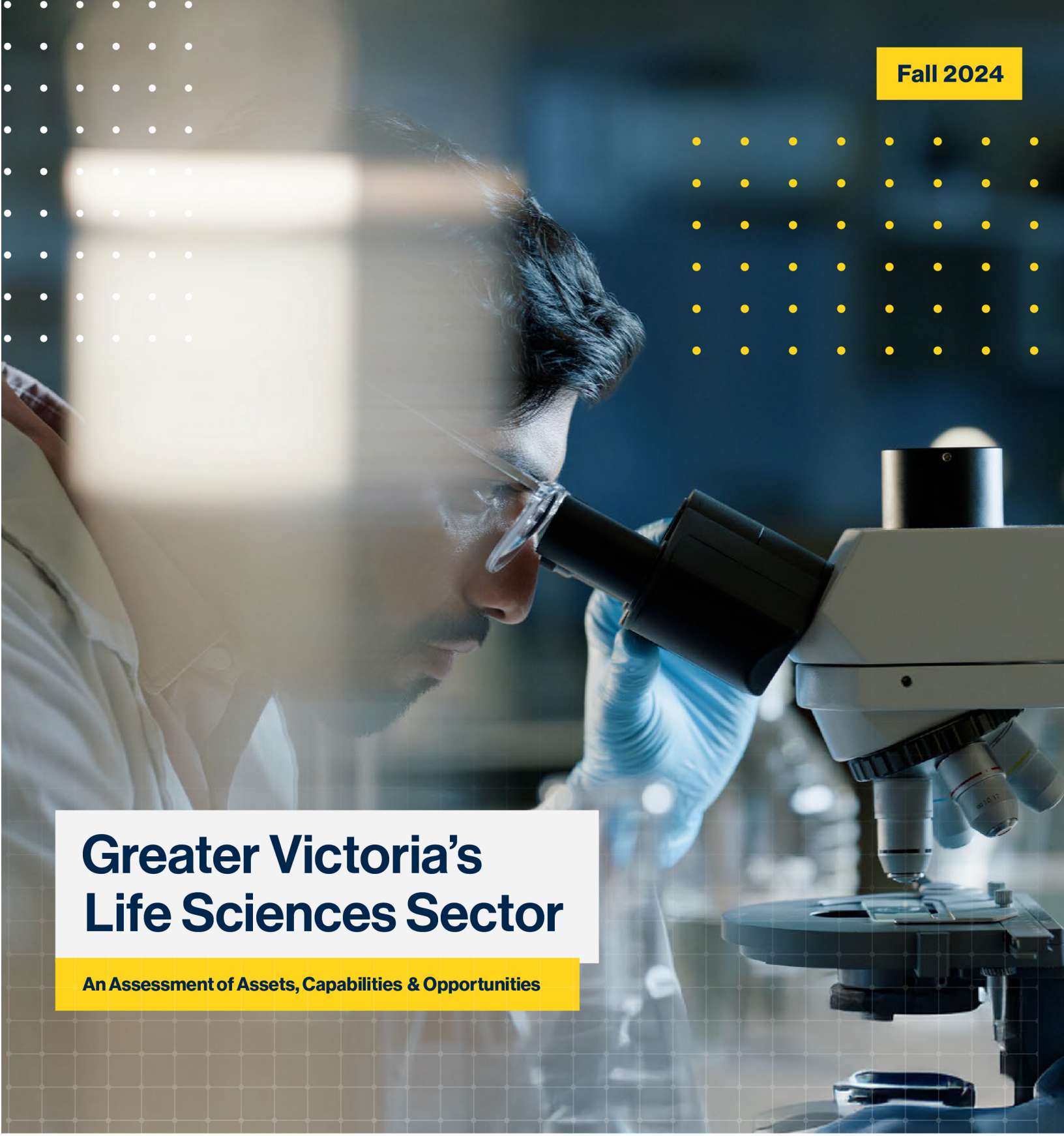

Fall 2024

# Greater Victoria's Life Sciences Sector

## An Assessment of Assets, Capabilities & Opportunities


This report is produced by

SOUTH ISLAND PROSPERITY PARTNERSHIP

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Saanich

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# 1. INTRODUCTION

In 2023, the South Island Prosperity Partnership (SIPP), in partnership with the District of Saanich's Economic Development Department, initiated a process of assessing the Greater Victoria region's life sciences sector. We aimed to:

- learn more about the sector, including its size, breadth and depth
- identify barriers to success being felt by life sciences companies and other ecosystem organizations and decision-makers
- discover trends and opportunities the sector offers to create good-paying jobs across the region in emerging areas such as biotechnology (BioTech), healthcare and digital health, and medical technologies (MedTech).

Greater Victoria offers many assets and unique amenities that make the region a competitive environment in which to start and grow life sciences ventures. Pursuing this as a regional approach is a sound component of economic development strategy. It is within SIPP's guiding principles and defining ethos to pursue these opportunities collaboratively; therefore, a partnership between Saanich and SIPP worked perfectly for this purpose.

The District of Saanich *Economic Development Strategy*, published in 2024, describes the life sciences sector as a key area of opportunity for the District and the Greater Victoria region. As the largest municipality in the region, Saanich is already host to many of the companies and organizations that are leaders in the life sciences sector, including StarFish Medical (Canada's largest MedTech company), the University of Victoria and UVic's Vancouver Island Technology Park (where many life sciences companies are located). Through its *Economic Development Strategy*, the District is positioning itself to attract and grow this sector as a strategic area of opportunity.

In late 2023, after a competitive process, we commissioned Qatalyst Research Group to complete the scope of work of this research. We then supplemented Qatalyst's work with targeted interviews by SIPP and District of Saanich staff. The resulting work can be found on the following pages.

### Research Findings Summary

In summary, the findings of this research are:

- The life sciences sector is growing. It presents opportunities that respond to our region's need for jobs and household incomes, which will keep and attract the next generation here. Subsectors within life sciences, such as digital health/health informatics and MedTech, are large economic opportunities projected to grow rapidly in the coming years.
- The Governments of Canada and British Columbia have each identified the life sciences and digital health sectors as high priorities for development, which presents opportunities for strong alignment and project funding.
- The life sciences sector is relatively small compared to other sectors in the region (such as construction, healthcare, public administration, technology and ocean and marine space).

Even so, a growing life sciences sector offers unique, high-skilled, well-paid career opportunities in a region that must continue diversifying.

- Greater Victoria's strengths in life sciences include:
    - diversity of the sector
    - research excellence (primarily at UVic)
    - quality educational programs producing talented graduates
    - enthusiastic business support networks (such as the Vancouver Island Life Sciences Association (VILS) located in Victoria
    - government support for R&D
    - location advantages, such as lower input costs, relative to other hotbeds of life sciences like Boston or San Diego.

- Greater Victoria also has weaknesses that need to be addressed. These include:
    - problems with access to capital for existing and emerging companies
    - undefined competitive positioning (the diversity of the sector makes it difficult to carve out where our unique niche advantages exist)
    - high operational costs for startups (and a lack of subsidized spaces such as wet labs and testing facilities for early-stage work)
    - lack of facilities for expansion of life sciences ventures (these are hard to come by or non-existent)
    - lack of experienced managerial-level talent in the life sciences industries.

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## Realizing the Sector's Potential

In general, there will be many opportunities across the life sciences sector. Our region can capitalize on these opportunities in the years to come. However, to fully realize the potential of the life sciences sector, our region needs to make deliberate and collaborative efforts to address weaknesses and pursue opportunities through a coordinated strategy. SIPP looks forward to playing our part in achieving this.

Special thanks to Global Affairs Canada (CanExport Program) for the funding support for this project and to the District of Saanich for its funding contribution and partnership. Thank you as well to all the private, public and third-sector stakeholders we interviewed for this project across Greater Victoria. We appreciate your time and passion for our region and your role in uncovering the many hidden success stories across the life sciences sector. By working together, we can help nurture more of them in the years to come.

## 1.1 ABOUT SOUTH ISLAND PROSPERITY PARTNERSHIP (SIPP)

South Island Prosperity Partnership (SIPP) is an alliance of over 70 public, private and third-sector partners in Greater Victoria, including municipal and First Nations governments, post-secondary institutions, chambers of commerce, industry associations and nonprofits, and over 30 leading employers. SIPP is governed by a non-partisan board of directors appointed by its members, with a team of five dedicated professionals undertaking the day-to-day work. The mission of SIPP is "to build a more innovative, diversified, inclusive and sustainable South Island economy."

## 1.2 PURPOSE OF THE PROJECT

The life sciences sector has been identified as a potential growth area for Greater Victoria, particularly in the District of Saanich. Saanich is the region's largest municipality in both land area and population and is home to many of the region's key R&D assets and institutions, including many associated with the life sciences and health sectors. This assessment was, therefore, initiated as a joint effort between SIPP and the District of Saanich, with the intent of finding value at both the regional and District Levels.

The life sciences sector is commonly defined to include Drugs and Pharmaceuticals, Medical Devices, Equipment & Technologies, and Research, Testing and Medical Laboratories. It can encompass other technology sectors that have applications in healthcare, such as digital health, biotechnology, including genetic engineering.

The purpose of this project is to assess the region's major assets related to research and development facilities and activities (public and private), with an emphasis on the life sciences sectors. This work will:

- position our region's strengths for the purpose of nurturing and growing sectors in the region that create attractive, good-paying jobs for graduates and the next generation workforce
- identify weaknesses and gaps that are paramount to the region being able to nurture a competitive environment for the life sciences sectors
- align to and inform SIPP's future strategic planning efforts
- be linked to SIPP's platform for business and talent attraction ("Victoria Rising"— launched in March 2024)
- align to the District of Saanich's economic development strategy, approved in early 2024
- inform positive relationships with key life sciences stakeholders, such as provincial and federal governments, the Vancouver Island Life Sciences association (VILS), Island Health, post-secondary institutions and others.

## 1.3 METHODOLOGY

To prepare the report, we:

- **held a project launch meeting** to discuss the goals and priorities for the project, including key issues to be addressed, key players in the sector and expectations regarding reporting.

- **developed a project plan** which provided a preliminary overview of the life sciences sector in BC and more specifically in the Greater Victoria area. It also outlined the work that we planned to undertake in the next phase of the project.

- **conducted a literature review** on the characteristics of life sciences sector and the digital health/health informatics sectors in BC, the strengths and constraints to growth of those sectors, and their presence in the Greater Victoria area.

- **conducted interviews** with 20 representatives of life sciences companies and members of the R&D ecosystem. The purpose of the interviews was to obtain information on:

    - characteristics and stage of development of the life sciences sector in the region
    - key developments (e.g., recent wins) and emerging sector trends
    - areas of strength, relative competitive advantages and constraints facing the sector in the region.
    - opportunities and constraints to further develop the sector
    - access to skilled workers including the most acute skilled personnel shortages that hinder effective operations or growth.
    - key elements of the innovation ecosystem in the region/level of interaction between the ecosystem and life science companies in the region
    - strengths, weaknesses, opportunities and threats associated with the ecosystem.
    - competing regions and relative competitive position
    - actions that government and others could take to strengthen the ecosystem and support further development of the sector.
    - investment readiness of the region to attract and support life sciences investment.
    - how the region and sector should be positioned to attract investment, businesses, and talent.

- **analyzed the results of the interviews and prepared the project report.** The report presents the background, research findings, SWOT analysis, and recommendations that stakeholders could consider for improving the value proposition for regional R&D, life sciences and digital health. The recommended positioning can be used to generate marketing and promotional materials to attract business, investment, and talent to the region.

## 1.4 STRUCTURE OF THE REPORT

This report is divided into four chapters. Chapter 2 outlines the characteristics of the life sciences and digital health sector and innovation ecosystem in BC, while Chapter 3 focuses specifically on the sectors in the Greater Victoria areas. Chapter 4 provides the major conclusions and recommendations regarding future positioning.

# 2. THE LIFE SCIENCES SECTOR IN BC

This chapter presents an overview of the characteristics of the life sciences sector and the digital health/health informatics sectors in BC, the strengths and constraints to growth of those sectors, and development strategies that have been prepared at the provincial level.

## 2.1 THE LIFE SCIENCES SECTOR IN BC

The Government of British Columbia published a profile of the life sciences sector in British Columbia in May 2023, updating a profile that was published in 2020.[1] The provincial government defines the life sciences sector to include the following NAICS industries.

| SUB-SECTOR | NAICS | INDUSTRY DESCRIPTION |
|---|---|---|
| Research, Testing and Medical Laboratories | 541380 | Testing laboratories |
| | 541710 | R&D in the physical, engineering and life sciences |
| | 6215 | Medical and diagnostic laboratories |
| Medical Devices and Equipment | 3391 | Medical equipment and supplies manufacturing |
| | 417930 | Professional machinery, equipment and supplies wholesalers |
| Drugs and Pharmaceuticals | 3254 | Pharmaceutical and medicine manufacturing |
| | 414510 | Pharmaceuticals and pharmacy supplies merchant wholesalers |

Under this definition, the Research, Testing and Medical Laboratories sub-sectors includes companies primarily engaged in:

- Providing physical, chemical and other analytical testing services.
- Conducting research and experimental development in physical, engineering and life sciences, including electronics, computers, chemistry, oceanography, geology, mathematics, physics, environmental, medicine, health, biology, botany, biotechnology, agriculture, fisheries, forestry, pharmacy, veterinary and other allied subjects.
- Providing analytic or diagnostic services, generally to the medical profession or patients on referral from a health practitioner.

The medical devices and equipment sub-sector include diagnostics companies that develop and manufacture devices for a range of medical purposes including assessing and diagnosing medical conditions, collecting and monitoring vital signs, and patient rehabilitation or therapy. Drug and pharmaceuticals companies are involved in the research and development of new drugs and novel medication delivery methods as well as the manufacture and wholesale of established drugs and pharmaceuticals.

[1] Government of BC, Life Sciences in British Columbia: Sector Profile, May 2023

As indicated below, the life sciences sector in BC have grown more than 20% over the period from 2018 to 2021 in terms of businesses with employees, employment, wages, GDP and export of services. Employment in the sector grew by 23.3%, while overall employment in BC increased by only 0.6%. BC ranks third amongst Canadian provinces in terms of sector employment, behind Ontario (77.900) and Quebec (44,500) and just ahead of Alberta (18,700).

## Characteristics of the Life Sciences Sector in BC

| INDICATOR | BC Life Sciences Sector | | | | % Growth 2018-2021 | |
|---|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 | Life Sciences | All Sectors |
| Business counts (with employees) | 1,058 | 1,072 | 1,311 | 1,338 | 26.5% | 2.7% |
| Business counts (without employees) | 868 | 826 | 894 | 939 | 8.1% | -- |
| Total life sciences business counts | 1,926 | 1,898 | 2,205 | 2,277 | 18.2% | -- |
| Employment | 15,500 | 17,000 | 17,300 | 19,100 | 23.2% | 0.6% |
| Wages and salaries ($ millions) | 1,040 | 1,199 | 1,265 | 1,423 | 36.9% | 16.9% |
| Average annual earnings ($) | 67,100 | 70,600 | 73,000 | 74,600 | 11.2% | 16.2% |
| GDP (current $ millions) | 2,013 | 2,126 | 2,153 | 2,611 | 29.7% | 8.7% |
| GDP (chained 2012 $ millions) | 1,922 | 1,942 | 1,952 | 2,320 | 20.7% | 5.8% |
| Goods exports ($ millions) | 257 | 272 | 333 | 279 | 8.7% | 16.5% |
| Services exports ($ millions) | 271 | 273 | 295 | 370 | 36.5% | -7.9% |

Source: Life Sciences in British Columbia: Sector Profile, May 2023

The research, testing and medical laboratories sub-sector accounts for the majority of the businesses and employment in the life sciences sector (64% and 54% respectively) while the drugs and pharmaceuticals sub-sector accounts for 10% and 26% respectively and the medical devices and equipment sub-sector accounts for 26% and 20% respectively. Of the 10,300 were employed in the research, testing and medical laboratories sub-sector in 2021, almost one-half (5,100) were involved in R&D related to the physical, engineering and life sciences (NAICS 541170).

Salaries tend to be highest in the research, testing and medical laboratories sub-sector, particularly within NAICS 541710 (business involved in R&D in the physical, engineering and life sciences). While most life sciences companies in BC are small, the number of businesses with more than 50 employees has been increasing, growing from 68 in 2018 to 107 in 2021.

Growth in the sector has been propelled by the development of new technologies in areas such as precision medicine, COVID-19 therapeutics, messenger ribonucleic acid (mRNA) vaccine technology, lipid nanoparticles, antibodies and medical devices.

The life sciences sector is expected to grow going forward, driven by increasing investment in R&D, increasing levels of industry collaboration and shared services, and digital transformation achieved through artificial intelligence, machine learning and cloud technologies which will lower development and manufacturing costs and accelerate drug research and development efforts. The global market for medical devices is projected to increase from US$512 billion in 2022 to US$536 billion in 2023 to US $800 billion by 2030 (CAGR of 5.7%), driven largely by the growing prevalence of chronic diseases and the increasing emphasis of healthcare agencies toward early diagnosis and treatment is leading to an increasing number of patients undergoing diagnostic and surgical procedures.[2] The global market for pharmaceutical

[2] https://www.fortunebusinessinsights.com/industry-reports/medical-devices-market-100085

manufacturing is projected to grow at a CAGR of 7.6%, from US$516 Billion in 2022 to US$929 billion by 2030 growing.[3]

Significant investments are being made in Canada and internationally across a range of platforms such as gene and cell therapies, mRNA, and biologics as well as in novel medicines and novel approaches to make existing medicines more effective. Some of the potential global headwinds facing the life sciences sector include an increasingly competitive market, an evolving regulatory landscape, pricing and reimbursement pressures, growing demands from patients and health care providers for more effective medications and experiences as they manage health and well-being, and increasing geopolitical and economic uncertainty.[4]

## 2.2 DIGITAL HEALTH (HEALTH INFORMATICS)

Digital health refers to the use of information and communications technologies in medicine and other health professions to diagnose, monitor, manage and treat illnesses and health risks. It aims to integrate, streamline, and accelerate service delivery, improve the quality of healthcare, and promote wellness. Digital health can involve a wide range of technologies such as wearable devices, mobile applications, diagnostic tools, artificial intelligence, virtual and augmented reality, big data analytics, connected devices, sensors, 3D printing, and computer simulation and modelling. Digital health enables the health system to:

- Collect, sense, measure, connect, and distribute valuable information effectively and efficiently.
- Create, amalgamate, analyze, and apply highly complex information to improve decision-making.
- Complement and increase the value of existing virtual health solutions.

Digital health is closely associated with key trends such as virtual care, consumer-centric healthcare, precision medicine, and the application of artificial intelligence in healthcare. It is transforming the delivery of healthcare, facilitating sharing of healthcare data and records, and providing greater access to services where and when they are needed. Digital health is changing the way in which health professionals interact with patients, deliver services, share information, and receive training. Development of digital health is a high priority for most governments given the potential impact on patient outcomes, quality of services, and system efficiency. For example, digital health technologies can:

- *Strengthen and improve clinical intelligence, infusing diagnostic and care delivery decisions with accurate, timely evidence***.** It is recognized that patients can live healthier and longer lives when disease progression is prevented, delayed, or countered through timely diagnosis and appropriate clinical management. Diagnostics provide information that can benefit patients by enabling the selection of suitable treatments, helping health professionals in choosing appropriate preventive interventions, and providing vital prognostic data to optimize care pathways and management.[5].
- *Further integrate virtual care options into healthcare delivery***.** Patient preferences for accessing healthcare have changed significantly in recent years, with interest in digital health services surging during the pandemic.[6]
- *Increase access to system data and personalized healthcare data***.** The Internet of Things (IoT) has contributed to exponential growth in the number and types of internet-connected devices, including

[3] https://www.grandviewresearch.com/industry-analysis/pharmaceutical-manufacturing-market
[4] Deloitte, 2023 Global Life Sciences Outlook
[5] Wurcel, V., Cicchetti, A., Garrison, L., Kip, M., Koffijberg, H., Kolbe, A., Leeflang, M., Merlin, T., Mestre-Ferrandiz, J., Oortwijn, W., Oosterwijk, C., Tunis, S., & Zamora, B. (2019). The Value of Diagnostic Information in Personalised Healthcare: A Comprehensive Concept to Facilitate Bringing This Technology into Healthcare Systems. *Public Health Genomics, 22*, 8-15.
[6] Canada Health Infoway (2022). 2022 Canadian Digital Health Survey: Interest in and Access to Digital Health Services.

medical devices and consumer devices like smartphones, smartwatches, and various types of wearable devices.[7] The proliferation of these devices has created opportunities to better collect, analyze, share, and store health-related data.

- *Support the further development of precision medicine.* By guiding individualized diagnosis and treatment for patients, digital technologies can facilitate a paradigm shift from "one-size-fits-all" approach to healthcare to the more nuanced and personalized approach of precision medicine.
- *Provide more consumer-centric healthcare delivery***.** Consumers increasingly demand digital health services, which can offer the service and information they want in a convenient form and at their preferred time.[8]
- *Facilitate more integrated services***.** Most Canadians interact with a multitude of heath care providers in addition to their regular doctor. Health technologies aid the flow of referrals and information sharing between healthcare providers.
- *Leverage the power of big data analytics, artificial intelligence, and machine learning to support clinical practice management, clinical research, transformational informatics, and health surveillance***.** Large volumes of data are created daily in healthcare settings. There is an ongoing struggle to convert this data into meaningful insights that improve patient outcomes and operational efficiency. Analytical techniques used in other sectors to extract information from big data are starting to infiltrate healthcare.[9]
- *Support research, learning, and innovation to drive long-term quality improvement in the health system.* Realizing the full value of technology in healthcare requires ongoing research, learning, and innovation. Collaborative work involving the provincial government, academic institutions in Alberta, and the private sector is continuous and intentional.

While it is difficult to determine the current size of the sector because digital health forms a small component of a wide range of industry classifications, there are a number of areas that demonstrate the importance and growth of digital health. It serves the healthcare sector, which is a major component of BC's economy (directly employing about 300,000 people in BC and accounting for about 40% of Government of BC expenditures). Across Canada, the Canadian Institute for Health Information (CIHI) estimates that the total cost of healthcare in Canada was $242.6 billion in 2020 which is equal to 11.6% of the country's GDP.[10]

A recent report by Grandview Research projects that the US market for digital health will increase from US$211 billion in 2022 to US$809 billion in 2030, an average annual increase of 18.6%, while the size of the worldwide market will reach $1.5 trillion by 2030.[11] Growth will be driven by factors such as improved internet connectivity, adoption of 5G, increasing smartphone penetration, advancements in healthcare IT infrastructure, introduction of new apps (including those that incorporate deep learning, machine learning techniques & AI functionality,) and increased demand for virtual care. The global virtual care delivery market (telehealth) is projected to grow from US$83.5 billion in 2022 to US$466 billion by 2030, with a CAGR of

[7] Digital Health Canada (2016). *The evolution of the Internet of Things in healthcare.*
[8] Rowlands, D. (2019, December). What is digital health and why does it matter? Retrieved from: https://www.hisa.org.au/wp-content/uploads/2019/12/What_is_Digital_Health.pdf?x97063
[9] Batko, K., & Ślęzak, A. (2022). The use of Big Data Analytics in healthcare. J Big Data. 9:3. doi: 10.1186/s40537-021-00553-4.
[10] https://www.insights10.com/report/canada-pharmaceutical-market-analysis/#:~:text=Canada%20Pharmaceutical%20Market%20Executive%20Analysis,the%20forecast%20period%202022%2D2030.
[11] Grandview Research, *Digital Health Market Size, Share & Trends Analysis Report By Technology (Healthcare Analytics, mHealth, Tele-healthcare, Digital Health Systems), By Component (Software, Hardware, Services), By Region, And Segment Forecasts, 2023 - 2030*

24%.[12] Tractica forecasts sales of software, hardware, and services in AI health will surpass $34 billion globally by 2025.[13]

## 2.3 INNOVATION ECOSYSTEM AND DEVELOPMENT STRATEGIES IN BC

Some of the major strengths associated with the BC life sciences and digital health sectors and their associated innovation ecosystem[14] includes:

- **The Governments of Canada and British Columbia have both identified the life sciences and digital health as a high priority for development** given the economic potential, opportunities to create good-paying jobs and support the economic transition to a cleaner, more sustainable, knowledge-based economy; the potential impact on health outcomes, system efficiency, and ability of governments to quickly respond to future pandemics and public health emergencies; and opportunities to strengthen connections to the global life sciences and health supply chains and international markets.[15]

  To help guide development of the life sciences sector, the Ministry of Jobs, Economic Development and innovation (JEDI) developed a Life Sciences and Biomanufacturing Strategy for BC.[16] The strategy aims to position BC as a global life sciences hub and a centre for commercial-scale biopharmaceutical and medical manufacturing. The strategic pillars of the Strategy focus on improving access to talent; growing innovative local companies; increasing biomanufacturing capacity and attracting anchor companies; expanding BC's clinical trials capacity; and leveraging and commercializing research. The federal government strategy, the Canada's Biomanufacturing and Life Sciences Strategy, launched in 2021, commits $2.2 billion over seven years to rebuilding Canada's domestic biomanufacturing capabilities and growing a strong and competitive sector able to produce vaccines and therapeutics. [17]

  The Government of BC has also developed a Digital Health Strategy for the province, which is focused on empowering patients (enabling them to be active participants in their health journey with the ability to choose the time, nature, and location they receive trusted and personalized care), improving the experience of healthcare providers (e.g., reducing administrative burden, and increasing their capacity to deliver efficient, trusted,
  high-quality, consistent care), establishing a connected health system (enabling seamless and secure sharing and exchange of provincial health data between all users across the care continuum), and enabling the business enterprise (fundamental business infrastructure and solutions are integrated, and business processes are streamlined, creating efficiencies across the system).[18]

- **Universities, colleges, and technical institutes in BC offer numerous educational and training programs and opportunities for researchers and entrepreneurs to collaborate on life sciences, digital health, and health technology innovation.** The University of British Columbia ranks second in

[12] Grand View Research, *Telehealth Market Size, Share & Trends Analysis Report By Product Type (Software, Services), By Delivery Mode (Cloud-based, Web-based), By End-use (Payers, Patients), By Disease Area, By Region, And Segment Forecasts, 2023 - 2030*
[13] https://www.businesswire.com/news/home/20180827005149/en/
[14] A profile of some of the key components of the innovation ecosystem in BC is provided in Appendix 1.
[15] BC Life Sciences Update 2021: Building on a foundation of innovation. MARCH 31, 2021. Life Sciences British Columbia and Greater Vancouver Board of Trade
[16] Government of BC, 2020 Life Sciences and Biomanufacturing Strategy.
[17] ISED, Canada's Biomanufacturing and Life Sciences Strategy, July 2021
[18] Government of British Columbia, Digital Health Strategy, February 2023
https://divisionsbc.ca/sites/default/files/72475/MoH-Digital-Health-Strategy-Handout-Feb-2023.pdf

Canada's top 50 research universities in 2022, followed by the Simon Fraser University (19th), University of Victoria (20th) and the University of Northern BC (42nd).[19] Life sciences disciplines where BC has notable strengths include lipid nanoparticles, mRNA, antibodies, radiopharmaceuticals, genomics, oncology, precision medicine and medical device design. In addition, post-secondary institutions across the province are further integrating machine learning, clinical informatics, health innovation, and digital transformation-related programs and partnerships into their programs. In addition to the research completed by these universities, centres and institutes have been established at the BC Cancer Agency, TRIUMF, Vancouver Coastal Health Research Institute Research, Providence Health Care Research Institute, Women's Health Research Institute, and BC Children's Hospital Research Institute.

- **The presence of leading companies.** COVID-19 greatly raised the profile of life sciences companies in BC, building on our past experience in global markets, biotech companies and as global partners. BC is home to Canada's largest biotech company (STEMCELL Technologies), Canada's largest medical device design, development, and contract manufacturing company (and at least four of Canada's new biotech companies with over $1 billion in market capitalization. we're home to Canada's largest biotech company. Some of BC's leading companies are listed in the table below.

| Company | Overview |
|---|---|
| StarFish Medical | • Specializes in medical device design, development, and manufacturing.<br>• Offers expertise in regulatory approvals and commercialization strategies.<br>• Serves a diverse range of medical specialties including cardiology and diagnostics. |
| Acuitas Therapeutics | • Innovative lipid nanoparticle delivery systems for nucleic acid therapeutic<br>• Collaborating with partners to address malaria, tuberculosis, HIV and cancer, and is developing therapeutics for other applications, including genome editing and monoclonal antibodies |
| Precision Nanosystems | • Global leader in technologies, solutions and services for the development of lipid nanoparticle-delivered genomic medicines, including mRNA vaccines and therapeutics |
| Thrive Health | • SAAS company<br>• Digital platform enables customers to configure digital health and wellness solutions. Customers range from clinics, hospitals and health systems to postsecondary institutions, enterprise organizations and governments. |
| Amgen | • One of the world's leading biotech companies with over 100 highly trained personnel at their research facility in Burnaby<br>• Bringing together the experimental disciplines of immunology, cellular and molecular biology, and emerging areas of computational data science |
| Aspect Biosystems | • Pioneering microfluidic 3D bioprinting of human tissues for medical research, therapeutic discovery and regenerative medicine.<br>• Technology platform enables the creation of living human tissues with unprecedented control, flexibility and precision |
| AbCellera | • Building a first of-its-kind good manufacturing practices facility for antibody medicines in Canada, which will provide technology and infrastructure to help Canada respond to future pandemics and bring important treatments to patients that need them |

[19] https://researchinfosource.com/top-50-research-universities/2022/list

| Company | Overview |
|---|---|
| STEMCELL Technologies | Canada's largest biotech company with offices across North America, Asia-Pacific and Europe. The company employs over 1,800 people, most of whom are in BC's Lower Mainland<br>Suite of more than 2,500 best-in-class cell products and services are designed and developed by a team of dedicated scientists to streamline research protocols, reduce experimental variability and increase the accuracy of results |
| Chinook Therapeutics | Developing therapies to preserve kidney function and make dialysis and transplant unnecessary for people living with kidney disease<br>With 185+ employees and a market capitalization of more than $1 billion |
| Notch Therapeutics | Developing renewable, induced pluripotent stem cell (iPSC)-derived immunotherapies, with an initial focus on cancer where cell therapies offer transformational benefits over existing standards of care |

- **Access to capital.** Across Canada, venture capital investment increased sharply in 2021 before declining in 2022 and through the first three quarters of 2023. The level of venture investment in Canada increased from $4.6 billion in 2020 (523 deals) to $15.7 billion in 2021 (846 deals) before declining to $10.5 billion in 2022 (755 deals) and $5.4 billion (494 deals) through the first three quarters of 2023.

  BC has followed a similar pattern. Although venture investment levels in BC declined in 2022, they remained well above pre-pandemic levels. In 2022, venture capital investments in BC totaled $1.6 billion (106 deals) down from totaling $2.9 billion (105 deals) in 2021 but up from 69 deals and $893 million in 2020 and 77 deals and $1.3 billion in 2019.[20,21] Over the three quarters of 2023, venture investments totaled $888 million (72 deals).[22]

  Some of the BC life sciences companies that have raised significant funding in recent years include AbCellera and Chinook Therapeutics.[23]

  Some of the many venture capital firms and funds which are active in BC include the BC Tech Fund (Kensington Capital Partners), Pangaea Ventures, Active Impact Investments, Evok Innovations, Chrysalix Venture Capital and BDC. In addition, the Government of BC established the InBC Investment Corp (InBC), a provincial Crown corporation, with $500 million to invest in venture capital funds and growing companies that demonstrate a measurable impact in driving climate action, innovating for the future, advancing reconciliation and elevating inclusive communities in BC. The Vancouver Island Venture Acceleration Fund (VIVA) is the first dedicated investment fund targeting early-stage, high growth technology companies on the Island.

  BC life sciences companies have also been able to access private and public equity, including significant deals such as Xenon Pharmaceuticals ($632 million), AbCellera Biologics ($555 million), Chinook Therapeutics ($288 million), Essa Pharmaceuticals ($130 million), and Zymeworks ($115 million). The number of deals in British Columbia involving the life sciences sector has increased from 10 in 2021 to 14 through the first three quarters of 2023.

- **Established funding programs**. Some of the sources of government funding National Research Council Industrial Research Assistance Program (NRC IRAP), the Strategic Innovation Fund (SIF), Innovative

[20] https://www.cvca.ca/assets/files/reports/year-end-2022-vc-pe-canadian-market-overview/CVCA_VC_Q4_2022_FINAL-2.pdf
[21] https://www.cvca.ca/files/reports/year-end-2021-canadian-vc-pe-market-overview/CVCA_VC_Q4_2021-updated-031722.pdf
[22] https://reports.cvca.ca/books/xpqy/#p=9
[23] https://reports.cvca.ca/books/xpqy/#p=9

Solutions Canada, CanExport SMEs, CanExport Innovation, the federal research granting agencies (NSERC, SSHRC, and CIHR), Canada Foundation for Innovation (CFI), Pacific Economic Development Canada (PacifiCan), Genome BC, Genome Canada, and the BC Knowledge Development Fund. Innovate BC administers ScaleUp, the Venture Acceleration Programs (VAP) across BC, the BC Fast Pilot and Ignite. The recently created Michael Smith Health Research BC is a merger of several entities, including the Michael Smith Foundation for Health Research (MSFHR) and the BC Academic Health Science Network (BC AHSN). Tax incentives, including the federal and provincial Scientific Research and Experimental Development (SR&ED) Tax Incentive Programs, can help de-risk R&D investments by offsetting a percentage of the costs of technology development and adoption.

- **A strong network for clinical trials.** Canada accounts for about 4% of global trials, and about 20% of those trials are conducted in BC. The 1,350 active clinical trials active in BC in 2022 involved more than 600 investigators and over 100 sites. About 90% of trials are Phase 2 to 4 trials. The trials most commonly focus on oncology (35%), cardiology (10%) and medical devices (14%). BC has established a provincial clinical trial management system and offers support to help with approvals, implementation, regulatory compliance, and audit preparations.

- **Access to incubators, accelerators, and other business development services to support existing and emerging companies.** Some of the incubators, accelerators, and scaling support services available in BC include adMare BioInnovations, the Creative Destruction Lab (CDL) – Vancouver, entrepreneurship@UBC, SFU Venture Labs, New Ventures BC, Coast Capital Innovation Centre including the BioInnovation Hub and Circle Innovation. The BC Venture Acceleration Programs (VAP)—delivered by VIATEC in the Greater Victoria area—provides early-stage to scaling businesses with access to coaching from experienced Executives in Residence (EIRs). The new Immuno-Engineering and Biomanufacturing Hub will further improve co-ordination between research, industry, and the health sector.

- **High levels of collaboration between academia, private sector, and increasingly government**. A unique feature of the BC's life sciences ecosystem is the convergence and integration of disciplines within and across life sciences, tech, and innovation sectors that are leading to the creation of novel technology platforms generating solutions for human health.

- **Local companies also benefit from other competitive advantages of being located in BC**. Businesses benefit from BC's geographic location as a gateway to Asia and major global centres, investment and regulatory climate, skilled workforce, favorable labour, utility and facility costs, low corporate income tax rates, access to clean power, access to government procurement opportunities and international agreements (such as CETA, CPTPP and CUSMA) and domestic trade agreements such as the Canadian Free Trade Agreement (CFTA) and the New West Partnership Trade Agreement (NWPTA).

Potential constraints to development that were highlighted in recent government strategies and other reports include:

- Challenges in commercializing scientific research and discovery and scaling businesses (inconsistent access to growth capital and limited incentives and support for commercialization)
- Complex regulatory, tax, and procurement policies and processes (taxation provides a disincentive for companies to keep IP in Canada and attract top global talent and procurement policies do not support the health system to buy local innovation and enable growth)

- Shortage of wet-lab space and manufacturing capabilities
- Difficulties in attracting, developing, and retaining scientific leaders including C-suite leadership that will support commercialization and company growth
- Inconsistency of coordinated collaboration across levels of government, academia, research, and industry in efforts to scale companies and adopt innovation
- Lack of coordinated data strategy to advance research and health innovation/the need to invest in a coordinated, comprehensive strategy to provide faster, streamlined access to data and facilitate and create data-driven advances in research, innovation, and health outcomes
- A shortage of investment in research and critical infrastructure, particularly lab space and manufacturing

The Government of BC's Life Sciences and Biomanufacturing Strategy focuses on five key pillars that are designed to build on the provincial strengths.

| Pillar | Strategic Recommendations |
|---|---|
| PILLAR 1: Improving access to talent | • Deliver industry-recognized and customized training to teach specialized biomanufacturing skills to new graduates and reskill or upskill workers<br>• Train people in the theoretical and hands-on knowledge needed for large-scale manufacturing operations, including clean room protocols, quality assurance, technical bioprocessing and good manufacturing practices<br>• Strengthen partnerships with post-secondary institutions to provide students in biomedical engineering and other academic programs with access to hands-on biomanufacturing training<br>• Continuing to partner, through the upcoming Future Ready: Skills for the Jobs of Tomorrow Plan, with post-secondary institutions to ensure British Columbians can access the specific learning they need – whether that's a micro-credential or an advanced degree<br>• Upskilling the existing workforce to meet the demand for specialists who can drive innovation in this sector<br>• Continuing to use immigration streams, such as the Provincial Nominee Program and the international post-graduate category, to encourage immigrants to choose BC as a place to live and apply their skills<br>• Supporting and promoting leadership training for BC's workforce, including through micro-credentials and other academic offerings. This will ensure leaders have the wide-ranging skills in strategy, marketing, finance, and human resources to navigate change |
| PILLAR 2: Growing innovative local companies | • Increase available wet lab space and small-scale biomanufacturing facilities<br>• To make it easier for companies to access capital, we will raise more awareness and promote the benefits of the Small Business Venture Capital Tax Credit program, Scientific Research & Experimental Development program, and InBC Investment Corp<br>• Establish intellectual property strategies |
| PILLAR 3: Increasing biomanufacturing capacity and attracting anchor companies | • Streamline access to light industrial zoned land and buildings for biomanufacturing activity<br>• Establish mechanisms to attract investment and co-invest in strategic projects that will expand clean biomanufacturing operations |

| Pillar | Strategic Recommendations |
|---|---|
| PILLAR 4: Expanding our clinical trials capacity | • Building our capacity to conduct clinical trials by enabling infrastructure, accelerating skills training and streamlining the research approvals process<br>• Fostering a research-positive culture across the health system |
| PILLAR 5: Leveraging and commercializing research capacity | • Strategically allocating funds through the BC Knowledge Development Fund, Michael Smith Health Research BC and Genome BC Encourage research translation and commercialization<br>• Encouraging collaborations between industry and academia<br>• Supporting BC companies in commercializing their products<br>• Continuing to invest in programs, such as Mitacs, that bring research-trained innovators into positions in industry and government |

# 3. THE SECTOR IN GREATER VICTORIA

This chapter presents the major findings of our review regarding characteristics of the life science sectors in greater Victoria and the innovation ecosystem in place to supports its development.

## 3.1 SECTOR EMPLOYMENT

Vancouver Island accounts for 15% of BC's life sciences businesses and 13% of sector employment. [24]

The results are presented in the table on the following pages. We are not able to replicate data in the Government of BC, Life Sciences in British Columbia: Sector Profile because some of that data was generated using data at the six-digit NAICS code. However, the results provide an indication of the size of particular sub-sectors in the CRD, most notably that:

- Of the NAICS codes listed, the major economic sectors include computer systems design and related services (7,042 employees in 2022), architectural, engineering, and related services (3,792 employees in 2022), and scientific research and development services (917 employees).

- Relative to the province overall, Greater Victoria tends to be more active in the research, testing and medical laboratories sub-sectors (accounting for 8% to 9% of provincial employment in 2022) than in the drugs and pharmaceuticals sub-sector (accounting for 1% to 3% of employment in 2022) and, to a lesser extent, the medical devices and equipment sub-sector (accounting for 3% to 4%).

- Employment growth in the computer systems design and related services NAICS code has been much slower in Greater Victoria than in the province overall. As a result, the region's share of provincial employment has dropped from 14% in 2017 to 8% in 2022. Part of this NAICS code will include employment directly or partially connected to Digital Health.

[24] Government of BC, Life Sciences in British Columbia: Sector Profile, May 2023

| NAICS | INDUSTRY DESCRIPTION | Capital Regional District | | | | | | British Columbia | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| **Research, Testing and Medical Laboratories** | | | | | | | | | | | | | |
| 5413(80)* | Architectural, engineering, and related services (includes testing labs) | 2,979 | 3,708 | 2,792 | 4,063 | 4,146 | 3,792 | 39,354 | 43,167 | 48,625 | 48,667 | 53,563 | 43,875 |
| | | 8% | 9% | 6% | 8% | 8% | 9% | 100% | 100% | 100% | 100% | 100% | 100% |
| 5417(10)* | Scientific research and development services (includes R&D in the physical, engineering and life sciences) | 729 | 625 | 854 | 708 | 708 | 917 | 7750 | 5,313 | 7,875 | 6,688 | 7,667 | 11,000 |
| | | 9% | 12% | 11% | 11% | 9% | 8% | 100% | 100% | 100% | 100% | 100% | 100% |
| 6215 | Medical and diagnostic laboratories | 375 | 438 | 479 | 875 | 396 | 438 | 4917 | 5,271 | 4,188 | 3,917 | 4,563 | 5,542 |
| | | 8% | 8% | 11% | 22% | 9% | 8% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Medical Devices and Equipment** | | | | | | | | | | | | | |
| 3391 | Medical equipment and supplies manufacturing | 125 | 188 | 104 | 354 | 250 | 63 | 3,688 | 3,063 | 2,542 | 2,250 | 2,438 | 1,708 |
| | | 3% | 6% | 4% | 16% | 10% | 4% | 100% | 100% | 100% | 100% | 100% | 100% |
| 4179(30)* | Other machinery, equipment and supplies merchant wholesalers (includes professional machinery, equipment and supplies wholesalers) | 146 | 438 | 458 | 250 | 333 | 250 | 9,063 | 7,250 | 8,458 | 8,354 | 8,000 | 7,208 |
| | | 2% | 6% | 5% | 3% | 4% | 3% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Drugs and Pharmaceuticals** | | | | | | | | | | | | | |
| 3254 | Pharmaceutical and medicine manufacturing | 63 | 83 | 0 | 21 | 146 | 42 | 4,083 | 2,625 | 3,792 | 5,438 | 3,188 | 5,063 |
| | | 2% | 3% | 0% | 0% | 5% | 1% | 100% | 100% | 100% | 100% | 100% | 100% |
| 4145(10)* | Pharmaceuticals, toiletries, cosmetics and sundries merchant wholesalers (includes pharmaceuticals and pharmacy supplies merchant wholesalers) | 0 | 167 | 500 | 21 | 21 | 104 | 3,250 | 5,542 | 5,563 | 1,854 | 3,979 | 3,188 |
| | | 0% | 3% | 9% | 1% | 1% | 3% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Digital Health** | | | | | | | | | | | | | |
| 5415 | Computer systems design and related services | 6,792 | 5,729 | 6,938 | 6,854 | 7,771 | 7,042 | 47,479 | 58,458 | 61,125 | 68,083 | 83,604 | 91,750 |
| | | 14% | 10% | 11% | 10% | 9% | 8% | 100% | 100% | 100% | 100% | 100% | 100% |

Sources: Statistics Canada RTRA Subscription Data from the Labour Force Survey

* The data for this NAICS code is presented at the four-digit level while the Sector Profile while the Government of BC's Life Sciences in British Columbia Sector Profile used data at the four-digit level.

## 3.2 LEADING COMPANIES

The life sciences sector in Greater Victoria includes a rich variety of researchers and companies, from startups to profitable global enterprises, including some of the province's most innovative companies. We have compiled a list of more than 60 companies in the Greater Victoria area that appear related to the life sciences and digital health sectors, drawing from the Crunchbase online database, the membership of the Vancouver Island Life Sciences Association (VILS) and the membership of Life Sciences BC. The list is provided in Appendix 2. Some of the leading companies that were identified are profiled below.

| Company | Description |
|---|---|
| StarFish Medical | Founded in 1999, it is Canada's largest full-service medical device product design, development, and contract manufacturing company. Services include intellectual property development, human factors, industrial design, engineering, consulting, supply chain management and specialty manufacturing, and an expanding line of bio services. It partners with innovative companies to create and manufacture breakthrough products for a full range of medical specialty areas including digital health, cardiovascular, neurology, urology, gastroenterology, otology, ophthalmology, and in-vitro diagnostics. It develops and incubates medical device ventures, including the 2009 acquisition of ViVitro Labs, a global cardiovascular device testing company with labs in Victoria and Marseille, France. In 2021, the StarFish Group acquired the assets of Otoharmonics, and created Levo Medical Corporation, a provider of tinnitus management solutions. |
| Immunoprecise Antibodies | IPA is a scientific Contract Research Organization (CRO) which represents a HUB of biotherapeutic intelligence that includes a hybrid of experts and technologies, in the science and business of bioplatform-based discovery. IPA provides highly specialized full-continuum therapeutic antibody discovery, development, and out-licensing services with advanced omics and complex intelligence technology that provide greater efficiency and accuracy than ever before. |
| Eupraxia Pharmaceuticals | Eupraxia is a clinical-stage biotechnology company focused on the development of locally delivered, extended-release alternatives to currently approved drugs. Each of Eupraxia's product candidates has the potential to address therapeutic areas with high unmet medical need and strives to provide improved patient benefit by delivering targeted, long-lasting activity with fewer side effects. |
| CSL Vifor | CSL Vifor, formerly known as Vifor Pharma - Aspreva International Ltd., operates as a division of CSL Limited, an Australian biotechnology company. It focuses on being a global leader in the management of iron deficiency and iron deficiency anaemia. CSL Vifor provides innovative therapies and solutions to address these health issues, contributing to their substantial impact on global health. This specialization marks a significant part of CSL's broader mission to deliver life-saving biotherapies to treat a range of serious and chronic medical conditions. |
| Medgenesis Therapeutix | MedGenesis is a privately held biopharmaceutical company committed to developing and commercializing highly innovative treatments for patients with serious neurologic disease. Its lead program, glial cell-line derived neurotrophic factor (GDNF), is a potentially disease-modifying treatment for Parkinson's disease that has recently completed Phase 2 clinical studies. |
| Plurilock | Plurilock is a real-time cybersecurity solution that uses artificial intelligence to identify, prevent, and eliminate insider threats, securing the enterprise and ensuring compliance with requirements in financial, healthcare, and federal organizations. Using behavioural, environmental, and contextual signals, Plurilock invisibly authenticates users without added friction. |
| CARE2TALK | Unlike standard devices, Care2Talk is designed specifically for seniors, enabling them to communicate without barriers. Accessibility is built right into the platform to make |

| Company | Description |
|---|---|
| | connecting simple. This includes an easy-to-use tablet with one-touch calling, video calls with closed captioning and secure contact list. |
| StressMarq Biosciences Inc. | StressMarq Biosciences is a bioreagents company producing antibodies, proteins, assay kits and small molecules for life sciences research. Their extensive product portfolio is available in 45 countries and includes a focus on reagents for neurodegenerative disease research, including alpha synuclein and tau protein preparations such as monomers, oligomers, and pre-formed fibrils (PFFs), as well as antibodies that detect aggregated alpha synuclein and tau. |
| Axolotl Biosciences | Axolotl Biosciences provides turn-key reagents such as functional bioinks, 3D tissue models, and consulting services in the field of 3D bioprinting. Their goal is to improve human health through novel 3D printing technologies. |
| Aurinia | Aurinia Pharmaceuticals is a fully integrated biopharmaceutical company focused on delivering therapies to treat targeted patient populations with a high unmet medical need that are impacted by autoimmune, kidney and rare diseases. In January 2021, the FDA approved the company's drug treatment for lupus nephritis. The Company's head office is in Edmonton, Alberta, its U.S. commercial office is in Rockville, Maryland. The Company initiated a robust strategic review at the end of June 2023 and is continuing to review all strategic options for the Company including, but not limited to, a potential sale, merger, or other strategic transaction. |
| Semaphore Solutions | Semaphore focuses on supporting the software engineering needs of clinical genomics laboratories across Europe and North America. Their clients are cutting-edge laboratories using Next Generation Sequencing (NGS) technologies to provide critical medical services, customer-direct services, and research. |
| Siscapa Assay Technologies - Canada | SISCAPA Assay Technologies (SAT) develops, performs and supports definitive immunoaffinity-MS assays for protein drugs, targets and biomarkers. The Company was founded in 2011 by pioneers in the practical application of proteomics for pharmaceutical and diagnostic applications. |
| VoxCell BioInnovation | VoxCell is a tissue engineering company responsible for a line of Truly Biomimetic solutions for the drug development industry and the field of Oncology research by creating vascularized cancer tissue models. |
| 4M Biotech | 4M Biotech addresses global health challenges through developing technology that lies at the interface of cellular biology, biomaterials, mechanical engineering, and AI. |
| Innovakine Therapeutics | Founded in 2019, Innovakine Therapeutics Inc. is an innovative platform technology company developing novel molecular tools to revolutionize cell-based therapies for cancer, infectious disease, autoimmunity and regenerative medicine. |
| Pathverse | Designed by researchers, for researchers. Pathverse hosts a free no-code platform. The tool can help streamline mobile health research and data collection processes. They can also provide a range of technical services to researchers and health specialists, including content translation, content development, and content consultation services. |
| Guidestar Medical Devices | GuideStar Medical Devices is a bio-tech start-up that has developed EpiZact, a novel device designed to reduce the chance of accidental dural puncture, improve patient satisfaction, and deliver cost savings for healthcare providers. |
| TrichAnalytics | TrichAnalytics uses advanced laser technology and elemental analysis on "growing" biological tissues to monitor temporal changes in metal exposure, diet and health of wildlife species. |
| Victoria Hand Project | The Victoria Hand Project (VHP) is a non-profit organization based in Victoria, British Columbia, that provides low-cost, functional, and high-quality 3D-printed prosthetic arms to amputees, primarily in resource-poor countries. The project leverages the |

| Company | Description |
|---|---|
| | benefits of 3D printing technology to create prosthetic devices that are affordable and accessible, significantly improving the quality of life for its recipients. |
| Redlen Technologies | Redlen Technologies specializes in the development of cadmium zinc telluride (CZT) semiconductor radiation detectors, which enhance the precision of medical imaging, security screening, and industrial inspection. Their advanced technology is crucial for producing high-resolution nuclear imaging used in diagnostics and therapy. After being acquired by Canon in 2021 but continues to operate locally. |

## 3.3 MEMBERS OF THE INNOVATION ECOSYSTEM

There is also an innovation ecosystem developing in the region encompasses:

- Industry associations and networks including the Vancouver Island Life Sciences Association (VILS), Victoria Innovation, Advanced Technology and Entrepreneurship Council (VIATEC) and the South Island Prosperity Partnership (SIPP) as a regional economic development agency.

- Research centres and leading education programs, most of which are located at the University of Victoria. Examples include the Centre for Advanced Materials and Related Technology (CAMTEC), the Genome BC Proteomics Centre, Canadian Institute for Substance Use Research, and the Royal Jubilee/ Vancouver Island Cancer Treatment and Research Centre. The University of Victoria also delivers key education and research programs in areas such as Health Information Science, Biomedical Engineering, and Chemistry for Medical Sciences. It is also examining the potential to establish a Faculty of Health. Camosun College also provides a range of health-related programs including bachelor's degrees, diplomas and certificates, and nurture applied research and innovation through Camosun Innovates, which includes the Camosun Technology Access Centre (CTAC) and the Babcock Interaction Lab.

- Centres where industry can access technology and business development resources, including the Camosun Technology Access Centre (CTAC) and the Babcock Interaction Lab at Camosun College, and UVic's CAMTEC and BioInnovation Hub. Funding of $2.5 million has been announced by the Province of BC towards a life sciences manufacturing, scaling and wet lab facility to be developed by VILS. A makerspace is being developed in the University of Victoria's Engineering Lab Wing.

- Business development services such as Coast Capital Innovation Centre (CCIC), and Research Partnerships and Knowledge Mobilization unit. Opened in 2002 by the University of Victoria, the Vancouver Island Technology Park provides physical infrastructure that links emerging and growing tech companies.

Members of the innovation ecosystem operating in the region are highlighted in the table below.

| Organization | Description |
|---|---|
| **Industry Groups and Networks** | |
| Vancouver Island Life Sciences Association (VILS) | With over 50 member companies and entities on the island, non-profit and volunteer society VILS represents members from biotech, medical device, pharmaceutical and software companies, local health authorities, students, and post-secondary institutions. |
| VIATEC | A non-profit organization providing support to the technology sector in Greater Victoria. It offers programs & resources, networking opportunities, and advocacy to tech companies of all sizes ranging from startups to established entities. This includes mentorship, workshops, training sessions, and access to investment and funding opportunities. VIATEC organizes events to build a strong community within the tech industry and contributes to talent development and recruitment. |
| SIPP | A collaborative network that includes local governments, businesses, educational institutions, and Indigenous communities across southern Vancouver Island. This alliance, encompassing a diverse range of sectors such as technology, entrepreneurship, academia, and public administration, is dedicated to strategic economic planning and fostering innovation and growth in the Greater Victoria area. SIPP's initiatives focus on nurturing positive economic and business conditions, sector development in multiplier industries, attracting investments, and nurturing talent, all aimed at enhancing and diversifying the region's economic ecosystem. |
| **Health Education and Research – University of Victoria** | |
| Centre for Advanced Materials and Related Technology (CAMTEC)/BioCore | The centre provides shared equipment to researchers for fundamental and applied research and serves as a training centre. CAMTEC operates the BioCore, an accessible, open-access facility in which local companies and UVic researchers access a range of equipment for bio-sample preparation, purification, and analysis as well as advanced training within a unique biosafety-certified co-working space. The facility's equipment supports various biomedical research activities, including gene expression, protein purification, cell culture, and advanced imaging. |
| UVic-Genome BC Proteomics Centre | UVic serves as the central hub of the Pan-Canadian Proteomics Centre and a major node in the Metabolomics Innovation Consortium, leading national efforts to provide ‘omics technologies and services to academia and industry. |
| Canadian Institute for Substance Use Research | A community-based network that studies substance use and addiction to promote health and reduce harm and develops and deploys new drug-checking services to combat the drug overdose crisis. |
| CanAssist at UVic | Develops innovative technologies, programs and services for people who experience physical or cognitive barriers. |
| School of Health Information Science at UVIc | Health Information Science offers unique and comprehensive courses to around 200 undergraduates and 90 graduate students. Renowned for its innovative laboratory facilities, which simulate real-world environments, such as a replica hospital room and a "smart home" setting, both equipped with the latest technology, wearable devices, and IoT systems. This hands-on approach ensures that students gain practical experience in settings that closely mimic actual healthcare environments. Research strengths include human and social aspects of healthcare information systems and technologies; methods for healthcare system analysis, design and evaluation; consumer health informatics; organizational management aspects of healthcare IT; healthcare system adoption; usability engineering in healthcare; and healthcare data analytics. |

| Organization | Description |
|---|---|
| Biomedical Engineering at UVic | UVic offers a dynamic and comprehensive program in Biomedical Engineering, both at the undergraduate and master's levels, focusing on the intersection of engineering, human anatomy, physiology, and biochemistry. Undergraduate Program in Biomedical Engineering combines mechanical and electrical engineering with studies in human anatomy, physiology, and biochemistry. The MEng program at UVic is geared towards those interested in developing and designing medical devices and technologies. |
| Chemistry for Medical Sciences at UVic | UVic offers a Bachelor of Science (BSc) degree in Chemistry for the Medical Sciences, designed for students interested in chemistry and its applications in the health sciences. This program focused primarily on chemistry with a focus on its medical applications, complemented by courses from other disciplines. |
| Faculty of Health at UVic | The University of Victoria is currently examining the possibility of establishing a major new faculty focused on the study of health. UVic's existing interdisciplinary health programs would be based out of the new faculty. The faculty would strengthen the university's health profile, delivering programs, training professionals and conducting community-relevant research. It would engage with the community on population health, Indigenous health and other priority areas; recruit students including graduate students, post-docs, faculty and staff. |
| **Other Health Education and Research** | |
| Camosun College | Camosun College provides a range of health-related programs including bachelor's degrees, diplomas and certificates. |
| BC Cancer: The Deeley Research Centre - DRC | The Deeley Research Centre (DRC) is a key site for BC Cancer's Immunotherapy Program. The BC Cancer's Immunotherapy Program's goal is to develop precise and potent immunotherapeutic strategies for cancer. Researchers at the DRC are studying how the immune system responds to cancer and how best to enhance this response for therapeutic purposes. The Immunotherapy Program is translating discoveries from the DRC and our many collaborators into innovative clinical trials, offering promising new treatment options for patients with cancer. |
| Royal Jubilee/V.I. Cancer Treatment & Research Centre | Situated on the grounds of Royal Jubilee Hospital, the new 90,000 square feet, Vancouver Island Cancer Centre is a state-of-the-art treatment and research facility. This Centre is designed to provide comprehensive cancer care and conduct research to improve patient outcomes. Royal Jubilee Hospital is the largest hospital on Vancouver Island. |
| **Business Scaleup and Support** | |
| Coast Capital Innovation Centre (CCIC) | Located at UVic, CCIC is a venture incubator that helps students, faculty and alumni develop their business ideas and get ready for startup and investment. CCIC provides tools, expertise, space, mentorship, funding (pitch competitions), and connections to support innovation and entrepreneurship at UVic. |
| UVic Innovation Hub (off campus) | The Innovation Hub is a node in the UVic Innovation Network. It officially opened in August 2022 in Saanich in collaboration with the Vancouver Island Life Sciences association (VILS) and serves as a collaborative workspace where entrepreneurs and industry professionals can connect with researchers. The hub fosters an environment for innovation and development in digital health and medical technology. |
| Wet Lab at (CIEBH) | A new wet lab facility is receiving $2.5 million in funding through provincial government's British Columbia Life Sciences and Biomanufacturing Strategy to establish a 7,000 square feet state-of-the-art facility. It will serve as a resource for up to six local companies each year, offering them affordable access to specialized and high-demand laboratory space. |
| Makerspace | The makerspace is being developed in the UVic's Engineering Lab Wing as part of the Faculty of Engineering and Computer Science's (ECS). It will allow students to turn their ideas into reality, tinker with state-of-the-art technologies (e.g., large lathes, 3D |

| Organization | Description |
|---|---|
| | printers, laser cutters and smaller tools such as soldering stations), and leverage the powerful multiplying effects of collaboration, teamwork, and creativity to engineer inspired innovation. An official opening is planned for 2024. |
| Camosun Technology Access Centre (CTAC) and the Babcock Canada Interaction Lab | Camosun College, through Camosun Innovates, operated the Camosun Technology Access Centre (CTAC), which includes the Babcock Interaction Lab, which is a technically advanced physical space where students, faculty and staff from diverse disciplines can use cutting-edge technology such as 3D printers, robotic systems, and 3D scanners to turn their ideas into market-ready innovations. The Interaction Lab is housed within the Camosun Innovates department which includes a Technology Access Centre. It is part of a network of such centres across British Columbia, each with its specific strengths and focus areas. |
| Vancouver Island Technology Park (VITP) | Opened in 2002, the VITP is a technology hub owned by the University of Victoria and provides physical infrastructure for emerging or growing tech companies. |
| **Source of Capital (local)** | |
| Alacrity Canada | Alacrity Canada provides hands-on advisory services and digital training for emerging businesses, connects them with experts in our network, and offers dilutive and non-dilutive investment opportunities. In its 13 years of operations, Alacrity has worked with more than 10,500 companies, helping them create or support 6,800 jobs and attract $360 million in investments. According to Crunchbase, Alacrity has 28 investments and has completed five exits. |
| Cindicates | Based in Victoria, Cindicates is a Seed VC Fund focused on providing early funding to local startups, supporting the local economy while creating long-term value for investors, entrepreneurs, the community, and the planet. Cindicates looks across BC, with a focus on Victoria and Vancouver Island pre-seed and seed-stage companies that are building software, AI, marketplaces, e-commerce, and consumer products. According to PitchBook, Cindicates has made 13 investments and has completed one exit. |
| Tiny Capital | Based in Victoria, Tiny is a holding company owning subsidiaries engaged in diverse businesses. Its investments are primarily internet and technology focused, but it also owns businesses in other industries. Tiny's businesses are managed on a decentralized basis, with few integrated business operations. Tiny's corporate management team is primarily focused on capital allocation decisions, investment activities, and hiring and incentivizing senior management teams of its operating businesses. According to Crunchbase, Tiny has 50 investments and has completed five exists. |
| Women's Equity Lab (WEL) | Launched in Victoria in 2017, WEL now is a network of over 350 women investors, with syndicates located in Victoria, Vancouver, Toronto, Manitoba, the Atlantic and Silicon Valley. In the WEL model, partners in the investment round meet regularly to learn how to invest in companies, discuss opportunities, vet deal flow and make investment decisions. Every participant ends up with a deeper understanding of the angel investment process, a portfolio of early-stage companies and a great network of accomplished women. |
| Other | Perhaps we list some other options here: traditional financial products, angel investors (like at the Capital Investment Network), and then possibly alluding to our location within the Cascadia megaregion that is rich in capital (Vancouver, Seattle) and many companies that are tied in with California capital markets. |

## 3.4 SWOT ANALYSIS

### *Strengths*

- **Diverse Sector**. The Greater Victoria's life science sector encompasses a board spectrum of specialties ranging from pharmaceuticals to biotechnology. This diversity ensures a comprehensive approach to health and medical solutions. The interplay between pharmaceutical and biotechnological entities fosters an environment conducive to cross-disciplinary innovation.

- **Research Excellence at UVic.** The University of Victoria distinguishes itself in the life sciences sector through exceptional research. It features leading research centres such as the Centre for Advanced Materials and Related Technology (CAMTEC), Genome BC Proteomics Centre, and Canadian Institute for Substance Use Research as well as the capabilities of the School of Health Information Science, and CanAssist. IP Policy at the University of Victoria helps facilitate spinoffs and academic startups. The synergy between academic research and industry applications ensures that the knowledge and technologies developed are relevant and readily transferable to the sector.

- **Education and Training.** UVic's specialized programs in life sciences and digital health, along with its collaborative research initiatives, play a significant role in driving innovation and supplying the sector with highly skilled professionals. Through the specialized, interdisciplinary programs, such as bachelor's and master's biomedical engineering and medical sciences that blend science, technology, and health, UVic prepares well-rounded graduates. The emphasis on practical, hands-on learning experiences, such as lab work and co-op placements, ensures that graduates are industry ready. UVic's role in developing future professionals and leaders significantly contributes to the sector's growth and global competitiveness.

- **Business and Industry Supports** Facilities like the Coast Capital Innovation Centre and the Innovation Hub at UVic, Camosun Technology Access Centre (and their Babcock Interaction Lab) and the UVic-Genome BC Proteomics Centre provide support to startups and researchers, creating an environment that fosters innovation. Companies like Axolotl Biosciences and Eupraxia Pharmaceuticals have levered available resources to create innovative products, technologies, and services that have contributed to the development of the life sciences sector in Victoria.

  Entities such as Vancouver Island Life Sciences association (VILS), Life Sciences BC, Canadian Biomaterials Society, and Metabolomics Consortium of British Columbia (MetaboBC) actively contribute to promoting collaboration and providing crucial support within the sector. This environment promotes a culture of entrepreneurship and innovation, where new ideas are nurtured and developed into viable products and services. The presence of these support systems is instrumental in reducing the barriers to entry for startups and accelerating their growth trajectories. Moreover, this ecosystem fosters collaborations between academia, industry, and government, ensuring a comprehensive approach to addressing the challenges and opportunities in the life sciences sector.

- **Skilled Workforce**. The strength of the life sciences and digital health sectors lies in its highly skilled workforce, which is nurtured by academic institutions and industry training programs. This workforce

consists of professionals with expertise in various fields such as biotechnology, pharmaceuticals, digital health, and biomedical engineering. The University of Victoria's (UVic) presence ensures a consistent influx of well-educated graduates equipped with the latest knowledge and skills relevant to the life sciences sector. Additionally, the sector provides continuous professional development opportunities to keep the workforce up to date with the latest trends and technologies. Mitacs plays a crucial role in building a skilled workforce by facilitating collaborations between academia and industry through their internship and research-based training projects that address industry-specific challenges. This skilled workforce is essential for maintaining the sector's competitive edge, as it allows companies to undertake complex research projects, develop innovative products, and adapt to changing market demands.

- **Access to Markets.** The life sciences and digital health sectors of Greater Victoria have a strong global outreach, demonstrated by its impact on global health and wellbeing. This presence not only enhances the sector's reputation but also opens up avenues for cross-border collaborations, knowledge exchange, and market expansion. It is vital for the sector to operate and influence globally to stay competitive and access new technologies, funding sources, and talent pools. The international outreach of the sector also helps in attracting international talent and investments, further strengthening its global standing. Additionally, the sector's international sales channels and partners are in high demand, making Victoria an ideal location to access global markets and expand their reach.

- **Locational Advantages.** Greater Victoria's affordability in comparison to major recruitment hubs like San Francisco, Seattle, and Boston makes it a highly attractive option for businesses. Moreover, the region's lower cost of living compared to Vancouver, combined with the overall appeal of British Columbia as a desirable location to live and conduct business, establishes a strong foundation for growth. Furthermore, Victoria's smaller size facilitates easier connections, fosters collaboration across disciplines, and encourages interaction among diverse companies and entrepreneurs. As opposed to larger cities where networks can be more siloed, Victoria's close-knit community enhances cross-industry collaboration and innovation. Greater Victoria's affordability, quality of life, and overall attractiveness contribute to its strength as a location for life sciences businesses, making it an appealing choice for companies looking to thrive in a cost-effective yet highly conducive environment.

- **Government Support.** Government support is a vital element in fostering a conducive environment for the life sciences sector in Greater Victoria. Initiatives supported by the government include funding opportunities, regulatory support, and platforms for industry-academia collaboration. This backing instills confidence among investors and entrepreneurs while providing the sector with the necessary resources to thrive. Regional strategies like those of the District of Saanich play a critical role in shaping the environment for the industry. Saanich's Economic Development Strategy recognizes the potential of the life sciences sector as a key area for growth and innovation and is part of a broader effort to enhance the district’s attractiveness to new businesses, particularly in high-tech and sustainable industries. Additionally, while the provincial government has not established formal support specifically flagged for life sciences, British Columbia benefits from strong government support through programs like NSERC (Natural Sciences and Engineering Research Council) and Grand Challenges Canada. These programs play a pivotal role in the sector’s success by encouraging R&D activities and innovative solutions.

Saanich, through its strategic initiatives, aims to position itself as a hub for life sciences and high-tech industries. This commitment is reflected in its economic development strategy, which focuses on fostering innovation and supporting the growth of new and existing businesses. By doing so, Saanich aims to create a robust environment for the life sciences sector to flourish, contributing to the overall economic landscape of Greater Victoria.

### *Weakness*

- **Access to Capital.** Access to capital, particularly for startups, is a significant challenge. Due to the early-stage nature of the sector and its geographical isolation, it may be less appealing to investors compared to more established hubs. This lack of funding can impede the development and commercialization of innovative products and technologies. Startups often depend on external funding sources like venture capital, grants, and angel investors, but these options can be limited and highly competitive. To overcome these funding challenges, the sector may need to more actively engage with potential investors, demonstrate its strengths and successes, and explore alternative funding models like public-private partnerships and crowdfunding. Moreover, government support in the form of grants and tax incentives can play a vital role in alleviating the financial burden on startups. The amount of venture capital investment reported in Victoria has varied from $28 million in 2021 to $109 million in 2022, and $38 million in the first nine months of 2023.

- **Competitive Positioning.** The sector, while growing, is still considered early stage with few large companies. This impacts its competitive positioning against more established hubs with a greater concentration of large-scale enterprises. The dominance of smaller companies and startups, though beneficial for innovation, can lead to a lack of market power and visibility on a global scale. This early-stage nature of the sector can also affect its ability to attract significant investments and partnerships, which are often drawn to more established markets. To enhance its competitive positioning, the sector needs to focus on fostering collaboration among local companies, strengthening ties with larger global entities, and promoting its unique strengths and innovations on international platforms.

- **High Operational Costs for Startups**. The start-up cost of setting up and maintaining lab spaces is prohibitive for many new companies. Startups often face prohibitive operational costs, especially when setting up and maintaining laboratory spaces. These costs include expenses for specialized equipment, safety measures, and regulatory compliance. The high cost of real estate in the area further exacerbates this challenge, making it difficult for emerging companies to find affordable lab space. This financial burden can impede the growth of startups, which are essential for driving innovation in the sector. High operational costs also limit the ability of these companies to invest in other critical areas such as research and development, talent acquisition, and marketing. This issue calls for a need to explore cost-effective solutions, like shared lab facilities and government subsidies, to support the burgeoning startup ecosystem in the life sciences sector.

- **Dependency on External Investment.** There is a heavy reliance on external investment, particularly from the U.S., for growth and scaling is a notable weakness. This dependency can lead to challenges in maintaining financial stability and autonomy, especially in times of economic uncertainty or shifts in investment trends. Relying heavily on external funding can also mean that local companies may have to align their strategies with investor preferences, which might not always be in the sector's

best interest. To reduce this dependency, the sector needs to diversify its funding sources by exploring local and national funding opportunities, government grants, and partnerships. Building a stronger local investment community and encouraging reinvestment of profits into the sector can also help in creating a more self-sustaining ecosystem. Moreover, demonstrating success stories and potential for high returns can attract more diverse investors, reducing reliance on any single source or region.

- **Geographical Isolation and Limited Space for Expansion.** Challenges in scaling up due to space constraints, particularly for established companies. The geographical limitations of being on an island mean that there is limited available land for expansion. This restricts the ability of companies to increase their operations, impacting their growth potential. Additionally, the high demand for space in prime locations leads to increased rental costs, further complicating expansion efforts. This limitation not only affects the physical expansion of facilities but also limits the ability to increase workforce and production capacities. To address this, there needs to be strategic planning in urban development, focusing on creating more space for industrial and research activities and considering vertical expansion options where feasible. It can also affect the sector's ability to network and collaborate with other major life sciences hubs. Potential investors and collaborators, who may prefer more centrally located hubs, can perceive this isolation as a barrier.

- **Workforce Limitations**. The Greater Victoria life sciences sector faces difficulties in retaining talent, with skilled professionals often moving to larger hubs for better opportunities. This talent drain can be attributed to factors such as limited career advancement options, lower salaries compared to larger cities, and the desire for a more vibrant professional community.

- **Management and Entrepreneurial Challenges.** Within the Greater Victoria life sciences sector, there are notable challenges in the realm of management and entrepreneurship. One notable weakness is the limited availability of a robust local talent pool in marketing and management roles. This challenge is compounded by the presence of seasoned executives who may be nearing retirement, potentially resulting in a shortage of experienced leaders to spearhead growth and innovation initiatives. Moreover, the sector faces a deficiency in expertise across critical domains, including regulatory affairs, finance, business development, and management. The shortage of professionals with specialized knowledge in these areas poses difficulties in navigating complex regulatory landscapes, securing essential funding, and strategically expanding business operations.

### *Opportunities*

Some of the many opportunities that were highlighted in the key informant interviews include:

- **Promoting the Region's Potential.** Greater Victoria's life sciences sector is strategically positioned to address contemporary challenges and harness emerging opportunities. With the support of organizations like SIPP (South Island Prosperity Partnership) and its collaborative partners, the region can present a compelling case for investment and growth in the life sciences sector.

- **Leveraging Digital Health**. The Greater Victoria life sciences sector, with its diverse composition of innovative companies, can capitalize on the surge in digital health. By focusing on digital diagnostics and AI-driven personalized health solutions, companies can address the growing demand for

technology in healthcare. This includes developing apps for health monitoring, AI algorithms for diagnostic imaging, or digital platforms for patient data management. The proximity to high-quality academic institutions like UVic provides access to cutting-edge research and skilled graduates, enabling these companies to stay at the forefront of digital health innovation. Collaborative efforts between industry and academia can lead to the development of new technologies that improve patient care and health outcomes, positioning the sector as a leader in the digital health space.

- **Focus on Precision Medicine**. Precision medicine offers a significant opportunity for the Greater Victoria life sciences sector, especially with UVic's strong research foundation. By focusing on developing treatments and diagnostics that consider individual genetic and environmental factors, the sector can lead in creating more effective and personalized healthcare solutions. This approach aligns with global healthcare trends, providing opportunities for collaboration and funding in specialized medical fields. The implementation of precision medicine can revolutionize patient care and open new markets, positioning the sector as a vanguard in this emerging field.

- **Championing Women's Health Research**. Leveraging its R&D strengths, the sector has the opportunity to champion women's health research, an area with significant global impact. By focusing on conditions and diseases prevalent among women, the sector can contribute to closing the gender gap in healthcare. This focus can lead to the development of innovative treatments and healthcare solutions, addressing a critical need in global health. Collaborations with women's health organizations and international research bodies can amplify the impact of this research.

- **Global Connectivity Through Technology.** Utilizing its international outreach, the sector can enhance global connectivity through technology. By adopting digital tools and platforms, the sector can overcome geographical barriers, facilitating global collaborations and access to new markets. This approach enables the sector to stay connected with international trends, collaborate on research, and engage with customers worldwide. Embracing digital connectivity can also help in attracting international talent and investments, further bolstering the sector's global presence.

- **Demographics and Healthy aging.** Victoria's demographic trend towards an older population presents significant opportunities for the local life sciences sector. This demographic shift can drive demand for products and services tailored to the needs of older adults, including mobility aids, remote monitoring systems, and personalized healthcare solutions. Companies in Victoria can capitalize on this by developing innovations that address age-related health conditions, wellness programs, and home care services, tapping into a growing market both domestically and globally.

- **Medical Technologies.** With facilities like those provided by StarFish Medical and the Victoria Hand Project, Victoria has the capability to offer advanced manufacturing and prototyping services. These services are essential for the rapid development and testing of medical devices, allowing for quicker market entry. The University of Victoria's engineering programs also play a crucial role in supporting medical technology development, contributing to innovations like the Victoria Hand Project. Victoria's geographical location offers strategic advantages for accessing major markets in North America and the Asia-Pacific region. Medical technology companies in Victoria can leverage this position to export their products and services, expanding their market reach. This strategic positioning, combined with local expertise and advanced facilities, makes Victoria a hub for medical technology innovation and development.

### *Threats*

Some of the challenges and threats facing the region's life sciences and digital health sectors include:

- **Intense Global Competition.** The Greater Victoria life sciences sector faces intense competition from well-established global hubs in attracting investment, talent, and market share. This competition is not just for financial resources but also for breakthrough innovations and key partnerships. Global hubs, often located in larger markets with more robust ecosystems, offer greater visibility and opportunities, posing a challenge for Victoria to stand out. To counter this, the sector needs to emphasize its unique strengths, such as specialized research areas or innovative approaches. Developing niche areas of expertise and fostering a collaborative ecosystem can help Victoria carve out a unique position in the global life sciences landscape.

- **Economic Instabilities.** The sector is vulnerable to economic fluctuations, particularly from key investment sources like the U.S. Economic downturns or policy changes in major funding countries can have a direct impact on the availability of investment and research funding in Victoria. To mitigate this risk, diversifying funding sources and establishing more local and national investment avenues can be beneficial. Additionally, creating a stable and supportive local economic environment can help cushion the sector from global economic instabilities.

- **Technological Disruption and Cyber Risks.** Keeping pace with rapid technological changes and innovations is crucial. The sector must continuously update and adapt its technologies to remain competitive. This requires ongoing investment in research and development, as well as fostering a culture of innovation. Partnerships with universities and tech companies can facilitate access to cutting-edge technologies. Additionally, implementing training programs to upskill the workforce can ensure the sector stays abreast of technological advancements. With increasing the digitalization of the sector, protecting sensitive data and intellectual property is paramount. Cybersecurity threats pose risks to research data, patient privacy, and business operations. Victoria's life sciences sector needs to invest in robust cybersecurity measures and cultivate a culture of cyber awareness.

- **Talent Drain.** The ongoing risk of losing skilled professionals to larger, more established hubs is a significant threat. To retain talent, Victoria must create an attractive work environment, offering competitive salaries, career development opportunities, and a quality living environment. Building strong connections between industry and academia can also provide a steady pipeline of skilled graduates. Additionally, showcasing the unique lifestyle and professional opportunities available in Victoria can help retain and attract.

- **Supply Chain Disruptions**. Managing logistical challenges and dependencies in a globally interconnected supply chain is crucial, especially for an island location like Victoria. Disruptions can impact the availability of raw materials and the timely delivery of products. To address this, diversifying suppliers and developing local supply chains can reduce dependency on external sources. Investing in logistics infrastructure and technology can also improve supply chain resilience.

# 4. CONCLUSIONS AND RECOMMENDATIONS

## 4.1 MAJOR CONCLUSIONS

1. **Life sciences and digital health/health informatics are large economic sectors which are projected to grow rapidly over the next five to ten years.**

   The global market for medical devices is projected to increase from US$512 billion in 2022 to US$536 billion in 2023 to US $800 billion by 2030 (CAGR of 5.7%), driven largely by the growing prevalence of chronic diseases and the increasing emphasis of healthcare agencies toward early diagnosis and treatment is leading to an increasing number of patients undergoing diagnostic and surgical procedures. The global market for pharmaceutical manufacturing is projected to grow at a CAGR of 7.6%, from US$516 Billion in 2022 to US$929 billion by 2030 growing. A recent report by Grandview Research projects that the US market for digital health will increase from US$211 billion in 2022 to US$809 billion in 2030, an average annual increase of 18.6%, while the size of the worldwide market will reach $1.5 trillion by 2030.

   Growth in these sectors is being driven by increasing investment in R&D, increasing levels of industry collaboration and shared services, and digital transformation achieved through artificial intelligence, machine learning and cloud technologies which will lower delivery, development and manufacturing costs and accelerate research and development efforts. In the life sciences sector, significant investments are being made in Canada and internationally across a range of platforms such as gene and cell therapies, mRNA, and biologics as well as in novel medicines and novel approaches to make existing medicines more effective. Growth in the digital health sector will be driven by factors such as improved internet connectivity, adoption of 5G, increasing smartphone penetration, advancements in healthcare IT infrastructure, introduction of new apps (including those that incorporate deep learning, machine learning techniques & AI functionality,) and increased demand for virtual care. Development of digital health is a high priority for most governments given the potential impact on patient outcomes, quality of services, and system efficiency.

2. **The Governments of Canada and British Columbia have each identified the life sciences and digital health sectors as high priorities for development.**

   Life science and digital health are closely aligned with the healthcare sector, which is a major component of BC's economy directly employing about 300,000 people in BC and accounting for about 40% of Government of BC expenditures. Across Canada, the Canadian Institute for Health Information (CIHI) estimates that the total cost of healthcare in Canada was $242.6 billion in 2020 which is equal to 11.6% of the country's GDP.

   The high priority placed by government reflects not only the importance of health to our residents but also the economic potential on these sectors, the opportunities to create good-paying jobs and support the economic transition to a cleaner, more sustainable, knowledge-based economy; the potential impact on health outcomes, system efficiency, and ability of governments to quickly respond to future pandemics and public health emergencies; and opportunities to strengthen connections to the global life sciences and health supply chains and international markets.[25]

[25] BC Life Sciences Update 2021: Building on a foundation of innovation. March 31, 2021. Life Sciences British Columbia and Greater Vancouver Board of Trade

Reflecting this priority, the Government of BC has developed both a Life Sciences and Biomanufacturing Strategy for BC and a Digital Health Strategy for the province. The federal government launched Canada's Biomanufacturing and Life Sciences Strategy in 2021, committing $2.2 billion over seven years to rebuilding Canada's domestic biomanufacturing capabilities and growing a strong and competitive sector.

**3. BC intends to become a global hub for life sciences, building on the progress it has made in recent years.**

The sector in BC grew by more than 20% over the period from 2018 to 2021 in terms of businesses with employees, employment, wages, GDP and export of services. Employment in the sector grew by 23.3%, while overall employment in BC increased by only 0.6%. BC ranks third amongst Canadian provinces in terms of sector employment, behind Ontario (77,900) and Quebec (44,500) and just ahead of Alberta (18,700). The Life Sciences and Biomanufacturing Strategy for BC and a Digital Health Strategy for the province have laid out an ambitious plan to further develop these sectors.

**4. Within the Greater Victoria region, these sectors are well positioned to grow given the presence of leading education and research facilities; the resources currently in place and being developed to facilitate business startup, development and technology commercialization; the locational advantages of Greater Victoria; and available of government funding and other support.**

Vancouver Island currently accounts for about 15% of BC's life sciences businesses and 13% of sector employment. Our review identified more than 60 life sciences and health informatics companies active in the region, spanning product and services lines as diverse as contract manufacturing, contract research, medical devices, proteomics, biotech, pharmaceuticals, neurodegenerative diseases, diagnostics, cell-based therapies, metabolomics, 3D bioprinting, digital health cybersecurity, biomedical and mechanical engineering. The region has been home to leading companies such as StarFish Medical (Canada's largest medical device design, development, and contract manufacturing company), Aspreva, Aurinia, Eupraxia Pharmaceuticals, IPA (ImmunoPrecise Antibodies), MedGenesis, Redlen, and Procura as well as emerging and early-stage companies such as Axolotl Biosciences, the Victoria Hand Project, VoxCell, SISCAPA, Plurilock and StressMarq Biosciences.

The life sciences and digital health sectors have made significant advancements over the past five years and most industry representatives are optimistic in terms of anticipated growth over the next five years. Some of the key competitive advantages of the region include:

- *Universities, colleges, and technical institutes on southern Vancouver Island and across BC offer numerous educational and training programs and opportunities for researchers and entrepreneurs to collaborate on life sciences, digital health, and health technology innovation***.** The University of Victoria, which ranked 20$^{th}$ amongst in Canada's top 50 research universities in 2022, features leading research centres such as the Centre for Advanced Materials and Related Technology (CAMTEC), Genome BC Proteomics Centre, and Canadian Institute for Substance Use Research as well as the capabilities of the School of Health Information Science, and CanAssist. IP Policy at the University of Victoria helps facilitate spinoffs and academic startups. Other key elements of the research ecosystem in the region include the Royal Jubilee/ Vancouver Island Cancer Treatment and Research Centre, BC Cancer's Deeley Research Centre and Island Health. In addition, post-secondary institutions in the region and across the province are further integrating machine learning,

clinical informatics, health innovation, and digital transformation-related programs and partnerships into their programs.

The availability of high-skilled talent coming out of the University of Victoria is identified by life sciences and health informatics industry representatives as one of the major competitive advantages for the region. The industry has ready access to the recent graduate across a range of disciplines. UVic programs focused on Health Information Science, Biomedical Engineering, and Chemistry for Medical Sciences prepare graduates to work in the industry and development of a Faculty of Health is under consideration. Gustavson School of Business and Royal Roads University deliver management and entrepreneurship degree programs.

- *Major advances are being made in the development of the supporting infrastructure, providing startups and merging companies with access to labs, innovation spaces, business development services and other support needed*. Key resources such as the Coast Capital Innovation Centre and Babcock Canada Interaction Lab. Planned developments include a makerspace at the University of Victoria Engineering Lab Wing and a wet lab facility, as well as VILS plans for a BioManufacturing and Scaling facility. The new Immuno-Engineering and Biomanufacturing Hub being developed at BCIT in the Lower Mainland will also help develop the sector by further improving co-ordination between research, industry, and the health sector. Industry associations and networks such as the Vancouver Island Life Sciences Association, VIATEC and SIPP facilitate collaboration and coordination across the sectors.

- *Government is investing in the life sciences and digital health sectors*. Some of the leading sources of government funding include National Research Council Industrial Research Assistance Program (NRC IRAP), the Strategic Innovation Fund (SIF), Innovative Solutions Canada, CanExport SMEs, CanExport Innovation, the federal research granting agencies (NSERC, SSHRC, and CIHR), Canada Foundation for Innovation (CFI), PacifiCan, Genome BC, Genome Canada, and the BC Knowledge Development Fund. Innovate BC administers ScaleUp, the Venture Acceleration Program, the BC Fast Piot and Ignite. The recently created Michael Smith Health Research BC merged several entities. Tax incentives, including the federal and provincial Scientific Research and Experimental Development (SR&ED) Tax Incentive Programs, can help to offset the costs of technology development and adoption.

- *Local companies also benefit from other competitive advantages of being located in the region*. Businesses benefit from our geographic location as a gateway to Asia and major global centres, investment and regulatory climate, skilled workforce, favorable labour, utility and facility costs, low corporate income tax rates, access to clean power, access to government procurement opportunities and international agreements (such as CETA, CPTPP and CUSMA) and domestic trade agreements such as the Canadian Free Trade Agreement (CFTA) and the New West Partnership Trade Agreement (NWPTA).

  The high quality of life in the Greater Victoria area is an important draw for students, talent and companies. It was also suggested that, in a smaller-sized city like Victoria, it is much easier for people to connect, find likeminded companies or entrepreneurs that have done similar work or faced similar challenges, and work across disciplines.

- *A strong network for clinical trials*. Canada accounts for about 4% of global trials and about 20% of those trials are conducted in BC. The 1,350 active clinical trials active in BC in 2022 involved more than 600 investigators and over 100 sites. BC has established a provincial clinical trial management

system and assist with approvals, implementation, regulatory compliance, and audit preparations. and is making significant new investments to strengthen capabilities in BC.

**5. Some of the major challenges to development include the low profile of the region, limited access to capital, difficulties in attracting, developing, and retaining senior business management and scientific leaders, and concerns about rising costs.**

- *The region has a low profile*. Awareness of the region's research, capabilities, companies and education programs related to life sciences and digital health is very low internationally, nationally and even provincially. There is a need to raise the profile of the region to better attract companies, researchers, students, graduates and investment.

- *Access to capital is frequently identified as a challenge for companies in the Greater Victoria region*. Venture capital investments have declined sharply across North America and internationally. In 2022, venture capital investments in BC totaled $1.6 billion (106 deals) down from totaling $2.9 billion (105 deals) in 2021 but up from 69 deals and $893 million in 2020 and 77 deals and $1.3 billion in 2019. Over the three quarters of 2023, venture investments totaled $888 million (72 deals). The level of venture capital investment reported in Victoria across all sectors has increased from $28 million in 2021 to $109 million in 2022 before declining to $38 million through the first nine months of 2023.[26,27,28] Very little of the capital is accessed locally; most comes from the US. Difficulties in accessing capital can slow or constrain the ability of companies to commercialize their technology and scale operations, and can contribute to companies being attracted to relocate operations outside of the region as they further develop.

- *The cost of setting up and maintaining lab spaces and manufacturing facilities is prohibitive for most startups*. While the region is less expensive than Toronto, Seattle, and San Francisco, costs are rising. Access to land was identified as a particular priority. The high cost of real estate in the area makes it difficult for emerging companies to find affordable space. The Vancouver Island Technology Park (VITP) does not appear to have helped mitigate this issue.

- *Complex regulatory, tax, and procurement policies and processes are in place*. In particular, it was noted that local procurement policies make it difficult for companies to develop local markets and make important first sales. The small size of the local market can slow the development, testing and commercialization of new technologies.

- *Difficulties in attracting, developing, and retaining HQP* including science leaders and C-suite leadership that will support commercialization and company growth. Some of the gaps that were identified include people with experience in scaling life sciences companies, and senior business development and management leaders. It was noted that early-stage companies tend to have little access to expertise related to regulatory issues, finance, management and business development.

[26] https://www.cvca.ca/assets/files/reports/year-end-2022-vc-pe-canadian-market-overview/CVCA_VC_Q4_2022_FINAL-2.pdf
[27] https://www.cvca.ca/files/reports/year-end-2021-canadian-vc-pe-market-overview/CVCA_VC_Q4_2021-updated-031722.pdf
[28] https://reports.cvca.ca/books/xpqy/#p=9

## 4.2 KEY INFORMANT RECOMMENDATIONS

The key informants provided a range of recommendations regarding actions that could be taken to further develop the life science and digital health sectors in Greater Vancouver. The most common recommendations are outlined below:

### *Profile of the Region*

- Raise the profile of the life sciences and health informatics sectors amongst researchers, companies, talent, investors, and government funding programs.

### *Access to Talent*

- Strengthen partnerships between industry and post-secondary institutions related to life sciences and health informatics, using mechanisms such as MITACS, coops and internship programs that bring research-trained innovators into positions in industry.

- Undertake joint promotional programs design to attract talent (e.g. research, management and business development staff) to locate in the region.

- Promote the use of programs such as the Provincial Nominee Program and the international post-graduate category to encourage immigrants to choose Greater Victoria BC as a place to live, work and invest.

### *Access to Capital*

- Promote the region to investors, with a particular focus on increasing access to early-stage seed and venture capital. Suggestions included organizing private angel and venture financing events for up-and-coming companies, stage pitch competitions that come with investment funds, and working with banks and other investors to raise the profile of the sectors in Greater Victoria and encourage investment in local businesses.

### *Access to Business and Other Support*

- Develop an Innovation Asset Map that will help innovators including researchers and entrepreneurs more quickly identify pathways to accessing talent, capital, infrastructure and other resources.

- Build our capacity to conduct clinical trials by enabling infrastructure, accelerating skills training and streamlining the research approvals process.

### *Business Retention*

- Monitor conditions and undertake research to better understand the needs of the growing mid-size companies that are the most at risk of leaving the region.

## 4.3 MARKETING AND PROMOTION

### *Key Target Groups:*

Working in partnership, SIPP has released a new platform for business and talent attraction, "*Victoria Rising*" which launched in March 2024. Other marketing and promotional activities to attract business, investment, and talent to the region will stem from this. We recommend that efforts be targeted at:

- **Attracting companies** from a wide range of sub-sectors within the life sciences and digital health sectors. The existing sectors are highly diverse. While the region has some pockets of strength at the research, education and corporate levels, there is little evidence of clustering at this stage of development.

- **Attracting potential talent**. The industry has not identified a shortage of new graduates, although conditions may change as the sectors further develop. In the meantime, the primary focus would be to attract more experienced workers with a particular focus on people experienced in the scaling of such companies, including scientific, management and business development professionals.

- **Investors**. Access to capital is very limited, particularly at the seed level and as companies move on to Series A. It will be important to raise the profile of the regional sectors and find ways to better link companies with potential investors.

- **Educating local researchers, entrepreneurs and businesses** about the pathways to development and the sources of assistance available to them, including funding programs, research capabilities and business support services, and potential paths to investment.

A final target is funding programs. Key informants suggested that, on a per capita basis, life sciences and digital health businesses in the region have not been as successful in securing government funding as those in larger centres. Addressing this issue may be a function of both supporting researchers and businesses in identifying sources and developing funding applications and raising the profile of Greater Victoria as a centre for life sciences and digital health amongst the funding programs.

***Positioning:***

The positioning needs to be consistent with the reality. The life sciences and digital health sectors are in an early stage of development but have access to important economic drivers, particularly research and education, that will drive future growth.

> *Greater Victoria is a great place to grow your business or build your career in life sciences and digital health given the priority that the government, businesses and our institutions are placing on becoming a global leader. By locating here, you'll gain access to a world-class research and education ecosystem and participate in the emergence of a leading life science and digital health technology hub.*

**Key Messaging:**

- There is a province-wide push to make BC a global leader in life sciences and digital health.

- Greater Victoria is well-positioned to become a leading life science and digital health technology hub:

- More than 60 life sciences and health informatics companies are active in the region, spanning a diverse range of product and service lines

- The region is home to leading companies such as StarFish Medical (Canada's largest medical device design, development, and contract manufacturing company), emerging companies, and promising start-ups.

- Educational institutions, most notably the University of Victoria, provide ready access to new graduates across a range of disciplines relevant to the life sciences and digital health sectors.

- The University of Victoria ranked 20th amongst in Canada's top 50 research universities in 2022. The region features leading research centres and research programs in areas such as advanced materials, proteomics, substance use, biomedical engineering, chemistry for medical sciences, prosthetics, health informatics, and cancer.

- Resources such as an innovation hub, technology access centre, shared workspaces, and a technology park are in place and a new wetlab and makerspace are planned to support new and existing companies with technology and business development.

- Greater Victoria offers significant advantages in terms of our high quality of life, our strategic location on the west coast of North America and as a gateway to Asia and other major global centres, a positive investment and regulatory climate, a highly educated and skilled workforce, favourable labour, utility and facility costs, low corporate income tax rates, access to clean power, and access to government procurement opportunities and international trade agreements.

- A mix of federal, provincial, and industry-driven programs provide funding for research and innovation related to life sciences and digital health.

- Industry associations, networks, and other initiatives are active in facilitating communication and collaboration and leading further development of the sectors.

- Greater Victoria is a great place to grow your business or build your career in life sciences and digital health. By locating here, you'll gain access to a world-class research and education ecosystem and participate in the emergence of a leading life science and digital health technology hub.

# Appendices

# LIFE SCIENCES SECTOR PROFILE: VICTORIA, BC

## INTRODUCTION

The life sciences sector in Victoria, British Columbia, is a rapidly growing field that encompasses a wide range of activities including biotechnology, pharmaceuticals, medical devices, and healthcare services. This sector plays a crucial role in driving innovation, improving healthcare outcomes, and contributing to the local economy. With the support of esteemed institutions, significant investments, and a robust talent pipeline, Victoria is poised to become a leading hub for life sciences in Canada.

The life sciences sector in Victoria employs thousands of professionals in various roles such as researchers, technicians, and healthcare providers. The presence of esteemed institutions like the University of Victoria and local research centers ensures a steady talent pipeline. The sector provides high-paying jobs and fosters an environment conducive to professional growth and development.

## KEY STATISTICS

The life sciences sectors in BC have grown more than 20% over the period from 2018 to 2021 in terms of businesses with employees, employment, wages, GDP and export of services. Employment in the sector grew by 23.3%, while overall employment in BC increased by only 0.6%. BC ranks third amongst Canadian provinces in terms of sector employment, behind Ontario (77.900) and Quebec (44,500) and just ahead of Alberta (18,700).

Growth Metrics

- **Business Counts (with employees)** increased from 1,058 to 1,338, a growth of 26.5%.
- **Employment** grew from 15,500 to 19,100, a 23.2% increase.
- **Wages and Salaries** rose from $1.04 billion to $1.423 billion, a 36.9% increase.
- **GDP (current $ millions)** expanded from $2.013 billion to $2.611 billion, a 29.7% increase.
- **Services Exports** increased from $271 million to $370 million, a growth of 36.5%.

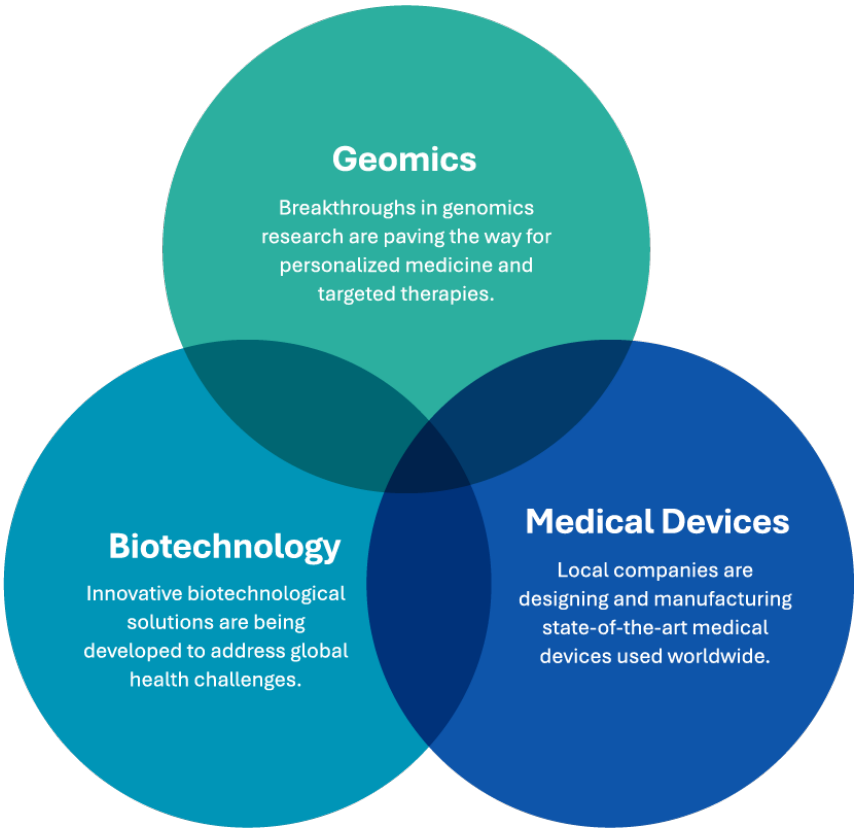
Employment Distribution

- **Research, Testing, and Medical Laboratories** account for 54% of employment.
- **Drugs and Pharmaceuticals** account for 26% of employment.
- **Medical Devices and Equipment** account for 20% of employment.

Regional Impact

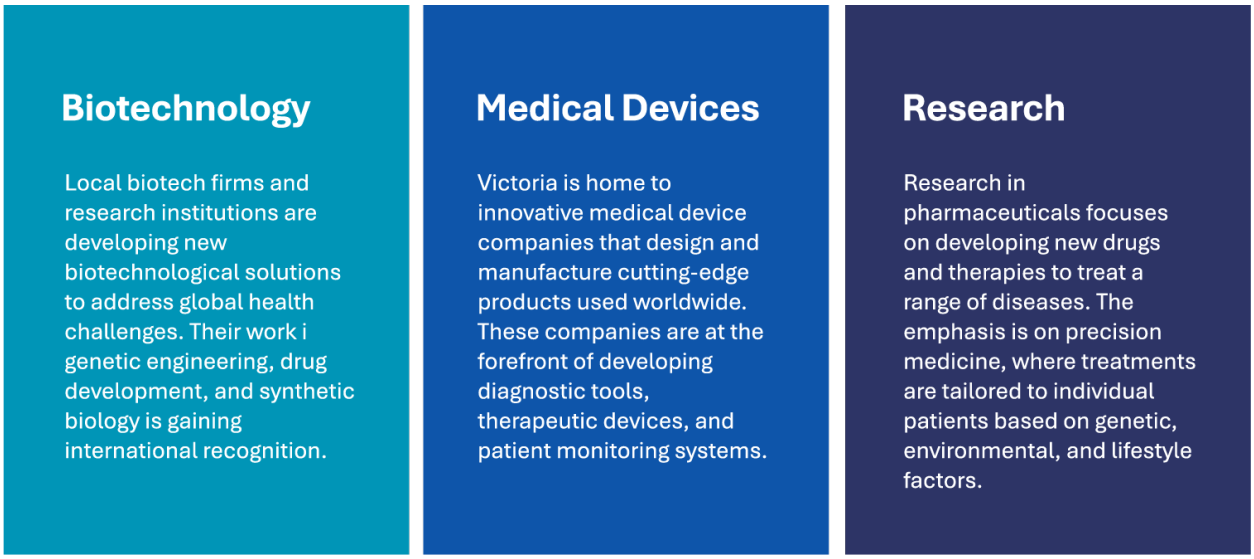
- Vancouver Island accounts for 15% of BC’s life sciences businesses and 13% of sector employment, highlighting the region's significant role in the broader provincial landscape.

## KEY INNOVATIONS




## RESEARCH AND DEVELOPMENT

R&D is a cornerstone of the life sciences sector in Victoria. The region boasts several research centers and collaborative projects focused on various aspects of life sciences. The life sciences sector is expected to grow going forward, driven by increasing investment in R&D, increasing levels of industry collaboration and shared services, and digital transformation achieved through artificial intelligence, machine learning and cloud technologies which will lower development and manufacturing costs and accelerate drug research and development efforts. The global market for medical devices is projected to increase from US$512 billion in 2022 to US$536 billion in 2023 to US $800 billion by 2030 (CAGR of 5.7%), driven largely by the growing prevalence of chronic diseases and the increasing emphasis of healthcare agencies toward early diagnosis and treatment is leading to an increasing number of patients undergoing diagnostic and surgical procedures.




## DIAMOND MODEL ANALYSIS

Victoria boasts a highly skilled workforce supported by strong educational institutions such as the University of Victoria (UVic). The region's robust research infrastructure includes advanced laboratories and specialized research centers, enhancing its capacity for innovation. Access to funding through government grants and venture capital further strengthens these conditions, creating an environment conducive to growth in the life sciences sector. Key resources include the UVic's Innovation Hub, which offers shared workspaces and access to cutting-edge technology, facilitating the development and commercialization of new products and services.

The demand for innovative healthcare solutions in Victoria is substantial, driven by an aging population and the increasing prevalence of chronic diseases. Local healthcare providers, including the Vancouver Island Health Authority, collaborate with life sciences companies to develop and implement cutting-edge technologies and treatments. This high local demand fosters a competitive environment, stimulating continuous improvement and innovation in healthcare solutions.

Victoria's life sciences sector benefits from the presence of related and supporting industries, including advanced manufacturing, information technology, and health services. These collaborations enhance the capabilities of life sciences companies, enabling them to develop state-of-the-art solutions. Organizations like the Vancouver Island Life Sciences Association (VILS) and VIATEC provide vital networking opportunities and support services, fostering industry collaboration and synergy.

The life sciences sector in Victoria features a diverse mix of startups, small and medium-sized enterprises, and established companies. This diversity fosters a dynamic and competitive environment where firms strive for innovation and excellence. Local companies benefit from supportive policies and initiatives by both provincial and federal governments, which promote research, development, and the commercialization of new technologies.

Government support is crucial to the growth of Victoria's life sciences sector. Policies that provide financial incentives reduce regulatory barriers, and support talent development are essential for maintaining the sector's competitive edge. Continued government investment in infrastructure and research facilities will further strengthen Victoria's position as a leading life sciences hub. Programs like the Strategic Science Fund and the Venture Capital Catalyst Initiative provide the necessary resources for sector growth.

## KEY PLAYERS AND INSTITUTIONS

Several key players and institutions drive the life sciences sector in Victoria

**University of Victoria**
The University of Victoria plays a pivotal role through its research programs, providing expertise and facilities that support life sciences innovation. The university's biology, biochemistry, and biomedical engineering programs produce a steady stream of skilled graduates who contribute to the sector's growth.

**Vancouver Island Health Authority (VIHA)**
VIHA is a significant healthcare provider collaborating on various research and development projects. Its involvement ensures that innovations are translated into practical healthcare solutions.

**BC Cancer Agency**
The Victoria branch of the BC Cancer Agency is involved in groundbreaking cancer research and treatment. Its work is crucial in advancing cancer therapies and improving patient outcomes.

**Local Life Sciences Companies**
Victoria is home to over 60 life sciences and health informatics companies, including prominent firms like StarFish Medical, ImmunoPrecise Antibodies, and Axolotl Biosciences. These companies are involved in a range of activities from medical device development to biotechnology research and pharmaceuticals.

## VICTORIA'S LIFE SCIENCES SECTOR OPPORTUNITIES

Victoria's life sciences sector is poised for remarkable growth, presenting numerous opportunities for innovation and development. By leveraging these opportunities, stakeholders, startups, companies, and investors can drive significant advancements in healthcare and contribute to the sector's global impact. Here are some key opportunities.

| Opportunity | Description | Strategic Approach |
|---|---|---|
| Promoting the Region's Potential | Victoria's life sciences sector is uniquely positioned for investment and growth, supported by organizations like SIPP and its collaborative partners. | Promote the region's potential to attract top-tier companies and investors. |
| Leveraging Digital Health | The surge in digital health presents a prime opportunity for innovation. The sector can develop cutting-edge apps for health monitoring, AI algorithms, and digital platforms. | Foster collaborations between industry and academia to develop groundbreaking digital health technologies. |
| Focus on Precision Medicine | Victoria is at the forefront of precision medicine, and UVic's strong research foundation enables the development of personalized healthcare solutions. | Develop personalized treatments and diagnostics, attracting investors interested in innovative healthcare. |
| Championing Women's Health Research | Opportunity to become a global leader in women's health research, addressing conditions and diseases prevalent among women. | Focus on women's health research to attract stakeholders and investors dedicated to making a meaningful impact. |
| Enhancing Global Connectivity Through Technology | Technology can significantly enhance global connectivity, facilitating international collaborations and access to new markets. | Adopt digital tools and platforms to overcome geographical barriers and expand global reach. |
| Addressing Demographics and Healthy Aging | The aging population presents a significant opportunity for innovation in age-related health conditions, wellness programs, and home care services. | Develop tailored solutions for the older demographic, positioning Victoria as a leader in healthy aging. |
| Advancing Medical Technologies | Advanced manufacturing and prototyping services are essential for rapidly developing and testing medical devices. | Leverage the region's strategic location and local expertise to become a hub for medical technology innovation. |

**Promoting the Region's Potential**

Victoria's life sciences sector is uniquely positioned for investment and growth, supported by organizations like the South Island Prosperity Partnership (SIPP) and its collaborative partners. This strategic support, combined with Victoria's robust infrastructure and talent pool, makes the region an ideal destination for life sciences ventures. By promoting the region's potential, we can attract top-tier companies and investors eager to be part of this burgeoning hub.

**Leveraging Digital Health**

The surge in digital health presents a prime opportunity for innovation in Victoria. With a diverse range of innovative companies, the sector is well-equipped to develop cutting-edge apps for health monitoring, AI algorithms for diagnostic imaging, and digital platforms for patient data management. Collaborative efforts between industry and academia can lead to groundbreaking technologies that enhance patient care and health outcomes, making Victoria a leader in digital health.

**Focus on Precision Medicine**

Victoria is at the forefront of precision medicine, thanks to the University of Victoria's strong research foundation. By developing personalized healthcare solutions that consider individual genetic and environmental factors, the sector can lead the way in creating more effective treatments and diagnostics. This focus on precision medicine not only improves patient outcomes but also attracts investors looking to support the next wave of healthcare innovation.

**Championing Women's Health Research**
Victoria has the opportunity to become a global leader in women's health research. By focusing on conditions and diseases prevalent among women, the sector can contribute to closing the gender gap in healthcare. This focus attracts stakeholders and investors dedicated to making a meaningful impact on women's health worldwide.

**Enhancing Global Connectivity Through Technology**
Technology can significantly enhance global connectivity in Victoria's life sciences sector. By adopting digital tools and platforms, the sector can overcome geographical barriers, facilitating international collaborations and access to new markets. This global reach is attractive to investors and companies seeking to expand their influence and impact.

**Addressing Demographics and Healthy Aging**
Victoria's aging population presents a significant opportunity for innovation in age-related health conditions, wellness programs, and home care services. Companies can develop tailored solutions to meet the needs of an older demographic, positioning Victoria as a leader in healthy aging. This focus not only addresses local needs but also attracts global attention and investment.

**Advancing Medical Technologies**
Victoria is well-equipped to offer advanced manufacturing and prototyping services essential for the rapid development and testing of medical devices. The region's strategic location provides easy access to major markets in North America and the Asia-Pacific region. Combined with local expertise and state-of-the-art facilities, Victoria is poised to become a hub for medical technology innovation and development.

## CHALLENGES IN THE SECTOR'S LANDSCAPE

Victoria's life sciences sector is poised for remarkable growth, presenting numerous opportunities for innovation and development. By leveraging these opportunities, stakeholders, startups, companies, and investors can drive significant advancements in healthcare and contribute to the sector's global impact. However, this promising landscape also comes with its set of challenges. Addressing these challenges effectively is crucial for maintaining the sector's momentum and ensuring sustained growth. Here are some key challenges and strategic recommendations for overcoming them:

| Challenges | Description | Strategic Recommendation |
|---|---|---|
| Intense Global Competition | Competition from global hubs in attracting investment, talent, and market share. Emphasize unique strengths and develop niche areas of expertise. | Emphasize unique strengths, develop niche areas, and foster collaboration. |
| Economic Instabilities | Susceptible to economic fluctuations, particularly from key investment sources. Diversify funding sources and establish local and national investment avenues. | Diversify funding sources, establish local and national investment avenues, and create a stable local economic environment. |
| Technological Disruption and Cyber Risks | Need to stay abreast of rapid technological changes and protect sensitive data. Invest in R&D, partnerships, training, and robust cybersecurity measures. | Invest in R&D, foster partnerships, implement training programs, and invest in robust cybersecurity measures. |
| Talent Drain | Risk of losing skilled professionals to larger hubs. Create an attractive work environment, offer | Create an attractive work environment, offer competitive salaries, promote |

| | | |
|---|---|---|
| | competitive salaries, and build industry-academia connections. | Victoria's unique lifestyle, and build industry-academia connections. |
| Supply Chain Disruptions | Managing logistical challenges and dependencies in the supply chain. Diversify suppliers, develop local supply chains, and invest in logistics infrastructure. | Diversify suppliers, develop local supply chains, and invest in logistics infrastructure and techno |

**Intense Global Competition**

Victoria's life sciences sector competes with well-established global hubs in attracting investment, talent, and market share. This competition extends beyond financial resources to include securing breakthrough innovations and key partnerships. Larger markets with more robust ecosystems often offer greater visibility and opportunities, making it challenging for Victoria to stand out. To address this, the sector must emphasize its unique strengths, such as specialized research areas and innovative approaches. Developing niche areas of expertise and fostering a collaborative ecosystem can help Victoria carve out a unique position in the global life sciences landscape.

**Economic Instabilities**

The sector is susceptible to economic fluctuations, particularly from key investment sources like the U.S. Economic downturns or policy changes in major funding countries can directly impact the availability of investment and research funding in Victoria. To mitigate this risk, it is essential to diversify funding sources and establish more local and national investment avenues. Additionally, creating a stable and supportive local economic environment can help cushion the sector from global economic instabilities, ensuring sustained growth and development.

**Technological Disruption and Cyber Risks**

Staying abreast of rapid technological changes and innovations is crucial for maintaining competitiveness. The sector must continuously update and adapt its technologies, requiring ongoing investment in research and development and fostering a culture of innovation. Partnerships with universities and tech companies can facilitate access to cutting-edge technologies while implementing training programs to upskill the workforce ensures the sector remains at the forefront of technological advancements. As digitalization increases, protecting sensitive data and intellectual property becomes paramount.

**Talent Drain**

The risk of losing skilled professionals to larger, more established hubs is a significant threat. To retain talent, Victoria must create an attractive work environment by offering competitive salaries, career development opportunities, and a high quality of life. Building strong connections between industry and academia can also provide a steady pipeline of skilled graduates. Additionally, promoting the unique lifestyle and professional opportunities available in Victoria can help retain and attract top talent, ensuring the sector's continued growth and innovation.

**Supply Chain Disruptions**

Managing logistical challenges and dependencies in a globally interconnected supply chain is critical, especially for an island location like Victoria. Disruptions can impact the availability of raw materials and the timely delivery of products. To address this, it is vital to diversify suppliers and develop local supply chains to reduce dependency on external sources. Investing in logistics infrastructure and technology can also improve supply chain resilience, ensuring the sector can meet demands and maintain operational efficiency.

## CONCLUSION

Victoria's life sciences sector stands at the cusp of remarkable growth and innovation, offering numerous opportunities for stakeholders, startups, companies, and investors. The region's unique strengths, including a highly skilled workforce, robust research infrastructure, and supportive government policies, create a conducive environment for advancing healthcare solutions and driving economic development. By addressing the identified challenges and leveraging the outlined opportunities, Victoria can solidify its position as a leading hub for life sciences in Canada and beyond. As the sector continues to evolve, the collaborative efforts of key players and the strategic utilization of available resources will be crucial in realizing its full potential and making a significant global impact.

# APPENDIX 2: COMPONENTS OF THE BC INNOVATION ECOSYSTEM WITH A FOCUS ON LIFE SCIENCES AND DIGITAL HEALTH

| Members of the Innovation Ecosystem | |
|---|---|
| **Industry Associations and Networks** | |
| Life Sciences BC (LSBC) | LSBC and its members work to expand BC's world-class life sciences sector, position BC as a global hub for life sciences and biomanufacturing, bring health improvements to British Columbians and strengthen the economy. |
| Canadian Biomaterials Society | The Canadian Biomaterials Society (CBS) is a not-for-profit dedicated to the development of biomaterials science, technology, and education in Canadian universities, industry, and government. CBS was established in 1973 and has a long-standing dedication to undergraduate and graduate biomaterials education. talent. |
| MetaboBC | The Metabolomics Consortium of British Columbia (MetaboBC) is a cluster of leading experts in metabolomics research. The team is comprised of multidisciplinary Board of working scientists across BC spanning areas in technological, analytical and instrumentation development, clinical metabolomics, practicing health-care professionals, oncology, computational sciences, and business development. |
| Vancouver Island Life Sciences Association (VILS) | With over 50 member companies and entities on the island, VILS represents members from biotech, medical device, pharmaceutical and software companies, local health authorities, students, and post-secondary institutions. |
| **Provincial Government** | |
| Ministry of Jobs, Economic Development, and Innovation (JEDI) - Trade and Invest British Columbia | Trade and Invest British Columbia helps organizations find and grow opportunities by facilitating foreign investment that enables businesses to successfully expand to and establish a business presence in British Columbia. It also helps build connections and partnerships by promoting the global trade of BC products and services. |
| Ministry of Health (MoH) | MoH is responsible for ensuring that quality, appropriate, cost-effective and timely health services are available for all British Columbians. It also supports health research programs, oversees organizations such as Health Research BC, leads the modernization of clinical trials in the province, and administers the recently announced BC's 10-year Cancer Care Action Plan (which includes $170M to the BC Cancer Foundation to support cancer research, including clinical trials across all cancer centres in the province). |
| Regional Health Authorities | The five regional health authorities across BC deliver health services to meet the needs of the population. The Provincial Health Services Authority oversees the co-ordination and delivery of programs and specialized health-care services. |
| Innovate BC | Innovate BC funds and delivers programs that support the growth of the BC economy by helping companies start and scale up, train talent that meets labour market needs, and encourage technology development, commercialization and adoption.<br>• ScaleUp supports companies that have completed product market validation and are ready to focus on ramping up product development, manufacturing, marketing and sales, as well as scaling their organizations and business opportunities to the point where their growth is self-sustaining.<br>• Fast Pilot helps SMEs design, build and operate a pilot plant or small demonstration of their technology in real-world conditions. It is delivered as a partnership between Innovate BC and the NRC IRAP<br>• The Venture Acceleration Program is designed to help growing technology companies and helps tech entrepreneurs accelerate the process of defining a proven business model. It is delivered by a team of Executives in Residence and supported by a province-wide network of partners and entrepreneurs.<br>• Ignite provides up to $300,000 in matching funds for innovation projects in the areas of natural resources or applied sciences. Projects must include at |

| Members of the Innovation Ecosystem | |
|---|---|
| | least one academic partner and one industry partner and have matching funds from industry or other government sources at a ratio of 2:1. |
| InBC Investment Corp | InBC Investment Corp. (InBC) is a strategic investment fund created by the provincial government which is investing $500 million in venture funds and companies with a strong connection to BC and a focus on both meaningful impact and profit. |
| Tax Credits | Canadian controlled businesses in BC may qualify for a scientific research and experimental development (SR&ED) tax credit top up of 10% if they qualify for the federal government SR&ED tax credit of up to 35%. In addition, the Small Business Venture Capital tax credit encourages investors to make equity capital investments in BC small businesses |
| The BC Knowledge Development Fund | The BC Knowledge Development Fund (BCKDF) is BC's primary capital investment program in support of research infrastructure in the province. The BCKDF provides funding for British Columbia's public post-secondary institutions, research hospitals and affiliated non-profit organizations on a cost-shared basis with federal Canada Foundation for Innovation. |
| Michael Smith Health Research BC | Health Research BC is focused on strengthening research infrastructure and capacity across the province, supporting evidence informed decision-making in health care, increasing the competitiveness of BC's life sciences sector, and maximizing the social and economic benefits of health research through programs including:<br>• Health Professional-Investigator Program – Supports health professionals to develop and advance research and bring evidence to practice.<br>• Health System Impact Fellowship – Supports the CIHR program that connects doctoral and post-doctoral awardees with experiential learning in health system organization.<br>• Research Trainee Program – Supports health researchers in the training phase of their research career.<br>• Scholar Program – Supports early career health researchers, helping them form their own research teams, train the next generation of scientists and develop world-leading research programs.<br>• Clinical Research Professional Certification Funding Program – Offers clinical research team members with financial and resource support to become internationally certified.<br>• Convening & Collaborating Program – For teams of researchers and users to co-develop research that can directly impact patients.<br>• Reach Program – Supports researchers and research users' teams to disseminate evidence to impact health and care in BC<br>• Match funding – To help qualify BC-based researchers applying to non-BC government-funded research competitions.<br>Partnered awards – To create co-funding partnerships with other organizations and leverage research investments. |
| Population Data BC (PopData) | PopData provides academic research with a range of services supporting access to a comprehensive collection of population health data, including health services, education, social, workplace and environmental data (including longitudinal, person-specific, de-identified data on BC's 5.3 million residents). |
| **Federal Government** | |
| Innovation, Science and Economic Development Canada | ISED advances the conditions for investment, enhances innovation, increases Canada's share of global trade, and builds a fair, efficient and competitive marketplace. It is responsible for Canada's Biomanufacturing and Life Sciences Strategy and oversees multiple programs and initiatives in support of industry and science.<br>• The Strategic Innovation Fund provides funding for large business projects and national innovation ecosystems (over $10 million in requested contribution).<br>• Innovative Solutions Canada (Challenge-based program) partners with Canadian small businesses to develop novel solutions, including testing and validation of prototypes, and preparing a pathway to commercialization. It also enables the |

| Members of the Innovation Ecosystem | |
|---|---|
| | Government of Canada to buy and test pre-commercial goods and services in a real-life setting.<br>- The Accelerated Growth Service helps growth-oriented Canadian businesses expand by helping them access the key government services they need, such as financing, exporting, innovation and business advice.<br>- The Global Hypergrowth Project (GHP) is a new scale-up service for revenue-generating companies. It will provide support to a select group of up to 15 Canadian firms to help them navigate and overcome challenges, from exporting barriers to regulatory challenges and beyond.<br>- The Intellectual Property Strategy supports Canadian businesses, creators, entrepreneurs and innovators with access to the best possible IP resources through several resources and programs such as IP awareness, education and advice, strategic IP tools for growth and IP legislation.<br>- Through the Venture Capital Catalyst Initiative, the Canadian government is building a portfolio of large funds-of-funds and alternative models to strengthen the VC ecosystem.<br>- The Strategic Science Fund (SSF) supports third-party science and research organizations (not-for-profit organizations incorporated in Canada) that cannot access other federal funding programs. The SSF is jointly administered with Health Canada. |
| Global Affairs Canada | GAC manages diplomatic relations, promotes trade and provides consular assistance.<br>- The Trade Commissioner Service provides strategic market information and market access solutions for Canadian companies looking to export, invest abroad or develop international partnerships.<br>- CanExport Associations can provide national industry associations and trade organizations with up to $250,000 in annual funding for new or expanded international business development activities.<br>- CanExport Innovation supports researchers who aim to commercialize technology by pursuing collaborative international R&D opportunities through partnerships in foreign markets.<br>- CanExport SMEs provides direct financial assistance to SMEs registered in Canada to help with the development of new export opportunities and markets, especially in high-growth emerging markets.<br>CanExports Community Investments provides support to Canadian communities seeking to improve their capacity to attract, retain and expand foreign direct investment in order to create jobs for Canadians, support innovation and increase exports |
| Pacific Economic Development Canada | PacifiCan advocates for BC in national economic policy, programs and projects and offers services and funding programs to local businesses and communities.<br>- Business Scale-up and Productivity program provides interest-free, repayable funding to high-growth businesses that are scaling and producing innovative goods, services or technologies.<br>The Regional Innovation Ecosystem invests in not-for-profit organizations that support cluster growth in priority sectors, including the life sciences. This includes scaling-up businesses, commercializing technology, improving productivity, building ecosystem capacity and supporting business acceleration and incubation. |
| National Research Council Canada | NRC provides advice, connections and funding to help SMEs increase their innovation capacity and take ideas to market. The Industrial Research Assistance Program (IRAP) provides financial assistance, advisory services and connections to business and R&D expertise. Through IRAP, NRC's Industrial Technology Advisors (ITAs) offer customized support through extensive networks of regional, national and international partners IRAP will be moved under the Canada Innovation Corporation umbrella once the CIC is established. |

| Members of the Innovation Ecosystem | |
|---|---|
| Canada Innovation Corporation | CIC is a newly established private sector-led Crown corporation established to advance Canadian business investment in research and development and promote economic growth. Once the corporation is established, it will take over delivery of IRAP from the NRC |
| Health Canada | Health Canada ensures that high-quality health services are accessible in the country and works to reduce health risks for Canadians. It is the federal regulator and competent authority for drug and health product review, and for clinical trial approvals, oversight and inspections. |
| The Canada Foundation for Innovation | CFI invests in research facilities and equipment in Canada's universities, colleges and research hospitals. The main ongoing programs are:<br>• The John R. Evans Leaders Fund for small equipment (up to $2 million).<br>• Innovation Fund for major projects.<br>• College Fund for applied research linking colleges and industry or communities.<br>Biosciences Research Infrastructure Fund (BRIF), a one-off $500 million competition to support the bioscience infrastructure and associated operating costs of postsecondary institutions and research hospitals |
| The Canadian Institutes of Health Research | The Canadian Institutes of Health Research (CIHR) is Canada's federal funding agency for health research. Composed of 13 institutes each dedicated to one area, the CIHR collaborates with partners and researchers to support the discoveries and innovations that improve health and strengthen the health-care system. The CIHR includes a series of six funding programs: New Frontiers in Research Fund, training award programs (Vanier Canada Graduate Scholarships, Banting Postdoctoral Fellowships), a project grant program; a foundation grant program; initiatives; and prizes. CIHR also offers funding for several clinical trials |
| Natural Sciences and Engineering Research Council | NSERC promotes and supports discovery research and fosters innovation by encouraging Canadian organizations to participate and invest in post-secondary research projects. Funding programs include student scholarships, discovery research programs, innovation research programs, chairs and some minor programs for instrumentation and equipment. |
| Social Sciences and Humanities Research Council (SSHRC) | SSHRC administers the Canada Biomedical Research Fund on behalf of three federal research funding agencies. Under Canada's Biomanufacturing and Life Sciences strategy, the CBRF is investing $250 million over four years, starting in 2022-23, to support research and training. The CBRF contributes to create new technologies and support the translation of academic research into applications and commercial products for five selected Canadian research hubs, including Canada's Immuno-Engineering and Biomanufacturing Hub in BC. |
| **Non-profits** | |
| MITACS | Mitacs is a national, not-for-profit funded by both federal and provincial governments that co-funds graduate student internships to promote research and innovation across Canada by building linkages between academia and industry. Programs include:<br>• Accelerate (grad student interns): four to six-month internships for graduate students and post-doctoral fellows to work on approved projects at partner companies under the guidance of a faculty expert.<br>• Elevate (post-doctoral fellows): two-year postdoctoral fellowships on research projects with partner organizations. It includes a research management training program and a postdoctoral fellowship.<br>• Entrepreneur International (start-ups): travel grants to Canadian startups housed in university-linked incubators. The grant enables startups to connect with international incubators (linked to an academic institution) to explore new business development opportunities in global markets. |
| Genome BC | Genome BC connects academic researchers, industry partners and public sector interests, invests in startup companies, and catalyzes partnerships to drive societal, environmental and economic benefits for BC. Programs include:<br>• GeneSolve Program: supports projects providing solutions to challenges from users across industry sectors. |

| Members of the Innovation Ecosystem | |
|---|---|
| | • Industry Innovation Program: early-stage commercialization support for companies developing BC-based technologies.<br>• Sector Innovation Program: supports projects which address the needs of key sectors and have the potential to generate social, environmental and economic benefits.<br>Societal Issues Competition: for projects that identify and study the social issues that emerge from genomics-based innovations. |
| Genome Canada | Working in partnership across sectors, Genome Canada provides large-scale investments that develop new technologies, connect the public sector with private industry and create solutions to problems of national interest. Coordinates activities with the pan-Canadian network of Genome Centres. including Genome BC, it invests in and coordinates genomics research, innovation, data and talent |
| BioTalent Canada | BioTalent offers the Career Starter Program and Skilled Newcomer Internships. Career Starter facilitates the transition of barriered youth into the labour market by bridging the gap between talent and industry and introducing participants to the bio-economy. The Skilled Newcomer Internships for the Bio-Economy covers 75% of a participant's salary up to a maximum of $20,000 for bio-economy employers to hire, accommodate and train internationally educated professionals for up to a nine-month work placement. |
| Information and Communication Technology Council (ICTC) | ICTC offers Work-Integrated Learning (WIL) Digital that provides wage subsidies to help employers grow their businesses by hiring post-secondary students. WIL Digital provides 50% of the student's salary up to $5,000, or 70% up to $7,000 for underrepresented students. |
| **Academic Institutions** | |
| University of British Columbia | UBC had over $773 million in research revenue in 2021/22. Key areas of research related to life sciences include molecular genetics, genomics, bioengineering, personalized medicine, RNA vaccines and treatments, lipid nanoparticles, healtMitacsh data, artificial intelligence and microbial research. UBC's Okanagan campus in Kelowna has strengths in population health and chronic disease prevention, especially in the areas of spinal cord injury, behaviour change, biodiversity, bio-micro and nanotechnologies, and in the therapeutic benefits of cannabis. Life sciences related institutions at UBC include:<br>• School of Biomedical Engineering (SBME) aims to provide a clear route from the discovery of new fundamental biomedical technologies to their innovative application and development to benefit human health.<br>• Life Sciences Institute (LSI) performs interdisciplinary science to discover the fundamental biological mechanisms underlying health and disease and translate this knowledge into new therapies. LSI members conduct research on diabetes, cardiovascular disease, immune responses, infectious disease, cancer biology, developmental disorders, bacterial regulation, neuroscience, structural biology and molecular epigenetics. The Life Sciences Institute's translational research and innovative interdisciplinary sciences is improving health care practices and identifying more sustainable methods to harvest natural resources while minimizing environmental costs.<br>• Michael Smith Laboratories brings together biologists and engineers from several faculties, including Science, Medicine, Applied Science, Forestry, and Land and Food Systems to discover innovative solutions to problems of societal importance. Michael Smith Laboratories Leads biotechnology research with applications to health, agriculture, forestry, land and food systems to address society's most important problems<br>• Djavad Mowafaghian Centre for Brain Health is a training and research hub for neuroscience, neurology, psychiatry and rehabilitation.<br>• Innovation UBC provides support for translating research into new treatments, services and products by facilitating research partnerships, knowledge exchange, commercialization and venture building. More than 125 of UBC's |

| Members of the Innovation Ecosystem | |
|---|---|
| | spinoff companies have been in the life sciences sector, including Precision Nanosystems, AbCellera, Acuitas Therapeutics and ABOzymes.<br>• The Nanomedicines Innovation Network (NMIN), hosted by UBC, advances "smart" medicines to cure disease by delivering small molecule drugs specifically to disease sites and enabling the clinical use of gene therapies.<br>• The Data Science and Health (DASH) Cluster is building a system to link health research data in BC by enhancing the availability and use of health data to improve diagnosis, treatment, and prevention of disease, and enable computational tools that speed discovery of new knowledge, optimizing health outcomes. |
| University of Victoria | UVic had over $145 million in research revenue in 2022. Research centres include:<br>• The Centre for Advanced Materials and Related Technology (CAMTEC) is a growing interdisciplinary centre that provides shared equipment to researchers for fundamental and applied research and serves as a training centre. CAMTEC operates the BioCore, a facility in which local companies and UVic researchers access equipment and advanced training within a unique biosafety-certified co-working space.<br>• The BioInnovation Hub opened in 2022 and is a collaborative workspace that UVic developed in partnership with Vancouver Island Life Sciences (VILS), where entrepreneurs and industry can connect with researchers, gain access to CAMTEC equipment and expertise, and explore opportunities for collaboration.<br>• The UVic-Genome BC Proteomics Centre is the central hub of the Pan-Canadian Proteomics Centre and a major node in the Metabolomics Innovation Consortium, leading national efforts to provide 'omics technologies and services to academia and industry.<br>• The Canadian Institute for Substance Use Research is a community-based network that studies substance use and addiction to promote health and reduce harm, and that develops and deploys new drug checking services to combat the drug overdose crisis.<br>• CanAssist develops innovative technologies, programs and services for people who experience physical or cognitive barriers.<br>• The Research Partnerships and Knowledge Mobilization unit connects faculty and students with external partners – including industry, not-for-profit organizations and communities. The unit has supported over 160 startup companies with over 580 patents filed to date, including 4M BioTech, Axolotl Bioscience and IntegritE-DNA.<br>• The School of Health Information Science is one of the oldest and most respected Health Informatics programs in the world. Some of the research strengths of the School include human and social aspects of health care information systems and technologies; methods for health care system analysis, design and evaluation; consumer health informatics; organizational management aspects of healthcare IT; healthcare system adoption; usability engineering in healthcare; and healthcare data analytics. |
| Simon Fraser University | SFU generated research income of $170 million in 2021. Leading research areas related to life sciences include big data research (bioinformatics, genomics, health sciences, neuroscience).<br>• SFU's Big Data Hub uses the Supercomputer Cedar, one of the most powerful academic supercomputers in Canada. SFU hosts the new provincial Quantum Algorithms Institute to serve increasingly data intensive research, including in the life sciences.<br>• ¡4D LABS is a core materials science research facility that offers customized R&D for researchers and industry, including medical technology, and transforms ideas into commercial-ready engineered materials and devices. |

| Members of the Innovation Ecosystem | |
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| | • Bio3 Lab is a biosecure facility dedicated to infectious disease research activities on the CL3required level. The facility is also available to non-SFU academic and corporate researchers.<br>• The Pacific Institute on Pathogens, Pandemics and Society (PIPPS) is an interdisciplinary research institute hosted at SFU.<br>• The Institute for Neuroscience and Neurotechnology (INN) is a cross-disciplinary research hub that empowers its members to engage in cutting-edge neuroscience research, training and community engagement.<br>• SFU serves as the host of Circle Innovation, which supports BC digital health technology companies in their growth. Companies include Alectos Therapeutics, Mesentech and Shield-X.<br>• Embedded at Surrey Memorial Hospital, SFU's ImageTech Lab is a leading medical imaging research facility focused on bringing innovations to medical imaging.<br>• The eBrain Lab focuses on neuro-engineering solutions to prevent and treat mental health illnesses and addiction. The lab brings together world-leading expertise in multimodal neuromodulation technologies, wearable sensors, and digital health solutions involving artificial intelligence.<br>• Located next to Surrey Memorial, SFU's WearTech Labs works with researchers and their partners across academia and industry to explore and develop wearable technology to record biomedical signals and vital signs, design garments with transformative textile embedded with innovative artificial muscles, and innovate miniaturized systems that can harvest energy from the body and environment to power wearable biomedical technologies. |
| University of Northern British Columbia | UNBC generated over $15 in research income in 2021. Its research strengths are in the area of northern, rural and environmental health.<br>• UNBC's Health Research Institute works with the Northern Health Authority and other partners to conduct biomedical research, facilitate its translation and provide training for future health professionals.<br>• The recently announced Northern Centre for Clinical Research (NCCR) will work with the UBC Faculty of Medicine and the Northern Health Authority.<br>• UNBC is the host institution for the Centre for Technology Adoption for Aging in the North (CTAAN). CTAAN tests, pilots, implements and promotes technology solutions that can help older residents of northern and rural communities to age happily and healthily in those communities. |
| BCIT | BCIT focused primarily on educating and training workers for the industry, including programs delivered through the:<br>• Health Sciences Centre: BCIT offers over 32 health education programs, including nursing, diagnostic imaging, laboratory science and allied health, and specialty nursing programs.<br>• Biotechnology Program offers a joint honours degree with UBC. At BCIT, faculty are engaged in research in areas such as cancer biomarker discovery and vaccine development.<br>• The National Biomanufacturing Training Centre (NBTC) will offer professional hands-on biomanufacturing training to current and future industry employees. BCIT will partner with the Canadian Alliance for Skills and Training in Life Sciences (CASTL) to deliver the training, which will use the most advanced biomanufacturing curriculum and equipment.<br>• The Centre for Applied Research and Innovation hosts research groups such as:<br>  ○ NRG Phytoanalytics Laboratory focuses on medicine, gastrointestinal disease, psychiatry, and geriatrics. It is fully equipped for research and has the first certified food screener in North America.<br>  ○ MAKE+ PART (Product and Process Applied Research Team) is the only academic product development group in Canada that meets the ISO 13485 |

| Members of the Innovation Ecosystem | |
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| | requirements for a comprehensive quality management system for the design and manufacture of medical devices. |
| **Research Centres** | |
| BC Cancer Agency | BC Cancer Research is the research arm of BC Cancer. Part of the Provincial Health Services Authority, BC Cancer conducts epidemiological and clinical research on cancer prevention, early diagnosis, molecular characteristics of the cancer process and new treatments using drugs and radiotherapy. Research is conducted by more than 60 labs and over 70 principal investigators organized into nine departments and programs: Integrative Oncology, Genome Sciences, Molecular Oncology, Terry Fox Laboratory, Deeley Research Centre, Clinical Research, Cancer Control Research, Lymphoid Cancer Research, and Experimental Therapeutics. It has world-class facilities and platforms including genomics, bioinformatics, imaging, drug development and tissue banking. |
| TRIUMF | Canada's particle accelerator conduct research in isotope science and innovation, particle and nuclear physics, and life sciences. The TRIUMF Institute for Advanced Medical Isotopes (IAMI) is undertaking research and production of isotopes for medical imaging like PET and SPECT scans, cancer treatment and tracers for research on various neurological illnesses. |
| Vancouver Coastal Health Research Institute Research | As the top-funded and largest hospital-based research institute in Western Canada, VCHRI's works to improve quality of life and deliver high-quality medical care. The research community includes more than 2,400 personnel engaged in several research programs and in 10 research centres: the Vancouver Prostate Centre; the BC Centre on Substance Use (BCCSU); Centre for Cardiovascular Innovation; Centre for Clinical Epidemiology and Evaluation (C2E2); Centre for Lung Health; Centre for Hip Health and Mobility (CHHM); Djavad Mowafaghian Centre for Brain Health; Immunity and Infection Research Centre; International Collaboration On Repair Discoveries (ICORD); and Ovarian Cancer Research (OVCARE). |
| Providence Health Care Research Institute | PHCRI includes five research centres and over nine independent clinical research groups with clinical, epidemiological and laboratory research expertise in the fields of HIV/ AIDS, heart and lung disease, renal disease, mental health and addictions, substance use, chronic pain, emergency medicine, gastrointestinal disease, psychiatry, geriatrics, organ failure, and Indigenous health. For example:<br>• The BC Centre for Excellence in HIV/AIDS (BC-CfE) is Canada's largest HIV/AIDS research, treatment and education facility, both nationally and globally recognized for the made-in-BC Treatment as Prevention strategy (TasP). The BC Centre distributes antiretroviral therapy and monitors HIV-related outcomes.<br>• The Centre for Health Evaluation and Outcome Sciences (CHÉOS) is a leading health outcomes research organization evaluating the effectiveness of health interventions at the population level.<br>• The Centre for Heart Lung Innovation (HLI) is a translational research centre using basic molecular and cellular research discoveries to develop innovative approaches to prevent and treat heart and lung disease through complementary and connected clinical research.<br>• St. Paul's Hospital and Health Campus (opening in 2026) will unite century research and innovation with patient care, enabling BC-made therapies and technologies to reach patients more quickly. The Clinical Support and Research Centre (CSRC) will be a state-of-the-art research and medical complex for discovery, research and innovation that will include wet and dry labs, state of-the-art core facilities, a large Innovation Centre with sandbox and ideation space, prototyping and simulation facilities. The CSRC will be the new location of the Providence Health Care Research Institute. |
| Women's Health Research Institute | The Institute is a leading academic women's and newborn research centre that is devoted to improving the health and health care of girls and women. Its research programs include cancer, sexual and reproductive health, chronic diseases, and maternal, fetal and newborn health. |

| Members of the Innovation Ecosystem | |
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| BC Children's Hospital Research Institute. | The Institute works in close partnership with UBC, and its research portfolio includes basic, clinical, population and public health research. The Digital Health Innovation Lab at BC Children's Hospital Research Institute is focused on performing innovative research at the interface between technology and patient care. Their vision is to lead the realization of innovation in sensor/data-driven health care that encompasses prevention, diagnostics, and treatment. |
| Immuno-Engineering and Biomanufacturing Hub (cross-universities, led by UBC). | The Hub brings together over 50 partners, including nine post-secondary institutions and private, public and non-profit partners, to accelerate the development and manufacturing of medicines. The Hub plans to establish a seamless drug development pipeline for immune-based therapeutics that can be rapidly produced domestically, using the latest innovations in biomanufacturing, in response to future pandemics and other health threats. |
| **Accelerators, Incubators and Early-Stage Scaling** | |
| adMare BioInnovations | Created in 2019, adMare is a pan-Canadian organization headquartered in Vancouver that builds life sciences companies, ecosystems and talent to drive the growth of the Canadian life sciences industry into a sustainable and world-leading sector. |
| Creative Destruction Lab (CDL) - Vancouver | CDL-Vancouver (formerly known as CDL-West) is located in Vancouver, BC at the Sauder School of Business, University of British Columbia. Vancouver is a fast-growing tech hub on the West Coast, combining a Silicon Valley time zone with an Asia-facing outlook. CDL-Vancouver hosts Advanced Therapies, Biomedical Engineering, Cancer, Compute, Climate, and Minerals, focusing on the convergence of technologies that improve human health and wellness and advance solutions to preserve our natural world. |
| entrepreneurship@UBC | The HATCH Venture Builder is a collaborative initiative between entrepreneurship@UBC and the Institute for Computing Information and Cognitive Systems (ICICS). It supports UBC innovators who are building ventures driving social, environmental and economic impact. |
| SFU Venture Labs | SFU VentureLabs accelerates high-growth-potential technology-based companies in Vancouver and across British Columbia. It connects entrepreneurs with experienced mentors and a network of resources focused on tackling the unique challenges and complexities faced by technology innovators. |
| New Ventures BC | New Ventures BC is a non-profit organization that recognizes, encourages, and supports entrepreneurship in BC's technology sector. It runs the New Ventures BC Competition, offering education, coaching and awarding $250,000 and prizes to BC startups. They offer a mentored, Distance Venture Acceleration Program focused on customer discovery and Market Validation Training. The Innovator Skills Initiative grant program offers tech companies and startups up to $10,000 a year to hire a BC post-secondary student. |
| Circle Innovation | Circle Innovation, formerly known as Digital Health Circle and incorporated as AGE-WELL National Innovation Hub Foundation – BC, is a non-profit founded in 2016 that facilitates technology solutions and innovation. Circle helps companies connect with consumers, tech providers and other stakeholders to solve R&D challenges, grow revenues, create jobs, and develop emerging technologies across Canada. The Healthtech SME Program provides access to technology experts and a stakeholder network to help entrepreneurs develop products faster, scale their business, and pursue new opportunities and access project cost sharing opportunities related to user engagement studies, data analytics, stakeholder and knowledge connection, and market research and analysis. |

# APPENDIX 2: PARTIAL LISTING OF COMPANIES IN THE REGION

| Organization | Industries | HQ | Funding Raised | Rounds | Top 5 Investors | Founded | Revenues | Employees | Website |
|---|---|---|---|---|---|---|---|---|---|
| 4M BioTech | Smart dressing to enhance wound treatment | Victoria | | | | | | 11-50 | https://4mbiotech.com/ |
| Accuro Technologies | Manufacturing, Medical, Medical Device | Victoria | — | — | — | 2014 | $1M to $10M | 1-10 | www.accurotechnology.com |
| Aloyd Fitness Equipment | Health Care | Victoria | — | — | — | — | $1M to $10M | 11-50 | www.aloyd.com |
| Amira Health | Health Care, Software | Victoria | — | — | — | 2009 | — | 1-10 | www.amirahealth.com/ |
| ASEP Medical | Biotechnology, Health Care, Medical | Victoria | $200,000 | 1 | The NanoMedicines Innovation Network | 2020 | — | 1-10 | asepmedical.com |
| Aspreva Pharmaceuticals | Health Care, Medical, Pharmaceutical | Victoria | $57,000,000 | 1 | Vivo Capital, InterWest Partners, HBM Partners, Sprout Group, Axiom Ventures | 2001 | $100M to $500M | 1001-5000 | www.aspreva.com |
| Aurinia Pharmaceuticals | Biopharma, Biotechnology, Health Care, Medical, Therapeutics | Victoria | $658,461,737 | 7 | RA Capital Management, Apple Tree Partners, Redmile Group, New Enterprise Associates, Lumira Ventures | 40544 | $50M to $100M | 251-500 | www.auriniapharma.com/ |
| Avant Sleep | Health Care, Medical, Outpatient Care | Langford | — | — | — | 2010 | $1M to $10M | 11-50 | avantsleep.com |
| Axolotl Biosciences | 3D Printing, 3D Technology, Biotech | Victoria | — | 1 | Innovate BC | 2020 | — | 1-10 | www.axolotlbiosciences.com/ |
| BCACC | Association, Consulting, Health Care | Victoria | — | — | — | 1988 | $1M to $10M | 11-50 | bcacc.ca/ |
| BioDiem | Biopharma, Biotech, Pharmaceutical | Victoria | — | — | — | 2005 | — | — | www.biodiem.com/ |
| Cagley Johnson Consulting Inc. | Biotechnology, Contract Research & Scientific Services, Professional Services, Strategic Consulting | Victoria | | | | 2011 | | 1-10 | cagleyjohnson.com |

| Organization | Industries | HQ | Funding Raised | Rounds | Top 5 Investors | Founded | Revenues | Employees | Website |
|---|---|---|---|---|---|---|---|---|---|
| Cagley Johnson Consulting Inc. | Biotechnology, Contract Research & Scientific Services, Professional Services, Strategic Consulting | Victoria | | | | 2011 | | 1-10 | cagleyjohnson.com |
| Care2Talk | Apps, Health Care, Mobile, Software | Victoria | $1,250,000 | 2 | E-fund, WUTIF, Sprout, MAV AN Capital Partners | 44138 | — | 11-50 | www.care2talkhealth.com |
| Clarity Cannabis | Cannabis, E-Commerce, Pharmaceutical, Retail | Victoria | — | — | — | 2018 | — | 51-100 | www.claritycannabis.ca |
| Clarity Cannabis | Cannabis, E-Commerce, Pharmaceutical, Retail | Victoria | — | — | — | 2018 | — | 51-100 | www.claritycannabis.ca |
| ClinicAid | Health Care | Victoria | — | — | — | 40940 | $10M to $50M | 1-10 | clinicaid.ca |
| Cloud Practice | Enterprise Applications, Enterprise Software, Health Care, Medical Device, SaaS, Software | Victoria | $200,000 | 1 | — | 40940 | — | 1-10 | cloudpractice.ca |
| Cognito Health | Health Care, Medical, Wellness | Victoria | $1,800,000 | 3 | Garage Capital, Andrew Wilkinson, Scott Lake, StandUp Ventures, Jason Warner | 44348 | — | 11-50 | www.getcognito.ca |
| Compumedics | Biotechnology, Manufacturing, Medical, Medical Device | Victoria | — | — | — | 1987 | $10M to $50M | 51-100 | www.compumedics.com.au |
| CroMedica International | Life Science, Pharmaceutical | Victoria | — | — | — | 1995 | — | — | www.cromedica.com/ |
| EcoSafe Natural Products | Biotechnology, Cosmetics, Manufacturing | Saanichton | — | — | — | 33298 | $1M to $10M | 11-50 | www.ecosafenatural.com |
| e-Health Global | Cloud Data Services, Health Care, Medical, Software | Victoria | — | — | — | — | — | — | ehealthglobal.com |

| Organization | Industries | HQ | Funding Raised | Rounds | Top 5 Investors | Founded | Revenues | Employees | Website |
|---|---|---|---|---|---|---|---|---|---|
| eMedica Technologies | Emergency Medicine, Health Care, Personal Health, Wellness | Victoria | — | — | — | 2012 | $1M to $10M | 1-10 | www.emedicatech.com |
| Eupraxia Pharmaceuticals | Biotechnology, Health Care, Medical, Pharmaceutical | Victoria | $36,720,894 | 4 | Silicon Valley Bank | 2012 | $1M to $10M | 11-50 | eupraxiapharma.com |
| GuideStar Medical Devices | Medical Device | Victoria | | | | 2019 | | 1-10 | www.guidestarmd.com/ |
| Health Data Coalition | Health Care, Hospital, Medical, Non Profit | Victoria | — | — | — | 2010 | $1M to $10M | 11-50 | hdcbc.ca |
| HiBoop! | Health Diagnostics | Victoria | — | — | — | 45200 | — | 1-10 | hiboop.com |
| IdeaConnection | Biotechnology, Information Technology | Victoria | — | — | — | 2007 | $10M to $50M | 11-50 | www.ideaconnection.com |
| Industrial Plankton | Biotechnology, Manufacturing | Victoria | $25,000 | 2 | Creative Destruction Lab (CDL), Innovate BC | 2010 | — | 11-50 | industrialplankton.com/ |
| InterChem | Biotechnology, Chemical, Wholesale | Victoria | — | — | — | 1992 | $10M to $50M | 11-50 | www.interchem.com.au |
| Inventu Research | Cloud Data Services, Fitness, Health Care, Manufacturing, Market Research | Victoria | — | — | — | 2012 | $1M to $10M | — | www.inventuresearch.com/ |
| IPA (ImmunoPrecise Antibodies) | Artificial Intelligence, Biotechnology, Machine Learning, Natural Language Processing, Pharmaceutical, Therapeutics | Victoria | $38,982,543 | 7 | Brisio Innovations, North Dakota Department of Agriculture | 1983 | — | 101-250 | ipatherapeutics.com/ |
| Island Mediquip | Medical Device, Rental, Retail | Victoria | — | — | — | 2003 | $1M to $10M | 11-50 | www.islandmediquip.com |
| Juno EMR Services | Health Care, Software | Victoria | — | — | — | 2012 | — | 11-50 | junoemr.com |
| Lucy Scientific Discovery | Manufacturing, Medical, Pharmaceutical | Victoria | — | — | — | — | — | 11-50 | www.lucyscientific.com |
| MedGenesis Therapeutix | Biopharma, Biotechnology, Pharmaceutical | Victoria | $5,000,000 | 1 | — | 2005 | $1M to $10M | 11-50 | www.medgenesis.com |

| Organization | Industries | HQ | Funding Raised | Rounds | Top 5 Investors | Founded | Revenues | Employees | Website |
|---|---|---|---|---|---|---|---|---|---|
| MRM Proteomics Inc. | has labs - proteomics technologies, tools, and know-how | Victoria | | | | | | 11-50 | www.mrmproteomics.com |
| NeurOptimal | Fitness, Health Care, Medical, Wellness | Victoria | — | — | — | — | — | 11-50 | neuroptimal.com |
| Nezza Naturals | Beauty, E-Commerce, Health Care | Victoria | — | — | — | 2004 | $1M to $10M | 11-50 | nezzanaturals.com |
| Nova Oculus | Health Care, Medical Device, Therapeutics | Victoria | $1,035,000 | 3 | — | 2014 | $10M to $50M | 1-10 | novaoculus.com |
| Oak Bay Biosciences | | Victoria | | | | | | 1-10 | https://www.linkedin.com/company/oak-bay-biosciences-inc/about/ |
| Optimind TMS Treatment Centres | Consulting, Health Care, Wellness | Victoria | — | — | — | — | — | 1-10 | www.myoptimind.ca |
| Paragon Orthotic Laboratory | Manufacturing, Medical, Medical Device | Victoria | — | — | — | 1975 | — | 11-50 | paragonorthotic.com |
| Plena | Health Care | Victoria | — | 1 | Tom Chapman | 2017 | — | 11-50 | www.plena-global.com/ |
| Plurilock | Biometrics, Cyber Security, Identity Management, Information Technology, Network Security | Victoria | $10,414,649 | 6 | Creative Destruction Lab (CDL), National Research Council of Canada Industrial Research Assistance Program, Stonewood Investors | 42370 | $1M to $10M | 1-10 | www.plurilock.com |
| Precision Orthotics | Manufacturing, Medical Device, Pharmaceutical Analytics, Biometrics, Clinical | Victoria | — | — | — | 1988 | $1M to $10M | 11-50 | precisionorthotics.com |
| Primary Biostatistical Solutions | Trials, Consulting, Health Care, Professional Services | Victoria | — | — | — | 2006 | — | 11-50 | www.primarybiostat.com/ |
| Procura | Health Care, Information Technology, Software | Victoria | — | 1 | Carrick Capital Partners | 1989 | $1M to $10M | 251-500 | goprocura.com/ |

| Organization | Industries | HQ | Funding Raised | Rounds | Top 5 Investors | Founded | Revenues | Employees | Website |
|---|---|---|---|---|---|---|---|---|---|
| Redlen Technologies Inc | Medical Device, Medical Technology | Saanich ton | | | | 1999 | | 101-250 | redlen.com/ |
| Rudra Solutions | Academic & Research Institutions, Accelerators & Incubators , Biotechnology, Contract Research & Scientific Services, Global Pharmaceutical Corporations, Professional Services, Strategic Consulting | Saanich | | | | 2022 | | 1-10 | rudrasolutions.ca/ |
| Rumble Supershake | Food and Beverage, Health Care, Nutrition, Organic | Victoria | — | 2 | CircleUp | 2008 | — | 1-10 | www.drinkrumble.com |
| Salyx Medical Inc. | Digital Health | Victoria | | | | 2021 | | 1-10 | www.salyxmedical.com |
| Semaphore Solutions Inc | end-to-end intelligent lab solutions | Victoria | | | | | | 11-50 | www.semaphoresolutions.com |
| SISCAPA Assay Technologies | measure protein biomarkers | Victoria | | | | | | 11-50 | https://www.siscapa.com/ |
| SpayVac | Immuno-Contraceptive Fertility-Control Vaccines | North Saanich | | | | | | | www.spayvac.com |
| StarFish Medical | Manufacturing, Medical Device | Victoria | — | — | — | 1998 | — | 101-250 | starfishmedical.com |
| StressGen Biotechnologies | Developer Platform, Life Science, Pharmaceutical | Victoria | — | — | — | 2005 | — | — | — |
| Stressmarq Biosciences | Biotechnology, Health Care, Neuroscience | Victoria | — | — | — | 39083 | — | 1-10 | www.stressmarq.com |
| Telmediq | Enterprise Software, Health Care, Telecommunications, Unified Communications | Victoria | $35,000 | 1 | — | 40940 | — | 11-50 | www.telmediq.com |
| TrichAnalytics Inc. | high quality laboratory analysis | Saanich ton | | | | | | 1-10 | www.trichanalytics.com |

| Organization | Industries | HQ | Funding Raised | Rounds | Top 5 Investors | Founded | Revenues | Employees | Website |
|---|---|---|---|---|---|---|---|---|---|
| Tulevik Consulting | Biotechnology, Facilities & Real Estate, Global Pharmaceutical Corporations, Investors, Professional Services, Strategic Consulting | Victoria | | | | 2017 | | 11-50 | www.tulevik.bio |
| Victoria Hand Project | 3D Technology, Health Care, Manufacturing, Medical, Printing | Victoria | — | — | — | 2015 | $1M to $10M | 1-10 | www.victoriahandproject.com/ |
| Vigil Health Solutions | Health Care, Hospital Analytics, Dietary Supplements, Fitness, Health | Victoria | — | 1 | Brisio Innovations | 1998 | $1M to $10M | 101-250 | www.vigil.com/ |
| VitaminLab | Care, Personalization, Software | Victoria | $1,700,000 | 5 | E-Fund, The CDMN Soft-Landing Program, WUTIF, DSM Venturing, Nimbus Synergies Inc. | 2017 | — | 11-50 | www.getvitaminlab.com |
| ViVitro Labs | Health Care, Medical, Medical Device | Victoria | — | — | — | 1975 | — | 1-10 | vivitrolabs.com |
| Vocan Biotechnologies | Biotechnology, Health Care | Victoria | — | — | — | 2018 | $1M to $10M | 1-10 | vocanbiotech.com/ |
| VoxCell BioInnovation | Biopharma, Biotechnology, Health Care, Life Science, Medical Device | Victoria | $1,683,455 | 5 | Spring Activator, E-Fund, WUTIF, New Ventures BC, Women's Equity Lab | 44044 | — | 1-10 | voxcellbio.com |
| YouCount.io | @Home Biomarker Testing | Vancouver | | | | | | | https://www.youcount.io/ |