



Life Sciences in British Columbia:

SECTOR PROFILE / MAY 2023



BRITISH
COLUMBIA

Foreword

This report was created by the Ministry of Jobs, Economic Development and Innovation in collaboration with BC Stats and with input from Life Sciences BC, Global Affairs Canada, Pacific Economic Development Canada, Innovation, Science and Economic Development Canada, British Columbia's public post-secondary institutions, not-for-profit organizations, and life sciences companies. It presents an overview of the life sciences sector and its ecosystem in British Columbia (B.C.), highlights the sector's statistics and economic contribution to the province, and outlines the ecosystem assets and resources that contribute to its growth potential.

The life sciences sector is in constant evolution, and this document is a snapshot in time that will be revised and

updated regularly. Most numerical data is derived from the annual data releases of Statistics Canada and is up to date to the end of 2021/early 2022, while qualitative information is as current as possible.

This document may serve as a reference and baseline to monitor the evolution of B.C.'s life sciences sector. The statistics are presented so that they are consistent with how the life sciences sector is examined across Canada.



Contents

Executive Summary	5	B.C. Life Sciences Ecosystem	31
General Context: Unprecedented times for life sciences in British Columbia	8	Industry associations and life sciences accelerators	31
Statistical profile of the Life Sciences Sector in British Columbia	10	Provincial and federal governments	31
Definition and approach	10	Research ecosystem: A strong asset of British Columbia	33
Number of businesses	11	<i>Academic institutions</i>	33
Geographic distribution	13	<i>Research institutes</i>	36
Employment	15	<i>Clinical trials</i>	38
Wages and average earnings	18	<i>Key research funding and research support organizations</i>	39
Gross domestic product and sector revenue	21	Interprovincial and international activity	41
Trade in goods and services	23	<i>The Cascadia Innovation Corridor</i>	41
Manufacturing in the B.C. life sciences sector	25	<i>Interprovincial activity</i>	41
Talent development	26	<i>International markets and free trade agreements</i>	42
Investment in British Columbia's Life Sciences Sector	28	Appendix A: Sources and methodology	43
		Appendix B: Overview of enabling programs ..	47

Message from the Minister of Jobs, Economic Development and Innovation



BRITISH COLUMBIANS HAVE MUCH TO BE PROUD OF because of the talented and committed people working in our life sciences sector. Our province has been recognized internationally for our research and discovery in biopharmaceutical products, medical devices and vaccine components that improve people's lives, prevent disease and solve health-care challenges for people worldwide. Virtually every COVID-19 vaccine candidate that reached late-stage development in 2020 used components that were initiated, developed or manufactured by a B.C. company or scientist.

This report demonstrates the accelerated growth of the life sciences sector during the pandemic and beyond. Between 2018 and 2021, the life sciences sector grew faster than the overall B.C. economy; jobs even grew in 2020 when the B.C. economy slowed during COVID-19.

Life sciences are booming in this province, and through the StrongerBC Economic Plan, our government is building on the momentum of this rapidly expanding sector with the launch of our B.C. Life Sciences and Biomanufacturing Strategy. This strategy was developed in close consultation with industry, academia, other governments and advisors, and will position the province as a global life sciences hub that will nurture new talent, develop new lab space, expand clinical trial capacity and leverage research capacity, all in service to improving health outcomes through advanced technology.

As the home of one of Canada's fastest growing life sciences sectors, B.C. is leveraging its expertise and creating new pathways for innovators, entrepreneurs, and anchor companies to grow their businesses and take their discoveries "from bench to market to bedside," while creating good jobs for British Columbians in an innovative, world-class environment.

This report will be updated regularly and is a useful reference tool. My deep gratitude goes out to LifeSciences BC, Global Affairs Canada, PacifiCan, Innovation, Science and Economic Development Canada, and B.C.'s post-secondary institutions and life sciences companies for their contributions. Thank you also to the many other valued contributors to this report, including BC Stats, and staff from the ministries who provided data, information and analysis for the report.

I look forward to hearing about the next discoveries that will improve and change the lives of British Columbians and people worldwide, and how our actions help move the sector forward. Through the StrongerBC Economic Plan, we will continue to fuel innovation, nurture talent, drive growth and transform B.C.'s economy to build a strong and sustainable province that works for everyone.

Sincerely,

A handwritten signature in black ink, appearing to read "Brenda Bailey". The signature is fluid and cursive, with a long horizontal stroke at the end.

Honourable Brenda Bailey
Minister of Jobs, Economic Development and Innovation

Executive Summary

This second edition of the Life Sciences in British Columbia report presents economic statistics for B.C.'s life sciences sector for the three-year period from 2018 to 2021—both before and during the COVID-19 pandemic—and describes the broader ecosystem within which the sector thrives and grows.

The first edition of this report, published in 2020 (with 2018 data), identified that the B.C. life sciences sector was beginning to mature. Over the past three years, the sector's continued growth is evidenced by the increasing number of large companies, upward employment trends and growing valuation in equity investments.

The pandemic spurred several scientific collaborations and innovations in B.C., underpinned by an increase in federal

investments in the life sciences sector. Altogether, this supported a rapid expansion of the industry.

The pandemic also fuelled a digital transformation of B.C.'s life sciences sector, with disruptive technologies propelling innovation in precision medicine, COVID-19 therapeutics, messenger ribonucleic acid (mRNA) vaccine technology, lipid nanoparticles, antibodies and medical devices. The future will offer even more opportunities for the life sciences industry to leverage the power of digital transformation by using artificial intelligence, machine learning and cloud technologies to support the development of new therapeutics and life sciences innovation.

STATISTICAL PROFILE OF THE SECTOR:

TABLE 1: B.C.'s life sciences sector by numbers

INDICATOR	B.C. LIFE SCIENCES SECTOR					B.C. ALL SECTORS
	2018	2019	2020	2021	2018-2021 % CHANGE	2018-2021 % CHANGE
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: BC Stats and Statistics Canada

TABLE 2: Manufacturing GDP for B.C.'s life sciences sector

MANUFACTURING GDP (CURRENT \$ MILLIONS)	2017	2018	2019	2020	2021	CAGR (FIVE-YEAR)
Pharmaceutical and Medicine Manufacturing	214.2	296.2	330.1	359.0	462.5	17.6%
Medical Equipment and Supplies Manufacturing	271.6	272.0	253.7	262.5	286.1	6.5%

Source: Ministry of Jobs, Economic Development & Innovation using data from Statistics Canada

In 2021, B.C.'s life sciences sector consisted of 2,277 companies, with 1,338 companies employing 19,100 employees and 939 companies without employees.¹ The number of large businesses (those employing more than 50 employees) grew by 57% between 2018 and 2021 – from 68 to 107 large businesses. However, the sector continues to be dominated by small businesses of less than 50 employees, which account for 92% of all companies with staff.

The sector's activity is largely concentrated in the Metro Vancouver area, which is home to 64% of the businesses and 75% of the sector's employment. Vancouver Island and the Okanagan region account for 15% and 9% of the province's life sciences businesses, respectively.

Employees in the sector earn high wages, earning an average of \$74,600 annually, which is 27% above the province's average yearly salary. The sector's total provincial payroll was over \$1.4 billion.

Between 2018 and 2021, the life sciences sector grew faster than the overall B.C. economy in terms of the number of businesses, employment levels and weekly earnings. Even in 2020, the number of jobs in this sector increased by 2% when the overall B.C. economy contracted and number of jobs decreased by -8%.

The Research, Testing and Medical Laboratories sub-sector accounted for most of the employment (54%), however, the bulk of employment growth (32.6%) came from companies in the Drugs and Pharmaceuticals sub-sector.

In 2021, B.C.'s life sciences sector recorded \$6.7 billion in revenue and generated \$2.6 billion in GDP² – a 30% growth since 2018. Real GDP³ grew by 20%, second only to Quebec, which grew its sector real GDP by 33%.

In 2021, B.C. exported \$650 million in life sciences goods and services. Conversely, B.C. imported \$2.1 billion. This resulted in an overall trade deficit of \$1.4 billion. This deficit was due to the increased import of goods, possibly related to the COVID-19 pandemic which exacerbated the need for imported pharmaceuticals. The province did

.....

¹ Businesses without employees may be owned by people with other day jobs, such as academic researchers employed at a university. They may also include self-employment, inactive companies, companies that hire only contractors, or companies with unpaid family workers.

² Current dollars.

³ Chained 2012 dollars. Adjusted for price increases.

better with life sciences services which posted a surplus helpful to the trade balance.

B.C.'s life sciences sector ranks third in Canada – after Ontario and Quebec – with respect to the number of businesses, employment, revenue and GDP contributions. However, B.C. is catching up: the number of businesses based in the province grew faster than anywhere else in Canada between 2018 and 2021 (+26.5%), and the average weekly earnings per employee (\$1,288) were the second highest, behind only Ontario (\$1,367).

Private investment in B.C.'s life sciences companies totalled a record \$3.3 billion over 2020 and 2021.

A vibrant and dynamic life sciences sector ecosystem

B.C.'s life sciences sector is characterized by a supportive and cohesive ecosystem of talent, partnerships, infrastructure and investment. The ecosystem benefits from a strong foundation in research and discovery; close collaboration among stakeholders that include the federal and provincial governments, not-for-profit organizations, academia and industry; and an entrepreneurial and innovative spirit. B.C. is home to Canada's largest biotech company, 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. The recently created Michael Smith Health Research BC that merged several entities, and the new Canada's Immuno-Engineering and Biomanufacturing Hub will further improve co-ordination between research, industry and the health sector.

In addition, the new [*B.C. Life Sciences and Biomanufacturing Strategy*](#) will create the conditions to build on existing strengths and further support the growth of the sector.

Besides its private companies, B.C.'s life sciences sector ecosystem includes:

- Industry associations and not-for-profit organizations, including Life Sciences BC, Vancouver Island Life Sciences Association and adMare BioInnovations
- Provincial and federal government entities, such as various ministries and departments, Innovate BC, InBC Investment Corp., Pacific Economic Development Canada (PacifiCan) and Global Affairs Canada, that facilitate connections and support innovation through programs like the provincial Small

Business Venture Capital Tax Credit program, Scientific Research and Experimental Development Tax Credit program and the federal Strategic Innovation Fund

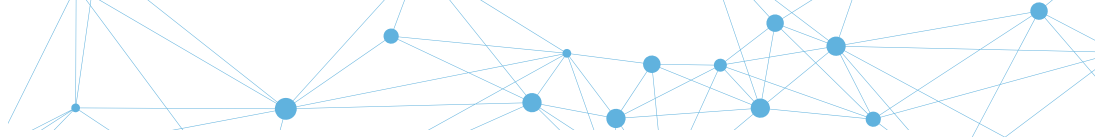
- Academic research institutions, including the University of British Columbia, the University of Victoria, Simon Fraser University, the University of Northern British Columbia, the British Columbia Institute of Technology, and TRIUMF, Canada's particle accelerator centre
- World-class research institutes and centres attached to hospitals and affiliated with universities
- Research funding and support organizations, like Genome BC, Michael Smith Health Research BC, the BC Knowledge Development Fund, the Canada Foundation for Innovation and the Canadian Institutes of Health Research
- Clinical trial networks and Clinical Trials BC that support over 1,350 clinical trials annually (representing approximately 20% of all trials conducted in Canada) at over 100 sites across British Columbia
- Key provincial and national initiatives like the B.C. Life Sciences and Biomanufacturing Strategy, the StrongerBC Economic Plan, the B.C. Future Ready Action Plan, the Cascadia Innovation Corridor and Canada's Biomanufacturing and Life Sciences Strategy that further propel the momentum, creativity and opportunities for B.C.'s life sciences sector



This report indicates that British Columbia's life sciences sector is adaptable, resilient and on track to continue to mature and evolve. The sector has sustained growth in the face of a global pandemic, supported by its innovative companies, a strong research ecosystem and an increasingly skilled workforce.

B.C.'s leading-edge biotech and medtech companies have demonstrated they can develop and manufacture innovative products that improve health and are of interest to both local and global companies, health-care providers and investors.

With record investments in the sector over the past few years, increased levels of collaboration and a growing demand for B.C. innovations, the provincial life sciences sector is poised to generate new opportunities and continue making significant contributions to advancing health both here in Canada and around the world.



General Context: Unprecedented times for life sciences in British Columbia

THE COVID-19 PANDEMIC BOOSTED THE LIFE SCIENCES SECTOR

The COVID-19 pandemic highlighted the importance of the life sciences sector and its contributions to public health and the greater global economy. Pandemic-driven advancements led to immense progress worldwide, and the new processes adopted to tackle COVID-19 are now being applied to develop other drugs and therapeutics.⁴ Unique efforts helped improve manufacturing and fill raw materials shortages to meet the high demand for vaccines worldwide. While the COVID-19 pandemic accelerated innovation, it also exposed vulnerabilities in supply chains; Canada, in particular, relied on other countries to source vaccines, therapeutics, and personal protective equipment.

Within this unprecedented global context, British Columbia's life sciences sector made notable impacts in the fight against COVID-19 both locally and abroad. The province's public and private sector players came together to solve scientific problems and address the urgent need for treatments, vaccines, diagnostics and medical devices. This earned them international recognition for their leadership and for the innovative new technologies and treatments they made available around the world, including new respirators, medical devices, COVID-19 therapeutics, lipid nanoparticles (LNP), antibodies, nanomedicine, precision medicine and messenger ribonucleic acid (mRNA) technologies used to generate vaccines. Virtually every COVID-19 vaccine candidate that reached late-stage development in 2020 used components that were consulted on, initiated, developed or manufactured by a B.C. company or scientist. The willingness to collaborate and the spirit of innovation in B.C. continue to strengthen and drive the growth of the province's life sciences ecosystem.

.....
⁴ Deloitte. (2022). *2022 Global Life Sciences Outlook*

Vancouver's ACUITAS THERAPEUTICS has earned a global reputation for its innovative lipid nanoparticle delivery systems for nucleic acid therapeutics. The company's proprietary technology allows nucleic acids to be carried to and received by cells, and enables the Pfizer/BioNTech mRNA COVID-19 vaccine COMIRNATY® and Alnylam Pharmaceuticals ONPATTRO® to work. The result: the safe delivery of about four billion doses of COMIRNATY globally.

Having nearly doubled in size since 2020, Acuitas Therapeutics is now leveraging its technology by collaborating with partners to address malaria, tuberculosis, HIV and cancer, and is developing therapeutics for other applications, including genome editing and monoclonal antibodies.

Acuitas Therapeutics is committed to supporting the province's biotech sector and offers a community-focused philanthropic program that encourages the next generation of scientists through a key partnership with Science World.

PRECISION NANOSYSTEMS INC. is a global leader in technologies, solutions and services for the development of lipid nanoparticle-delivered genomic medicines, including mRNA vaccines and therapeutics. It supports (bio)pharma companies who are ushering in the next wave of genomic medicines in infectious diseases, cancer and rare diseases, and works with the world's leading drug developers to understand disease and help create the therapeutics and vaccines that will define the future of medicine. The company's mission is to accelerate the creation of transformative medicine that significantly impacts human well-being.

ARTIFICIAL INTELLIGENCE AND DIGITAL TECHNOLOGIES CONTINUE TO TRANSFORM THE LIFE SCIENCES INDUSTRY

The COVID-19 pandemic has accelerated digital transformation across the life sciences sector and this trend is set to continue post-pandemic. The laboratories of the future will be equipped with interconnected ecosystems of data, platforms, instruments and advanced analytical tools to support scientists across teams and geographies to rapidly discover breakthrough therapies.

The power of these digital technologies has led multinational organizations to prioritize investments in artificial intelligence, machine learning and cloud technologies to optimize drug discovery, automate industry processes, address repetitive work, decrease timelines and reduce the risk of cyber threats.⁵ Life sciences companies will increasingly need to hire digital talent, software engineers and data scientists.

THRIVE HEALTH, founded in 2016, is a software as a service organization headquartered in Vancouver with 70 employees operating across North America. Thrive Health's digital platform enables their customers to configure digital health and wellness solutions to deepen their relationships with and empower individuals in their care. Customers range from clinics, hospitals and health systems to post-secondary institutions, enterprise organizations and governments who harness the technology to deliver elevated care experiences and collect meaningful data on the health and well-being of their communities.

.....
⁵ Deloitte. (2022). *2022 Global Life Sciences Outlook*

NEW GOVERNMENT STRATEGIES WILL SUPPORT THE GROWTH OF THE B.C. LIFE SCIENCES SECTOR

The B.C. life sciences sector will benefit from the combined impacts of two dedicated government strategies that have been released since the COVID-19 pandemic.

The federal government launched [Canada's Biomanufacturing and Life Sciences Strategy](#) in 2021, committing \$2.2 billion over seven years to rebuild Canada's domestic biomanufacturing capabilities and grow a strong and competitive sector able to produce vaccines and therapeutics. B.C. companies have already benefitted from federal investments under this strategy, which will also support a new immuno-engineering and biomanufacturing research hub in the province.

British Columbia released the [B.C. Life Sciences and Biomanufacturing Strategy](#) in April 2023, a commitment first introduced in the StrongerBC Economic Plan. This strategy will position the province as a global life sciences hub and a centre for commercial-scale biopharmaceutical and medical manufacturing through five pillars:

- Improving access to talent
- Growing innovative local companies
- Increasing biomanufacturing capacity and attracting anchor companies,
- Expanding clinical trials capacity
- Leveraging and commercializing research capacity

Other government plans and initiatives will also contribute to support the life sciences sector, including the StrongerBC Economic Plan, the B.C. Future Ready Action Plan, and the Cascadia Innovation Corridor.



Statistical profile of the Life Sciences Sector in British Columbia

Definition and approach

Life sciences refers to fields that involve the scientific study of living organisms, and the technology developed from the life sciences has many practical applications for health, medicine and pharmaceuticals. The range of companies in the life sciences sector includes contract research firms, testing and medical labs, and companies that produce or sell medical devices, diagnostics, pharmaceuticals and other reagents.

As outlined in this report, the life sciences sector is divided into three industry groups, made up of industries corresponding to the North American Industry Classification System (NAICS).⁶

1. Research, Testing and Medical Laboratories
2. Medical Devices and Equipment
3. Drugs and Pharmaceuticals

Although not perfect, this approach gives us access to the economic data collected by statistical agencies. This data is typically attached to NAICS codes and industry groupings, and includes business counts, employment, wages, revenue, gross domestic product (GDP) contributions, and the trade of goods and services. This approach also enables us to assess the size and growth of the sector relative to other provinces.

To remain focused, the definition of the sector for the purposes of this report excludes:

- The health-care system, as including it may give a skewed idea of the size and impact of the life sciences sector.
- Medical cannabis, because of the difficulty in distinguishing it from non-medical use. Since cannabis was legalized in Canada in October 2018, the overall cannabis industry has grown substantially – with growers usually captured under the agriculture sector.
- Digital health and information technology companies that support the life sciences sector, when these companies are not recorded under the NAICS codes mentioned above. These companies are primarily captured in the tech segments of the British Columbia economy.

Unless otherwise stated, the statistics reported in this document were derived by BC Stats with the methodology described in [Appendix A: Sources and Methodology](#). All amounts are in Canadian dollars.

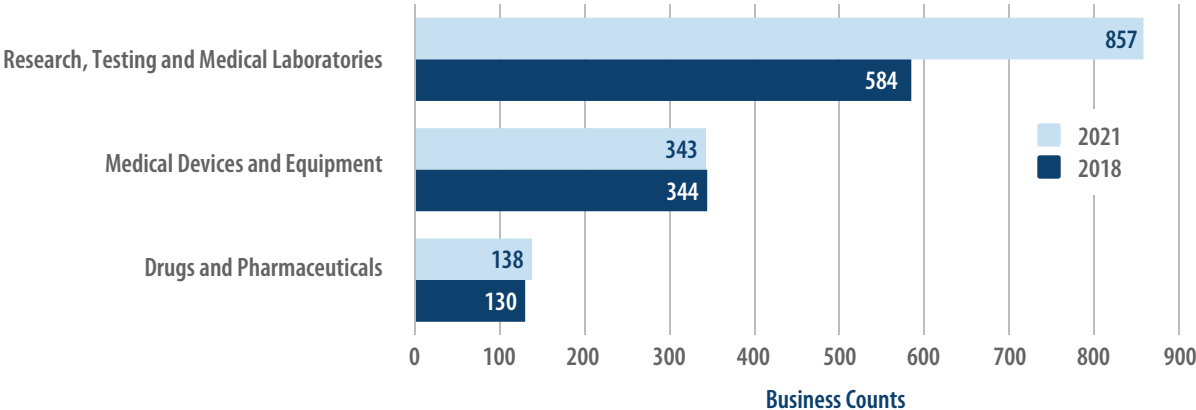
.....
⁶ See [Appendix A](#) for the detailed composition of the life sciences industry groups.

Number of businesses

MORE BUSINESSES IN RESEARCH, TESTING AND MEDICAL LABORATORIES

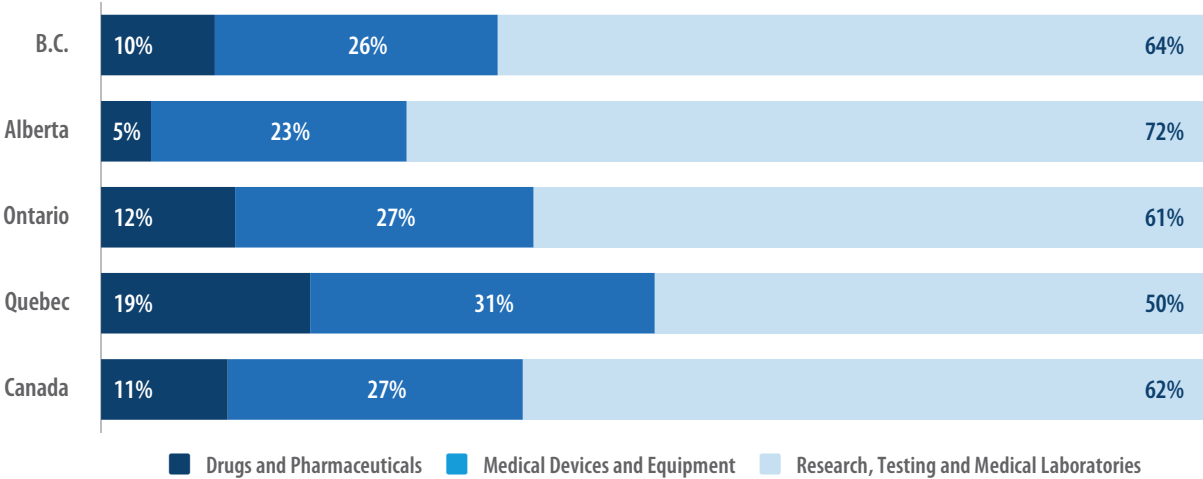
In 2021, British Columbia’s life sciences sector was comprised of 1,338 businesses with employees, of which the majority (68%) were in the Research, Testing and Medical Laboratories industry group (Figure 1 and 2). In the three-year period from 2018 to 2021, the number of these businesses in the life sciences sector grew from 1,058 to 1,338, or 26.5%.⁷ The majority of net new businesses were in Research, Testing and Medical Laboratories.

FIGURE 1: Business counts in the life sciences in British Columbia by industry group, 2018 and 2021



Source: BC Stats, using data from Statistics Canada. This figure excludes businesses without employees

FIGURE 2: Life sciences businesses by province – business count by industry group, 2021



Source: BC Stats, using data from Statistics Canada. This figure excludes businesses without employees

⁷ Since this report was last produced in 2020, methodological changes have resulted in downward revisions to the business counts estimates for 2018. For more on the methodology see [Appendix A](#).

A SECTOR GROWING FASTER IN B.C. THAN IN OTHER PROVINCES

Although Ontario and Quebec have more life sciences businesses than British Columbia, the number of businesses in these two provinces grew at a slower pace than in B.C. in the previous three years (Table 3). Since 2018, British Columbia has gone from the province with the fourth-highest number of life sciences companies to the third highest, overtaking Alberta by one spot.

TABLE 3: Life sciences businesses with employees by province

PROVINCE	2018	2019	2020	2021	ONE-YEAR GROWTH	THREE-YEAR GROWTH
British Columbia	1,058	1,072	1,311	1,338	2.1%	26.5%
Alberta	1,193	1,178	1,163	1,127	-3.1%	-5.5%
Saskatchewan	184	180	195	180	-7.7%	-2.1%
Manitoba	209	231	251	243	-3.2%	16.2%
Ontario	2,676	2,706	3,100	3,192	3.0%	19.3%
Quebec	1,232	1,265	1,323	1,361	2.9%	10.5%
Canada	6,852	6,942	7,612	7,752	1.8%	13.1%

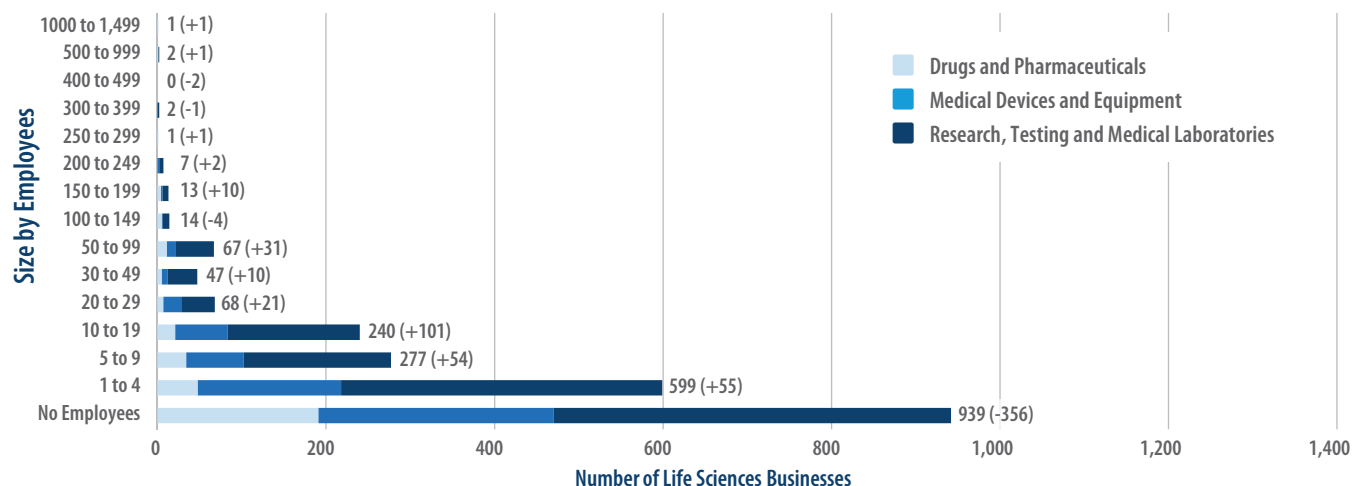
Source: BC Stats, using data from Statistics Canada. Figures exclude businesses without employees

THE SIZE OF BUSINESSES IS GROWING

Most of British Columbia's life sciences companies tend to be small operations (Figure 3), however, the number of larger businesses (those with more than 50 employees) grew from 68 to 107, or by 57%, between 2018 and 2021, an indication that the sector is maturing.

In 2021, around 92% of the province's life sciences companies had fewer than 50 employees and 45% had fewer than five employees. In addition, 939 life sciences businesses were recorded as having no employees, bringing the total number of businesses to 2,277.⁸

FIGURE 3: Life sciences businesses by size in British Columbia, 2021



Note: Figures shown are total life sciences businesses in each size category. Figures in parentheses are changes from 2018. Source: BC Stats, using data from Statistics Canada

⁸ Businesses without employees may be owned by people with other day jobs, such as academic researchers employed at a university. They may also include self-employment, inactive companies, companies that hire only contractors, or companies with unpaid family workers.

Geographic distribution

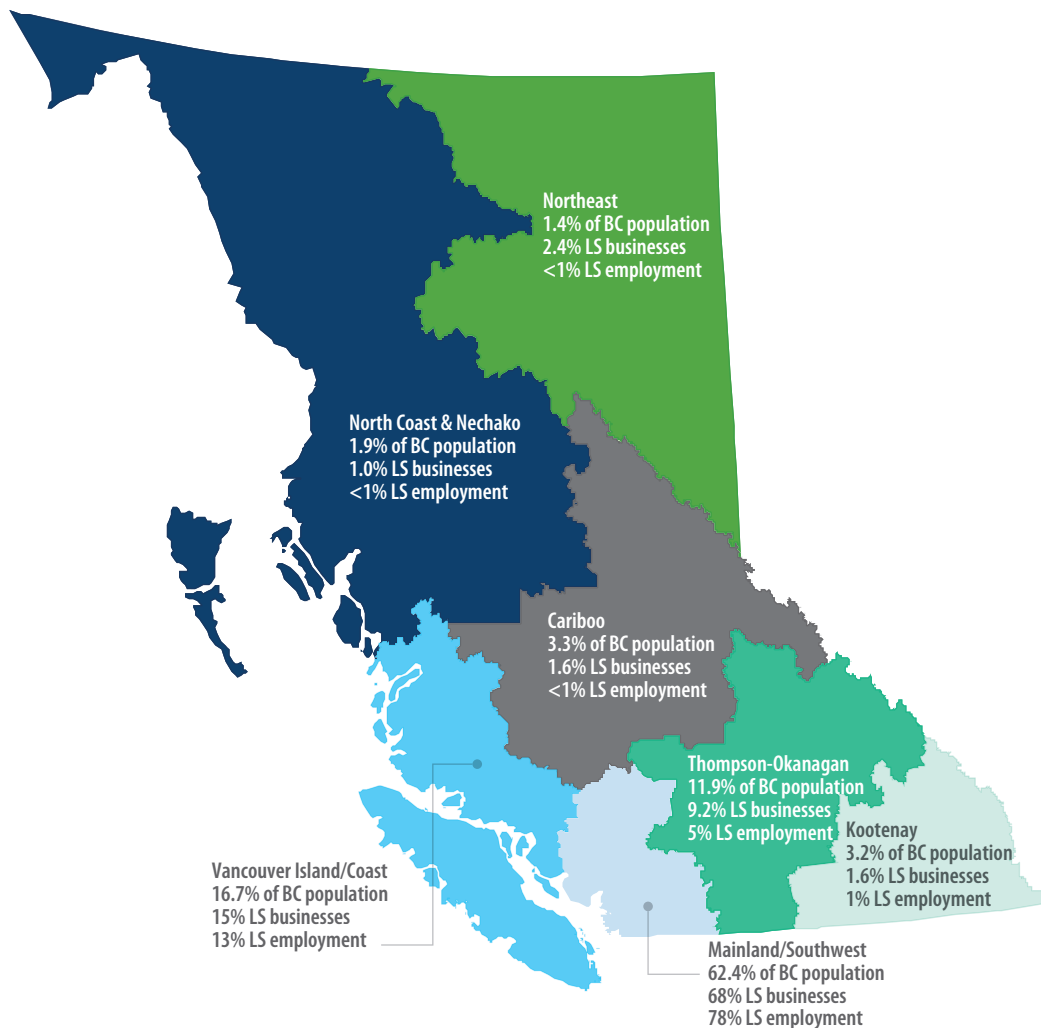
B.C.'S LIFE SCIENCES SECTOR IS CONCENTRATED IN METRO VANCOUVER AND TWO SMALLER REGIONAL HUBS

As shown on the map (Figure 4), most of British Columbia's life sciences businesses are in the Lower Mainland and Southwest region, which account for 62% of the province's population, 68% of the life sciences businesses and 78% of the employment in the sector.⁹ The vast majority of these businesses are concentrated in the Metro Vancouver Regional District, in proximity to research centres,

hospitals, universities, and other life sciences companies: Metro Vancouver is home to 64% of the life sciences businesses and 75% of the employment. Vancouver Island and the Thompson/Okanagan regions also contain significant numbers of companies and employment.

Businesses in the Drugs and Pharmaceuticals and in the Medical Devices and Equipment categories tend to be concentrated in the Lower Mainland, while those in the Research, Testing and Medical Laboratories category are spread more evenly around the province.

FIGURE 4: Regional distribution of life sciences businesses and life sciences employment, 2021



Source: BC Stats, using data from Statistics Canada

⁹ These percentages are calculated using the total less those businesses for which the region is unknown. The share of employment by region estimate is based on business counts by size.

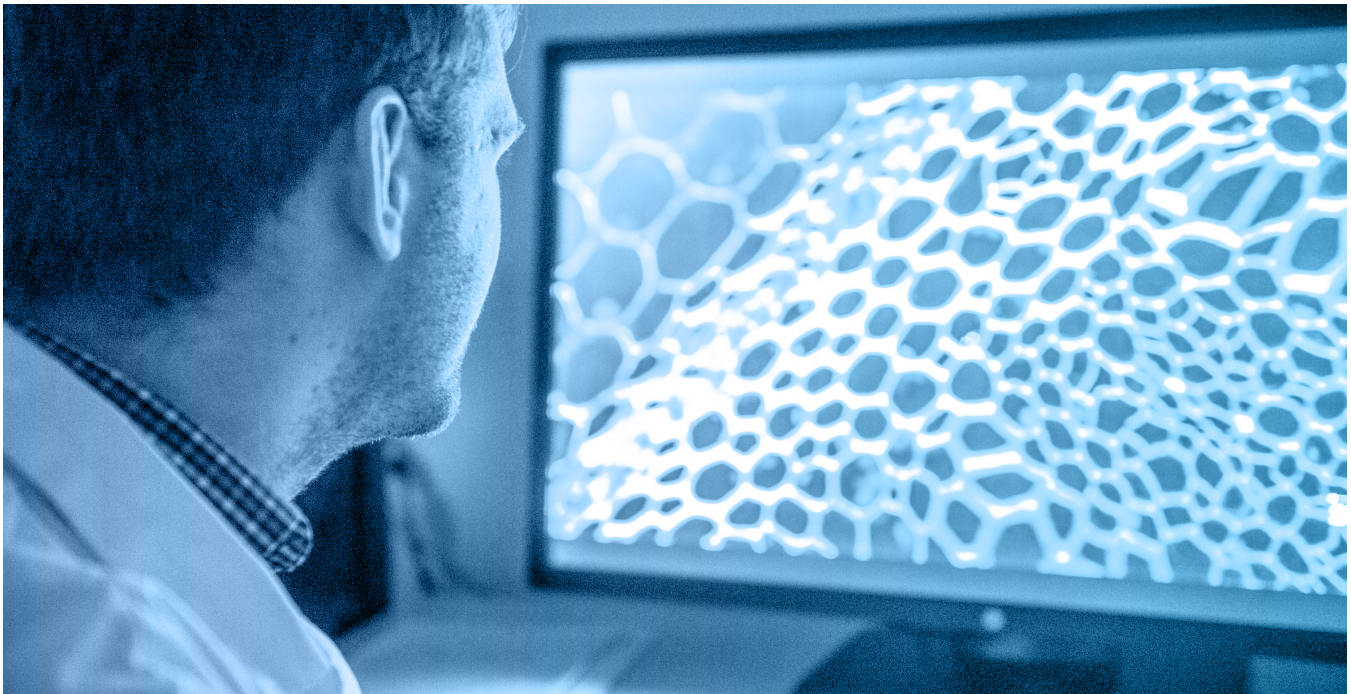
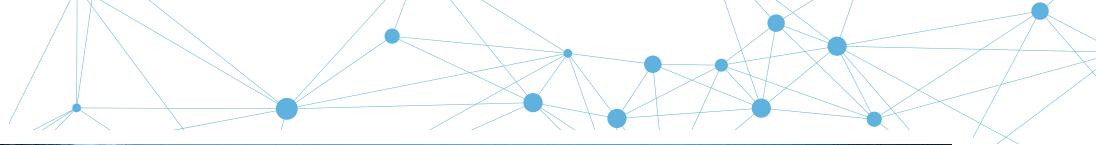


Photo courtesy of Providence Healthcare

VANCOUVER ISLAND is B.C.'s second-largest life sciences cluster after Metro Vancouver, home to 15% of B.C.'s life sciences companies in areas such as pharmaceuticals, biotech, medical devices, diagnostics, and digital health. The life sciences sector on Vancouver Island includes a rich variety of researchers and companies, from startups to profitable global pharmaceuticals, including some of the province's most innovative companies – ImmunoPrecise Antibodies and clinical-stage Eupraxia Pharmaceuticals, each with market cap over \$100 million; and Starfish Medical, Canada's leading full service medical device design, development and contract manufacturing company with global reach.

In 2022, the regional BioInnovation Hub – a collaboration between University of Victoria and Vancouver Island Life Sciences association – opened as the island's first life science coworking centre to help bridge academic innovation into the community. It is home to several startup companies in the digital health and medical technology space. The Vancouver Island region will soon add a new wet lab facility to its ecosystem that will offer affordable space and equipment to help grow local early-stage companies.

THE METRO VANCOUVER AREA is the largest life sciences cluster in B.C., named in 2021 by Startup Genome the top life sciences startup ecosystem in Canada. Facilities are expanding at a rapid pace in the area:

The new St. Paul's Hospital and Health Campus is under construction and will house the Clinical Support and Research Centre, a new state-of-the-art research and medical complex for discovery, research and innovation.

Leading life sciences companies are expanding their footprint with an estimated 1.3 million square feet of new space by 2027, including AbCellera's 380,000 sq ft new state of the art tech campus and Precision Nanosystems' 75,000 sq ft biomanufacturing center and global headquarters in Vancouver, and STEMCELL's new manufacturing facility in Burnaby. adMare BioInnovations is expanding its footprint in Vancouver to offer new affordable turnkey wet-lab space to start-up companies. Property developers are also envisioning building more dedicated space for the life sciences sector.

Employment

A NOTICEABLE UPWARD TREND IN EMPLOYMENT SINCE 2018

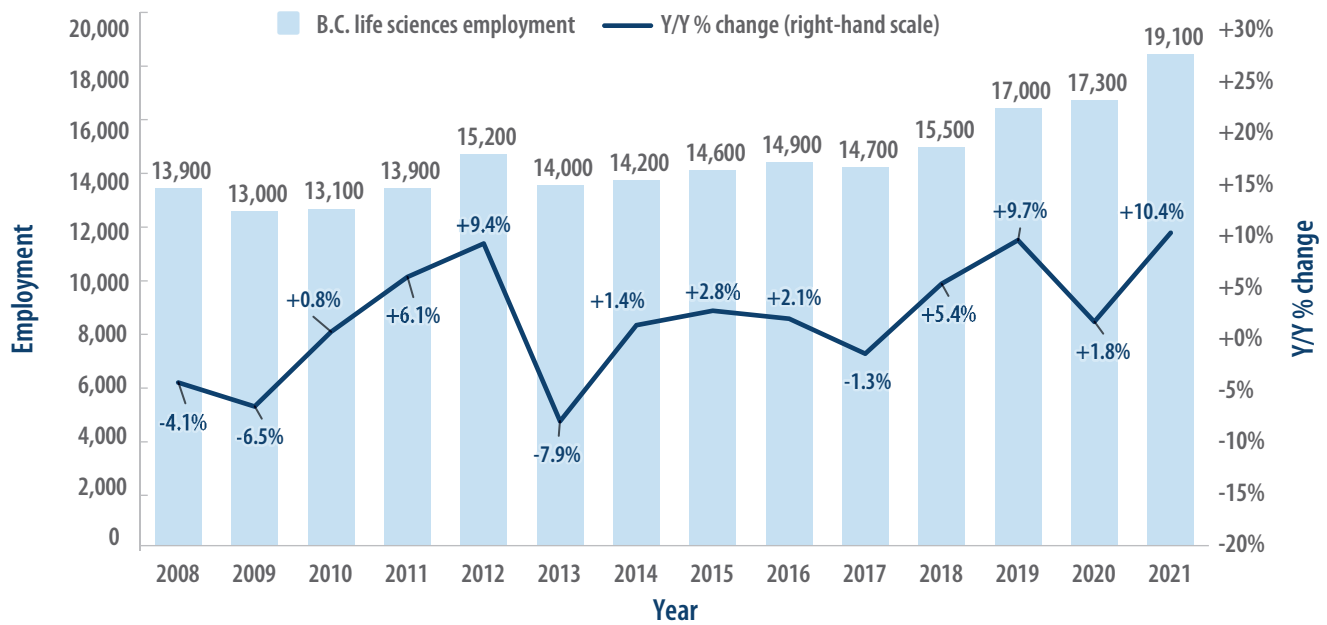
Employment in B.C.'s life sciences sector remained relatively constant between 2008 and 2017, but has been on an upward trend since then. In 2021, there were 19,100 people employed in the sector (Figure 5), representing 0.8% of the province's total employment.

Employment in B.C.'s life sciences sector has grown 23.2% since 2018, including by 10.4% in 2021 alone.



Photo courtesy of STEMCELL Technologies

FIGURE 5: British Columbia life sciences employment



Source: BC Stats, using data from Statistics Canada

AMGEN, one of the world's leading biotech companies, focuses on areas of high unmet medical need and leverages its expertise in human biology to strive for solutions for patients around the world. Amgen's Canadian research facility in Burnaby employs over 100 highly trained personnel that contribute to the company's 40-year history as a global leader in the discovery, development, manufacturing and delivery of innovative human therapeutics.

Today, Amgen researchers in Burnaby work at the cutting edge of biotech, bringing together the experimental disciplines of immunology, cellular and molecular biology, and emerging areas of computational data science. The mission of this research centre is the discovery of transformative medicines that address serious illness and dramatically improve people's lives.

ONE OF THE FASTEST-GROWING SECTORS IN B.C. FOR JOBS

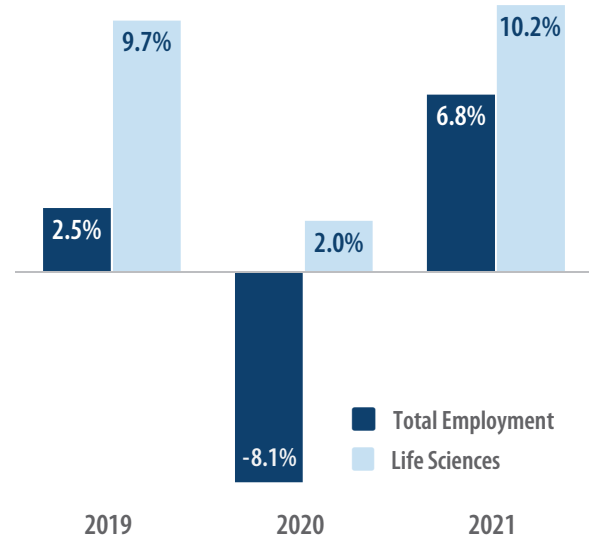
Life sciences has been one of the fastest-growing sectors in B.C. over the three years from 2018 to 2021, with job numbers growing by a total of 23.3% compared to just 0.6% in the overall B.C. economy. In comparison, only computer system design and publishing grew jobs faster (Table 4).

Even through the pandemic in 2020 when B.C. employment fell -8.1%, life sciences sector employment grew by 2.0% (Figure 6).

TABLE 4: British Columbia employment growth for selected industries, 2018-2021

INDUSTRY	THREE-YEAR % CHANGE 2018-2021
Computer system design and publishing	33.7%
Life Sciences	23.3%
Motion picture and sound recording industries	16.0%
Health care and social assistance	12.1%
Public administration	8.6%
Construction	8.2%
Mining and oil and gas	4.8%
Educational services	3.8%
Goods-producing industries	3.8%
Finance and insurance	1.7%
TOTAL EMPLOYMENT	0.6%
Service-producing industries	0.2%
Manufacturing	-0.1%
Forestry	-2.9%
Real estate and rental and leasing	-3.6%
Telecommunications and data processing	-7.1%

FIGURE 6: Year-over-year employment growth, B.C.



Source: BC Stats, using data from Statistics Canada

The Research, Testing and Medical Laboratories industry group accounts for the majority of B.C.'s life sciences employment (Figure 7), with 10,231 jobs or 54% of the total in 2021, followed by employment in Drugs and Pharmaceuticals (5,057 jobs or 26%) and Medical Devices and Equipment (3,803 jobs or 20%). Job growth was fastest in the Drugs and Pharmaceuticals industry group, which added 1,244 jobs and grew by 33% between 2018 and 2021 (Figure 8).

FIGURE 7: Distribution of B.C. life sciences employment by industry, 2021

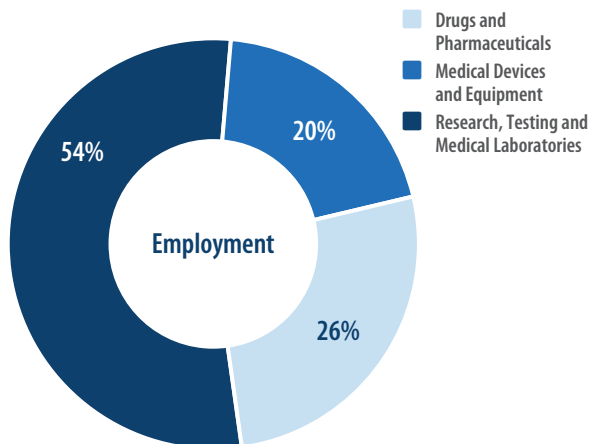
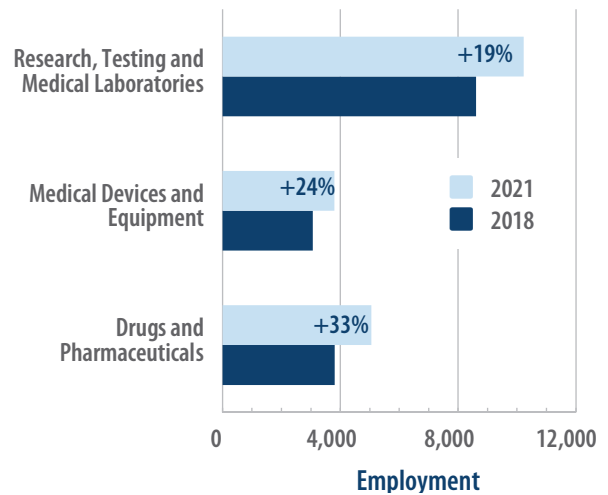


FIGURE 8: B.C. life sciences employment growth by industry, 2018-2021

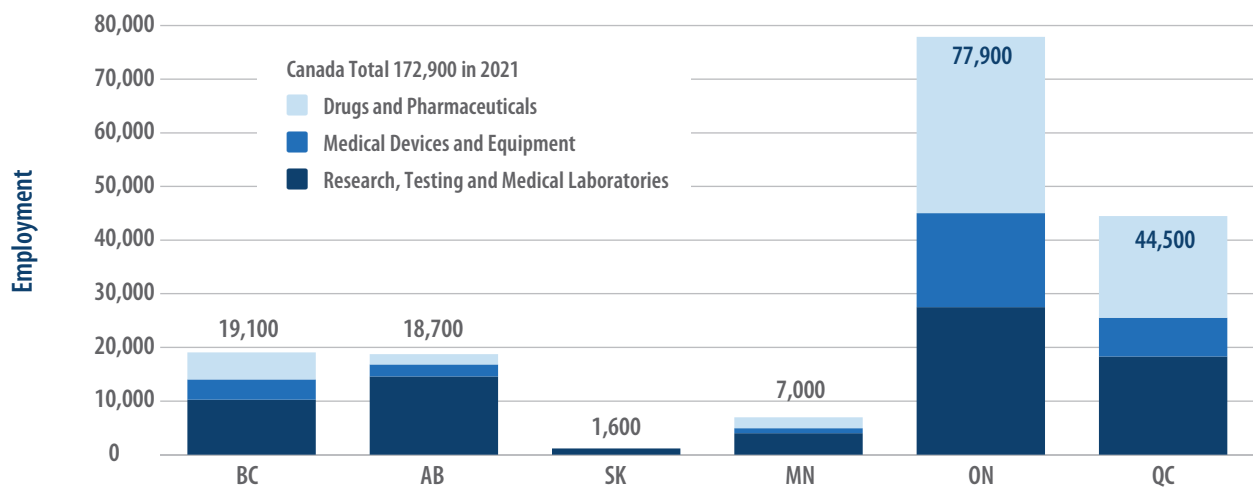


Source: BC Stats, using data from Statistics Canada

BRITISH COLUMBIA'S LIFE SCIENCES SECTOR EMPLOYMENT IS CATCHING UP NATIONALLY

In Canada, 172,900 people were employed in the life sciences sector in 2021, with Ontario and Quebec leading the country (Figure 9).

FIGURE 9: Canadian life sciences employment by province, 2021



Source: BC Stats, using data from Statistics Canada

When taken as a share of total employment (Figure 10), the life sciences sector is largest in Ontario, making up 1.2% of overall provincial employment. British Columbia's sector, at just over 0.8% of total employment in 2021, was the smallest proportion among the major provinces, although it has grown since 2017 when it represented just under 0.7% of all provincial employment.

B.C.'s life sciences sector employment has seen the second-fastest growth of all Canadian provinces since 2018, only behind Quebec (Figure 11). Shown as an index starting in 2018, employment grew 23.3% in B.C. and 29.1% in Quebec.

FIGURE 10: Life sciences employment as a share of total employment, by province

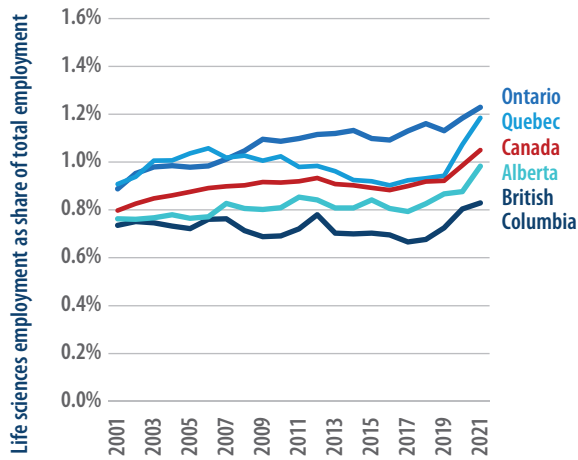
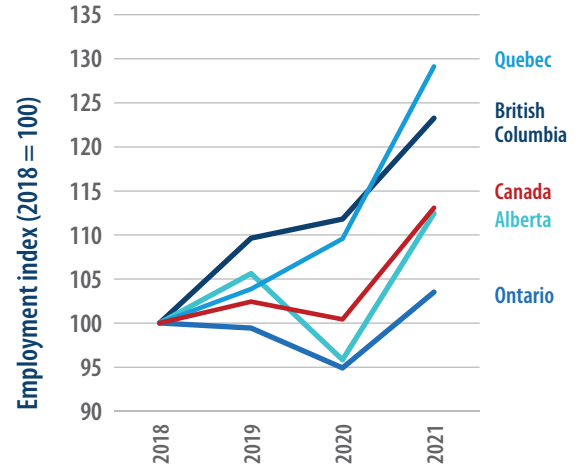


FIGURE 11: Index of life sciences employment growth since 2018, by province



Source: BC Stats, using data from Statistics Canada

Wages and average earnings

AN INCREASING PAYROLL FOR BRITISH COLUMBIA

The life sciences sector paid just over \$1.4 billion in wages in 2021, up 36.9% from three years earlier in 2018 (Table 5).¹⁰ The total life sciences payroll grew 20.2% in Canada overall, with only Quebec's growth, at 42.7%, exceeding B.C.'s.

TABLE 5: Wages and earnings in the life sciences sector, by province

	TOTAL WAGES (\$ MILLIONS) 2018	TOTAL WAGES (\$ MILLIONS) 2021	THREE-YEAR % CHANGE 2018-21	AVERAGE WEEKLY EARNINGS 2018	AVERAGE WEEKLY EARNINGS 2021	THREE-YEAR % CHANGE 2018-21
British Columbia	1,040	1,423	36.9%	1,288	1,430	11.1%
Ontario	5,365	5,851	9.1%	1,367	1,441	5.4%
Alberta	1,069	1,220	14.1%	1,232	1,249	1.4%
Quebec	2,302	3,286	42.7%	1,282	1,417	10.5%
Manitoba	327	403	23.4%	1,046	1,109	6.1%
Saskatchewan	76	82	7.8%	957	983	2.8%
Canada	10,544	12,673	20.2%	1,323	1,406	6.3%

Source: BC Stats, using data from Statistics Canada

¹⁰ Note that wage, revenue and trade figures in this report are valued in current dollars as sufficient information is not available to calculate constant dollar figures; therefore, growth rates include the effects of inflation.

WELL-PAYING JOBS WITH THE HIGHEST WEEKLY WAGE GROWTH IN CANADA'S LIFE SCIENCES SECTOR

Average weekly earnings for people employed in the sector grew 11.1% in B.C. over the three years from 2018 to 2021, the highest rate of growth in the country. By 2021, average wages were \$1,430 per week, making B.C.'s life sciences average earnings the second highest in Canada after Ontario, and representing an average annual salary in the sector of approximately \$74,600, which includes all employees – whether part-time or full-time management, scientists, support staff, professionals or specialists.

Although workers in the life sciences sector are highly paid (Table 6), average earnings grew at a slower rate over the three years of 2018 to 2021 than other sectors and compared to the B.C. economy as a whole. Average earnings in all B.C. industries rose through the pandemic (by 16.2% between 2018 and 2021), largely due to lower-wage workers being laid off in 2020 followed by worker shortages in 2021. For B.C.'s life sciences sector, earnings likely grew under a more normal dynamic.



TABLE 6: Average earnings for selected B.C. industries, 2021

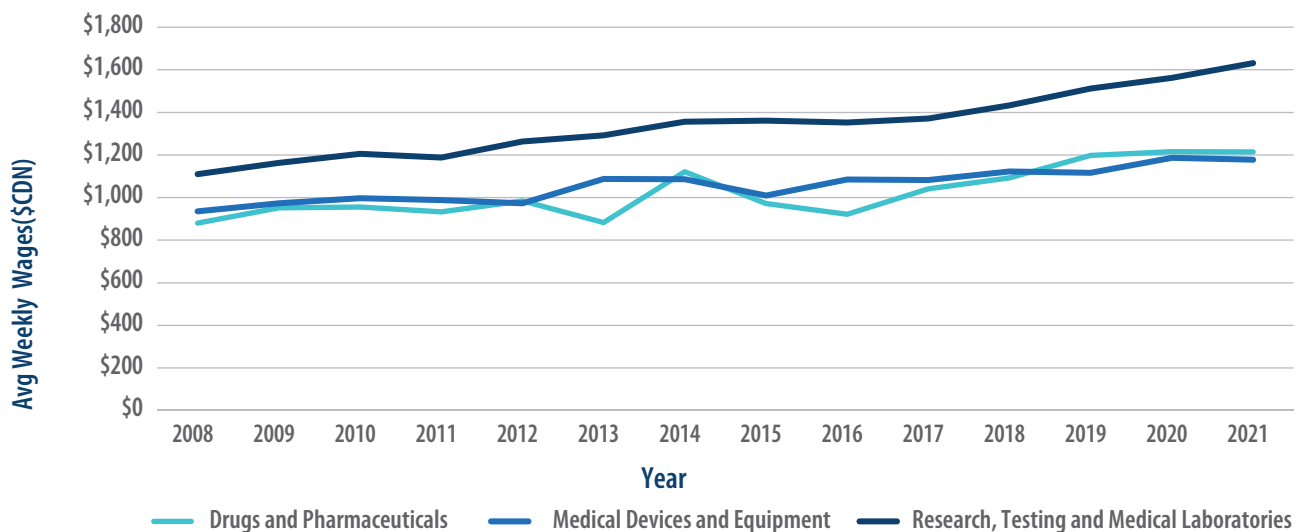
INDUSTRY	AVERAGE ANNUAL EARNINGS, 2021	THREE-YEAR % CHANGE, 2018-21
Mining and oil and gas	110,800	6.0%
Computer system design and publishing	99,900	15.0%
Telecommunications and data processing	79,100	24.4%
Finance and insurance	78,100	13.6%
Motion picture and sound recording industries	77,800	16.1%
Public administration	77,300	13.5%
Life Sciences	74,600	11.1%
Forestry	72,300	2.4%
Construction	71,100	13.5%
Goods-producing industries	71,100	10.9%
Manufacturing	63,000	10.8%
Real estate and rental and leasing	61,200	6.3%
Educational services	60,900	13.6%
TOTAL EMPLOYMENT	58,700	16.2%
Service-producing industries	56,200	17.4%
Health care and social assistance	52,200	12.9%

Source: BC Stats, using data from Statistics Canada

HIGH WEEKLY EARNINGS FOR RESEARCH AND DEVELOPMENT IN THE LIFE SCIENCES

Broken down by industry groups within the sector, the highest weekly earnings for life sciences employees in British Columbia have consistently been in the Research, Testing and Medical Laboratories sub-group, paying an average of \$1,631 per week in 2021 or \$85,000 per year, with the other two industry sub-groups being roughly equal (Figure 12). Each is composed of manufacturing firms and wholesaler firms, with the Drugs and Pharmaceuticals industry group paying an average salary of \$63,300 per year (\$1,214 per week) and the Medical Devices and Equipment industry group paying an average annual salary of \$61,400 (\$1,177 per week) in 2021.

FIGURE 12: British Columbia's average weekly earnings by industry group



Source: BC Stats, using data from Statistics Canada. This figure excludes businesses without employees

It should be noted that earnings vary significantly among the industry groups and across Canada (Table 7). Wages for the Research, Testing and Medical Laboratories industry group in British Columbia were 13% higher in 2021 than the Canadian average for this group. This can be explained by B.C.'s higher proportion of employment in Research and Development (R&D) as compared to medical and diagnostic laboratories, which pay less. B.C.'s average earnings were 17% lower than the Canadian average for jobs in the Drugs and Pharmaceuticals industry group and 4% lower in the Medical Devices and Equipment industry group.

TABLE 7: Average annual earnings for the life sciences sector by province, 2021

INDUSTRY GROUP	BC	AB	SK	MB	ON	QC	CAN
Drugs and Pharmaceuticals	63,300	62,900	64,500	72,400	78,600	74,200	76,100
Medical Devices and Equipment	61,400	66,700	60,000	62,900	63,600	66,200	63,900
Research, Testing and Medical Laboratories	85,000	65,200	47,100	49,300	78,300	76,600	74,900
Total Life Sciences	74,600	65,200	51,300	57,800	75,100	73,900	73,300

Source: BC Stats, using data from Statistics Canada

RESEARCH AND DEVELOPMENT (R&D) IS A STRONG PART OF THE B.C. LIFE SCIENCES SECTOR

B.C.'s life sciences industry demonstrates a particular strength in R&D, with companies focused on innovation and the development of new technologies. Overall, the R&D industry, a subset of the Research, Testing and Medical Laboratories industry group, made up over one-quarter (26%) of the sector's total employment in 2021, the highest share in Canada. It is also the highest-paying subset of B.C.'s life sciences sector, paying average annual salaries of \$98,600 or 50% more than the average for the rest of the sector. B.C. also has the highest-paying life sciences R&D industry in Canada.

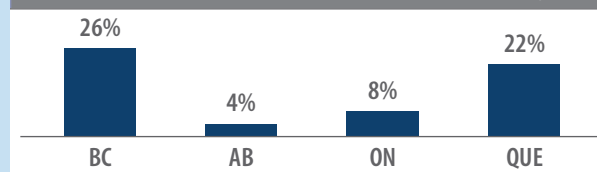
Note: The R&D industry is reflective of a portion of the NAICS code 541710 as defined in the Appendix

Source: BC Stats, using data from Statistics Canada

LIFE SCIENCES R&D COMPARED, 2021, BRITISH COLUMBIA

	R & D	REST OF THE SECTOR
Employment	5,100	14,000
Annual Earnings	\$98,600	\$65,900
GDP per employee	\$147,700	\$97,700

R&D'S SHARE OF PROVINCIAL LIFE SCIENCES EMPLOYMENT, 2021



R&D AVERAGE ANNUAL EARNINGS BY PROVINCE, 2021

BC	\$98,600
Alberta	\$91,200
Ontario	\$96,700
Quebec	\$84,900

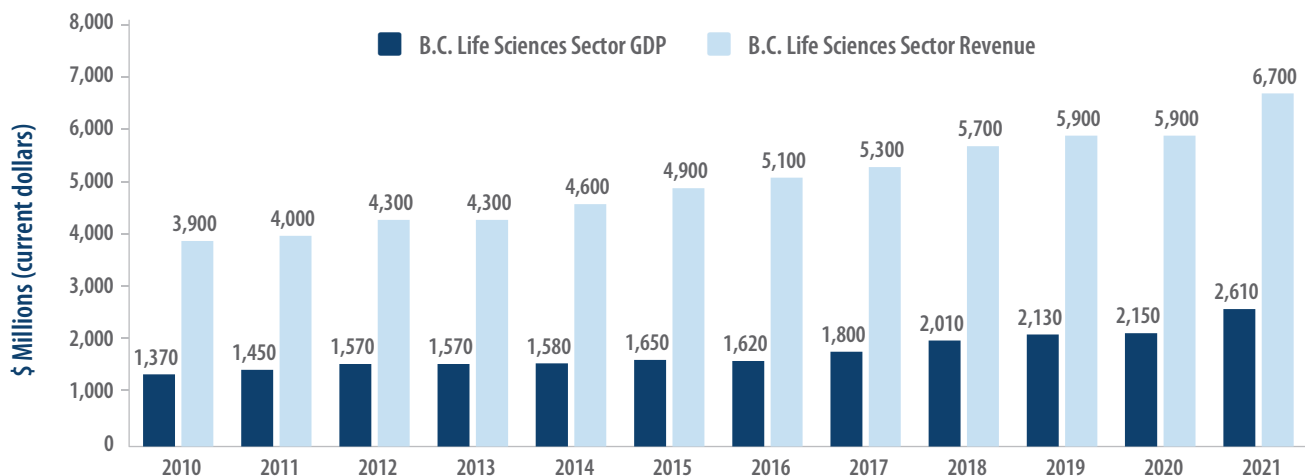
Gross domestic product and sector revenue

HIGH GDP AND REVENUE GROWTH BETWEEN 2018 AND 2021, DURING THE COVID-19 PANDEMIC

Gross Domestic Product (GDP) reached \$2.6 billion in 2021, when measured in current dollars, an increase of 21.2% from 2020 and 29.7% from three years earlier in 2018.

Sector revenue for British Columbia's life sciences sector was approximately \$6.7 billion in 2021 (Figure 13).

FIGURE 13: GDP and revenue



Source: BC Stats, using data from Statistics Canada

B.C.'s life sciences sector ranked third in the country for GDP and revenue, behind Ontario (\$13.1 billion in GDP and \$56.3 billion in revenue) and Quebec (\$9.5 billion in GDP and \$32.4 billion in revenue) (Figures 14 and 15).

FIGURE 14: Life sciences sector revenue by province, 2021 (with growth since 2018)

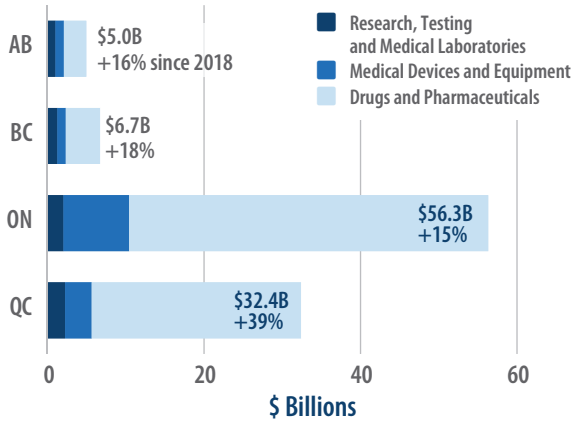
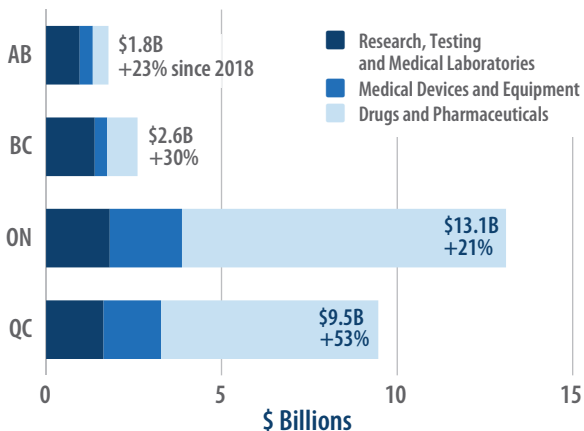


FIGURE 15: Life sciences sector GDP by province, current dollars, 2021 (with growth since 2018)



Source: BC Stats, using data from Statistics Canada

The three-year period from 2018 to 2021 saw a large \$18.4 billion (21.1%) increase in revenue for the sector in Canada, with most of that increase occurring in Ontario and Quebec. British Columbia's revenue for the sector grew by a total of 18.0% over the three years. In terms of GDP, B.C.'s sector grew 30% over the three years (in current dollars), exceeded only by Quebec's, which grew 53%.

A SECTOR THAT MAINLY CONTRIBUTES TO THE ECONOMY THROUGH RESEARCH, TESTING AND MEDICAL LABORATORIES

Most revenue for the sector is attributed to the Drugs and Pharmaceuticals industry group (\$4.4 billion or 65% for B.C.), and more specifically to wholesalers (\$3.3 billion or 46% of sector revenue) (Figure 16). However, large sales volumes for wholesalers may not lead to large margins over the goods sold that would contribute to the economy. GDP is a better measure of the economic contribution of the sector¹¹ by B.C. firms and here, it is the Research, Testing and Medical Laboratories industry group that is the largest contributor; even though revenue in that group was just \$1.3 billion, its contribution to B.C.'s GDP was \$1.1 billion because more of the value is created in B.C. (Figure 17).

FIGURE 16: Revenue for life sciences industry groups in British Columbia, 2021 (millions of current dollars)

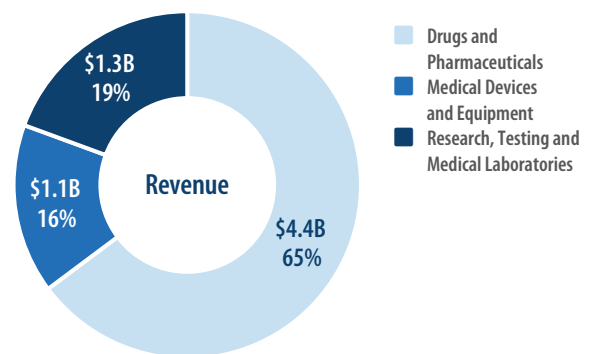
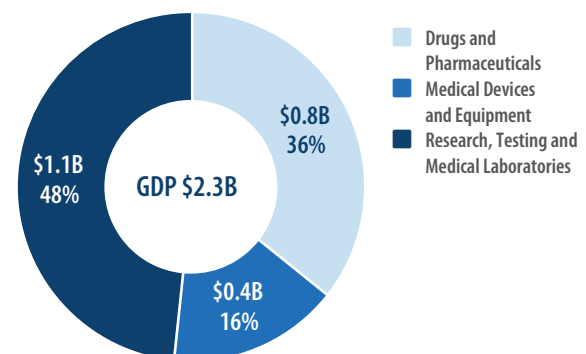


FIGURE 17: GDP for life sciences industry groups in British Columbia, 2021 (millions of 2012 chained dollars)

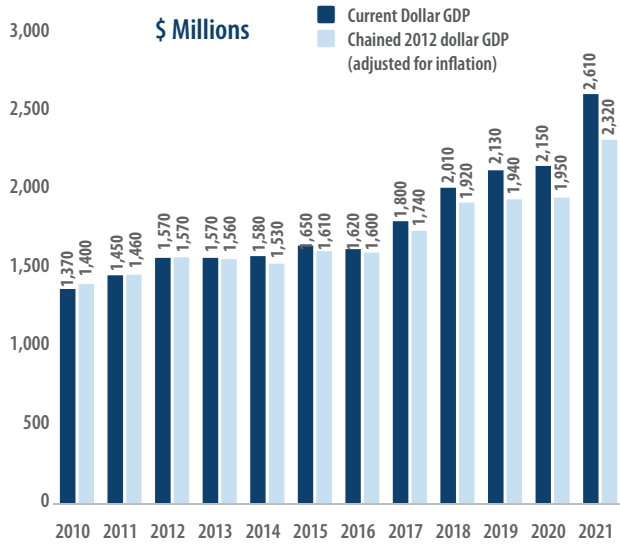


Source: BC Stats, using data from Statistics Canada

¹¹ Here, GDP is analogous to the value added by the industry. GDP and value added are close in definition (GDP includes the taxes paid on the industry's products), but data on value added is not available for all industries in the life sciences sector.

When adjusted for price increases in the component industries, B.C.'s life sciences sector was worth \$2.3 billion (chained GDP) in 2021. Real GDP growth was 20.7% over the three years from 2018 to 2021 (Figure 18).

FIGURE 18: Chained GDP vs. current dollar GDP, B.C. life sciences sector



Source: BC Stats, using data from Statistics Canada

Trade in goods and services

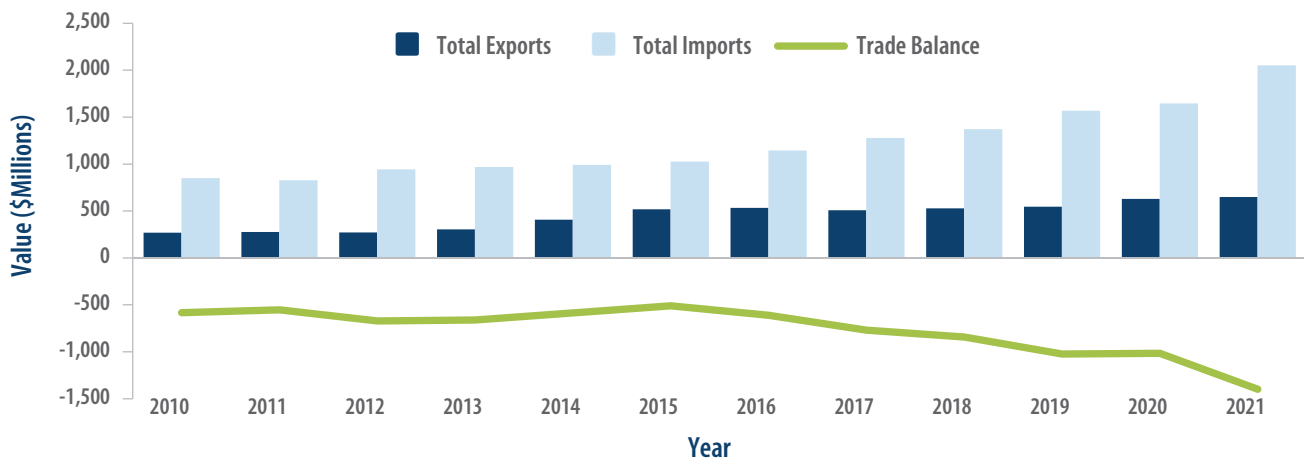
A TRADE DEFICIT DRIVEN BY LARGE IMPORTS OF GOODS

In 2021, British Columbia exported approximately \$650 million in life sciences goods and services to international destinations, which was approximately 12% of the Canadian total for this sector. Conversely, B.C. imported almost \$2.1 billion in life sciences goods and services – 13% of the country's imports for the sector. This resulted in an overall trade deficit for the province of about \$1.4 billion (Figure 19).¹²

The trade deficit was entirely due to trade in goods, which had a \$1.6 billion deficit, as British Columbia recorded a surplus of \$200 million in services. In fact, B.C.'s exports are currently concentrated in services, which make up 57% of the total, a trend that is reversed in Ontario and Quebec where more of their exports are in goods (74% and 71%, respectively). Almost all (96%) of B.C.'s life sciences service exports are in research and development services, as opposed to any international transactions by medical diagnostic laboratories or other testing facilities.

Nationally, Canada's trade deficit in life sciences goods and services stood at almost \$13.8 billion in 2021. As with British Columbia, the national deficit was entirely due to low trade in goods, as Canada recorded an \$800 million surplus in trade in life sciences services.

FIGURE 19: British Columbia trade in life sciences goods and services



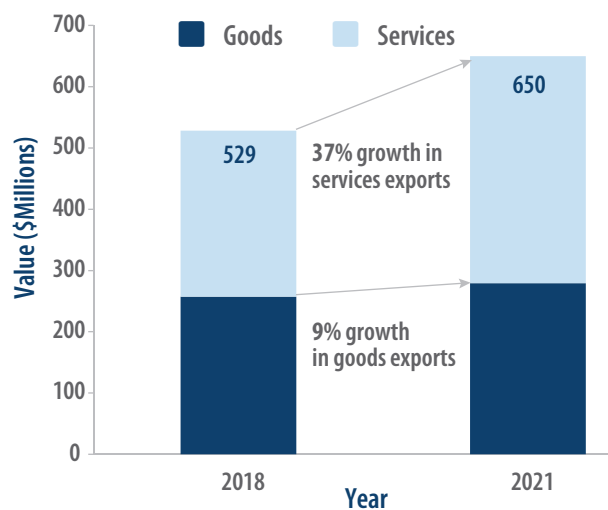
Source: BC Stats, using data from Statistics Canada

¹² Note that the trade balance calculation includes \$10 million in re-exports, which are goods imported into the province from an international origin, perhaps stored for a short period of time, then shipped out again without being materially transformed.

GROWING TRADE, ESPECIALLY WITH SERVICES

Despite the trade deficit, British Columbia's life sciences goods exports totalled \$279 million in 2021 and grew 9% since 2018. However, this is still behind the Canadian average growth rate of 24% in goods exports. Service exports for B.C.'s life sciences sector were \$370 million, a 37% jump over the three-year period (Figure 20). Despite its impressive growth since 2018, British Columbia's exports of life sciences services accounted for only a 0.3% share of the overall provincial service exports. Exports of life sciences goods represented 0.6% of the province's total international commodity trade.

FIGURE 20: British Columbia life sciences exports growth



Source: BC Stats, using data from Statistics Canada

Quebec experienced the country's strongest growth in exports for both goods and services (Table 8).

TABLE 8: Exports of life sciences goods and services, by province (\$ millions)

PROVINCE		2018	2021	THREE-YEAR % CHANGE
B.C.	Goods	257	279	9%
	Services	271	370	37%
ALBERTA	Goods	59	47	-20%
	Services	102	143	41%
QUEBEC	Goods	682	1,343	97%
	Services	379	548	45%
ONTARIO	Goods	1,864	1,748	-6%
	Services	522	611	17%
CANADA	Goods	2,834	3,515	24%
	Services	1,398	1,848	32%

Source: BC Stats, using data from Statistics Canada

Overall, with regard to trade, the life sciences sector may have more similarities to the information technology sector than to traditional manufacturing or commodity-producing industries. Companies from the life sciences sector are exporting more services than goods, and projections for Canada predict that the trend will continue.¹³ In British Columbia, the constant and substantial increase of services exported by small and medium-size life sciences enterprises since 2011 suggests an area of provincial strength.

EXPORTS

British Columbia benefits from the many Canadian free trade agreements and the interventions of trade commissioners to develop international markets in niche areas that demonstrate provincial strengths.

B.C. is the third-largest exporter of medical instruments after Ontario and Quebec with 15% of export value share. The largest market for B.C.'s medical instruments is the U.S. (\$193 million or 82% of all British Columbia's medical instruments exports). B.C. is also the main exporter of ultraviolet and infrared ray equipment in Canada, accounting for 94% of Canada's total exports.

B.C. is also the third-largest exporter of artificial body parts after Quebec and Ontario with 20% of Canada's export value share. The European Union market is a key destination for the province's exports of prostheses with around \$21 million in 2022. The value of British Columbia's vitamins and medicines exports to China were \$6 million, up 287% from 2021, while the second-largest destination was the U.S. at \$3.7 million in 2022, up 203% from 2021, placing China and the U.S. ahead of the EU consumers.

Source: Government of Canada – Trade Data Online (February 2023).
<https://www.ic.gc.ca/app/scr/tdst/tdo/crtr.html?&productType=HS6&lang=eng>

¹³ Trade Commissioner Service. (December 2019).
[Canadian service exports are on the rise](#)

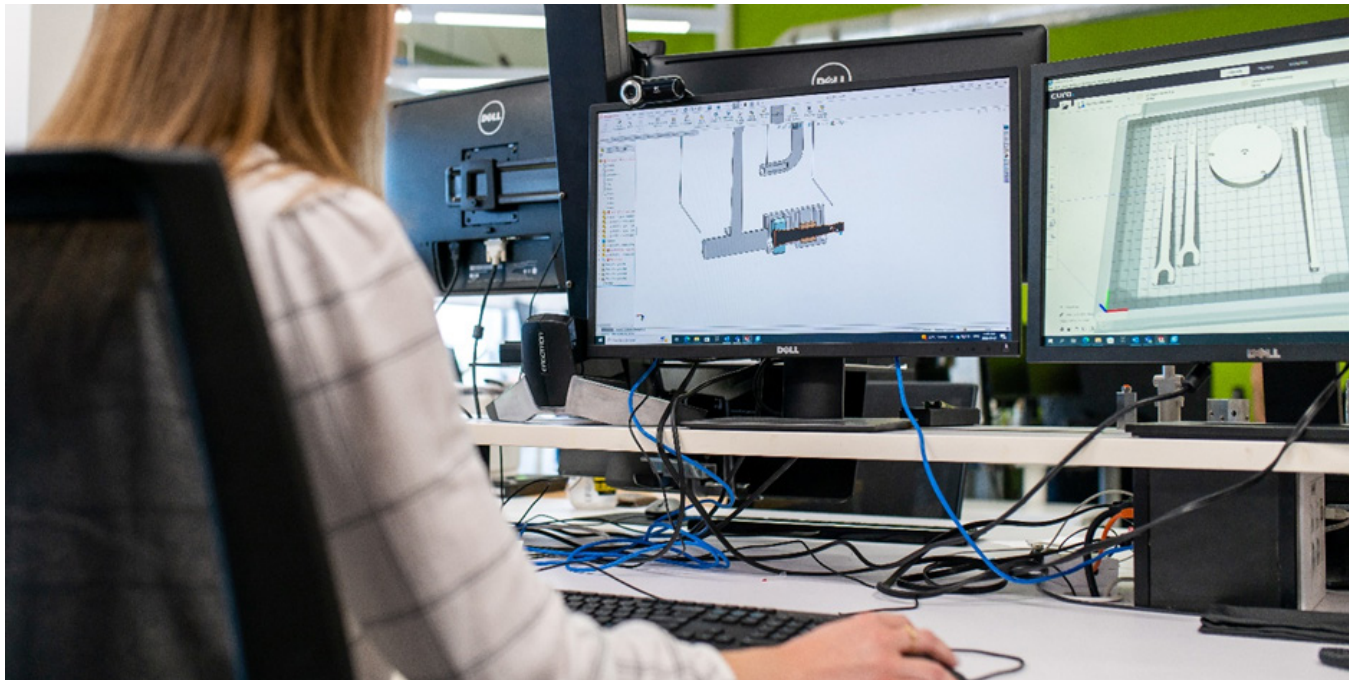


Photo courtesy of Starfish Medical

STARFISH MEDICAL, founded in 1999, is Canada's largest full-service medical device product design, development and contract manufacturing company. Based in Victoria, the company turns client technology into commercial products. StarFish Medical's services include intellectual property development, human factors, industrial design, engineering, consulting, supply chain management and specialty manufacturing, and an expanding line of bio services. StarFish Medical exports worldwide and helps clients obtain patents. The StarFish Group 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 2020, StarFish Medical led a multi-company Canadian team that updated the 30-year-old Winnipeg Ventilator to address the unique challenges of COVID-19 supply chains and operation limitations. In 2021, the StarFish Group acquired the assets of Otoharmonics, and created Levo Medical Corporation, a provider of tinnitus management solutions.

Manufacturing in the B.C. life sciences sector

Manufacturing is the second-largest contributor to GDP for goods-producing industries in the province's overall economy (all sectors).

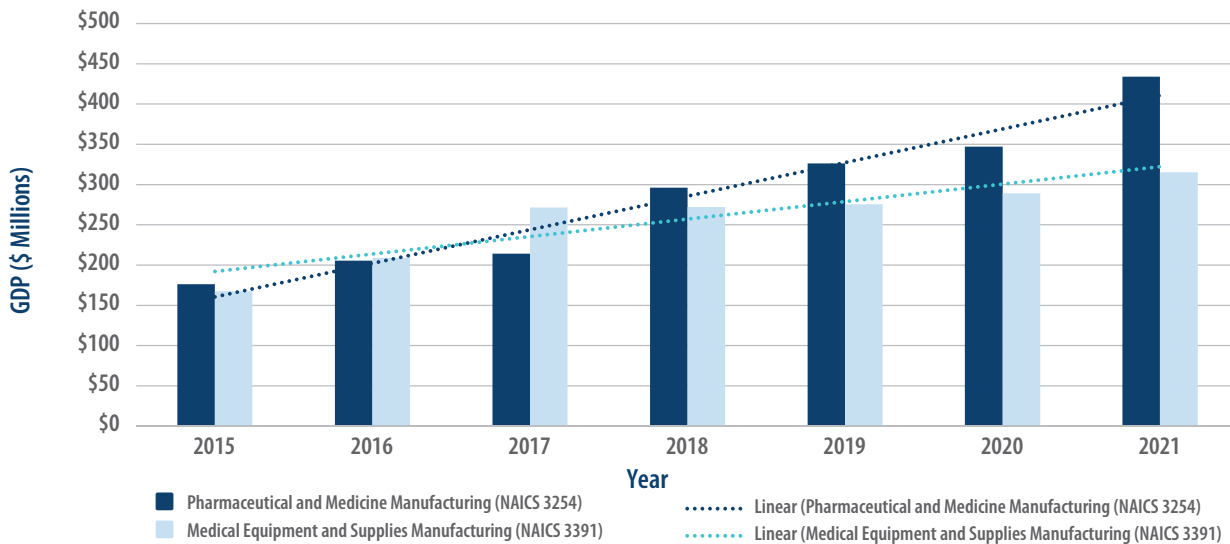
In B.C.'s life sciences sector, manufacturing is made up of two categories (NAICS):

- **Pharmaceutical and Medicine Manufacturing**
This group comprises establishments primarily engaged in manufacturing drugs, medicines and related products.
- **Medical Equipment and Supplies Manufacturing**
This group comprises establishments primarily engaged in manufacturing medical equipment and supplies.

Pharmaceutical and Medicine Manufacturing is one of the fastest-growing manufacturing areas in B.C., with a 17.6% compound annual growth rate over five years (2017-2021) and generating \$462.5 million GDP in 2021 (Figure 21).

Medical Equipment and Supplies Manufacturing is the 12th-fastest growing manufacturing sector in B.C. with a 6.5% compound annual growth rate over five years (2017-2021) and generating \$286.1 million GDP in 2021 (Figure 21).

FIGURE 21: GDP manufacturing in British Columbia's life sciences sector



Source: Ministry of Jobs, Economic Development & Innovation using data from Statistics Canada

Combined, the total GDP generated by these two manufacturing groups reached \$748.6 million in the province, trailing only by the top four B.C. manufacturing sectors, including sawmills and wood preservation (\$1,109.6 million of GDP); pulp, paper, and paperboard mills (\$921 million of GDP); veneer, plywood and engineered wood product manufacturing (\$795.8 million of GDP); and other wood product manufacturing (\$760.9 million of GDP).

The growth of B.C.'s Pharmaceutical and Medicine Manufacturing category is consistent with the rest of the country.

Talent development

Canada ranked as the most highly educated country among G7 nations in 2021.¹⁴ The life sciences sector in British Columbia will continue to benefit from high-quality training offered at public post-secondary institutions across the province that have gained recognition for their excellence in teaching and research. At the forefront of innovation and research in the industry, B.C.'s 25 public post-secondary institutions offer a range of health sciences and applied and natural sciences training programs in areas such as biotechnology, microbiology and immunology, molecular biology,

¹⁴ Statistics Canada. (2022). *Canada leads the G7 for the most educated workforce*

genetics, clinical genetics technology, behavioural neuroscience and biomedical engineering and technology (see [Appendix A: Sources and Methodology](#)).

The B.C. Future Ready Action Plan will provide grants for new training opportunities, create more tech-relevant post-secondary spaces to meet demands, and address barriers to access education and skills training for British Columbians. The newly announced National Biomanufacturing Training Centre will train current and future industry employees, expanding the field-specific skills and talent available in the province.

THE NEW NATIONAL BIOMANUFACTURING

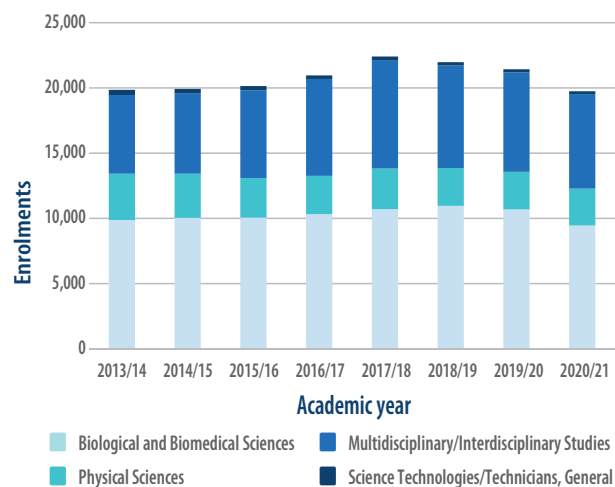
TRAINING CENTRE (NBTC) located on the campus of the BC Institute of Technology (BCIT) will offer professional hands-on biomanufacturing training to current and future industry employees. BCIT will partner with the Canadian Alliance for Skills and Training in Life Sciences (CASTL) to deliver industry-informed biopharmaceutical manufacturing training at the NBTC. This includes onboarding/upskilling industry employees, reskilling unemployed workers and crediting academic students. The training will use the most advanced biomanufacturing curriculum and equipment in a cleanroom environment that reflects industry needs for Good Manufacturing Practice and more.

POST-SECONDARY ENROLMENTS IN LIFE SCIENCES RELATED PROGRAMS

The number of students enrolled in life sciences related undergraduate and graduate programs in B.C. increased from 2013/14 to 2018/19 and has since declined by 10%, from approximately 22,000 in 2018/19 to just under 19,800 in 2020/21. This reflects the impact that the COVID-19 pandemic had on the overall number of enrolments into post-secondary institutions, including life sciences related programs. The number of Indigenous students enrolled in life sciences related programs, has, however, continued to grow from almost 680 in 2013/14 to more than 750 in 2020/21.

Biological and biomedical sciences programs had the largest proportion of enrolments in each of the eight years reported.

FIGURE 22: Enrolments in life sciences related programs by instructional program type

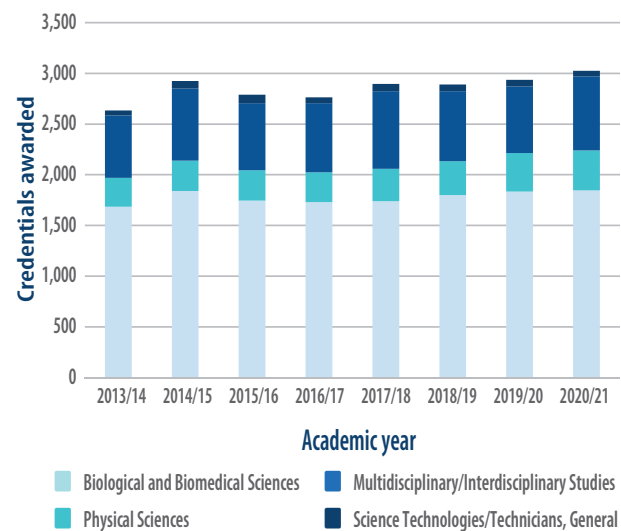


Source: Student Transitions Project, Fall 2021 submission, Ministry of Post-Secondary Education and Future Skills

CREDENTIALS AWARDED FOR LIFE SCIENCES RELATED PROGRAMS

The number of credentials awarded by British Columbia's public post-secondary institutions for life sciences related programs has grown 8% and fluctuated slightly around an annual average of 2,900 credentials over the last five years, with biological and biomedical sciences making up the largest proportion.

FIGURE 23: Credentials awarded for life sciences related programs by instructional program type



Source: Student Transitions Project, Fall 2021 submission, Ministry of Post-Secondary Education and Future Skills

MITACS is a national, not-for-profit organization 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. Mitacs works with 117 post-secondary partners and 6,000 companies. The organization has trained more than 22,000 student and postdoc participants over the past 20 years. Mitacs graduate interns typically work within industry settings and apply their graduate expertise to create innovative research-based solutions, including in the life sciences and biotech sector.

In April 2023, the B.C. government has provided Mitacs with \$50 million to support 10,000 paid internships over five years.

Investment in British Columbia's Life Sciences Sector

In Canada, overall venture capital (VC) investments for 2021 more than doubled from the previous record year 2019 (\$6.2 billion) with \$14.7 billion invested, despite a drop to \$4.4 billion during the pandemic year 2020.¹⁵ The Canadian life sciences sector saw high levels of VC investment in 2021, setting a record of \$1.8 billion across 102 deals, a 50% increase from 2020's previous record of \$1.2 billion invested, with only 15% more deals.^{16,17}

In British Columbia, biotech companies raised unprecedented capital during the pandemic period. After raising a record \$2.33 billion in 2020, life sciences companies raised \$1.47 billion in capital in 2021, with the majority (\$1.28 billion) sourced from B.C. companies and investment funds.¹⁸ The top two disclosed Canadian VC deals of 2020 were from B.C. life sciences companies AbCellera (\$144 million) and Chinook Therapeutics (\$140 million).

AbCellera that same year raised approximately \$720 million from gross equity financings (in a Series A2 and IPO).^{19,20} Despite the macroeconomic volatility after an outlier 2021, in the first half of 2022, life sciences saw \$622 million invested across 55 deals in Canada. Compared to Q1, deal count in Q2 increased by 29%.²¹

ASPECT BIOSYSTEMS is a growing biotech company of approximately 30 employees pioneering microfluidic 3D bioprinting of human tissues for medical research, therapeutic discovery and regenerative medicine. Aspect Biosystems' technology platform enables the creation of living human tissues with unprecedented control, flexibility and precision. Aspect Biosystems' collaborations with the University of Victoria and the University of British Columbia received two Ignite awards from Innovate BC (2017 and 2019).

The life sciences sector in B.C. reported 12 private equity deals in 2021, more than all other sectors in the province.²² Highlights from the same year include Xenon Pharmaceuticals (\$345 million), Chinook Therapeutics (\$183 million), and Essa Pharmaceuticals (\$130 million), after closing public offerings of their shares.^{23,24,25} Some major announcements came from B.C.'s sector in 2022, including Xenon Pharmaceuticals Inc. following up on their previous success with the closing of a \$287.5-million public offering, along with Zymeworks (\$115 million) and Chinook Therapeutics (\$105 million).^{26,27,28}

15 Canadian Venture Capital & Private Equity Association. (2021). Year-End 2021 – VC & PE Canadian Market Overview

16 British Columbia Securities Commission. (2021). [BC Capital Market Report 2021](#)

17 Canadian Venture Capital & Private Equity Association. (2021). Year-End 2021 – VC & PE Canadian Market Overview

18 British Columbia Securities Commission. (2021). [BC Capital Market Report 2021](#)

19 AbCellera. (2021). [AbCellera Reports Full Year 2020 Business Results](#)

20 Chinook Therapeutics Inc. (2021). [Chinook Therapeutics announces closing of \\$183.5 million public offering](#)

21 Canadian Venture Capital & Private Equity Association. (2022). H1 2022 Canadian Venture Capital Market Overview

22 26 Canadian Venture Capital & Private Equity Association. (2021). Year-End 2021 – VC & PE Canadian Market Overview

23 Xenon Pharmaceuticals Inc. (2021). [Xenon Pharmaceuticals Announces Closing of \\$345 Million Public Offering](#)

24 Chinook Therapeutics Inc. (2021). [Chinook Therapeutics announces closing of \\$183.5 million public offering](#)

25 ESSA. (2021). [Essa Pharma Announces Closing of \\$130 Million Public Offering of Common Stock](#)

26 Xenon Pharmaceuticals Inc. (2022). [Xenon Pharmaceuticals Announces Closing of \\$287.5 Million Public Offering](#)

27 Zymeworks (2022). [Zymeworks Announces Closing of \\$115 Million public offering](#)

28 Chinook Therapeutics Inc. (2022). [Chinook Therapeutics announces pricing of a \\$105 million public offering](#)

FIGURE 24: Publicly disclosed partnerships of B.C. therapeutics companies with large global pharmaceuticals.
 Image courtesy of Novateur Ventures Inc. Copyright 2023



Dotted line = acquisition of biotech companies by global pharmaceutical

Solid line = partnership between biotech companies and global pharmaceuticals

This diagram is a snapshot in time as of May 2023. This diagram does not include:

- partnerships with other biotechnology companies
- partnerships that are not disclosed
- service providers (except Precision Nanosystems)

DEALS IN BRITISH COLUMBIA:

- 242 deals have taken place in B.C. over the 2013-2023 decade (as of May 2023)
- 51 had disclosed financials: The average deal was \$259 Million USD and the total deal values reached \$13.2 Billion USD.
- The B.C. companies with most active deals are AbCellera, Zymeworks, Acuitas, Corveio.
- Top diseases for these partnerships are cancer, infectious diseases and neurology.

Source: Novateur Ventures Inc.



Photo courtesy of AbCellera Biologics Inc.



Photo courtesy of STEMCELL Technologies.



Photo courtesy of Chinook Therapeutics

ABCELLERA is a Vancouver-based biotech company that partners with global pharmaceutical and biotech companies of all sizes, empowering them to tackle the toughest problems in drug development and bring new treatments to patients faster.

AbCellera's effort to combat COVID-19 resulted in two antibody treatments, including the first antibody to be authorized by Health Canada and the U.S. FDA. Together, AbCellera's COVID-19 antibodies have treated more than 2.5 million patients.

The company is 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.

STEMCELL TECHNOLOGIES, headquartered in Metro Vancouver, is 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 B.C.'s Lower Mainland.

Throughout its almost 30-year history, STEMCELL has established itself as an industry leader in supporting the advancement of life sciences research around the world. Today, the company's 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.

STEMCELL's ongoing success is due, in large part, to its research relationships with academic institutions in Canada and abroad, and partnerships with both the governments of British Columbia and Canada.

CHINOOK THERAPEUTICS is a biopharmaceutical company with a mission to discover and develop therapies to preserve kidney function and make dialysis and transplant unnecessary for people living with kidney disease.

Chinook's lead clinical program is atrasentan, a phase 3 ETA antagonist for the treatment of IgA nephropathy and other proteinuric glomerular diseases. Chinook's pipeline also includes BION-1301, which is in phase 1/2 development for IgA nephropathy and CHK-336, which is being evaluated in a phase 1 trial for hyperoxalurias.

With 185+ employees and a market capitalization of more than \$1 billion, Chinook is committed to utilizing cutting-edge research to drive the understanding of kidney biology with the aim of discovering, developing and commercializing new therapeutics for patients suffering from kidney disease.



B.C. Life Sciences Ecosystem

British Columbia's diverse life sciences sector is very collaborative, and supported by industry organizations and accelerators, governmental organizations, universities and research hospitals, and other organizations that co-ordinate and fund research and clinical trials.

This section describes some of the key organizations and recent initiatives that support the life sciences industry in British Columbia. Programs are listed in [Appendix B](#).

Industry associations and life sciences accelerators

The B.C. life sciences sector can benefit from the large combined networks, targeted services and opportunities offered by industry associations and accelerators.

- ▶ [Life Sciences BC](#) (LSBC) is the voice of B.C.'s life sciences sector and is uniquely positioned at the intersection of academia, research and commercialization. LSBC brings the community together to discuss issues that impact the life sciences sector, provides networking opportunities with national and international thought leaders, and showcases the key achievements of the life sciences community. LSBC and its members help expand British Columbia's world-class life sciences sector, position B.C. as a global hub for life sciences and biomanufacturing, bring health improvements to British Columbians, and strengthen the economy.
- ▶ [Vancouver Island Life Sciences Association](#) (VILS) is a non-profit and volunteer-led society that brings together the life sciences community in Victoria and around Vancouver Island, and builds and strengthens local connections with the global life sciences community. 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.
- ▶ [adMare BioInnovations](#) is a pan-Canadian organization created in 2019 and headquartered in Vancouver. adMare builds life sciences companies, ecosystems and talent to drive the growth of the Canadian life sciences industry into a sustainable and world-leading sector. adMare BioInnovations

use scientific and commercial expertise, specialized research and development infrastructure, and seed capital, to build investable companies, robust ecosystems and industry-ready talent, and reinvest back into the Canadian industry. Their mission is to translate leading academic research into new companies of scale, to train the next generation of highly qualified personnel to drive the growth of Canadian companies into strong anchors, and to help existing life sciences companies to scale up. adMare's purpose-built innovation centres in Vancouver and Montreal provide key drug development capacity and highly cost-effective, move-in-ready lab and office space with shared services and facilities, along with top-notch amenities and educational and networking events.

Provincial and federal governments

British Columbia's life sciences sector is supported by both provincial and federal government organizations that generate economic growth and foster a competitive environment for industry through several initiatives, services, programs and incentives (See [Appendix B](#)).

THE GOVERNMENT OF BRITISH COLUMBIA:

- ▶ The [B.C. life Sciences and Biomanufacturing Strategy](#) will position the province as a global life sciences hub and a centre for commercial-scale biopharmaceutical and medical manufacturing. The strategy will: Improve access to talent; grow innovative local companies; increase biomanufacturing capacity and attract anchor companies; expand B.C.'s clinical trials capacity; and leverage and commercialize research.

- The Ministry of Jobs, Economic Development and Innovation provides the long-term foundation for the economic development of the province and is responsible for the [StrongerBC Economic Plan](#) as well as B.C.'s Life Sciences and Biomanufacturing Strategy. The ministry champions innovation across the economy, creates the conditions to help small businesses be successful, co-ordinates Indigenous and international collaborations, and promotes B.C. as a preferred place to invest and do business.
- The [Ministry of Health](#) has overall responsibility for ensuring that quality, appropriate, cost-effective and timely health services are available for all British Columbians. The ministry also supports health research programs, oversees organizations such as Health Research BC and leads the modernization of clinical trials in the province. The ministry is responsible for the recently announced B.C.'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.

[Health authorities](#) deliver health services to meet the needs of the population within five geographic regions. In addition, the Provincial Health Services Authority oversees the co-ordination and delivery of programs and specialized health-care services. Several health authorities are home to research hospitals directly connected to research institutes.

[Innovate BC](#) is the provincial crown agency responsible for the innovation ecosystem. It funds and delivers programs that support the growth of the B.C. economy by helping companies start and scale up, train talent that meets labour market needs, and encourage technology development, commercialization and adoption.

[InBC Investment Corp.](#) (InBC) is a strategic investment fund created by the Government of British Columbia with \$500 million to invest in venture funds and companies that demonstrate strong and measurable opportunities aligned to the triple bottom line of people, planet and profit. InBC supports companies and venture funds with a strong connection to B.C. and a focus on both meaningful impact and profit.

THE GOVERNMENT OF CANADA:

- [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.
- [Innovation, Science and Economic Development Canada](#) (ISED) is the federal department that advances the conditions for investment, enhances innovation, increases Canada's share of global trade, and builds a fair, efficient and competitive marketplace. ISED is responsible for Canada's Biomanufacturing and Life Sciences Strategy and oversees multiple programs and initiatives in support of industry and science.
- [Global Affairs Canada](#) (GAC) advances Canada's interests and values in a complex global environment. GAC manages diplomatic relations, promotes trade and provides consular assistance. GAC's [Trade Commissioner Service](#) (TCS) provides strategic market information and market access solutions for Canadian companies looking to export, invest abroad or develop international partnerships. The TCS assists foreign companies planning to invest or expand their operations in Canada.
- [Pacific Economic Development Canada](#) (PacifiCan) is the federal agency that promotes growth and diversification in B.C.'s economy by enhancing innovation, improving business competitiveness and promoting inclusive growth. PacifiCan offers services and funding programs to local businesses and communities. PacifiCan also advocates for B.C. in national economic policy, programs and projects.
- [The National Research Council Canada](#) (NRC) has charge of matters affecting scientific and industrial research in Canada. The NRC provides advice, connections and funding to help small and medium-sized businesses increase their innovation capacity and take ideas to market. Through its flagship Industrial Research Assistance Program, NRC's local industrial technology advisors offer customized support through extensive networks of regional, national and international partners.

- **Health Canada** ensures that high-quality health services are accessible in the country and works to reduce health risks for Canadians. Among other responsibilities, Health Canada is the federal regulator and competent authority for drug and health product review, and for clinical trial approvals, oversight and inspections.
- **The new Canada Innovation Corporation (CIC)** – to be established by the end of 2023 – is a Crown corporation led by the private sector that will operate independently from government and report to the Minister of Innovation, Science and Industry. The CIC will advance Canadian business investment in research and development and promote economic growth. The Industrial Research Assistance Program led by the NRC will be moved under the CIC umbrella.

Research ecosystem: A strong asset of British Columbia

Whether conducted by the private sector or public institutions, research in life sciences is a strong asset of the province. All players serve a vital role in investigating and advancing discoveries, training a highly skilled workforce and transferring knowledge to clinical applications and commercialization. The partnerships forged in the province between researchers, academia, clinicians and industry, community organizations and government agencies facilitate the transfer and commercialization of knowledge.

ACADEMIC INSTITUTIONS



Photo courtesy of UBC

The University of British Columbia

The University of British Columbia (UBC) is a global centre for teaching, learning and research, consistently ranked among the top 20 public universities in the world, with over 70,500 students, more than 7,100 faculty members and over \$773 million in research funding in 2021/22. UBC is British Columbia's largest research university, with two main campuses in Vancouver and Kelowna, and with research and learning sites located throughout the province.

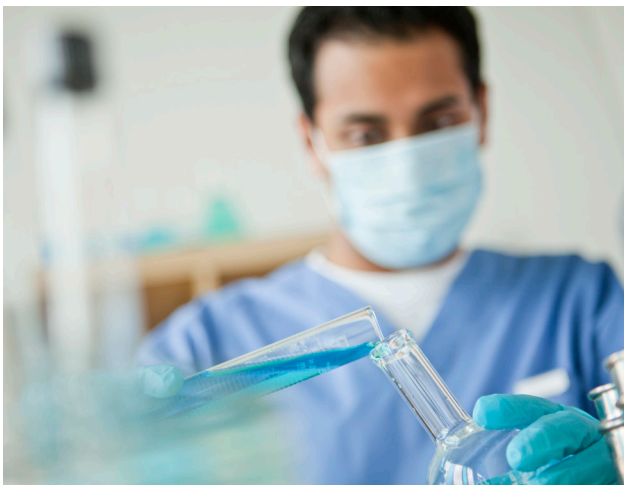
UBC is home to some of Canada's strongest life sciences interdisciplinary and genomics hubs, with researchers in molecular genetics, genomics, bioengineering, personalized medicine, RNA vaccines and treatments, lipid nanoparticles, health data, artificial intelligence and microbial research. Notable institutions within UBC include:

- **School of Biomedical Engineering (SBME):** Established in 2017, the SBME is UBC's first inter-faculty school. With access to world-leading research infrastructure, and close partnerships with research-intensive hospitals and local industry, 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.
- The **Life Sciences Institute (LSI)** performs interdisciplinary science to discover the fundamental biological mechanisms underlying health and disease, and translate this knowledge into new therapies. Research is organized into nine groups that leverage the LSI's scientific facilities and core services. LSI members conduct research on diabetes, cardiovascular disease, immune responses, infectious disease, cancer biology, developmental disorders, bacterial regulation, neuroscience, structural biology and molecular epigenetics.
- **Michael Smith Laboratories**, named in honour of the Nobel Prize-winning UBC researcher, brings together biologists and engineers to discover innovative solutions to problems of societal importance. It is home to researchers from several faculties, including Science, Medicine, Applied Science, Forestry, and Land and Food Systems.

- The [Djavad Mowafaghian Centre for Brain Health](#) bridges basic science and clinical care and provides opportunities for education, collaboration and interaction with patients from across B.C. It is a training and research hub for neuroscience, neurology, psychiatry and rehabilitation.
- [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 spinoff companies have been in the life sciences sector, including Precision Nanosystems, AbCellera, Acuitas Therapeutics and ABOzymes.

UBC's Okanagan campus in Kelowna is one of the most rapidly expanding campuses in Canada, with over \$46 million in research funding for more than 1,300 research projects in 2021/22, and 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.

UBC is affiliated with health authority research institutes, and partners with numerous national and international centres, including [TRIUMF](#): Canada's particle accelerator centre, and the [Nanomedicines Innovation Network](#) (NMIN). Hosted by UBC, NMIN advances "smart" medicines to cure disease by delivering small molecule drugs specifically to disease sites and enabling the clinical use of gene therapies.



University of Victoria

The [University of Victoria](#) (UVic) is one of the top-ranked comprehensive, research-intensive universities globally, with signature research areas in mental health, Indigenous health, healthy aging and translational medicine. UVic has over 22,000 students, more than \$145 million in research revenue in 2022, approximately 150 researchers working in the life sciences area, and several research centres with state-of-the-art equipment, including:

- 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.
- 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.
- 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.
- 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.
- [CanAssist](#) develops innovative technologies, programs and services for people who experience physical or cognitive barriers.

UVic's [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.

Simon Fraser University

Simon Fraser University (SFU) has approximately 37,000 students and conducts research with global impact. SFU's annual research income reached \$170 million in 2021.



Image courtesy of Simon Fraser University

- SFU is renowned for big data research, including in the life sciences (bioinformatics, genomics, health sciences, neuroscience). SFU's Big Data Hub makes use of the Supercomputer Cedar, one of the most powerful academic supercomputers in Canada, serving over 13,000 Canadian researchers. The Big Data Hub recently partnered with the Ministry of Health to model several scenarios during the COVID-19 pandemic. SFU also hosts the new provincial Quantum Algorithms Institute to serve increasingly data-intensive research, including in the life sciences.
- 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.
- Bio3 Lab is a biosecure facility dedicated to infectious disease research activities on the CL3-required level. The facility is also available to non-SFU academic and corporate researchers.
- The Faculty of Health Science at SFU has a strong focus on population and public health, mental health and substance use, and infectious diseases.
- The Pacific Institute on Pathogens, Pandemics and Society (PIPPS) is an interdisciplinary research institute hosted at SFU with a mandate to strengthen B.C.'s response to future pandemics.

- Future school of medicine. The provincial government is supporting the creation of B.C.'s second medical school at the SFU Surrey Campus. The new medical school will help train the doctors the province needs to improve access to primary care, with a desired first student intake by September 2026. The new medical school will support new research.

In recent years, SFU researchers have commercialized a number of promising technologies in biomanufacturing, pharmaceuticals, wearable tech and other health technologies. Companies include Alectos Therapeutics, Mesentech and Shield-X. SFU serves as the host of Circle Innovation, which supports B.C. digital health technology companies in their growth.

SFU collaborates with other academic institutions and research institutes across B.C.

University of Northern British Columbia

The University of Northern British Columbia (UNBC) is one of Canada's best small universities, with a growing research income that reached over \$15 million in 2021. UNBC's strengths in community development and its strong ties with First Nations have resulted in state-of-the-art research in northern, rural and environmental health.

- 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 in the north of the province. The university's strengths in knowledge translation stem from its community-driven partnerships.
- UNBC recently announced the new Northern Centre for Clinical Research (NCCR) in collaboration with UBC Faculty of Medicine, and the Northern Health Authority, to be housed at the University Hospital of Northern British Columbia in Prince George. The new centre will create more opportunities for clinical and biomedical research in the north and improve care for northerners.
- UNBC is the host institution for the Centre for Technology Adoption for Aging in the North (CTAAN). CTAAN breaks the barriers to the adoption of technologies that can help older residents of northern and rural communities to age happily and healthily in those communities. CTAAN tests, pilots, implements and promotes technology solutions to help older adults live independently.

British Columbia Institute of Technology (BCIT)

With five campuses in and around Vancouver, [BCIT](#) is one of the province's largest post-secondary institutions. It offers career credentials designed for the workplace to nearly 50,000 students annually.

- The new [Health Sciences Centre](#): BCIT offers over 32 health education programs, including programs in nursing, diagnostic imaging, laboratory science and allied health, and specialty nursing programs.
- The [Biotechnology Program](#) offers a joint honours degree with UBC. At BCIT, faculty are engaged in a variety of research projects, including cancer biomarker discovery and vaccine development.
- [National Biomanufacturing Training Centre](#) (NBTC): The recently announced NBTC at BCIT's Richmond campus will support the development of skilled workers for the operation and maintenance of biomanufacturing facilities. This will include basic and customized training for new and experienced industry employees, and accredited programming for students.
- At its [Centre for Applied Research and Innovation](#), BCIT hosts several niche research groups, such as:
 - » [NRG Phytoanalytics Laboratory](#): This Canadian leader in supporting the natural health product and agrifood sectors is fully equipped for research and is home to the first certified food screener in North America.
 - » [MAKE+](#): The MAKE+ sub-group PART (Product and Process Applied Research Team) is the only academic product development group in Canada that meets the ISO 13485 requirements for a comprehensive quality management system for the design and manufacture of medical devices.

RESEARCH INSTITUTES

British Columbia is home to several large health research institutes. All work with provincial health authorities to conduct state-of-the art research. The main health research institutes include:

British Columbia's main health-related research institutes

On hospital campuses

- [Providence Health Care Research Institute](#);
- [Vancouver Coastal Health Research Institute](#);
- [BC Cancer Research Institute](#);
- [Women's Health Research Institute](#);
- [BC Children's Hospital Research Institute](#); and

Other locations

- [Immuno-Engineering and Biomanufacturing Hub](#) (cross-universities, led by UBC)
- [TRIUMF and TRIUMF Innovations](#) (isotopes and radiotherapy)

Providence Health Care Research Institute

The [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:

- 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-B.C. Treatment as Prevention strategy (TasP).
- The [Centre for Health Evaluation and Outcome Sciences \(CHÉOS\)](#) has become one of Canada's foremost health outcomes research organizations evaluating the effectiveness of health interventions at the population level.
- 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.

By 2026, **THE ST. PAUL'S HOSPITAL AND HEALTH CAMPUS** in Vancouver's False Creek Flats area, will be uniting 21st century research and innovation with patient care, enabling B.C.-made therapies and technologies to reach patients more quickly. On the new campus, 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. It will bring together patients, physicians, researchers, clinicians, corporate staff and leaders, along with industry players, academic partners, and startups to share ideas, collaborate on discoveries and develop new medical advancements that will change the world. The CSRC will be the new location of the Providence Health Care Research Institute.

The Vancouver Coastal Health Research Institute

The **Vancouver Coastal Health Research Institute (VCHRI)** is the top-funded and largest hospital-based research institute in Western Canada, and the fifth largest in Canada. VCHRI's 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). For example:

- The **Vancouver Prostate Centre** is the largest prostate cancer treatment facility in Canada and includes a large patient clinic, a clinical trials facility, patient supportive care, and basic science research program dedicated to answering challenging questions of cancer biology and translating research discoveries into treatments.
- Five **research programs** also focus on community research, emergency medicine, hematology, rehabilitation and skin research.

- Three **Emerging Research Areas** include wound healing, ophthalmology and pancreatic cancer.

BC Cancer and BC Cancer Research

BC Cancer is a part of the Provincial Health Services Authority. It provides a comprehensive cancer control program for the people of British Columbia by working with community partners to deliver a range of oncology services, including prevention, early detection, diagnosis and treatment, research, education, supportive care, rehabilitation and palliative care.

BC Cancer Research is the research arm of BC Cancer, which strives to improve the lives of patients through the integration of basic biomedical research, genomics, clinical trials, health services research, cancer surveillance, population health, and the development of innovative new technology, programs and interventions. 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. BC Cancer Research supports ground breaking research and personalized care approaches through world-class facilities and platforms including genomics, bioinformatics, imaging, drug development and tissue banking.

The Women's Health Research Institute

The Women's Health Research Institute is a leading academic women's and newborn research centre embedded within the BC Women's Hospital and Health Centre. It 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.

The BC Children's Hospital Research Institute

The BC Children's Hospital Research Institute is part of the Provincial Health Services Authority and is supported by the BC Children's Hospital Foundation. The institute works in close partnership with UBC, and its research portfolio includes basic, clinical, population and public health research. Thousands of patients and families are enrolled in clinical studies to help develop new treatments.

Immuno-Engineering and Biomanufacturing Hub

The Immuno-Engineering and Biomanufacturing Hub.

Newly created in B.C., the Hub brings together a coalition of 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.

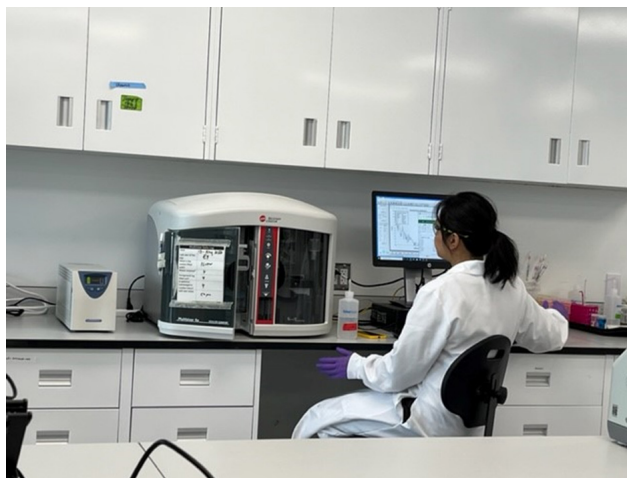


Image courtesy of Notch Therapeutics

NOTCH THERAPEUTICS, INC. is a biotech company 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.

Notch is working to maximize the benefit of cell therapies through a proprietary T cell-production platform that combines sophisticated product design with commercial-compatible processes to enhance patient outcomes. Notch's iPSC-based technology platform allows for precision control of notch signaling, which removes several critical limiting factors in the development of cell therapies, delivering the ability to design and manufacture a uniform and unlimited supply of therapeutic T cells.

The company currently employs 88 people, nearly 50% of whom work from the Vancouver office. Notch also has facilities in Toronto and Seattle.

29 Health Research BC. (2023). *Clinical Trials BC*

TRIUMF and TRIUMF Innovations

TRIUMF is Canada's particle accelerator centre, located on UBC's campus. From the hunt for the smallest particles in the universe to the development of new technologies, including medical isotopes, TRIUMF is pushing the frontiers in research to advance science, medicine and industry. TRIUMF's life sciences program includes research and production of isotopes for medical imaging like PET and SPECT scans, cancer treatment and tracers for research on various neurological illnesses.

TRIUMF's **Institute for Advanced Medical Isotopes (IAMI)** is a flagship life sciences research and isotope production facility on TRIUMF's campus. IAMI will significantly increase British Columbia's and Canada's capacity to sustainably produce and distribute life-saving medical isotopes. Centered around two core components – a new, made-in-BC cyclotron and an integrated series of state-of-the-art radiochemistry labs – IAMI will build and fortify commercial collaborations that will enhance Canada's medical isotope and radiopharmaceutical research and production infrastructure.

Supported by **TRIUMF Innovations, the laboratory's** commercialization arm, this new facility will also play a key role in connecting cutting-edge medical science and technology innovations to emerging business opportunities –translating TRIUMF science from lab bench to bedside.

ARTMS is a TRIUMF spinoff company that is a leader in developing accelerator-based technologies for the production of critical medical isotopes, including technetium-99m – an isotope employed in more than 80% of all nuclear medicine imaging procedures.

CLINICAL TRIALS

Canadian clinical trials played a pivotal role during the COVID-19 pandemic, generating evidence for the safety, effectiveness and outcomes of vaccines, drugs, medical devices and clinical practices. Changes resulting from the COVID-19 pandemic have begun to streamline the integration of trial research and patient care,²⁹ including in B.C. For certain types of trials, digital and virtual technologies removed constraints such as geography and

the limitations of traditional business hours, and remote monitoring and visits helped maintain trial continuity.³⁰

Currently there are over 1,350 active clinical trials in B.C., with more than 600 investigators and over 100 sites.³¹ Over 90% of these trials are Phase 2 to 4 trials, and include device, procedure and drug trials. Trials conducted in B.C. account for 20% of all clinical trials in Canada. Most were registered as oncology trials (35%), cardiology trials (10%) and examining medical devices (14%).³²

With its large and diverse population, British Columbia offers a unique competitive advantage for companies that are undertaking clinical trials.

As the G7 leader in clinical trial productivity (number per population), Canada has captured 4% of global trials and is continuing to improve its clinical trial environment,³³ including in B.C., through, for example:

- The modernization of the clinical trials regulations under the [Regulatory Innovation Agenda](#).
- The [Canadian Clinical Trials Asset Map](#) to market Canada in the global marketplace.

Under the [B.C. Life Sciences and Biomanufacturing Strategy](#), the province will also strengthen its clinical trial ecosystem in collaboration with Michael Smith Health Research BC and its Clinical Trials BC unit.

Clinical Trials BC supports investigators, sites and institutions. Using a collaborative approach to infrastructure and capacity building, Clinical Trials BC is the go-to place for trials in B.C. It offers:

- Access to resources and tools such as the provincial clinical trial management system.
- Professional development and training to achieve and maintain certifications.
- Advice and advocacy to improve clinical trials provincially, nationally and internationally.
- Support to clinical trials sites and teams to help with approvals, implementation, regulatory compliance and audit preparations.

30 Deloitte. (2022). [2022 Global Life Science Outlook](#)

31 Health Research BC. (2023). [Clinical Trials BC: Why British Columbia](#)

32 US National Library of Medicine. (2022). [Clinical Trials.gov database](#)

33 Government of Canada. (2022). [Clinical trials environment in Canada](#)

34 Genome BC. (2023). [Strategic Plan 2023-2026](#)

KEY RESEARCH FUNDING AND RESEARCH SUPPORT ORGANIZATIONS

Michael Smith Health Research BC

[Michael Smith Health Research BC](#) (Health Research BC) is the province's health research agency. Its programs build research talent, strengthen the province's life sciences ecosystem, and mobilize communities for health, social and economic impact.

Funded by the Province of British Columbia, Health Research BC is a cornerstone of B.C.'s life sciences sector. Building on its 20-plus year track record, the organization is focused on strengthening research infrastructure and capacity across the province, supporting evidence-informed decision-making in health care, increasing the competitiveness of B.C.'s life sciences sector, and maximizing the social and economic benefits of health research.

Genome BC

[Genome BC](#) is a not-for-profit organization supporting world-class genomics research projects and innovation initiatives to grow a globally competitive life sciences sector and deliver sustainable benefits for B.C., Canada and beyond. By connecting academic researchers, industry partners and public sector interests, it advances research and innovation collaborations, invests in promising startup companies, and catalyzes partnerships to drive societal, environmental and economic benefits for B.C. Genome BC oversees projects, supports with funding provided by the Province, and facilitates matching funds for initiatives supported by federally funded organizations such as Genome Canada and PacifiCan. Since 2000, Genome BC has managed a cumulative portfolio of \$1.3 billion in over 500 projects. Outcomes include securing \$1 billion in co-funding, taking part in over 1,100 collaborations in 42 countries and advancing over 150 B.C.-based companies. Recent estimates project that, by March 2026, Genome BC's cumulative activities will have contributed nearly \$5 billion to B.C.'s GDP, created more than 51,000 jobs and contributed over \$1 billion to government revenues.³⁴

MAIN SOURCES OF PUBLIC FUNDING FOR LIFE SCIENCES RESEARCH IN BRITISH COLUMBIA:

- **Michael Smith Health Research BC (Provincial):** Focus on health and clinical research.
- **Genome BC (Provincial):** Focus on genomics research.
- **The BC Knowledge Development Fund (Provincial) and the Canada Foundation for Innovation (federal):** Focus on co-funding capital equipment for research.
- **The Canadian Institutes of Health Research (federal):** Canada's federal funding agency for health research. Focus on all types of health-related research.

The BC Knowledge Development Fund and the Canada Foundation for Innovation

The [BC Knowledge Development Fund](#) (BCKDF) is B.C.'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. Investments are cost-shared by the federal [Canada Foundation for Innovation](#). Together, since their inception in 1998, the two programs have co-contributed over \$800 million to establish life sciences research facilities for over 700 research projects in areas such as urology, ophthalmology, pediatrics, nutrition, biochemistry and molecular biology.

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 has contributed over \$1.7 billion to British Columbia research from 2009 to 2021, with over \$200 million awarded in 2020/2021 alone.³⁵

Population Data BC

[Population Data BC \(PopData\)](#) has been providing 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 for over 25 years. These data sets, many dating back to 1985, include longitudinal, person-specific, de-identified data on B.C.'s 5.3 million residents.

Researchers who access data to study population health have produced many outstanding contributions to scientific knowledge and to policy-making for healthier communities.

.....
³⁵ Government of Canada. (2022). [CIHR Funding Decisions Database](#)

Interprovincial and international activity

Life sciences businesses in British Columbia benefit from the province's open and diversified economy, advantageous location, attractive investment climate and skilled workforce. British Columbia is one of North America's most competitive, flexible and supportive business climates, with consistently favourable labour, utility and facility costs. The province has a good credit rating, streamlined regulations, competitive taxes, access to clean power, a stable and well-regulated financial system, and a fiscally responsible and supportive government. As such, B.C. is naturally positioned to meet the needs of investors, businesses and trading partners looking for opportunities in jurisdictions that have strong and measurable environmental, social and governance (ESG) commitments.

Strong collaborative, international partnerships can be leveraged for the development of ideas, co-development of products for two markets, and easy access to partner markets.³⁶

Even with the current high real estate costs, the cost of doing business in British Columbia can be lower than that in other locations in North America, and gives companies a competitive edge based on:

- A low corporate income tax rate.
- Labour costs.
- Costs for power and facilities.

³⁶ Government of British Columbia. (2023). *Trade and Invest BC: Why choose B.C.*

THE CASCADIA INNOVATION CORRIDOR

The *Cascadia Innovation Corridor* initiative links Vancouver, Seattle and Portland to increase economic opportunity beyond what the cities and their surrounding regions could achieve independently. The British Columbia, Washington State and Oregon governments, together with research, industry and business organizations, participate in the initiative.

Through its life sciences section, the Cascadia Innovation Corridor facilitates connections, and is advancing projects that include:

- accelerating collaboration on regional public health issues (e.g., anti-vaccination issues, opioid crisis, aging populations);
- enabling actionable data to cure disease-promoting tools including AI and other precision medicines, particularly related to cancer and aspects of global health; and
- improving cross-border awareness for collaboration, regional partnerships, cross-border presence, and networks in the health and life sciences sector.

INTERPROVINCIAL ACTIVITY

The Province of British Columbia is party to trade agreements making interprovincial trade a priority. The national *Canadian Free Trade Agreement* (CFTA) fosters improved interprovincial trade by removing and reducing barriers and promoting the free movement of goods, services and people between provinces.

The *New West Partnership Trade Agreement* (NWPTA) between British Columbia, Alberta, Manitoba and Saskatchewan aims to create Canada's largest barrier-free, interprovincial market. This replaces the former Trade, Investment and Labour Mobility Agreement (TILMA).

INTERNATIONAL MARKETS AND FREE TRADE AGREEMENTS

British Columbia's *strategic location* on the Pacific coast is the gateway to Asia and major global centres. The province's modern infrastructure of ports, airports, roads and railways – and a state-of-the-art communication network – links the province to the global community, and includes:

- Proximity to key markets and duty-free access to the U.S. and Mexico.
- The shortest sea route from Asia to North America.
- Connection to all major U.S. economic centres by secure, reliable road and rail networks.

Canada has one of the world's most open trading economies, and businesses in British Columbia benefit from significant international *Free Trade Agreements (FTAs)* that include provisions supporting the life sciences sector.

Canadian exporters of services in the life sciences are now on equal footing with competitors in European, Asian and North American markets, thanks to Canada's recent FTAs, such as the Canada-European Union Comprehensive Economic and Trade Agreement (CETA), the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Canada-United States-Mexico Agreement (CUSMA).

As a result of these agreements, tariffs have been eliminated on Canadian goods produced by the life sciences sector such as pharmaceuticals and medical devices.

Suppliers, including Canadian medical device companies, benefit from expanded access to government procurement opportunities (e.g., expanded access to opportunities to supply hospitals, schools and universities in the European Union under CETA). Since the implementation of CETA, both the pharmaceutical and medical instrument industries have seen growth in duty-free exports to the EU.³⁷

Government procurement provisions cover a broad range of services that may be of interest to the life sciences sector, including the repair of machinery and equipment, and technical testing and analysis.

FTAs make it easier for short-term business visitors, intra-company transferees, investors, contract service suppliers and independent professionals to conduct business and may include entry without the requirement of a work permit for 90 days in any six-month period for any of the following activities: meetings or consultations, research and design, marketing research, training seminars, trade fairs and exhibitions, sales, purchasing, after-sales or after-lease service, commercial transactions, translation and interpretation (some conditions apply).

FTAs include intellectual property protections for innovators that make Canada more attractive an environment for investment in life sciences.

Several opportunities exist for British Columbia's life sciences sector that can be leveraged, drawing new investment from the province's priority markets including the U.S., India, the European Union, Japan, China and Korea.

.....
³⁷ Government of Canada. (2023). *Canada's Merchandise Trade Performance with the EU after the Entry into Force of CETA*

Appendix A: Sources and methodology

Unless otherwise stated, the statistics reported in this document were derived by BC Stats, with the methodology described below, and using data from Statistics Canada.

Life sciences definition

For the purposes of this report, the following NAICS industries are included in the life sciences sector. Where all the six-digit NAICS in a four-digit aggregate industry are included, only the four-digit industry code and description are listed. For those industries marked with an asterisk (*), only a portion of the industry was included. These codes have been used for the analysis regarding British Columbia and the comparisons to other provinces.

TABLE 9: Life sciences definition: NAICS codes

INDUSTRY GROUP	CANADA	
	NAICS	INDUSTRY DESCRIPTION
Research, Testing and Medical Laboratories	541380	Testing laboratories
	541710	Research and development 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 merchant wholesalers *
Drugs and Pharmaceuticals	3254	Pharmaceutical and medicine manufacturing
	414510	Pharmaceuticals and pharmacy supplies merchant wholesalers

**Only a portion of the industry is included
Source: BC Stats*

It is impossible to aggregate existing NAICS codes because, for some industries, only a portion is included in the life sciences sector; therefore, the life sciences sector's share of those industries must be estimated. Also, given the scarcity of data at the most detailed level of NAICS, it is necessary to make some assumptions to disaggregate the data to the necessary level of detail.

Business counts

Data for business counts are sourced from Statistics Canada's Canadian Business Counts (CBC) tables. Statistics Canada publishes data for these tables twice annually, with June and December reference dates. For this report, the December reference period was used, so for example, business counts reported for 2021 are from the December 2021 table.

BC Stats receives an extract of the Business Register (BR), which is the source of the CBC tables, with all the micro-records for British Columbia. Business counts by sub-provincial region are derived from this extract. Statistics Canada excludes some businesses from its count of businesses without employees (e.g., businesses with under \$30,000 in annual revenue); however, the information the agency uses to make these exclusions is not included in the BR extract received by BC Stats. For this reason, counts of businesses without employees by sub-provincial region cannot be consistently calculated and are therefore not included in this report.

Employment and wages

The primary source for information on employment and earnings is Statistics Canada's Survey of Employment, Payrolls and Hours (SEPH). Wages were mainly calculated using employment and average weekly earnings data. Unfortunately, SEPH data are available at only a four-digit NAICS level of detail, whereas six-digit detail is required for most of the industries in the life sciences sector. The Annual Survey of Manufactures (ASM) has wage and revenue information for the manufacturing industries broken down to the six-digit level. For life sciences industries in the manufacturing sector, these data were used to split the four-digit SEPH employment. For the service-sector industries, a different approach was needed to split the four-digit employment figures into the six-digit codes in the life sciences definition.

The one data source with complete six-digit detail is business count data from the CBC tables. Data are also broken out by 21 employee size classes (i.e., 1-4, 5-9, 10-19, 20-29, etc.). To split four-digit NAICS employment data into the necessary six-digit detail, a ratio was calculated using employment estimates derived using the business count data. The estimates were calculated by taking the count for a size class times 60% of the lower bound plus the count times 40% of the upper bound and summing over all the employee classes. The 60/40 split was used instead of 50/50 as experimentation showed that 60/40 better predicted actual employment figures.

To illustrate, if a particular NAICS had 20 employees in the 1 to 4 employee class, the calculation would be $1 \times 20 \times 0.6 + 4 \times 20 \times 0.4 = 12 + 32 = 44$. This would be added to the number calculated to each of the other size classes to get a total employment estimate for the industry.

Estimates were calculated for both the six- and four-digit codes, then the ratio of the six-digit over the four-digit estimate was applied to the four-digit employment figure from SEPH to estimate employment for the six-digit NAICS.

In some cases, the SEPH data were suppressed by Statistics Canada for some years, either due to confidentiality or data quality concerns. For these situations, the data were estimated using a variety of methods depending on what other information was available. For instance, where some years of data for a couple of provinces were suppressed, but data for Canada and most other provinces were available, the gaps were filled by applying the growth rate of the residual of

Canada minus the sum of the provinces for which data exists to the available data from the provinces with missing data.

Wages for six-digit industries were calculated using the employment estimates for that industry and the average weekly earnings for the appropriate four-digit NAICS. In some cases, for the manufacturing sector, average weekly earnings from the ASM were used to calculate wages.

The source for employment growth from selected industries data is Statistics Canada's Employment by industry, annual accounts, specifically table 14-10-0202-01 (formerly CANSIM 281-0024).

Revenues

Revenues for industries in the manufacturing sector (Medical Equipment and Supplies Manufacturing; Pharmaceutical and Medicine Manufacturing) were calculated using data from the ASM.

For the wholesaling industries, data from Statistics Canada's Annual Wholesale Trade Survey were used. For NAICS 541380 Testing Laboratories, the only viable source of revenue data is from the Financial Performance Indicators produced by the federal government. These data do not provide a complete picture of revenue; however, it is the only source available. As a result, revenues calculated for this specific industry may be underestimated to some extent. For the remaining service-sector industries, gross output figures from Statistics Canada table 36-10-0488-01 were used as an estimate of revenue.

Where data were suppressed due to confidentiality or data quality concerns, gaps were filled using a variety of methods such as growth of wages or residual growth rates as described above. Where no data existed for the six-digit industry, data for a higher aggregation industry were split using the business count employment estimate methodology described earlier.

Gross domestic product

The source for gross domestic product (GDP) data is Statistics Canada's Economic Accounts - tables 36-10-0401-01, 36-10-0402-01 and 36-10-0434-01. Like SEPH data, GDP data are only available at the four-digit NAICS level from these tables. For current dollar estimates, the six-digit NAICS were split from the higher aggregations using ratios of revenue. Since current dollar data are available only to 2019, they had to first be grown forward using the growth of constant dollar data inflated using an index calculated from average weekly earnings.

Once the current dollar figures were estimated at the six-digit level, the constant dollar figures were calculated using the current dollar values divided by the appropriate four-digit NAICS index, which was the ratio of current over constant dollar values. A chained value was then calculated for the total life sciences sector and each of the industry groups included in this report.

International and interprovincial trade

For trade in goods, the U.S. Bureau of the Census' advanced technology products categories of biotech goods and life sciences goods were used to define trade in life sciences goods. The list of American codes used to define those two categories was matched against the equivalent Canadian codes to develop data for Canada and the provinces. Data is sourced from the customs-based export and import data produced by Statistics Canada. As imports by province of consumption are not available, an estimate of British Columbia-consumed imports was derived using the consumption of Canadian imports of those commodities by the provincial economy and applying this ratio to total Canadian imports.

The source for trade in services data is primarily Statistics Canada's Supply-Use tables from table 36-10-0478-01. The list of "products" included in the calculation of life sciences trade in services is as follows:

- Architectural, engineering and related services* (portion only)
- Research and development services* (selected portion only)
- Medical laboratory diagnostic and testing services

Only a portion of trade in those products marked with an asterisk is included. For those industries, the life sciences portion was calculated by applying the life sciences share of revenue in the appropriate industry (testing laboratories; and research and development in the physical, engineering and life sciences, respectively).

The latest available year of data from the Supply-Use tables is 2019, so values had to be grown to 2021. For British Columbia, the industry shares of each trade type (international exports, international imports, re-exports, interprovincial exports, interprovincial imports) were calculated from the Supply-Use tables and those shares were applied to gross output data, then the growth rates

of the resulting figures were applied to the trade by product. While BC Stats has access to current gross output estimates for British Columbia, access to data for other provinces and national-level data is limited to what is publicly available, so other methods are needed. For Canada, the growth of international transactions in commercial services from table 36-10-0006-01 was used. The other provinces were grown using the growth of the residual of Canada minus British Columbia.

Calculating the life sciences portion

There are two industries for which only a portion of the overall industry can truly be considered life sciences. For these industries, it was necessary to develop ratios to split the life sciences portion out of the industry total.

The two industries for which ratios were needed to split the Canadian data are NAICS 417930 Professional machinery, equipment and supplies merchant wholesalers and NAICS 541710 Research and development in the physical, engineering and life sciences. To calculate a ratio, data from Dun & Bradstreet's business list database was used, which give estimates of numbers of businesses, employment and sales.

Even though the data are for Canadian companies, Dun & Bradstreet code their data using American NAICS codes, and the difference in U.S. and Canadian NAICS definitions is used for Canadian NAICS 417930 to help find the life science portion. Since the relevant U.S. NAICS code (423450, Medical, dental and hospital equipment supplies and wholesalers) is all in the life sciences sector, Dun & Bradstreet were able to provide a simple count of that code and the parent 4-digit aggregation of 4234, which is equivalent to the Canadian four-digit code 4179. The ratio of the counts of 423450 over 4234 was used to split the data. The data is available by province such that province-specific ratios could be calculated. One ratio for each province was used to split business counts, employment and revenue figures, with the assumption that the ratios would be similar for each of these indicators. This was a necessary assumption given the scarcity of data to be used to calculate these ratios. For British Columbia in 2021 the ratio was 36%.

For NAICS 541710, a representative sample of about 25% of all NAICS 541710 businesses in Canada was obtained from the Dun & Bradstreet data was extracted and for each company in the list, it was determined through an online search whether the business should be included in

the life science sector. Ratios for numbers of businesses, employment and sales were thereby derived for each province. For B.C. in 2021, 41% of the businesses, 47% of the employment and 47% of the revenue of NAICS 541710 was determined to be in research and development in the life sciences. Wages for the subsector were not able to be disaggregated from its larger parent industry and use the average weekly wage rate for the industry NAICS 5417, Scientific research and development services, multiplied by 52 weeks per year.

The count was completed twice based on a “snapshot” of the data at the time, in 2019 and early 2022; the 2019 ratios had to be used for 2019 and each year prior, the 2022 counts were used for 2021, and years in between were taken as a trend between the two snapshots.

The ratios developed were used to split business counts, employment and revenue figures, with the assumption that the ratios would be similar for each of these indicators. This was a necessary assumption given the scarcity of data to be used to calculate these ratios.

Methodology for talent development statistics

Talent development statistics are sourced from the British Columbia Ministry of Post-Secondary Education and Future Skills. The Ministry gathers student and institutional data for policy development, program delivery, and to ensure student success. The Ministry provided data on enrolment and credentials awarded (source: Student Transitions Project) for life sciences-related programs offered at public post-secondary institutions.

Data include both domestic and international students and exclude offshore students.

- In any given year, some students may be enrolled in more than one program; therefore, the sum of the program headcounts may include some students more than once.

- Data are restated annually to maintain accuracy and reflect institutional updates. Each number has been rounded to the nearest five; the effects of rounding may result in different reports not matching exactly.
- The Programs are as identified by the Classification of Instructional Programs (CIP) grouping of [Physical and Life Sciences](#) programs established by Statistics Canada. Note that the grouping includes only a sub-set of CIP codes within the two-digit CIP 30 (Multidisciplinary/ Interdisciplinary Studies).

Methodology for manufacturing statistics

Manufacturing statistics are sourced from Statistics Canada. The British Columbia Ministry of Jobs, Economic Development and Innovation gathers and analyses manufacturing data from Statistics Canada to help with policy development and improve program delivery. For the purposes of this report, the following NAICS industries are included in the life sciences manufacturing sector. Where all the six-digit NAICS in a four-digit aggregate industry are included, only the four-digit industry code and description are listed.

- Pharmaceutical and Medicine Manufacturing [3254]
- Medical Equipment and Supplies Manufacturing [3391]

The data provided in this report is based on the Manufacturing Industry Sector Model developed by the Ministry using a larger model called the IMAP Comprehensive Model.

- GDP data: [table 36-10-0402-01](#)
- Jobs data: [table 36-10-0489-01](#)

Appendix B: Overview of enabling programs

Several provincial and federal governmental programs promote innovation in British Columbia. Most of these programs target all sectors, but some are more specific to life sciences. While the following list is not exhaustive, it presents several of the main government-supported programs and resources available in British Columbia.

Program ownership is mentioned prior to the program name: Innovate BC; B.C. Ministry of Jobs, Economic Development and Innovation (JEDI); Pacific Economic Development Canada (PacifiCan); Innovation, Science and Economic Development Canada (ISED); Global Affairs Canada (GAC); Canadian Border Services Agency (CBSA); National Research Council of Canada (NRC).

Disclaimer: Abstracts for individual programs aim to be accurate and reflect the wording for external sites and their subsequent links when this sector profile report was released. These links are being provided as a convenience and for informational purposes only; content within these links may change or be updated.

INNOVATION SUPPORT AND FUNDING PROGRAMS

Federal Concierge Service

A comprehensive list of programs and services available in British Columbia for life sciences companies (non-exclusively), in support of funding, investments, tax credits, wage subsidies, expert advice, partnering and research facilities. The federal programs in this table are listed on the Concierge list.

https://innovation.ised-ised.canada.ca/innovation/s/list-liste?language=en_CA&token=a0B5W000009xrkJAA

Innovate BC – ScaleUp Program

The ScaleUp program 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. The program is delivered by Innovate BC's network of partners throughout the province so that we can help entrepreneurs all over B.C.

<https://www.innovatebc.ca/programs/scaleup/>

Innovate BC – BC Fast Pilot

The BC Fast Pilot program helps SMEs design, build and operate a pilot plant or small demonstration of their technology in real-world conditions. The program allows B.C. technology companies to demonstrate the impact of their product, measure the value of their solution, and encourage customer adoption. This initiative is delivered as a partnership between Innovate BC and the National Research Council of Canada /Industrial Research Assistance Program (NRC /IRAP).
<https://www.innovatebc.ca/programs/bc-fast>

Innovate BC – Venture Acceleration Program (VAP)

The VAP program is designed to help growing technology companies and helps B.C. tech entrepreneurs accelerate the process of defining a proven business model. Delivered by a team of Executives in Residence and supported by a province-wide network of partners and entrepreneurs, the VAP helps small- to medium-sized tech companies grow into successful businesses.

<https://innovatebc.ca/what-we-offer/connect-with-experts/venture-acceleration-program/>

Innovate BC – Ignite Program

Ignite provides up to \$300,000 in matching funds for innovation projects in the areas of natural resources or applied sciences. Project teams must be a British Columbia-based partnership made up of at least one academic partner and one industry partner. Projects need to secure matching funds from industry or other government sources at a ratio of 2:1 matching dollars to Ignite dollars.

<https://www.innovatebc.ca/programs/ignite>

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. Trade and Invest British Columbia also helps build connections and partnerships by promoting the trade of B.C. products and services globally. Trade and Invest British Columbia teams are located in Canadian embassies, high commissions and consulates around the world.

<https://www.britishcolumbia.ca/>

ISED – Strategic Innovation Fund

Innovation, Science and Economic Development Canada (ISED) leads the Strategic Innovation Fund that provides funding for large business projects and national innovation ecosystems (over \$10 million in requested contribution). The program has five streams:

- Business innovation and growth (streams 1 to 3)
- Collaborations and networks (streams 4 and 5)

Federal Budget 2021 outlined investment priorities for Biomanufacturing and Life Sciences projects that:

- Build domestic resilience and improve long-term pandemic preparedness
- Support innovative firms well-positioned for growth in the life sciences sector
- Are co-funded by proponents or other entities

<https://ised-isde.canada.ca/site/strategic-innovation-fund/en>

ISED – Innovative Solutions Canada (Challenge-based program)

This program offers opportunities to solve Government of Canada's challenges through two streams, with funding dedicated to Canadian small companies that want to innovate, create and get to market:

- Through the Challenges Stream, the federal government partners with Canadian small businesses to develop novel solutions, including testing and validation of prototypes, and preparing a pathway to commercialization.
- The Testing Stream enables the Government of Canada to buy and test pre-commercial goods and services in a real-life setting.

<https://www.ic.gc.ca/eic/site/101.nsf/eng/home>

ISED – Accelerated Growth Service

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.

<https://ised-isde.canada.ca/site/accelerated-growth-service/en>

ISED – Global Hypergrowth Project

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. This project brings together the combined strength of government partners to facilitate connections for the companies, provide focused attention where it's needed most and help tailor support to specific needs.

<https://ised-isde.canada.ca/site/accelerated-growth-service/en/Global-Hypergrowth-Project>

PacifiCan – Business Scale-up & Productivity

The Business Scale-up and Productivity program hosted by PacifiCan supports high-growth businesses that are scaling up and producing innovative goods, services or technologies. It offers interest-free, repayable funding to incorporated businesses.

<https://www.canada.ca/en/pacific-economic-development/services/funding/business-scale-up-productivity.html>

PacifiCan – Regional Innovation Ecosystems

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. The program also fosters inclusive growth by supporting under-represented groups to better participate in the innovation economy.

<https://www.canada.ca/en/pacific-economic-development/services/funding/regional-innovation-ecosystems.html>

GAC – CanExport Associations

Canadian national industry associations and trade organizations may access up to \$250,000 in annual funding. The program covers up to 50% of eligible costs for new or expanded international business development (IBD) activities that benefit an entire industry: organization's members and non-members alike.

<https://www.tradecommissioner.gc.ca/funding-financement/canexport/associations/faq.aspx?lang=eng>

GAC – CanExport Innovation

This Global Affairs Canada program is designed to promote and enhance Canada's international innovation efforts. The program supports researchers who aim to commercialize technology by pursuing collaborative international R&D opportunities through partnerships in foreign markets. Maximum of \$75,000 per approved project.

<https://www.tradecommissioner.gc.ca/funding-financement/canexport/innovation/index.aspx?lang=eng>

GAC – 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. The program provides up to \$50,000 in funding per business to cover up to 50% of international market development activities.

<https://www.tradecommissioner.gc.ca/funding-financement/canexport/sme-pme/index.aspx?lang=eng>

GAC – CanExports Community Investments

Provides support to Canadian communities seeking to improve their capacity to attract, retain and expand foreign direct investment (FDI) in order to create jobs for Canadians, support innovation and increase exports. The program provides between \$3,000 to \$500,000 per community to attract FDI, representing up to 50% of costs.

<https://www.tradecommissioner.gc.ca/funding-financement/canexport/community-communaute/index.aspx?lang=eng>

GAC – Trade Commissioner Service

The Canadian Trade Commissioner Service (TCS) helps Canadian companies and organizations of all sizes grow and operate internationally. The TCS has a network of Trade Commissioners in more than 160 cities around the globe that can connect companies with qualified contacts, funding, and support programs, and provide key information to help them seize international opportunities and succeed in markets around the world. The TCS also assists foreign companies planning to invest or expand their operations in Canada.

<https://www.tradecommissioner.gc.ca/index.aspx?lang=eng>

CBSA– Import Services

Import services are coordinated via the Canadian Border Services Agency, Canadian Food Inspection Agency and ISED. This includes programs that help reduce duties.

<https://www.canada.ca/en/services/business/trade/import.html>

NRC - National Research Council /Industrial Research Assistance Program (IRAP)

Led by the National Research Council, the Industrial Research Assistance Program (NRC/IRAP) is Canada's leading innovation assistance program helping small and medium-sized businesses build innovation capacity and take ideas to market through financial assistance, advisory services and connections to business and R&D expertise. The IRAP will be moved under the Canada Innovation Corporation umbrella once the CIC is established.

<https://nrc.canada.ca/en/support-technology-innovation>

ISED – Intellectual Property Strategy

The strategy from the Government of Canada 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.

<https://www.ic.gc.ca/eic/site/108.nsf/eng/home>

LABOUR AND TRAINING PROGRAMS

BC Provincial Nominee program (labour/immigration)

The BC Provincial Nominee Program offers a series of sub-programs strategically designed to attract immigrants in areas that will benefit the province. This program helps recruit highly skilled foreign workers, entrepreneurs and investors to the province.

<https://www.welcomebc.ca/Immigrate-to-B-C/B-C-Provincial-Nominee-Program>

B.C. Future Skills Grant

The StrongerBC future skills grant is open to British Columbians aged 19 years or older – regardless of financial need – and covers up to \$3,500 per person for eligible short-term skills training at public post-secondary institutions. The grant will help learners access eligible short-term skills training to further their careers, upgrade their skills and enhance their productivity. Learners can choose from a growing list of more than 400 programs.

The program is part of the BC Future Ready Action Plan.
<https://www.educationplannerbc.ca/plan/finance/future-skills-grant>

<https://news.gov.bc.ca/files/Future-Ready-May2023.pdf>

Mitacs Accelerate (grad student interns)

This program co-funds 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. Paid internship funding starts at \$15,000, and the partner organization's financial contribution starts at \$7,500.

<https://www.mitacs.ca/en/programs/accelerate>.

Mitacs Elevate (post-doctoral fellows)

This program co-funds two-year postdoctoral fellowships on research projects with partner organizations. Elevate includes a research management training program and a postdoctoral fellowship. Partner organization's financial contribution starts at \$30,000 (Standard Elevate) per year or \$40,000 (Thematic Elevate) per year.

<https://www.mitacs.ca/en/programs/elevate>

Mitacs Entrepreneur International (start-ups)

This program offers travel grants to Canadian startups housed in university-linked incubators. The matching \$5,000 grant enables startups to connect with international incubators (linked to an academic institution) to explore new business development opportunities in global markets.

<https://www.mitacs.ca/en/programs/entrepreneur-international>

BioTalent Canada – The Career Starter Program (talent)

The Career Starter Program facilitates the transition of barriered youth into the labour market. It bridges the gap between talent and industry, introduces participants to the

bio-economy as a viable career path, and enables employers to strengthen their workforce.

<https://www.biotalent.ca/programs/career-starter-program/>

BioTalent Canada – Skilled Newcomer Internships for the Bio-Economy (talent)

The Skilled Newcomer Internships helps newcomers get a foot in the door. The program 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.

<https://www.biotalent.ca/programs/skilled-newcomer-internships-for-the-bio-economy/>

eTalent Canada – Work-Integrated Learning Digital (training current students)

The Information and Communication Technology Council (ICTC)'s Work-Integrated Learning (WIL) Digital is an innovative program that helps employers grow their businesses by providing wage subsidies for 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.

<https://www.wil-ait.digital/en/>

TAX INCENTIVES

Scientific Research and Experimental Development (SR&ED – provincial and federal)

Both the federal and provincial governments offer research and development tax credits to support innovation.

- The federal portion of the SR&ED tax credit program allows Canadian-controlled private corporations to earn a refundable tax credit on eligible expenses or investments (35% up to a threshold of \$3 million, and 15% beyond this amount or for other corporations);
- The British Columbia SR&ED tax credit is administered by the Canada Revenue Agency and offers a refundable tax credit of 10% on eligible expenses or investments.

<https://www.canada.ca/en/revenue-agency/services/scientific-research-experimental-development-tax-incentive-program.html>

<https://www2.gov.bc.ca/gov/content/taxes/income-taxes/corporate/credits/scientific-research-development>

Small Business Venture Capital Tax Credit (provincial)

The Small Business Venture Capital Tax Credit is designed to encourage investors to make equity capital investments in British Columbia small businesses developing proprietary technology by providing a refundable tax credit to provincially-based investors equalling 30% of their investment.

<https://www2.gov.bc.ca/gov/content/taxes/income-taxes/corporate/credits/venture-capital>

EQUITY FUNDS (PUBLICLY FUNDED)

ISED – Venture Capital Catalyst Initiative

Through the Venture Capital Catalyst Initiative, the Canadian government is building a portfolio of large funds-of-funds and alternative models to strengthen the Canadian venture capital (VC) ecosystem. The Initiative allocates capital as follows:

- A funds-of-funds stream investing up to \$350 million in funds-of-funds;
- A life sciences stream investing up to \$50 million in VC funds focused on high-growth potential companies in Canada's life sciences sector; and,
- An inclusive growth stream investing up to \$50 million in VC for underrepresented groups, such as women and racialized communities.

<https://ised-isde.canada.ca/site/sme-research-statistics/en/venture-capital-catalyst-initiative>

InBC Investment Corp. (Provincial)

InBC Investment Corp. (InBC) is British Columbia's new strategic investment fund investing \$500 million in a more sustainable, inclusive, and prosperous future for British Columbia. InBC is established as a provincial Crown corporation.

<https://www.inbcinvestment.ca/>

Business Development Bank of Canada (BDC) Capital

Founded in 1944, the Business Development Bank of Canada is a federal development bank structured as a Crown corporation wholly owned by the Government of Canada. Its mandate is to help create and develop Canadian businesses through financing, growth and transition capital, venture capital and advisory services, with a focus on small-

and medium-sized enterprises. The Canada Small Business Financing Program makes it easier for small businesses to get loans from financial institutions by sharing the risk with lenders.

<https://www.bdc.ca/en/bdc-capital>

SCIENTIFIC RESEARCH FUNDING (MAIN SOURCES OF PUBLIC FUNDING)

Michael Smith Health Research BC (Provincial)

British Columbia's health research funding agency has the following individual funding programs:

- [Health Professional-Investigator Program](#) – Supports health professionals to develop and advance research and bring evidence to practice.
- [Health System Impact Fellowship](#) – Supports the CIHR program that connects doctoral and post-doctoral awardees with experiential learning in health system organization.
- [Research Trainee Program](#) – Supports health researchers in the training phase of their research career.
- [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.
- [Clinical Research Professional Certification Funding Program](#) – Offers clinical research team members with financial and resource support to become internationally certified.

Team funding programs:

- [Convening & Collaborating Program](#) – For teams of researchers and users to co-develop research that can have a direct impact on patients.
- [Reach Program](#) – Supports teams of researchers and research users to disseminate evidence in order to impact health and care in B.C.

Partnered funding:

- [Match funding](#) – To help qualify B.C.-based researchers applying to non-B.C. government-funded research competitions.
- [Partnered awards](#) – To create co-funding partnerships with other organizations and leverage research investments.

<https://healthresearchbc.ca/funding/>

BC Knowledge Development Fund (provincial research infrastructure)

This program is the provincial government's primary funding program in support of capital research infrastructure in the province's public post-secondary institutions, affiliated hospitals and research institutions. The BC Knowledge Development Fund (BCKDF) shares funding with the Canada Foundation for Innovation (CFI):

- The BCKDF funds up to 40% of total eligible project costs;
- The CFI funds up to 40% of total eligible project costs; and
- Other funding partners provide cash or in-kind funding for the remainder.

BCKDF intakes align with the intakes of the CFI.

<https://www2.gov.bc.ca/gov/content/governments/technology-innovation/bckdf>

Canada Foundation for Innovation (federal research infrastructure)

The Canada Foundation for Innovation (CFI) invests in research facilities and equipment in Canada's universities, colleges and research hospitals. The CFI is funded by the federal government and project costs are typically shared with provinces (BCKDF for British Columbia). The main ongoing programs are:

- [The John R. Evans Leaders Fund](#): Three intakes per year for small equipment (up to \$2 million project cost).
- [Innovation Fund](#): One intake every two to three years for major projects.
- [College Fund](#): For applied research linking colleges and Canadian industry or communities.
- [The 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.

<https://www.innovation.ca/apply-manage-awards/funding-opportunities>

Strategic Science Fund (federal – for research organizations)

The Strategic Science Fund (SSF) is the new tool of the government of Canada to support third-party science and research organizations. Eligible recipients are not-for-profit organizations incorporated in Canada (federally or provincially) that cannot access other federal funding programs. SSF investments will achieve results for Canadians by addressing critical needs, such as supporting Canada's knowledge economy, in ways that advance federal objectives. The SSF is jointly administered by ISED and Health Canada.

<https://ised-isde.canada.ca/site/strategic-science-fund/en>

Genome BC (provincial – genomic research and translation)

Genome BC is an independent not-for-profit organization providing financial support and management services to research and innovation projects and technology platforms focused on the use of genomics and proteomics in the areas of health, forestry, agri-food, fisheries and aquaculture. Genome BC also invests in SMEs in the life sciences sector to support commercialization of promising technologies based on genomics.

Genome BC [programs include](#):

- [GeneSolve Program](#): supports projects providing solutions to challenges from users across industry sectors.
- [Industry Innovation Program](#): early-stage commercialization support for companies developing B.C.-based technologies.
- [Sector Innovation Program](#): supports projects addressing the needs of key sectors and that have the potential to generate social, environmental and economic benefits.
- Societal Issues Competition: for projects that identify and study the social issues that emerge from genomics-based innovations.

<https://www.genomebc.ca/>

Genome Canada (federal – genomic research and translation)

Genome Canada is an independent, federally funded not-for-profit organization and a national leader for Canada's genomic ecosystem. Working in partnership across sectors, it invests in, and coordinates, genomics research, innovation, data and talent. Genome Canada works with the Canadian government to address federal priorities for genomics. It coordinates with the [pan-Canadian network of Genome Centres](#) – including Genome BC – to reflect regional and provincial priorities, business development and connections across the country. 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.

Genome Canada offers various funding programs and challenges including:

- Challenge-driven initiatives and investments;
- Leading-edge technologies (genomic technology platforms); and
- Adoption, implementation and commercialization (translation research program with end-user partners).

Calls for proposals and priority topics are uploaded regularly. <https://www.genomecanada.ca/>

Canadian Institutes of Health Research (federal)

The CIHR is Canada's federal funding agency for health research, with an annual budget of over one billion dollars. 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.

<https://cihr-irsc.gc.ca/e/193.html>

Natural Sciences and Engineering Research Council (Federal)

NSERC is Canada's federal funding agency for natural sciences and engineering research. NSERC promotes and supports discovery research and fosters innovation by encouraging Canadian organizations to participate and invest in post-secondary research projects. With an annual budget of over one billion dollars, NSERC offers many different funding programs, including student scholarships, discovery research programs, innovation research programs, chairs and some minor programs for instrumentation and equipment.

https://www.nserc-crsng.gc.ca/index_eng.asp

Canada Biomedical Research Fund (federal)

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 B.C. The CBRF works in concert with the Biosciences Research Infrastructure Fund delivered by the Canada Foundation for Innovation.

<https://www.sshrc-crsh.gc.ca/funding-financement/cbrf-frbc/overview-apercu-eng.aspx#4>



BRITISH
COLUMBIA

