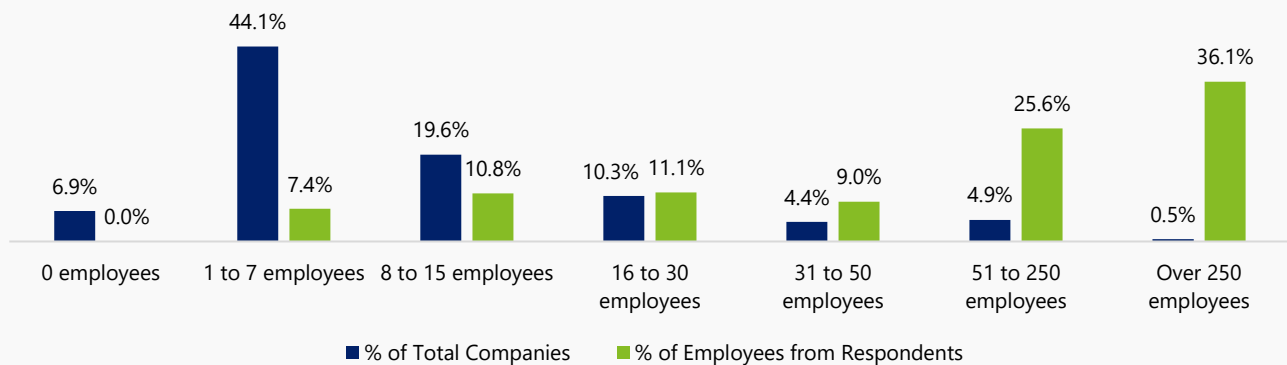
Similar to 2021 findings, companies reported a well-balanced split of cash, with most noting 12+ months (23.5%) of cash available, followed by 9-12 months (22.1%), 1-4 months (20.1%), and 5-8 months (17.6%) of cash available. Finally, 7.4% of respondents noted zero months of cash available, which may be, in part, composed of both participants who do not have cash available on hand and participants who chose not to disclose this information in their response.



Human Resources

How many people did you employ in your company in 2022?

Number of Employees



Note: A total of 9.3% of respondents did not provide an answer to this question.

Most companies reported employing fewer than eight employees (51.0%), which remains consistent with 2021 SOI findings. Of this 51.0%, few (6.9%) employ zero staff. Most employees are with a small number of large companies. For example, the 4.9% of companies with 51 to 250 employees, combined with the 0.5% of companies with over 250 employees, together make up 61.7% of total employees reported across all participating companies. This varies from the 2021 SOI report where the 2.1% of companies reporting 51 or more employees made up only 37.1% of the total employees reported across companies. This shift may be partly due to the composition of companies participating in the SOI 2023 survey compared to those that participated in 2021, as well as a growing number of partnerships and larger-scale organizations in the Alberta life sciences industry.

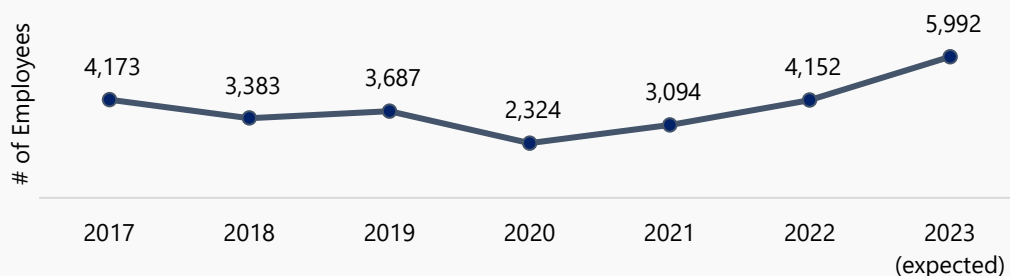
The data suggests that the industry continues to be dominated by start-ups/scale-ups and owner-operated organizations, similar to SOI 2021. However, the industry is seeing a few larger organizations making up a greater proportion of the job market in Alberta, as well as a prominent footprint in labour across the sector.

Diversity, Equity & Inclusion (“DEI”)

Based on respondent comments and the practices of leading Alberta life sciences companies, DEI is becoming more significant and important for the industry. Not only is DEI a means for attracting, recruiting, and retaining talent, taking a more deliberate DEI approach helps companies gain insights from diverse backgrounds and perspectives, which can reduce data bias in a scientific context and make for more effective and high-performing teams.

How many people do you expect to employ at your company by the end of 2023?

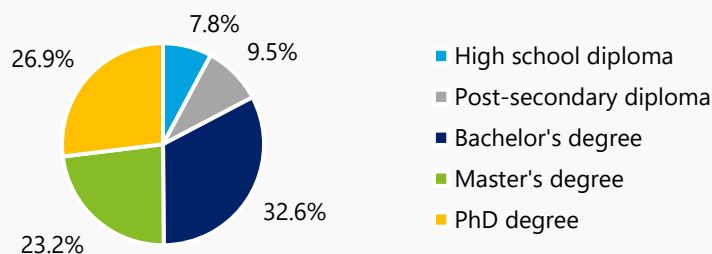
Forecasted Number of Employees



This year, participating companies are forecasting total direct employment of 5,992 employees by the end of 2023, up by 1,840 since last year. The industry saw a steady increase in employees after the onset of the COVID-19 pandemic, and the data suggests there will be continued hiring into 2023 as businesses ramp up to meet the demands of the sector as part of a partially recovered economy. Counting direct employment as well as a combined induced and indirect economic multiplier of 3.9, which has been extrapolated based on historical data from Statistics Canada, the sector is expected to contribute approximately 23,300 jobs to Alberta in 2023.⁴²

What percentage of your employees have a high school diploma, a post-secondary diploma, or some other form of post-secondary education?

Level of Employee Education

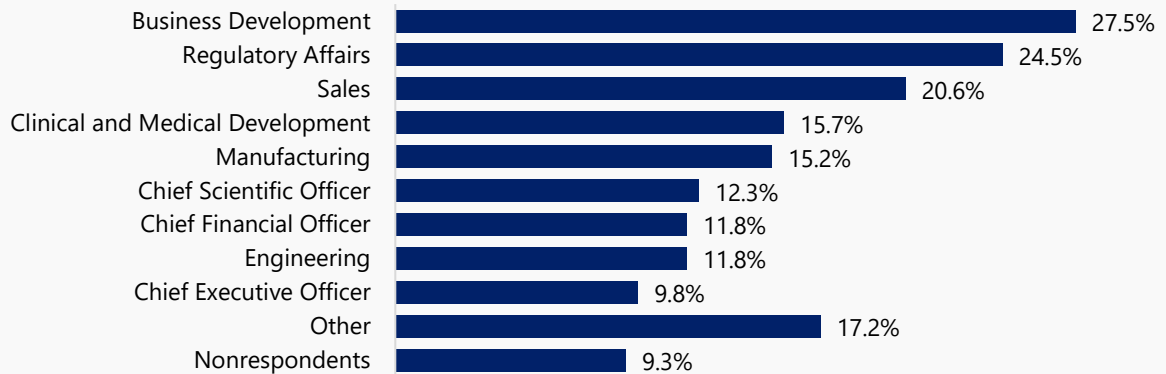


Employees in participating companies hold a variety of educational backgrounds, with the majority holding a Bachelor's degree (32.6%), a PhD (26.9%), or a Master's degree (23.2%). A subset of employees come with a post-secondary diploma (9.5%) or a high school diploma (7.8%). These proportions show minimal change from the 2021 survey, with a range of 2.0% change in each of the educational backgrounds. The data suggests that, with 17.3% of employees having an educational background below a Bachelor's degree, there is a need in the industry for additional sector-specific skills and training programs.

⁴² Statistics Canada. 2022. Input-output multipliers, provincial and territorial, detail level. December 13. Accessed May 4, 2023. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610059501>.

Which of the following executive positions are the most challenging for your company to fill?

Most Challenging Executive Positions to Fill

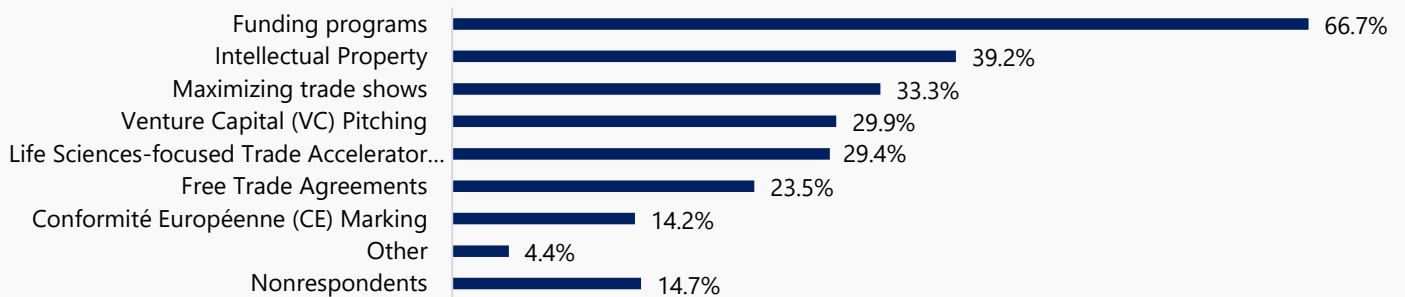


Note: The chart above adds up to greater than 100.0% as some organizations indicated multiple positions as challenging to fill.

Companies reported business development (27.5%) as one of the hardest positions to fill in their organization, followed by regulatory affairs (24.5%). These results vary from the 2021 reporting where data indicated the second most difficult position to fill was in sales (25.4%). "Other" positions (17.2%) ranked closely behind, for which responses include Chief Operating Officers, software developers and technicians, programmers, senior chemists, marketing and social media specialists, psychiatrists, glycobiochemists, and laboratory and research resources. The data also suggests that Chief Executive Officers, Chief Financial Officers, and engineering roles were the least challenging to fill. A total of 9.3% of companies did not provide a response to this question.

What training opportunities would you consider valuable as your organization forecasts growth for 2025?

Value of Training Opportunities



Note: This is a new question to the SOI 2023 report which was not evaluated in the previous survey. The chart above adds up to greater than 100.0% as some organizations indicated multiple opportunities would be valuable to them.

Companies prioritized training in funding programs (66.7%) as the most valuable training opportunities to them, followed by training in intellectual property (39.2%), maximizing trade shows (33.3%), as well as venture capital (VC) pitching (29.9%). The data suggests that companies are increasingly looking to better understand and seek out opportunities to raise capital to ensure that they are able to respond to market changes and uncertainty, highlighting a space within which

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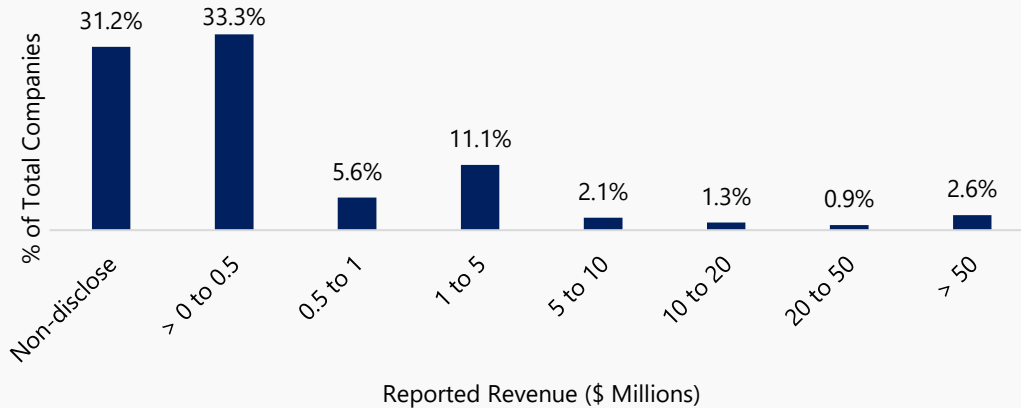
companies would potentially benefit from targeted training or additional information. A total of 14.7% of companies did not provide a response to this question.



Revenue

What is your reported revenue (product, sales and services) for your year ending 2022?

Reported Revenue



Note: The data contained in the above table includes data from publicly traded companies that did not respond to the survey. The publicly available information gathered from these organizations (which are listed under "Companies with publicly available information" in the Industry Participation section) was collected from Capital IQ.⁴³ A total of 12.0% respondents did not provide an answer to this question.

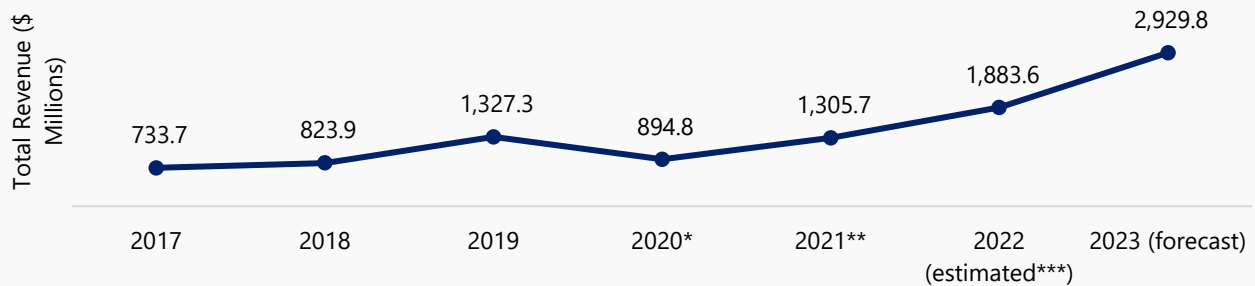
The majority of companies reported 2022 revenue of less than \$500,000 (33.3%), while others preferred not to disclose this information (31.2%). This is consistent with the 2021 SOI report where most companies noted early-stage revenue (34.9% reported 2020 revenue under \$500,000) or preferred not to disclose this information (37.2%). This data suggests that the majority of Alberta companies in the industry continue to generate early-stage revenue.

Participants that noted "1" in their response to this question may have preferred not to disclose this information. Of all questions presented to survey respondents, questions related to financial data regarding spending, revenue, or capital raises saw the highest number of non-disclosures. Participants that chose not to disclose certain information may have done so to reduce public disclosure of sensitive data as they continue to grow and evolve in the landscape.

⁴³ Capital IQ. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

What is your forecast revenue for 2023?

Forecast Revenue



*Excludes \$46B and \$32B reported revenue in 2020 from two public companies (global income)

**Excludes \$47B and \$33B forecasted revenue in 2021 from two public companies (global income)

***Estimated given that 2022 Capital IQ revenue values were not reported for all publicly listed companies accounted for in this question

Note: The data contained in the above table includes data from publicly traded companies that did not respond to the survey. The publicly available information gathered from these organizations (which are listed under "Companies with publicly available information" in the Industry Participation section) was collected from Capital IQ.⁴⁴

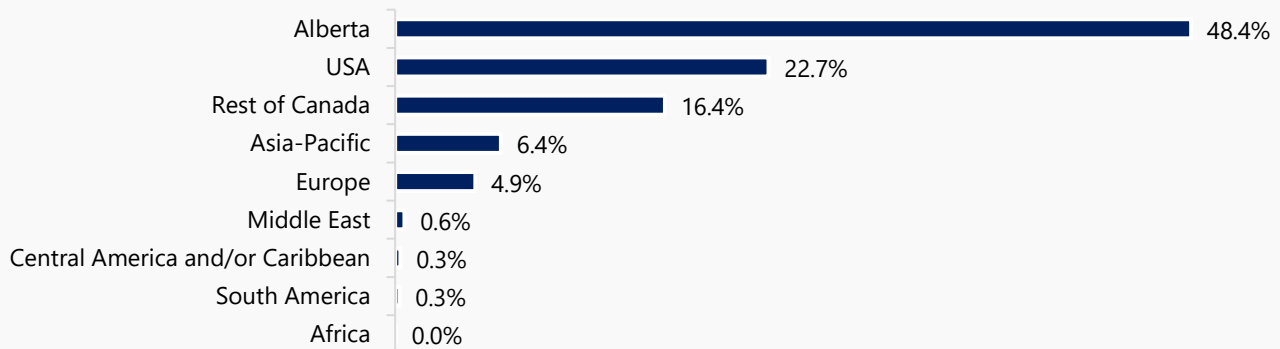
Companies forecast a continued increase in revenue over 2023 to \$2,929.8 million after a steady increase in revenue reported since the SOI 2021 report (\$1,305.7 million in 2021 followed by \$1,883.6 million in 2022). This translates to a 55.5% forecasted increase in 2023 revenue compared to 2022 company-reported revenue.

Public companies continue to account for the majority (72.2%) of reported revenue in 2022 (i.e., of the \$1,883.6 million in 2022 revenue, survey respondents reported \$522.9 million, compared to \$1,360.7 million from publicly listed companies). Similarly, these public companies contribute 70.9% of forecasted 2023 revenue (i.e., of the \$2,929.8 million in forecasted 2023 revenue, survey respondents reported \$853.4 million, compared to \$2,076.4 million from publicly listed companies). Participants that noted "1" in their response to this question may have preferred not to disclose this information.

⁴⁴ Capital IQ. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

What percentage of your 2022 fiscal revenue was earned in each of the following regions?

Revenue Earned by Region



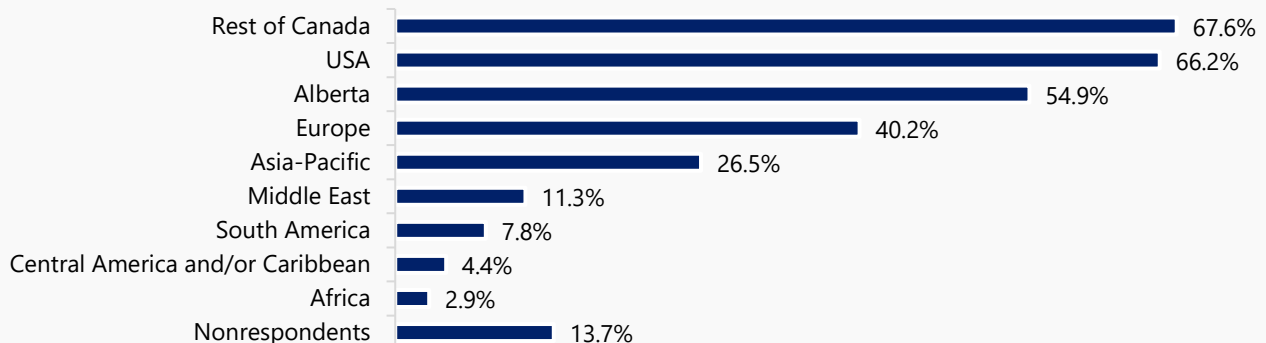
Since the SOI 2021 report, this question has been updated to now include additional regions for companies to select from. Companies noted most of their 2022 revenue being earned in the Alberta region (48.4%), down 7.0% since the previous SOI report, followed by the USA (22.7%), up 5.8%. The rest of Canada (16.4%) remains similar since the previous SOI report, down just 0.2%. Together, these insights suggest that sources of revenue for the Alberta life sciences industry are increasingly coming from outside of the province and that partnerships between the province and global regions are growing.

Other regions where companies noted revenue generation include Asia-Pacific (6.4%), up 2.4% since the SOI 2021 report; Europe (4.9%), down 2.2% since the SOI 2021 report; and the Middle East (0.6%), not evaluated in SOI 2021. Regions where minimal revenue was generated include Central America and/or Caribbean (0.3%), South America (0.3%), and Africa (0.0%). A total of 13.7% of respondents did not respond to this question.

Overall, participating companies in Alberta are generating revenue across many other regions outside of the province, especially in the USA and the rest of Canada, indicating that companies are pursuing markets and sales outside Canadian borders.

What market region(s) are you targeting before 2025?

Forecasted Target Regions



Note: This is a new question to the SOI 2023 report which was not evaluated in the previous survey. The chart above adds up to greater than 100.0% as some organizations indicated they are targeting multiple regions.

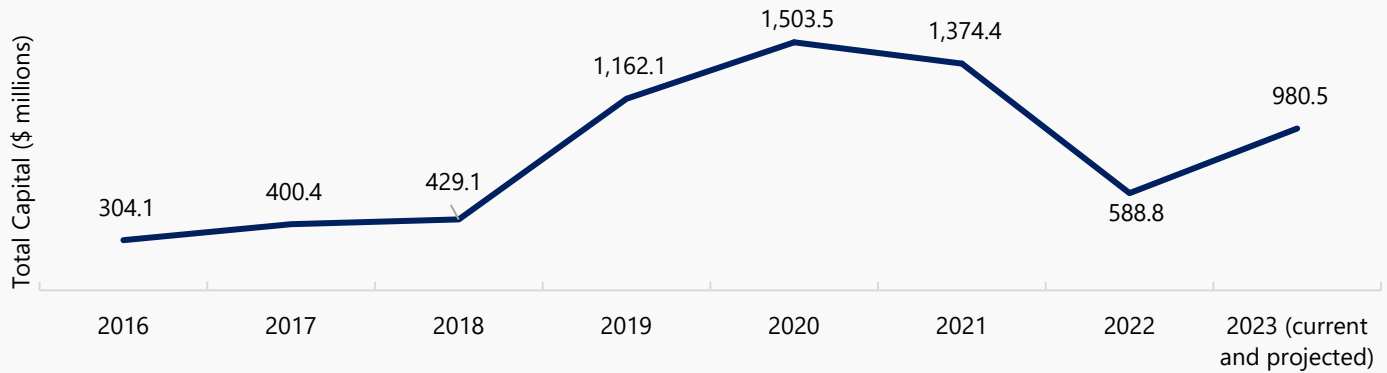
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When asked which market region(s) companies are targeting before 2025, most companies are looking to grow across the rest of Canada (67.6%) and the USA (66.2%). These are followed by Alberta (54.9%) and Europe (40.2%), indicating that, at this time, most Alberta respondents are looking to grow across North America and Europe over other global regions. These include Asia-Pacific (26.5%), the Middle East (11.3%), South America (7.8%), Central America and/or the Caribbean (4.4%), and Africa (2.9%). A total of 13.7% of respondents did not respond to this question. The data suggests that companies have a keen appetite to grow their business and reach a global market.

Financing

How much capital do you estimate raising in 2023?

Capital Raised



Note: The data in the above chart includes actual and forecasted capital investment data from publicly traded companies that did not respond to the survey. The publicly available information gathered from these organizations (which are listed under “Companies with publicly available information” in the Industry Participation section) was collected from Capital IQ.⁴⁵

As noted in the 2021 SOI report, the surge in capital raised by Alberta life sciences companies in 2020 was primarily attributed to investment in the cannabis sector as well as COVID-19-related funding for healthcare technology and services. Capital continued to flow to life sciences companies throughout 2021 as the industry played a central role producing new diagnostics, vaccines, and therapies in response to COVID-19, coupled with the attractive investment climate.

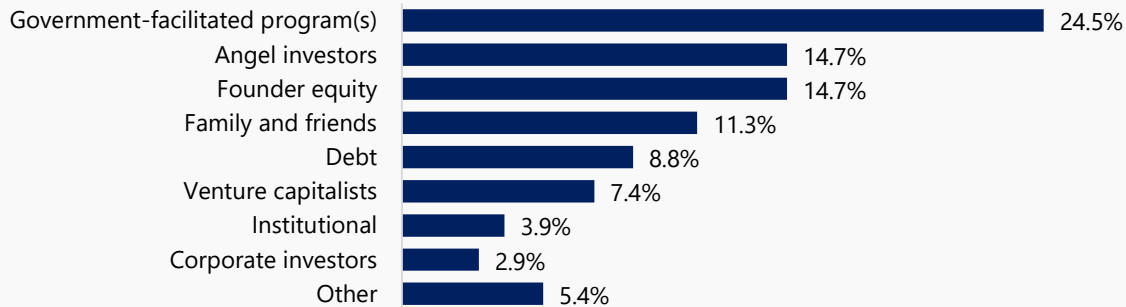
As 2022 brought a different climate – higher inflation, tight money, and market volatility – the unprecedented level of demand for life sciences solutions vis-à-vis the pandemic began to decrease. As a result, capital raised last year by the industry (\$588.8 million) was significantly less than each of the prior three years. Viewing 2019 to 2021 as an idiosyncratic period, it is notable that isolating the figures prior to and after this period (\$429.1 million in 2018, and \$588.8 million in 2022) represents a relatively steady 8.2% compounded annual growth, approximating the annual growth rate from 2017 to 2018.

Responding companies remain optimistic, forecasting a 66.5% increase in capital raised during 2023 (\$980.5 million) compared to last year.

⁴⁵ Capital IQ. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

What sources did you use to raise capital in 2022?

Capital Raise Sources



Note: The chart above does not add up to 100.0% because this question was only posed to companies that indicated they raised capital in 2022, and because some organizations indicated multiple capital raise sources. Results are presented as a percentage of all survey respondents to enable comparison with the previous SOI report.

Government-facilitated programs remained the most popular source of capital for respondents in 2022, as measured by number of transactions. In the previous SOI report, survey respondents indicated plans to significantly increase their use of government, venture capital, and corporate sources of capital. Use of venture capital remained steady compared to 2020 levels (7.4% in 2022 versus 7.3% in 2020). Compared to the previous SOI report, surveyed companies reduced their transactions with government by 20.4% to 24.5%. Companies also reduced their corporate transactions by 4.4% to 2.9%, compared to the previous SOI report.

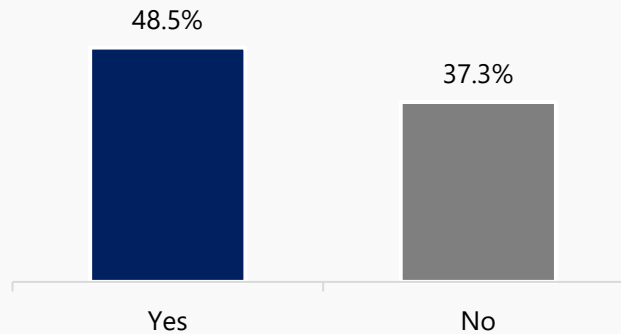
Two years ago, the previous SOI report indicated that 15.1% of companies used debt as a source of capital, and in that same report nearly twice as many (29.8%) expected to increase the use of leverage. A different investment climate awaited these companies, and debt declined significantly as a source of capital to just 8.8% of respondents in this year's report.

Early-stage financing tells a different story, with family and friends tracking with expectations reported in the previous SOI report — 11.3% vs 11.2%. Use of angel investors declined 3.3% since the previous SOI report to 14.7%.

Companies that selected the "other" option reported raising capital from sources that include qualified private equity, family offices, industry contacts, and their own cash flow.

Are you actively seeking investment?

Seeking investment

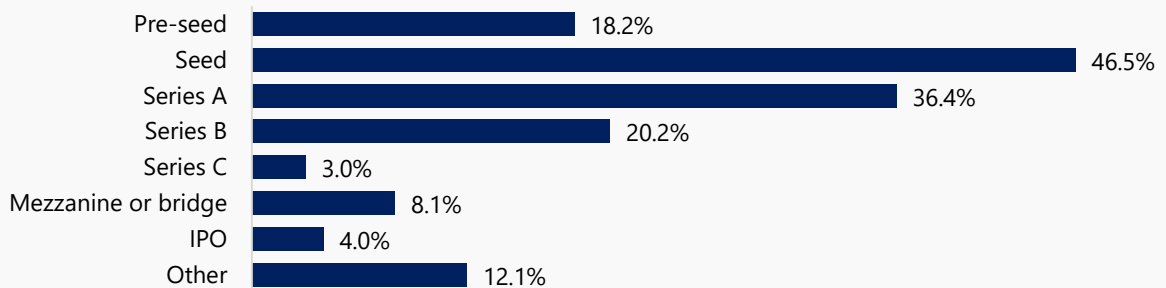


Note: This is a new question to the SOI 2023 report which was not evaluated in the previous survey. A total of 14.2% of respondents did not provide an answer to this question.

While nearly half of responding companies (48.5%) are seeking investment dollars, 37.3% reported that they are not — the remainder did not respond to this question. According to survey data, companies that are not seeking funding are more likely to be at the maturity life cycle stage, and tend to be larger, both in revenue and headcount. While these companies did raise capital in 2022, and do plan to add to their headcount in 2023, in both cases they are at levels below the average survey respondent.

If you are seeking investment, or planning to before 2025, what type?

Funding stage



Note: This is a new question to the SOI 2023 report which was not evaluated in the previous survey. This question was only asked of companies that indicated they are actively seeking investment. Companies could select more than one option, therefore responses do not add up to 100.0%.

New for this year's survey, companies were asked to provide additional details about their plans for accessing investment capital, including which stage of investment is on their horizon. Nearly two-thirds of companies (64.6%) that are seeking investment indicated they are at the pre-seed or seed funding stage – a positive indicator of a healthy future for the life sciences industry. According to survey data, these pre-seed and seed stage companies were recently founded, smaller in size, and located in urban areas. They are also job creators and innovators, spending significant dollars on R&D.

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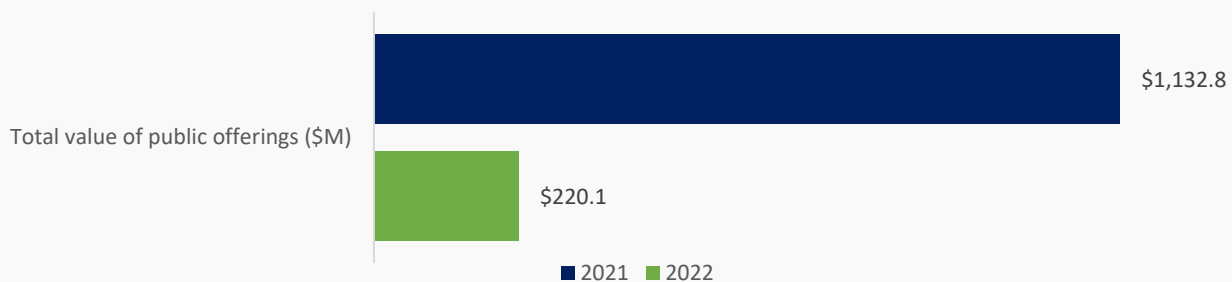
A similar cluster of companies (59.6%) are pursuing Series A, Series B, or Series C funding rounds, with most of these at Series A (36.4%).

Just 4.0% of companies foresee a potential IPO before 2025, reflecting the difficult investment climate of high inflation, economic uncertainty, market volatility, and lower valuations. Canadian IPO activity across all sectors was down significantly in 2022 compared to 2021.⁴⁶

The companies that indicated that they are not seeking investment from any of the choices in the survey (i.e., "Other") cited such types as project-level debt and other project-level investment types, and institutional investment.

The chart below shows the level of initial and secondary public offerings by Alberta life sciences companies. It is clear from this chart that the use of public capital markets by Alberta life sciences companies tracked with the overall national trend.

Total value of public offerings – Alberta life sciences companies



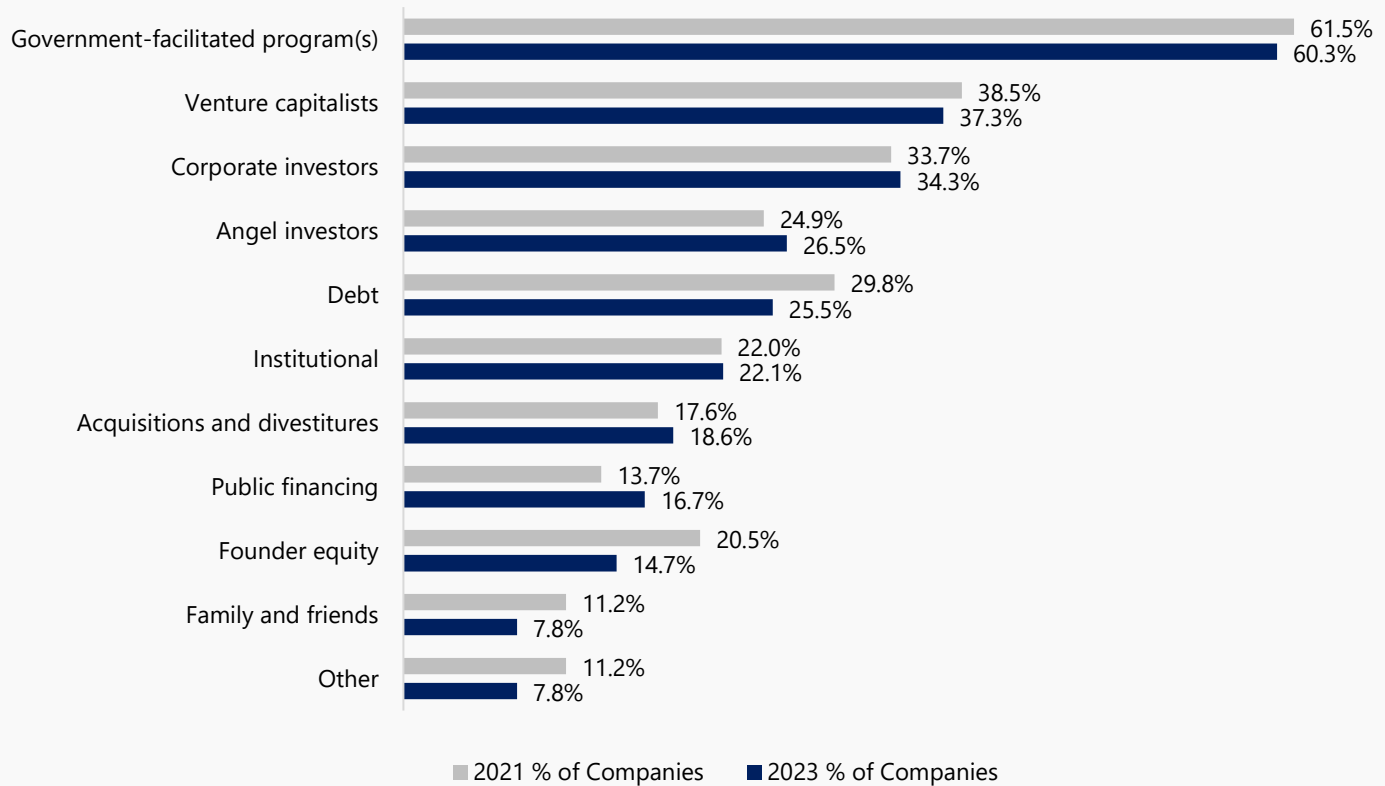
Note: This includes data from publicly traded companies that did not respond to the survey. The publicly available information gathered from these organizations (which are listed under "Companies with publicly available information" in the Industry Participation section) was collected from Capital IQ.⁴⁷

⁴⁶ Financial Post. 2022. After This Year's IPO Slump, Bankers Are Wary of 2023 Relief. December 18. Accessed May 4, 2023. <https://financialpost.com/pmn/business-pmn/after-this-years-ipo-slump-bankers-are-wary-of-2023-relief>.

⁴⁷ Capital IQ. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

Which sources of capital do you intend to pursue in the future?

Sources of Capital



Note: Companies could select more than one option, therefore responses do not add up to 100.0%.

The leading sources of capital that companies intend to pursue today are unchanged since 2021 and include government, venture capital, corporate investment, angel investors, debt, and institutional investment.

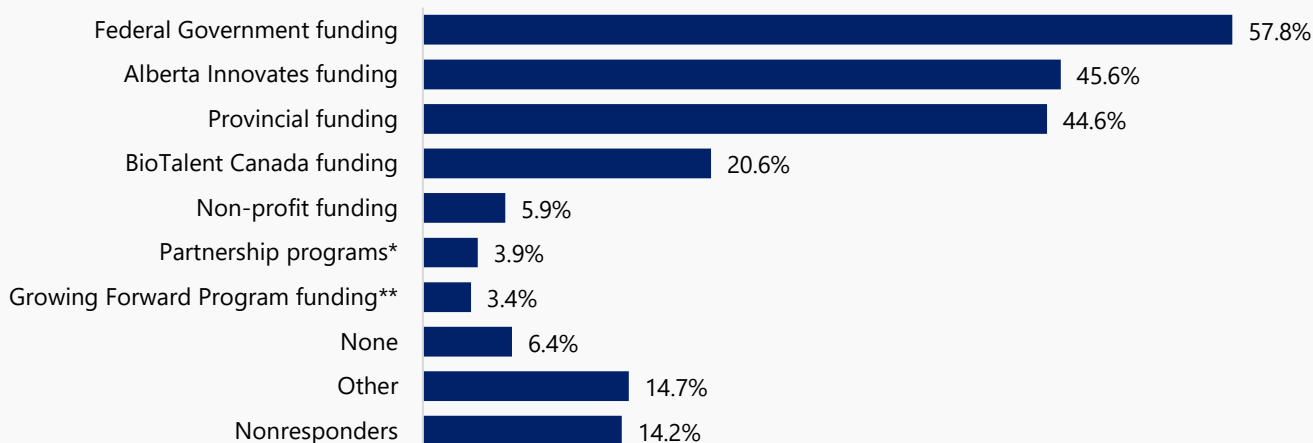
The most significant change since the 2021 SOI report is the 5.8% reduction in businesses that are planning to inject founder’s capital, representing just 14.7% of companies this year. Fewer companies are seeking capital from family and friends, down 3.4% since 2021. These trends may be linked to the slight shift in maturity of survey respondents, with those at the emerging life cycle stage down 4.2% this year since 2021, and respondents at the maturity stage up 1.5% over 2021. The section titled *Overview of Companies* in this document provides additional context on life cycle stages.

Public capital markets gained the most favour among companies since 2021, up 3.0%, though this remains a funding source being considered by just one in six (16.7%) companies.

Leverage has declined slightly, with only about one quarter (25.5%) of companies seeking to take on additional debt, a 4.3% decline since 2021.

Which government-supported initiatives have you used?

Government Support Initiatives Used



Note: Companies had access to more than one area of government funding and were able to select more than one government support initiative. Companies could select more than one option, therefore responses do not add up to 100.0%.

**Including Germany, Mexico (Jalisco), and China (Zhejiang)*

***Including the Sustainable Canadian Agricultural Partnership and Canadian Agricultural Partnership program*

Federal and provincial funding dominated the government support received by companies. More than half (57.8%) of respondents received federal government support, and just under half received funding from Alberta Innovates (45.6%), an Alberta crown corporation, and from other provincial sources directly (44.6%).

Based on how respondents answered this question, they were asked additional questions about their use of specific government support initiatives. The most significant single government support initiative is the National Research Council of Canada Industrial Research Assistance Program (“NRC IRAP”), accessed by over 43.1% of surveyed companies.

Several other federal programs were also widely accessed. Collectively, programs delivered by the Natural Sciences and Engineering Research Council of Canada (“NSERC”) were used by 10.8% of companies, while 9.3% of companies have accessed CanExport SME funding to support their global aspirations. About one in 20 companies accessed each of the following federal programs: Canadian Institutes of Health Research (“CIHR”) Proof of Principal Program (5.9%), Canadian Technology Accelerators (5.4%), Innovation Employment Grant (4.9%), and CanExport Innovation funding (4.9%).

A total of 13.7% of companies indicated that they have accessed federal funding not listed among the survey options. These companies stated they have used such programs as the Scientific Research and Experimental Development (“SR&ED”) tax incentive and support from Prairies Economic Development Canada.

At the provincial level, Alberta Innovates provides a wide range of targeted programs that were used by survey respondents. The most significant of these is the Alberta Innovates Voucher program, which has provided grants to nearly one in three (62.4%) respondents that use Alberta Innovates programs, or 28.4% of all respondents. Three Alberta Innovates programs were accessed by a significant number of respondents: Industry r&D Associates, Accelerating Innovation into Care, and Product Demonstration Program. In total, respondents identified 13 distinct Alberta Innovates programs that supported Alberta life sciences companies.

A total of 40.7% of companies identified that they used a provincial program other than the survey response options, and these companies were asked to type in an expanded response. Some of the additional provincial programs identified by respondents are listed below.

Table 3. Examples of additional provincial funding responses (listed in alphabetical order)

Aboriginal Economic Partnerships Program	Edmonton Regional Innovation Network	Jobs, Economy and Northern Development
Alberta Health Services Innovation Funding	Emissions Reduction Alberta	Results Driven Agriculture Research
Alberta Jobs Now	Innovation Catalyst Grant (ICG)	Technology Alberta
Bioenergy Producer Program	Innovation Employment Grant (IEG)	Workforce Development

A total of 20.6% of companies accessed funding from BioTalent Canada, primarily the Student Work Placement Program, which 18.6% of all companies have used. Additional funding programs from BioTalent Canada include: the Career Starter program (3.4%), the Science Horizons Youth Internship (2.9%), and the Skilled Newcomer Internship program (1.5%).

A small number of companies (3.4%) have accessed Growing Forward program funding, with most of this concentrated in the Growing Forward 2 program iteration (2.9% of all companies). The Growing Forward program evolved through several iterations, with 0.5% of all respondents noting they have accessed the Sustainable Canadian Agricultural Partnership program. In comments, respondents also noted they have accessed the Canadian Agricultural Partnership program.

While only 5.9% of respondents are funded by non-profits, the national research organization Mitacs is the dominant provider in this segment, comprising exactly half (50.0%) of companies that use non-profit funding, or 2.9% of all companies. Mitacs' support of academic research and business innovation helps to not only develop future generations of talent in Alberta, but to retain this talent in Alberta as well.

Multinational Enterprises: Impact on Alberta's Life Sciences Sector

MNEs, defined as companies with offices or subsidiaries in more than one country, continue to contribute significantly to Alberta's life sciences ecosystem. MNEs in Alberta provide benefits that include revenue and employment for Albertans, development of novel therapeutics in the pharmaceutical landscape, partnerships with public-and private-sector stakeholders, and supply chains into and out of the province. Continuing to engage and partner with MNEs remains critical to driving a thriving life sciences sector.⁴⁸

MNE responses, specifically those specializing in pharmaceuticals and life sciences, were not included in the original analysis and core data set because their responses risk skewing the data. However, because these companies have a definite presence and impact on the life sciences ecosystem in Alberta, their responses were analyzed separately.

The list below provides a snapshot of MNEs that were considered in the SOI 2023 survey as major contributors to the ecosystem with a presence (i.e., office, representatives) in Alberta. Pharmaceutical MNEs listed below either received the survey through distribution and/or responded:

3M Canada	Boehringer Ingelheim (Canada)	Jazz Pharmaceuticals
AbbVie Corporation	Eli Lilly and Company	Medtronic
Alexion Pharmaceuticals Inc.	Gilead Alberta ULC	Novartis Canada
Astellas Pharma Canada Inc.	GlaxoSmithKline ("GSK")	Pfizer Canada
AstraZeneca Canada Inc.	Hoffmann-La Roche Limited	Sanofi Canada
Bausch Health	Incyte Biosciences Canada	
Biogen Inc.	Janssen Inc.	

Many companies are contributing to the product landscape in Alberta by propelling drug candidates through clinical trials, including Merck, Eli Lilly, Pfizer, Hoffman-La Roche, and Sanofi, among others, each supporting ground-breaking research. With their process-manufacturing facility in Edmonton, Gilead Alberta ULC remains a primary "anchor tenant" in the Alberta pharmaceutical industry. Gilead's contributions to the province's economy can be noted in part through their \$100 million investment in expanding their facility to increase capacity and created 170 new jobs for highly-trained scientists.⁴⁹ Three organizations that have contributed significantly to the landscape — Novartis, the University Health Foundation, and Alberta Health Services — have partnered with the Government of Alberta to co-develop a secondary preventative, treatment, and care program for atherosclerotic cardiovascular disease in a joint public-private effort to apply community-based population health approaches to Alberta.⁵⁰ MNEs have also partnered with research institutes across the province, including the Alberta Diabetes Institute and the Li Ka Shing Institute of Virology.

⁴⁸ Edmonton Global. 2023. Driving a Thriving Life Sciences Sector. Edmonton Global.

⁴⁹ Canadian Manufacturing. 2015. Pharmaceutical firm to invest \$100M in Edmonton manufacturing site. May 28. Accessed April 26, 2023. <https://www.canadianmanufacturing.com/supply-chain/pharmaceutical-firm-to-invest-100m-in-edmonton-manufacturing-site-148953/>.

⁵⁰ National Post. 2022. A population health approach levels the playing field for patients with cardiovascular disease. December 14. Accessed April 26, 2023. <https://nationalpost.com/sponsored/health-sponsored/a-population-health-approach-levels-the-playing-field-for-patients-with-cardiovascular-disease>.

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MNEs work with Alberta Health Services, Alberta universities, and clinical research organizations to conduct clinical trial work at many sites in Alberta — clear recognition of the clinical and medical expertise that is resident in Alberta. MNEs are also active in supporting education and the development of the labour force in the life sciences industry.

Based on eligible partial and complete responses received from MNEs in the province, most have smaller offices in Alberta and/or have a virtual team. Most MNE Canadian headquarters and offices are located in Ontario and Quebec, with the exception of Gilead Alberta ULC, which has a physical presence in Edmonton.

No surveyed MNE reported actively seeking funding in Canada; however, a number of these companies noted that they plan to pursue federal funding in the future as a source of capital to support innovation, R&D, and growth. Regarding impacts of the COVID-19 pandemic, the one MNE with a complete response noted an increase in the development and monetization of new products and services. This MNE also ranked access to highly qualified personnel and a better environment for conducting clinical trials in Alberta as the issues most important to them.



Partnerships Across the Sector

Both MNEs and advancing enterprises have participated in a number of deals with significant transaction values in recent years and since the 2021 SOI reporting. This includes the agreement between Elli Lilly and Entos mentioned above, as well as a partnership between DynaLIFE Medical Laboratories and BiohubX to open Biospace 1, a new hub that is housing life sciences companies focused on biomedical innovation, health, and wellness.⁵¹ MNEs continued investment in changing the trajectory of the sector in Alberta is further noted with GSK's renewed partnership with the University of Alberta's Li Ka Shing Institute of Virology, valued at \$1.5 million.⁵²

Several public- and private-sector partnerships have been established, illustrating an investment in the life sciences sector and the long-term sustainability of research and innovation. Key stakeholder groups that continue to develop partnerships across Alberta and beyond its borders include the Government of Alberta, the Government of Canada, Amii, the Alberta Cancer Foundation, and the University Hospital Foundation, all of which continue to invest in the ecosystem by funding or supporting scale-ups to grow. Of these, many have extensive partnerships with the province's industry; for example, Amii has 74 formal partnerships on its own.⁵³ Lumii, which specializes in real-world data collection services that drive health outcomes, received \$1.3 million in funding from Prairies Economic Development Canada to support development of its digital products and commercialization.⁵⁴

In addition, large investment continues for the commercialization of drug development. The Government of Canada announced \$80.5 million in funding for the CCDI, a joint initiative between the not-for-profit Applied Pharmaceutical Innovation and the Li Ka Shing Applied Virology Institute to drive continued research, commercialization, and manufacturing for pharmaceuticals in the province.⁵⁵ The Alberta Cancer Foundation has also partnered with the University of Calgary and Alberta Health Services to raise \$250 million in support of improved cancer research, treatment, and care at what will be one of North America's largest comprehensive cancer care, research, and education centres when it opens in Calgary in 2024.⁵⁶

In developing tools to build a resilient province, the University of Alberta has also announced their leadership of a new Prairies research hub for pandemic preparedness, funded by the Canada Biomedical Research Fund, an investment valued at \$250 million.⁵⁷

⁵¹ CBC. 2021. Calgary life science hub gives companies space to succeed. May 28. Accessed April 18, 2023.

<https://www.cbc.ca/news/canada/calgary/biohubx-calgary-life-science-innovation-hub-startup-biomedical-pharmaceutical-1.6043309>.

⁵² Edmonton Global. (2023, February 10). Li Ka Shing Institute receives \$1.5M boost to advance virology research. Retrieved from <https://edmontonglobal.ca/news/li-ka-shing-institute-receives-1-5m-boost-to-advance-virology-research/#:~:text=This%20week%2C%20global%20biopharma%20company%2C%20GSK%2C%20reaffirmed%20its,improve%20human%20health%20with%20lifesaving%20medicine%20and%20the>.

⁵³ Alberta Machine Intelligence Institute. (n.d.). 2021/2022 Impact Report. Alberta Machine Intelligence Institute.

⁵⁴ Lumii. 2023. Lumii Receives \$1.3 Million in Funding from Prairies Economic Development Canada. January 13. Accessed April 26, 2023.

<https://www.lumii.com/news-research/lumii-receives-1-3-million-in-funding-from-prairies-economic-development-canada/>.

⁵⁵ University of Alberta. 2023. Drug manufacturing facility gets green light thanks to federal dollars. March 17. Accessed May 2, 2023.

<https://www.ualberta.ca/folio/2023/03/drug-manufacturing-facility-gets-green-light-thanks-to-federal-dollars.html>.

⁵⁶ Alberta Cancer Foundation. 2021. UCalgary, Alberta Cancer Foundation and Alberta Health Services announce \$250-million fundraising campaign – OWN.CANCER. October 5. Accessed April 26, 2023. <https://www.albertacancer.ca/partnering-to-own-cancer/#:~:text=The%20%24250-million%20OWN.CANCER%20campaign%20partners%20Alberta%20Health%20Services%2C,the%20Calgary%20Cancer%20Centre%20achieve%20its%20full%20potential>.

⁵⁷ University of Alberta. (2023, March 2). U of A to lead new Prairie research hub for pandemic preparedness. Retrieved from

<https://www.ualberta.ca/folio/2023/03/u-of-a-to-lead-new-prairie-research-hub-for-pandemic-preparedness.html>.

As life sciences companies transition through the emerging and growth life cycle stages, they are seeing more early-stage commercialization support from funders, programs, incubators, accelerators, and the broader ecosystem, including:

- Alberta Innovates through programming such as Accelerating Innovations into CarE, and the Partnership for Research and Innovation in the Health System
- DynaLIFE's Accelerator Lab
- University of Alberta Health Hub & Accelerator
- Applied Pharmaceutical Innovation Incubator program
- Edmonton Unlimited
- Prairies Economic Development Canada
- Edmonton Research Park
- Plug and Play Alberta
- Startup TNT
- Creative Destruction Lab (CDL)
- Brass Dome Ventures/Innovation Masterminds (imYEG)
- BiohubX
- The51
- W21C Research and Innovation Centre
- Centre for Advanced Medical Simulation (CAMS)
- Glenrose Rehabilitation Research, Innovation & Technology (GRRIT)
- Innovate Calgary/Life Sciences Innovation Hub (LSIH)

Partnerships between Alberta and non-Alberta life sciences companies are a marker of a healthy and growing industry ecosystem and continued industry growth and evolution within Alberta. Strengthening Alberta's life sciences and healthcare sector requires leveraging the unique capabilities of MNEs and acknowledging their economic contributions to Alberta's life sciences ecosystem. Alberta's life sciences ecosystem will require improved access to capital, broader recognition of the industry's entrepreneurial culture, and more robust support for the commercialization of early-stage products to continue to thrive.

In addition to the above, there are multiple groups of initiatives that are actively focused on specific targets in the sector, such as the International Microbiome Centre, Alberta Centre for Advanced Diagnostics, Precision Oncology and Experimental Therapeutics Protocol, Alberta Precision Exchange, Alberta Real World Evidence Consortium, Sensory Motor Adaptive Rehabilitation Technology Network, Institute of Health Economics, Genome Alberta, Nanotechnology Research Centre, Calgary Centre for Clinical Research, and the Northern Alberta Clinical Trials and Research Centre, among others. Ongoing growth in this list of initiatives only demonstrates the breadth of coordinated and collaborative research efforts that are underway on many cutting-edge fronts across the province, with global implications.

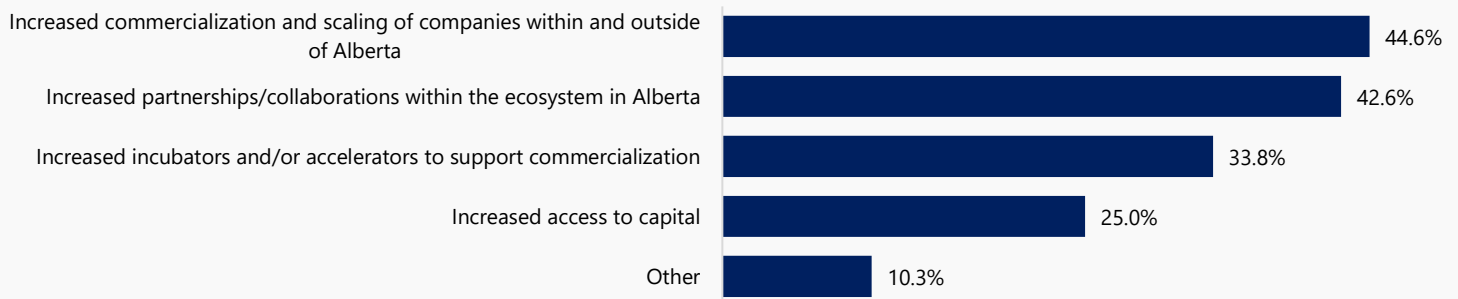
Despite such challenges as market volatility, high inflation, and the impact of COVID-19 on operations, growth in the life sciences sector in Alberta remains promising, and there is optimism in the ecosystem's evolution. Unique partnerships are being formed between private and public institutions, foundations, and a variety of other organizations, which is a testament that the ecosystem is working together to continue to grow the life sciences sector.

Industry Opportunities

The industry has seen growth in many subsectors in previous years, including new technologies emerging as the world adapted to pressures from COVID-19. This includes novel therapeutics and digital health tools/platforms, as well as rapid progression in machine learning and AI, including access to data. Psychedelics have also shown promise in treating mental health conditions, contributing to the province’s new policy in regulating psychedelics as a clinical therapeutic. Growth in Alberta’s life sciences sector is only expected to continue, bolstered by the discovery of innovative products and by partnerships between non-profits, institutions, public and private entities, hospital foundations, and others, all across the industry.

What are some of the key opportunities you see in the industry?

Industry Opportunities



Note: The chart above adds up to greater than 100.0%, as some organizations indicated multiple opportunities of interest.

Over the last two years, companies across Alberta continued to show growth and promise in their ability to develop innovative products to support the life sciences and healthcare industry. When requested to select opportunity(ies) within the industry, many respondents prioritized increased commercialization and scaling of companies within and outside Alberta (44.6%). This aligns with companies reporting revenue in regions outside the province and their targets in market regions outside the province, including the USA and the rest of Canada, as reported in the *Revenue* section. Together, these findings emphasize the global reach and ambition to drive global connections to the Alberta life sciences industry in order to grow.

Following increased commercialization and scaling, companies identified the opportunity to prioritize increased partnerships and other collaborations within the Alberta ecosystem (42.6%). The last two years have seen a number of significant transactions and partnerships between growing, emerging, and mature Alberta enterprises (including MNEs), demonstrating that companies are dedicated to further advancing and investing in this key opportunity in the coming years. A summary of such partnerships and transactions involving life sciences companies in Alberta over the last two years can be found in the *Partnerships Across the Sector* section and Table 4 of Appendix A, respectively.

Companies also indicated a preference for increased incubators and/or accelerators to support commercialization (33.8%) as well as increased access to capital to support growth of the industry (25.0%). Other (10.3%) key opportunities listed include:

- Foreign investment (venture capital)
- More funding for new and small businesses
- Building interest in domestic biomanufacturing support and market development support
- Leveraging remote employment and meetings

A few companies also noted that their business has remained strong throughout the COVID-19 pandemic, that they have continued to grow, and that the pandemic is no longer an issue for business. This indicates that the economy has reached a partial recovery stage for some Alberta companies in the industry.

In written comments, respondents proposed three ways to improve government funding:

- Shortening the review and approval times for federal and provincial grant funding programs;
- Extending the timeline for project execution for provincially and federally funded projects (particularly given the current supply chain challenges); and
- Increasing risk tolerance of provincial and federal grant funding programs to provide more funding assistance to start-ups that are ready to commercialize new and innovative technologies.

One respondent also proposed a micro-finance solution for businesses with revenues under \$25,000, and another suggested shifting government policy instruments from funding programs to tax incentives.

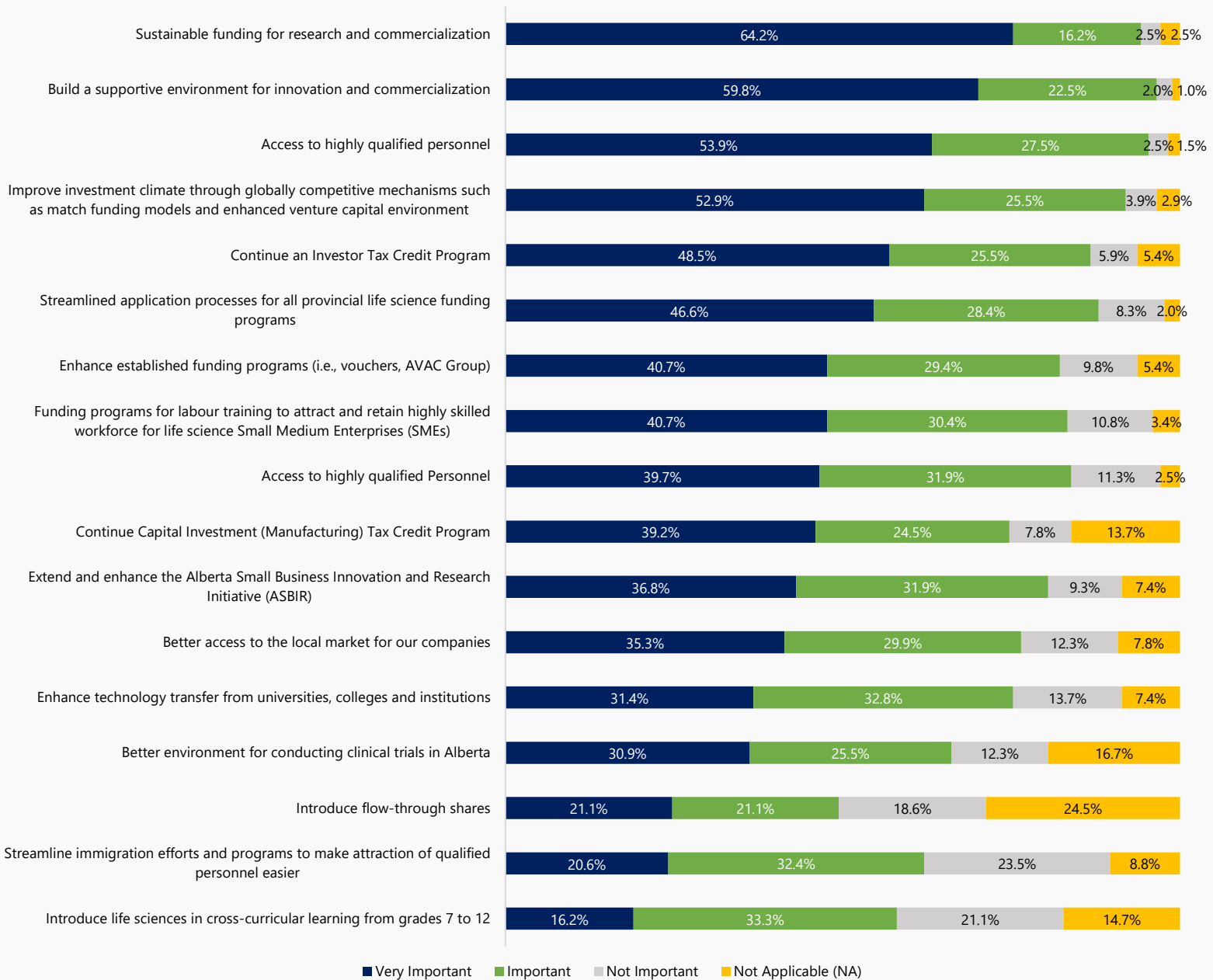
Regarding training, written comments emphasized that respondents seek to learn more about global markets to expand their reach. Exporting is a priority for several respondents. Respondents also highlighted improvements they would like to see made to the Alberta Export Expansion Program. These include streamlining the application process by retaining company details for future applications, and providing funds in advance (rather than reimbursements), similar to the CanExport Program, to help companies that are taking steps to export.

Issues Facing the Industry

With the pandemic's impact in decline, Alberta's life sciences companies are tackling a wide range of issues. Survey respondents were asked about the importance of 17 issues facing the life sciences industry.

Please rate the following issues as 'Very important', 'Important', 'Not Important' or 'Not Applicable' to your company.

Industry Needs

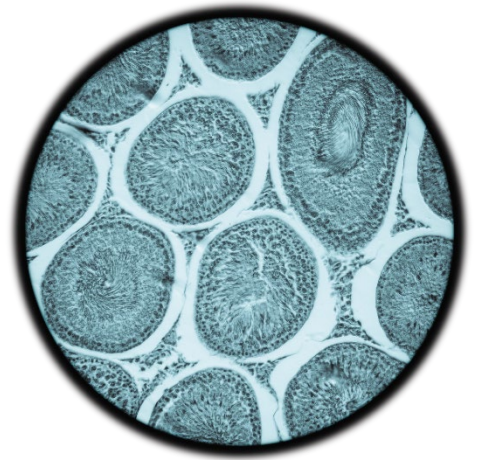


Note: Companies could select more than one option, therefore responses do not add up to 100.0%. All of the above are in addition to a total of 14.7% of respondents that did not provide a response to this question.

The survey findings indicate that the most significant concerns of respondent companies fall into three broad themes: access to funding, fostering innovation, and access to talent.

Access to Funding

The most significant issue for companies is sustainable funding for research and commercialization, which nearly two-thirds (64.2%) of companies identified as very important. Just over half (52.9%) of respondents stated it is very important to level the playing field between Alberta and other jurisdictions competing for investment capital, including through such measures as match-funding models and creating an enhanced venture capital environment. Nearly half of companies (48.5%) said it is very important to bring back an Investor Tax Credit program, which was phased out in Alberta after 2019, along with the Alberta Scientific Research and Experimental Development tax credit program, and replaced with the Innovation Employment Grant.



In written comments, some respondents noted difficulties experienced by early-stage companies in accessing capital from financial institutions. Several respondents noted that early-stage access to capital in Alberta is improving but remains at a level below other jurisdictions, which can create an incentive to leave Alberta.

Fostering Innovation

A total of 59.8% of respondents said it is very important to build a supportive environment for innovation and commercialization. In written comments, several companies highlighted challenges conducting clinical testing. One respondent underscored a need to support small-business innovation by improving communication and information sharing within the life sciences ecosystem and enhancing the interoperability of technical infrastructure.

Access to Talent

More than half (53.9%) of respondents cited access to highly qualified personnel as very important. Some respondents provided additional comments on this theme, noting that the young talent emerging from Alberta's education system is of high calibre, but retention of these people in Alberta is a challenge.

Additional Comments

The comments provided by respondents contain a number of interesting perspectives. Some respondents remarked on a need for more support to help smaller businesses access large customers in Alberta, including public healthcare institutions, health insurers, and universities.

Comments also reflected considerable pride in the industry, citing Alberta's potential to develop a life sciences ecosystem that is the envy of Canada and with a significant global reputation. Areas cited include the need to continue to invest in cutting-edge education and world-class research to feed translation, commercialization, and commercial innovation, a requirement to improve advocacy of hubs in specific subsectors, and the need to offer better support to access local markets and customers, as well as improved export assistance.

Industry Participation

BioAlberta and Deloitte would like to thank all the survey participants who agreed to be acknowledged in this report.

48Hour Discovery Inc.	Lumiio Inc.
8 Bit Cortex	Lupin Platform
ABD Naturals	MACH32 Inc.
Accumol Inc.	MagnetTx Oncology Solutions
Advanced Biofuels Canada	Medlior Health Outcomes Research Ltd.
AgGene Inc.	Meros Polymers Inc.
Agriview Inc.	Mikata Health
Alberta Research Chemicals Inc.	Mindelio Inc.
Alethea Medical	MindLab Interactive AI Inc.
AltaGreen Products Inc.	Mitogen Diagnostic Corporation
AltaML	mmHg (Millimeters Mercury) Inc.
AltoSante	More Than Protein Ingredients Ltd.
Amino Labs North	Muscle Check Sport and Arthritis Inc.
Amira Medical Technologies	My Normative
Andau Medical	My Viva Inc.
Andromeda Medical Imaging Inc.	Mycos
Applied Pharmaceutical Innovation	Nanalysis Scientific Corp.
Applied Quantum Materials Inc.	Nanostics Inc.
Aspire Cerebro Advertising Ltd.	NanoTess Inc.
Assistability	Neuraura
AUC Solutions Canada	Neurocage Systems
Aurora Vaccines Inc.	New Harvest Inc.
Bertech Pharma	Nimble Science Ltd.
BioComposites Group Inc.	Northern RNA Inc.
Biofuels Inc.	Northernmost Medical Devices, Inc.

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BioImmuno Designs	NuLeaf Farms
BioLargo Water Inc.	OKAKI
BioMimir Inc.	OncoHelix Inc.
BioRefinex Canada Inc.	OrbSurgical Ltd.
Biosenta Inc.	Orpyx Medical Technologies
Bio-Stream Diagnostics Inc.	Pacylex Pharmaceuticals
Blue Sky Analytical Labs	PanTHERA CryoSolutions
Botaneco	Paramoria Agri-Science Inc.
Brightsquid Secure Communications Corp.	Parvus Therapeutics Inc.
Canadian Center for Hydrodynamics	Path Therapeutics
Canadian Rockies Hemp Corp.	Pathway Rx
CanBiocin Inc.	PBG BioPharma Inc.
Canna Stream Solutions Ltd.	PBR Laboratories Inc.
Canvita Canada Ltd.	Pea Pro Nutrition Ltd.
CBS Bio Platforms Inc.	PeakTerra Ventirrs Inc.
ChemRoutes Corporation	Pharmapsil Corp.
Chenomx Inc.	Providence Therapeutics Holdings Inc.
Chinook Health Solutions Ltd.	PulseMedica Corp.
Circle Cardiovascular Imaging	Puravita Pharma
Classic Health Supplies Ltd.	Pure Life Carbon Inc.
Click&Push Accessibility Inc.	PurposeMed
Climacteric Control Solutions Inc.	Qualisure Diagnostics
Clubfoot Navigator Ltd.	RAD Medical Technologies Inc.
Coagtech Ltd.	Raft Digital Therapeutics
CSI Dry Eye	RetinaLogik Inc.
Dalynn Biologicals Inc.	RJH Biosciences Inc.
Deep Surface AI	Sarcomere Dynamics Inc.
DrugBank	Savvy Knowledge
dsBioscience Inc.	SciencePak

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DynaLIFE Medical Labs	SCS Healthcare Technology
Ecnius Biomedical	Seppure Technologies Ltd.
Entos Pharmaceuticals Inc.	Sequence2Script Inc.
Enveric Biosciences Canada Inc.	Serenity DTX Inc.
Faba Canada Ltd.	Sinoveda Canada Inc.
Fedora Pharmaceuticals Inc.	Sollora Peptides Inc.
Ferma Farms	stroke.ai
FREDSense Technologies Corp.	Surface Medical Inc.
FUEL Innovation Design & Manufacturing Inc.	SustainAgro
Future Fields	SV ChemBioTech Inc.
Gaia Protein Ltd.	Syantra Inc.
GrainFrac Inc.	Symbiotic EnviroTek Inc.
GrowTEC	SynBioBlox Innovations Ltd.
Health Gauge Inc.	Tactile Orthopaedics
Heka Therapeutics	Technology North Corporation
Hemp Fibre Production Corporation	Tenby Medical
Hermay Labs Corporation	Token Naturals Ltd.
IGY Inc.	Tricca Technologies Inc.
IMBiotechnologies Ltd.	True Angle
Institute of Child Psychology	University of Alberta Agri-Food Discovery Place
Institute of Health Economics	University of Lethbridge
Kaleidoscope XR Inc.	VaxAlta Inc.
Karma Medical Products Ltd.	Wave View Imaging Inc.
KASTx Ventures Inc.	Wayfound
Kent Imaging Inc.	Wyvern Pharmaceuticals Inc.
Leevs Group	XORTX Therapeutics Inc.
Li Ka Shing Institute of Virology	Zamplo
Liminality Innovations	Zanis Tech Inc.
Lowen's	

Companies with publicly available information

Asia Green Biotechnology Corp.	Innovotech Inc.
Aurinia Pharmaceuticals Inc.	Inovio Pharmaceuticals, Inc.
Aurora Cannabis Inc.	Maple Leaf Green World Inc.
Bionovate Technologies Corp	Marvel Biosciences Corp.
CanadaBis Capital Inc.	Medical Services International Inc.
CannaPharmaRX, Inc.	nDatalyze Corp.
Ceapro Inc.	Oncolytics Biotech Inc.
Cielo Waste Solutions Corp.	Quest PharmaTech Inc.
Decibel Cannabis Company Inc.	Radient Technologies Inc.
Discover Wellness Solutions Inc.	Resverlogix Corp.
EXMceuticals Inc.	SNDL Inc.
Forza Innovations Inc.	SugarBud Craft Growers Corp.
Hemostemix Inc.	VentriPoint Diagnostics Ltd.
High Tide Inc.	Vibe Growth Corporation
Imaging Dynamics Company Ltd.	Willow Biosciences Inc.
InnoCan Pharma Corporation	Zenith Capital Corp.



Appendix

APPENDIX A: TRANSACTION SUMMARY

Major Transactions at or Over \$1 Million (CAD) in Value

As indicated in Table 4 below, which lists transactions valued at \$1.0 million or greater, there was more than \$2,120 million in both public and private capital raised between 2021 and 2023. This was led, in part, by Sundial (“SNDL”) Inc.’s public offering (total value of \$511.3 million) and its Private Investment in Public Equity (“PIPE”) (total value of \$222.5 million).

At the subsector level, Table 5 notes that the cannabis (21.6%) and health biotechnology and pharmaceuticals (22.7%) subsectors listed the most transactions and capital raises. However, the cannabis subsector accounted for 77.5% (\$1,643.2 million) of total transaction value in the table, and health biotechnology and pharmaceuticals contributed 5.7% (\$120.3 million). The medical technology, diagnostics & devices subsector accounted for the third-highest (15.5%) number of listed transactions and capital raises, contributing 4.5% (\$95.7 million) to the total transaction value across available data between 2021-2023.

As a new subsector evaluated in the SOI 2023 survey, the psychedelics industry saw steady growth and expansion between 2021 and 2023. The industry accounted for some (5.2%) listed transactions and capital raises, totaling 1.2% (\$26.2 million) in total transaction value.

Data in the below table was sourced from Capital IQ and Pitchbook only. Transactions without available data in Capital IQ and/or Pitchbook regarding transaction values are also included at the end of Table 4 for reference. Given its focus on understanding capital raises in the industry, this table excludes information in buyout, capitalization, corporate, corporate assets, out of business, merger/acquisition, merger of equals, and reverse mergers over the timeframe. A highlight of key transactions of these types can be found in the following sections of this report: Advancing Enterprises; Multinational Enterprises: Impact in Alberta’s Life Sciences Sector; and Partnerships Across the Sector.

Table 4. Major 2021-2023 Transactions by Transaction Value ^{58,59}

Total Capital Raised: \$2,120.8 million

Date	Target Company	Deal Type	Transaction Value (CAD in Millions)
Deals with publicly listed transaction values (by value)			
20-Jan-21	SNDL Inc.	Public Offering	511.3
04-Feb-21	Sundial Growers	PIPE	222.5
26-May-22	Aurora Cannabis Inc.	Public Offering	189.9
26-Jan-21	Aurora Cannabis Inc.	Public Investment 2nd Offering	159.8
21-Jan-21	Aurora Cannabis Inc.	Public Offering	159.4
29-Jan-21	SNDL Inc.	Public Offering	128.2

⁵⁸ Capital IQ. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

⁵⁹ Pitchbook. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

01-Dec-22	Ethicann Pharmaceuticals	Early Stage VC	60.4
11-Jan-21	SNDL Inc.	Public Offering	58.8
18-Jan-21	Alcanna Cannabis Stores Finance Ltd.	Private Placement	40.0
24-Mar-21	Nova Cannabis	PIPE	40.0
11-Feb-21	Willow Biosciences Inc.	Public Offering	25.0
18-May-21	High Tide Inc.	Public Offering	20.2
01-Feb-21	High Tide Inc.	Public Offering	20.0
18-Aug-21	Vytelle	Later Stage VC	19.2
13-Jan-21	Kent Imaging Inc.	Private Placement	19.1
02-Feb-21	Canadian Rockies Hemp Corp.	Private Placement	18.0
24-Mar-21	Psygen Industries Ltd.	Private Placement	15.5
13-Oct-21	XORTX Therapeutics	Public Investment 2nd Offering	15.2
22-Feb-23	Future Fields	Seed Round	14.7
27-Dec-21	Pure Life Carbon	Later Stage VC	13.4
10-Jan-23	NanoPrecise Sci Corp.	Private Placement	13.4
26-Aug-21	Decibel Cannabis Company Inc.	Public Offering	13.1
05-Jan-22	MacroMind Media Inc.	Private Placement	12.7
05-Jan-22	Headversity	Later Stage VC	12.7
25-Feb-21	Future Fields	Private Placement	12.3
20-Jan-22	Nanalysis Scientific Corp.	Public Offering	10.7
05-Oct-21	Circle Cardiovascular Imaging Inc.	Private Placement	10.6
18-Jul-22	High Tide Inc.	Public Offering	10.0
17-Feb-21	Inner Spirit Holdings Ltd.	Public Offering	10.0
08-Apr-21	CVW CleanTech	PIPE	10.0
08-Apr-21	Dynaleo Inc.	Private Placement	9.7
25-Jun-21	Fire & Flower	PIPE	9.7
18-Aug-21	Path Therapeutics	Seed Round	9.4
11-Apr-22	DrugBank Online	Seed Round	8.9
02-Jun-21	CanadaBis Capital	PIPE	8.9

28-May-21	Pacylex Pharmaceuticals, Inc.	Private Placement	8.7
20-Jan-22	Syantra Inc.	Private Placement	8.5
08-Oct-21	InnoCan Pharma Corporation	Private Placement	8.2
15-Mar-22	DrugBank Online	Later Stage VC	8.0
29-Jul-21	Nanalysis Scientific Corp.	Public Offering	8.0
07-Mar-22	Strata Health Solutions Inc.	Private Placement	7.7
01-Sep-21	Zephyr Sleep Technologies	Later Stage VC	7.6
08-Dec-21	Pure Life Carbon	Early Stage VC	7.5
27-Jan-21	Delta Cleantech	PIPE	7.2
17-Mar-22	Genoptic	Grant	6.4
02-Dec-21	Northern RNA Inc.	Grant	6.3
08-Feb-21	XORTX Therapeutics	PIPE	6.1
11-Aug-21	Fluid Biotech Inc.	Private Placement	5.9
22-Jun-22	High Tide Inc.	Private Placement	5.0
12-Jan-22	CVW CleanTech	PIPE	5.0
20-Jan-23	PurposeMed	Early Stage VC	4.7
30-Jun-21	PurposeMed	Seed Round	4.7
27-Jul-21	Canary Biofuels	Grant	4.7
01-Jan-22	AdvEn Industries	Debt - General	4.6
09-Mar-21	SugarBud Craft Growers Corp.	Public Offering	4.0
27-Aug-21	The Newly Institute	Seed Round	3.9
15-Mar-22	Rehabtronics	Later Stage VC	3.6
14-Jun-21	Syantra Inc.	Seed Round	3.6
14-Jul-21	First Person	Seed Round	3.5
08-Nov-22	Ocumetics	PIPE	3.1
29-Mar-22	SugarBud Craft Growers Corp.	Public Offering	3.0
27-Jan-22	Nanalysis Scientific Corp.	Private Placement	2.9
02-Mar-22	Hemostemix Inc.	Private Placement	2.8
07-Dec-21	Providence Therapeutics	Grant	2.7

14-Jun-21	Marvel Biotechnology	PIPE	2.6
30-Mar-22	PulseMedica	Seed Round	2.6
01-Jan-22	Qualisure Diagnostics	Later Stage VC	2.6
01-Sep-22	Clinify	Seed Round	2.0
04-Mar-21	First Person	Seed Round	2.0
16-Aug-21	CVW CleanTech	PIPE	2.0
05-Oct-22	XORTX Therapeutics	Public Investment 2nd Offering	1.9
18-Jan-23	Lumiio Inc.	Later Stage VC	1.9
16-Mar-21	nDatalyze Corp.	PIPE	1.8
17-Feb-21	nDatalyze Corp.	Private Placement	1.8
29-Jul-21	Nanalysis Scientific Corp.	Private Placement	1.8
16-Apr-21	True Angle	Seed Round	1.6
20-Jan-23	Voyageur Pharmaceuticals Ltd.	PIPE	1.6
19-Aug-22	Hemostemix Inc.	PIPE	1.6
13-Apr-21	Voyageur Pharmaceuticals Ltd.	Private Placement	1.5
28-May-21	Voyageur Pharmaceuticals Ltd.	PIPE	1.5
28-Feb-21	Pacylex Pharmaceuticals	Grant	1.5
11-Oct-22	CVW CleanTech	PIPE	1.4
08-Sep-22	Hempalta Inc.	Private Placement	1.4
09-Mar-22	SensorUp	Grant	1.3
17-Feb-22	First Person	Seed Round	1.3
15-Dec-21	Radiant Technologies Inc.	Private Placement	1.3
04-Oct-21	Hemostemix Inc.	PIPE	1.3
04-Aug-21	SensorUp	Grant	1.3
30-Apr-22	Cherry Health Inc.	Private Placement	1.2
08-Dec-22	Voyageur Pharmaceuticals Ltd.	Private Placement	1.2
02-Feb-22	Hemostemix Inc.	Private Placement	1.2
26-May-22	Voyageur Pharmaceuticals Ltd.	Private Placement	1.2
16-Jun-22	Voyageur Pharmaceuticals Ltd.	PIPE	1.2

18-May-21	Health Logic Interactive	PIPE	1.1
20-Jun-22	Areto Labs	Seed Round	1.0
01-Jul-21	OraQ	Seed Round	1.0
Deals without publicly listed transaction values (by transaction date)			
28-Feb-23	Plexus Technology	Secondary Transaction - Private	-
01-Jan-23	Nimble Science	Later Stage VC	-
23-Nov-22	eimhe	Accelerator/Incubator	-
01-Nov-22	Vadu	Secondary Transaction - Private	-
01-Aug-22	Canary Biofuels	PE Growth/Expansion	-
26-Jul-22	OraQ	Accelerator/Incubator	-
06-Jun-22	Sawback Technologies	Accelerator/Incubator	-
01-Jun-22	Sawback Technologies	Accelerator/Incubator	-
30-Apr-22	Circle Cardiovascular Imaging Inc.	Secondary Transaction - Private	-
14-Apr-22	FYi Eye Care E-Commerce	Debt - General	-
01-Apr-22	OraQ	Seed Round	-
01-Apr-22	Orennia, Inc.	Private Placement	-
01-Apr-22	Craft Cannabis Copacking Services	Joint Venture	-
01-Apr-22	Future Fields	Early Stage VC	-
01-Apr-22	Raft Digital Therapeutics	Early Stage VC	-
16-Mar-22	Circle Cardiovascular Imaging Inc.	Private Placement	-
11-Feb-22	Joint Venture (Freedom Cannabis / Cannabis Tolling Solutions)	Joint Venture	-
24-Jan-22	Areto Labs Inc.	Private Placement	-
06-Jan-22	Entos Pharmaceuticals Inc.	Private Placement	-
01-Jan-22	Retinalogik	Early Stage VC	-
07-Dec-21	SensorUp	Later Stage VC	-
15-Nov-21	Qube Technologies	Early Stage VC	-
19-Aug-21	Delta Cleantech	IPO	-
01-Aug-21	Medo.AI	Early Stage VC	-

12-Jul-21	Aveiro Sleep	PE Growth/Expansion	-
11-Jul-21	OneBudd	Accelerator/Incubator	-
30-Jun-21	FYi Eye Care E-Commerce	Debt - General	-
17-Jun-21	LyfeMD	Accelerator/Incubator	-
01-Jun-21	NanoTess Inc.	Accelerator/Incubator	-
20-May-21	Sawback Technologies	Accelerator/Incubator	-
18-May-21	Orennia, Inc.	Private Placement	-
01-Apr-21	Impirica	Secondary Transaction - Private	-
01-Apr-21	AphioTx	Early Stage VC	-
01-Apr-21	Syantra Inc.	Accelerator/Incubator	-
01-Mar-21	Deep Surface AI	Seed Round	-
01-Mar-21	Tactile Orthopaedics	Seed Round	-
01-Mar-21	SciMed Technologies	Secondary Transaction - Private	-
01-Mar-21	Cohesic	Later Stage VC	-
01-Mar-21	Illucidx	Early Stage VC	-
26-Feb-21	NanoTess Inc.	Seed Round	-
01-Jan-21	OligomicsTx	Early Stage VC	-

Note: PIPE indicates Private Investment in Public Equity, VC indicates Venture Capital

**Per information made available through Capital IQ and Pitchbook on respective transactions*

Table 5. Transactions by SOI 2023 Subsector, By value* ^{60,61}

SOI 2023 Subsector	Transactions	Total Transaction Value (CAD in Millions)
Cannabis	21	1,643.2
Health Biotechnology and Pharma	22	120.3
Medical technology, Diagnostics, and Devices	15	95.7
Digital Health	17	82.6
Agricultural Biotechnology	5	67.2
Industrial Biotechnology	7	36.6
Psychedelics	5	26.2
Natural Health Products	1	25.0
Hemp	3	19.4
Environmental Biotechnology	1	4.7

* There were no companies in the PFI subsector with publicly listed transactions per Capital IQ and Pitchbook data.

⁶⁰ Capital IQ. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

⁶¹ Pitchbook. 2023. Alberta Healthcare & Life Sciences Transactions Data. Accessed March 9, 2023.

Need More Information?

BioAlberta

BioAlberta is a member-driven and funded not for profit industry association that represents and promotes the province's vibrant and diverse life sciences industry. Through its many partnerships and collaborations, they are dedicated to promoting Alberta's life science sectors, locally, nationally, and internationally. BioAlberta enables success for its members by providing a wide range of networking and educational events, and by effectively delivering policy options to governments. BioAlberta activities are focused in key strategic areas: advocacy; promotion, marketing, and networking; industry development.

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Deloitte's Life Sciences & Healthcare Practice

Deloitte professionals have experience working with life sciences companies across the country and globally to assess their strategic options; assist in forming, establishing and maintaining partnerships and alliances; develop commercialization strategic; enhance revenues; improve operating efficiencies; optimize asset utilization; strengthen management teams; provide due diligence and valuation support as part of a transaction; implement tax efficient structures; streamline the complexities related to industry auditing and accounting; mitigate enterprise risk; and provide negotiation and advisory assistance.

For more information about how Deloitte can help your organization, contact the life sciences leadership team:

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Canadian Trade Commissioner Service

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