FY 2022-23

PHSA RESEARCH AND STUDENT EDUCATION

Prepared for:
PHSA Research and Academic Development Committee

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Provincial Health Services Authority
Province-wide solutions. Better health.

CONSOLIDATED SUMMARY REPORT

ACKNOWLEDGEMENTS

The following report is prepared for the Provincial Health Services Authority (PHSA) Board of Directors on an annual basis to present data related to the Framework for PHSA Research Metrics (see Appendix 2) and the Framework for PHSA Student Education Metrics (see Appendix 3). As an academic health sciences organization, PHSA works in close partnership with the University of British Columbia, BC Institute of Technology, Simon Fraser University, University of Victoria, University of Northern BC, and other BC educational institutions. BC Emergency Health Services works closely with the Justice Institute of BC.

The research and student education activities described in this report are made possible only through the collaboration and partnership of PHSA, its programs and research entities, and its academic and health authority partners.

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PHSA'S MEASURABLE COMMITMENT TO RESEARCH & EDUCATION

Introduction to PHSA's 6th Consolidated Summary Report

PHSA Research & Academic Development is pleased to present its sixth annual consolidated summary of PHSA research and student education metrics. This year's report provides integrated information relating to PHSA's academic health science mandate for research and student education, including the ongoing impact of COVID-19. This year's report includes:

- Dashboards that reflect, at a glance, quantitative metrics based on PHSA Board-approved performance indicator frameworks
- Narrative that highlights PHSA's academic health science mandate, and the impacts and outcomes being realized in research and student education
- PHSA program sections that identify the Top 3 research accomplishments by research entity (important achievements that may not be well reflected through quantitative metrics), present research and student education infographics (illustrating high level inputs and outputs), and detail research outcomes identified by PHSA research entities
- Examples of important research questions that are being answered through the rich data assets available in PHSA registries, and
- Information on COVID-19 research projects awarded to PHSA entities.

PHSA is mandated to conduct world-class research, and to deliver excellence in education and training.

This consolidated and integrated reporting approach communicates how research is driving patient and health system benefits, and how student education is preparing a high-performance health workforce for the future. While research, inquiry and learning take place across PHSA, this report relates activities associated with PHSA's five programs that have research institutes and that play a vital role in providing students with clinical practice education: BC Children's (BC Children's Hospital Research Institute), BC Women's (Women's Health Research Institute), BC Cancer (BC Cancer Research Institute), BC Mental Health & Substance Use Services (BC Mental Health & Substance Use Research Institute), and BC Centre for Disease Control (UBC Centre for Disease Control). This report also relates the essential training role of BC Emergency Health Services.

Detailed data for the PHSA Board-approved frameworks for research and student education metrics continue to be reported in the related supplementary reports that support operational decision-making and are available on the PHSA website: http://www.phsa.ca/our-research/research-focus/research-education-metrics

PHSA is one of Canada's largest academic health science organizations – organizations with an integrated mandate to deliver care, conduct research and train students. PHSA's provincial mandate strongly reinforces that role, specifying PHSA is "expected to conduct world-class research, and deliver excellence in education and training … to support and underpin its ability to develop evidence-informed clinical policy and to deliver high quality provincial clinical services."

The following report illustrates PHSA's commitment to this critical role and the benefits that derive to patients, populations, and the BC health system.

PHSA RESEARCH METRICS

FISCAL YEAR SUMMARY - PHSA OVERALL

Indicator		Key Measure Description	FY 2020-21*	FY 2021-22	FY 2022-23
			Value	Value	Value
Producing & Advancing Knowledge	1a	**Total Annual Grant Awards by Type** (including Major CFI Infrastructure grants)	**$148,523,543**	$177,100,074	190,089,694
		Salary Awards	14,651,948	13,811,897	16,573,879
		Infrastructure Awards	4,717,341	8,077,745	6,316,173
		Operating Grants	125,818,541	155,130,637	163,514,856
		Other	3,335,713	79,795	3,684,786
		COVID-19 Research Funding (included in above categories)	$9,538,864	13,520,117	7,057,997
	1b	**Total Annual Grant Awards by RISe Sector** (including Major CFI infrastructure grants)			
		Government	84,988,757	76,344,423	85,150,160
		Non-Profit	47,325,166	76,328,230	83,475,718
		Industry	16,209,620	24,427,421	21,463,815
	1c	**CIHR Annual Grant Application Success Rate - PHSA Overall/ Nat'l**			
		Fall Project Grant	22.4%/19.0%	28.1%/26.0%	45.2%/25.0%
		Spring Project Grants	22.0%/20.3%	29.2%/22.3%	25.0%/22.4%
	1d	**Total # of Publications w/ Program Author**			
		BCCHR	1,117	1,284	1,403
		BCCRI	776	761	940
		WHRI	950	1,006	1,244
		BCCDC	243	301	308
		BCMHSUS	133	151	127
Building Research Capacity	2a	**Total # of Research Trainees**	2,663	2,917	3,120
	2c	**Total # of Researchers** (excluding Category 3 - Affiliate Investigator)	952	940.5	963
	2e	**Research Support Fund Grants** (Tri-Council only)	$4,102,759	$4,303,669	$4,134,441
Achieving Economic Benefits & Innovation	3a	# of Invention Disclosures	40	35	31
		# of Provisional Patent Applications Filed	18	17	15
		# of PCT Applications Filed	7	8	5
		# of Patents Filed/Issued	20/21	115/30	15/42
	3b	# Active License Agreements	125	130	133
		# of Spin-off Companies	18	19	20
		IP Related Revenue - Realized Revenue			
		BCCRI	$1,117,445	$2,210,216	$855,384
		BCCHR	$665,041	$1,209,525	$912,212
Advancing Health & Policy Benefits	4a	**Clinical Trials** (including Non-PHSA PIs utilizing PHSA facilities and resources)			
		# active trials at the end of the FY	657	695	706
		Cumulative Subject Enrollment-end of FY	20,591	36,287	37,266
	4b	**Registries as Research Resources**			
		# of Research Requests/Approvals	208/193	273/257	223/165

**FY 20-21 Award Totals are re-stated to include the Canada Research Continuity Emergency Fund (CRCEF) amounts*

PHSA STUDENT EDUCATION METRICS

FISCAL YEAR SUMMARY - PHSA OVERALL

Indicator		Key Measure Description	FY 2020-21	FY 2021-22	FY 2022-23
			Value	Value	Value
Build Student Education Capacity	1a	**Total Number of Student Hours by Program** (excludes medical learners)	**234,496**	**315,031**	**344,384**
		BCCH (including Sunny Hill)	106,181	131,221	124,248
		BCEHS	34,503	61,668	80,162
		BCW	29,915	45,954	50,668
		BCMHSUS (Forensics, MH & Addictions, CHS, Red Fish)	32,894	38,909	42,455
		BC CANCER – all locations	24,965	30,775	37,380
		BCCDC	5,058	3,674	7,246
		All Other	980	2,830	2,226
	1a	**Total Number of Students by Program** (excludes medical learners)	**1,465**	**2,130**	**2,260**
		BCCH (including Sunny Hill)	644	894	802
		BCEHS	244	439	645
		BCW	251	362	357
		BCMHSUS (Forensics, MH & Addictions, Burnaby Centre, CHS, Red Fish)	202	262	283
		BC CANCER – all locations	104	139	135
		BCCDC	13	16	19
		All Other	7	18	19
	1b	**Total Number of Medical Learners** (Undergraduate & Post-Graduate)			
		Undergraduate Medical Students (annual)	451	492	419
		Post-Graduate Medical Residents (annual)	866	858	888
	1c	Estimated FTE of staff time in direct supervision of students*	83	112	130
	1f	Total Number of PHSA declined placement requests in HSPnet	384	377	239
	1g	**Total # of Staff Participants participating in Preceptor/Educator Training**			
		Educator Pathway Project (Preceptor/Educator Training)	265	526	259
		BC Emergency Health Services (Preceptor Training)	98	57	121
	1h	**Total Number of Preceptors in HSPnet with and without a placement***			
		With a placement	348	377	563
		Without a placement	325	309	198
Build Effective Partnerships and Collaborations to Support Innovation	2a	Total # of Affiliation Agreements	69	75	75
	2b	**Top 5 Education Institutions by student hours-all disciplines***			
		BCIT	57,646	75,262	71,642
		University of BC	38,541	50,458	60,198
		Justice Institute of BC	29,708	45,456	57,114
		Douglas College	14,622	17,579	26,566
		Columbia Paramedic Academy	-	-	23,296
	2c	**Distribution of Student Hours by Student Education setting***			
		Hospital	131,485	175,874	184,565
		On Car	34,503	61,668	80,162
		Out Patient/Mixed	54,479	66,887	66,643
		Other (Population Heath and Corporate)	14,028	10,602	13,014
Results	3a	# of hires at PHSA with previous PE Placement*	195 (11%)	483 (12%)	568 (12%)

**Excludes undergraduate and post-graduate medical learners*

COVID-19 PANDEMIC

CONTINUING STRENGTH IN PHSA

COVID-19 continued to be a key area of research and collaboration for PHSA research in fiscal year 2022/23.

PHSA worked with multiple provincial partners, including the University of British Columbia (UBC), the BC government, funders, and other health authorities and universities, to chart new paths for supporting clinical research and data access. PHSA researchers generated more than $7 million in new COVID research funding over the course of the year (see Appendix 5 for details). The BC Centre for Disease Control, in collaboration with PHSA's Data Analytics Research and Evaluation (DARE) team, continued to play a central role in conducting research and analytics utilizing real time data to inform the provincial pandemic response.

Several PHSA research institutes identified COVID-19 achievements amongst their Top 3 achievements for the year. These achievements included:

- Publishing a report that identifies strategies to support youth mental health and well-being during the pandemic recovery period.
- Translating wastewater analysis initiated as research during the pandemic into an established public health surveillance tool.
- Generating a total of 42 COVID-19 research projects at BCCDC that cumulatively attracted $26 million in funding.

Recognizing the importance of coordinated and consistent efforts to sustain student learning in the presence of COVID-19, PHSA played a key leadership role in the province. Provincial forums with post secondary institutions (PSIs), health care organizations (HCOs) and government partners continued to be hosted quarterly to support consistent and coordinated approaches wherever possible, and the website for student education, developed and hosted by PHSA to provide a single source of information for multiple stakeholder groups, was accessed 11,490 times this year.

The evolving circumstances of the pandemic has required collaborative and innovative approaches across both health and education sectors to find creative solutions, establish communication processes and platforms, and support the shared goal of preparing the future workforce of the health system.

ONE OF CANADA'S LARGEST ACADEMIC HEALTH SCIENCE ORGANIZATIONS

PHSA ATTRACTS HIGHEST EVER RESEARCH FUNDING AND SUPPORTS RECORD NUMBER OF STUDENTS

Annual metrics show that PHSA's researchers again surpassed previous levels of external research funding and supported the highest ever number of students with clinical placements, reflecting the growing strength of PHSA's research and student education enterprise over the past fiscal year.

Annual metrics show that PHSA attracted the highest ever amount of external research funding and supported the highest ever number of students with clinical placements.

PHSA researchers generated more than $190 million in external funding this past year, an increase of more than $13 million over the previous year. PHSA also plays a unique role in BC's health education system and provided specialized training placements, often unavailable elsewhere in the province, to 3,567 students this past year.

PHSA's Three Year Research Roadmap aims to strengthen the PHSA research enterprise through collective and coordinated efforts.

PHSA completed and launched its first enterprise-wide research strategic plan this past fiscal year. Championed by PHSA's Research Leadership Council (RLC), the Three-Year Research Roadmap was approved by the PHSA Executive Leadership Team in July 2022. Through 32 projects supporting 11 strategic initiatives, the Roadmap aims to strengthen the PHSA research enterprise through collective and coordinated efforts that:

- foster alignment with clinical priorities
- optimize investment in research
- remove barriers
- enable scaling and sharing of resources, and
- strengthen shared infrastructure and expertise

Research Metric Highlights

PHSA researchers attracted $190 million in external funding in FY 2022/23, including $7 million in COVID-19 research funding. Reflecting their competitive success, PHSA researchers surpassed the national average success rate in the Canadian Institutes of Health (CIHR) fall and spring operating grants. Remarkably, the average success rate of PHSA researchers was more than 45% in the Fall 2022 operating grant competition compared to a national average success rate of 25%. The total number of PHSA researchers grew from 941 to 963 researchers. The number of research trainees also grew, from 2,917 to 3,120. PHSA researchers continue to publish prolifically, with the total number of publications up across all but one of the PHSA research entities. Revenues from the Research Support Fund, a federal funding program that supports the indirect costs of research, dropped from $4.3 million to $4.1 million.

PHSA researchers attracted more than $190 million in external funding in FY 2022/23.

PHSA actively advances commercialization of research discoveries, and generated IP revenue in FY 2022/23 of $1,767,596. The number of inventions disclosed decreased from 35 to 31, and the number of provisional patent applications and PCT applications filed remained relatively stable at 15 (down from 17) and 5 (down from 8) respectively. The number of patents filed dropped from 115 to 15, reflecting the very large volume of patents filed last year related to two new BC Cancer spinoff companies, Alpha 9 and Innovakine. The number of patents issued increased from 30 to 42. The number of active licensing agreements increased from 130 to 133. Two new spinoff companies were created, Overture Therapeutics and Linax Technologies, bringing the number of active PHSA spinoff companies to 20.

Overture Therapeutics is commercializing a technology developed by Dr. Brad Nelson, Distinguished Scientist and Co-Director of BC Cancer's Immunotherapy Program.

Dr. Nelson created a method to treat cancer called "Beacon" that combines two current biotherapeutics: monoclonal antibodies and oncolytic viruses (OVs). Monoclonal antibodies bind to proteins selectively expressed on the surface of cancer cells and trigger an immune response and/or deliver a toxic payload. Unfortunately, many cancers lack specific surface proteins to target with monoclonal antibodies, making them currently untreatable by this approach. OVs preferentially replicate within and destroy cancer cells and promote anti-tumor immunity. However, results to date indicate that not all tumor cells are infected or killed by OVs, and not all patients mount an anti-tumor immune response during OV therapy.

Beacon is a combination strategy to overcome these limitations. Cancer cells are first infected by an OV and OV-derived proteins are displayed on the cell surface, essentially "painting" the cancer cells with viral proteins (i.e. the beacon). Monoclonal antibodies that bind to the OV surface proteins are then deployed, enhancing the potency of OV treatment by increasing the recruitment of cancer-fighting immune cells and/or delivering radioactive payloads to the tumor.

Linax Technologies was founded by Dr. Marco Carlone, medical physicist at BC Cancer, Kelowna, to commercialize training for Medical Linear Accelerators (linacs). Linacs generate materials used in radiotherapy. With the significant demand for radiotherapy in developed countries as well as lower and middle income countries, there is a need to train many more professionals that are capable of maintaining and safely operating medical linear accelerators. Linax offers a novel approach to training using a simulated environment.

It is hoped that by using a simulator to aid in medical linac education, there will be an improvement in quality and consistency of learning by medical physics residents, hospital-based service technicians, and linear accelerator engineers. There is also a need to decrease the time needed to master these devices while providing a uniform and high level of training. It is hoped that simulator-based training will help to make medical linear accelerator training more accessible, faster and of higher quality all over the world.

Two new spinoff companies were created by BC Cancer researchers last fiscal year.

Clinical trial activity continued to increase in 2022/23. The number of active trials increased from 695 trials in FY 2021/22 to 706 trials in FY 2022/23. The number of enrolled subjects increased from 36,287 subjects to 37,266 subjects.

PHSA's impressive research metrics reflect the resilience of PHSA's research strength in the aftermath of COVID-19, and the continued success of PHSA researchers.

Student Education Metric Highlights

To align with the training component of the tripartite mandate, PHSA is committed to championing quality student education experiences across its services and programs. With specialized services and unique staff knowledge and expertise, PHSA plays a critical role in the development of a prepared workforce across BC's health system. Student practice education includes the learning activities that occur in health settings for students enrolled in a recognized academic institution who have a practicum as part of their program requirements.

Student education data support informed and strategic decisions to align student education activities with health human resource strategies and changing health system needs. PHSA monitors and communicates student activity data by discipline, academic partner, and PHSA program each term and annually.

Student education placement activity data is the foundation for establishing capacity to support the implementation of student-focused health human resource strategies.

PHSA supports learning for students from all disciplines of the health care teams in its programs. PHSA proudly welcomed a total of 3,567 students in placements across the organization in the past fiscal year. Of these students, 419 were medical undergraduates (MDUG), 888 were residents enrolled in Post-Graduate Medical Education (PGME), 1,042 were nursing students, and 1,218 were other members of the interprofessional team, including 645 paramedics completing on-car experiences.

There were 563 preceptors actively supporting students this year, with 380 preceptors participating in training sessions. PHSA has education affiliation agreements with 75 academic partners to support these placements. The top five partners this year for the most student placement hours (excluding medical students' hours) are BC Institute of Technology (BCIT), University of British Columbia (UBC), Justice Institute of BC (JIBC), Douglas College and Columbia Paramedic Academy. Based on the feedback in a new hire survey, 568 new employees hired at PHSA this year noted that their experience on placement influenced their decision to join our organization as employees.

RESEARCH IMPACTS AND OUTCOMES

PHSA-LED DISCOVERY IS MAKING A DIFFERENCE FOR PATIENTS

Quantitative metrics tell only part of PHSA's success story. Top accomplishments, outcomes, and the studies generated using PHSA's rich registry data further illuminate impact.

While quantitative metrics describe PHSA's academic health science mandate to a degree, the qualitative description of accomplishments, outcomes and studies generated using PHSA's rich registry data sets is needed to more fully understand how PHSA research is impacting patients, populations, and the health system.

For the sixth year, PHSA research entities were asked to identify their top three accomplishments, giving them an opportunity to highlight key successes relevant to their differing foci, strengths, and size. Several of the top three accomplishments this past year related to Covid-19, as already discussed. Others reflected provincial, national and international level contributions in other vital domains.

Detailed in this report's program specific sections, examples of non-COVID-19 key accomplishments include:

- Receipt of a $150 million BC Government grant to enhance cancer clinical research and trial capabilities
- Using cutting-edge technologies to grow an avatar model of children's cancer tumours in the lab, allowing researchers to understand how the tumour might grow and respond to different medications
- Advancing international clinical practice guidelines in the UK and USA through groundbreaking research and expertise in genetic counselling
- Influencing, through research evidence and advocacy, British Columbia's decision to become the first province in Canada to offer free prescription contraception for residents

As in past years, PHSA research entities were asked to identify any guideline, drug, diagnostic agent, or device adopted or approved in FY 2022/23 as a result of research driven by PHSA researchers, or collaborative research in which PHSA researchers were key participants. Recognizing that PHSA research entities function across the research spectrum from basic cell biology to clinical research to health system research, research outcomes generated in the basic research domain are also included. Research outcomes are innovations such as methodologies or software used in the conduct of research that have been developed by PHSA researchers and adopted or approved by other major entities in FY 2022/23.

PHSA research entities achieved outcomes that advanced care, treatment, and prevention in many other areas. Examples of non-COVID-19 outcomes, further detailed in the program sections of this report, include the following:

- 60 cancer patients from across Canada, who had no other treatment options available to them, were treated with made-in-Victoria CAR-T cells; more than half of the patients who received this therapy and would otherwise have not survived more than six months, have had complete remission.
- A WHRI researcher was one of the authors of the United Nations Inter-agency Group for Child Mortality Estimation and its Core Stillbirth Estimation Group's report: Never Forgotten: The Situation of Stillbirth Around the Globe which highlights the immense and continued annual burden of stillbirths globally.
- A BCMHSUS researcher contributed to new guidelines that will help ensure healthcare providers are clear about the relevance of both sex and gender in taking a medical family history and provide guidance about how to collect and record this information in a manner that is trans inclusive.
- BCCDC researchers contributed to findings that helped guide provincial decision makers in expanding prescribed safer supply beyond the context of the COVID-19 public health emergency, providing evidence for the importance of alternatives to the toxic drug supply in BC.
- BCCHR investigators established Indigenous oversight leading to the creation of genetic variation reference data that will enable improved diagnosis of rare diseases in BC's Indigenous population.

PHSA research is delivering new cancer therapies and influencing policy at provincial, national and international levels.

PHSA's large number of provincial registries and longitudinal data sets on services provided to specific populations and related outcomes is a major asset of PHSA. These rich data resources, unique in Canada, include a wealth of information that is studied to gain insights on clinical outcomes and health system design. A survey of PHSA's registry data stewards identified many research questions currently being addressed through registry data. Below are just a few examples, highlighting the tremendous research value of these datasets, and how they are being used to directly improve health outcomes and evaluate optimum care delivery models.

- Tissue samples from the BC Children's Hospital Biobank are undergoing genomic and epigenomic sequencing to understand resistance and relapse in acute myeloid leukemia.
- Data from the BC Cardiac Registry are being used to investigate access to timely percutaneous intervention (PCI) for ST-elevated myocardial infarction (STEMI).
- Data from Endometriosis and Pelvic Pain Interdisciplinary Cohort (EPPIC) are being used to identify the prevalence, types, and risk factors of short-term complications following endometriosis surgery.
- The COVID-19 dataset is being used to study whether COVID-19 vaccines are associated with an increased risk of myocarditis.
- PROMIS Renal data are being used to identify the impact of COVID-19 on the progression of kidney disease.
- PROMIS Transplant data are being used to determine the incidence of urinary tract infections and systemic infections post stent removal in kidney transplant recipients.
- Perinatal Services BC Registry data are being used to determine if the proportion of women who received standard of care cervical cancer screening increased after the transfer of responsibility for healthcare to the Ministry of Health compared with pre-transfer, among women who experienced imprisonment in BC.

- BC Trauma Services Registry data are being used to compare the accuracy and precision of several artificial intelligence algorithms that can retrospectively predict the length of stay and discharge disposition in trauma patients treated at VGH using BC Trauma Registry data.
- BC Tumour Tissue Repository tissues are being analyzed to identify lifestyle factors and biomarkers of prognosis in colorectal tumours.
- BC Cancer Registry data are being used to determine the rates of progression-free survival and overall survival for all patients with central lung tumours treated in BC with stereotactic ablative radiotherapy, since SABR was first used across the province.
- BC Cancer Lung Cancer Screening Program data are being used to investigate the use of blood biomarkers to detect lung cancer.
- BC Breast Cancer Screening program data are being used to assess if volumetric breast density can be used as an imaging biomarker for predicting breast cancer risk.
- BC Cervical Cancer Screening program data are being used to determine the uptake of cervix self-screening.

PHSA completed its three-year Student Education Roadmap to situate PHSA as an exemplar in student education.

PHSA's rich data resources, unique in Canada, include a wealth of information that can be studied to gain insights on clinical outcomes and health system design.

Discovery, innovation, and the application of new knowledge generated by PHSA researchers is clearly making a difference, improving clinical outcomes and the effectiveness of BC's health system in myriad ways.

STUDENT EDUCATION IMPACTS AND OUTCOMES

PHSA COMPLETES A THREE-YEAR STUDENT EDUCATION ROADMAP

Developed as part of its 2019-2020 Service Plan, PHSA completed the final year of its three-year Student Education Roadmap, designed to situate PHSA as an exemplar in student education. Progress was made on each of the following eight recommendations identified in the Roadmap:

1. Implement strategic planning processes for student education across PHSA.
2. Adopt and optimize best practices for coordinating student placements.
3. Establish an organizational approach to ensuring the delivery of quality student experiences.
4. Expand the monitoring and evaluation of education activities and learning environments.
5. Prepare students to meet the needs of patients throughout the health system.
6. Strengthen effective partnerships to support student education.
7. Establish a collaborative approach to provincial leadership for student education.
8. Lead advancement and innovation in student education models, designs, approaches, and practices.

Following are key accomplishments to achieve the above Student Education Roadmap Recommendations, over each of the three fiscal years:

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Year One 2020-2021

- Facilitated collaborative response to resuming placement activities throughout the phases of the pandemic
- Co-authored Student Practice Education Guideline for Healthcare Settings during the COVID-19 pandemic
- Launched the BC Student Practice Education website
- Established BC Student Practice Education Information and Planning Sessions
- Launched the Provincial Student Practice Education Coordinating Committee

Year Two 2021-2022

- Launched the Provincial Student Practice Education Data Working Group
- Launched the Provincial Student Practice Education Policy
- Monitored and reported education activity data to PHSA sites and programs each term and annually
- Hosted the highest ever number of students and placement hours at PHSA

Year Three 2022-2023

- Revised provincial Education Affiliation Agreement templates, in partnership with Health Care Protection Program (HCPP) and the University and College and Institute Protection Program (UCIPP)
- Transitioned responsibility for provincial Practice Education Guidelines to PHSA
- Revised PHSA/VCH student education organizational policies
- Developed provincial student practice education metrics framework
- Designed and implemented a sustainable approach to engaging students in developing collaborative practice competencies during clinical placements across PHSA.
- Developed a strategy to support students' competencies in culturally safe and trauma-informed care during their clinical placements at PHSA including student-specific actions for the Cultural Safety and Humility Standard

Completion of the Roadmap and the Future for Student Education

Over the past three years, with the COVID-19 pandemic and subsequent emphasis on health human resource strategies, the landscape for student education has shifted beyond organizational approaches to adopting system-wide change. There is new visibility and interest in the collaborative planning and coordination of placement activities amongst post-secondary institution partners and health care settings. The launch of the provincial student practice education policy, BC Health Human Resource Strategy (with a specific action for placement capacity), and the announced health program seat expansions in nursing, medicine and allied health collectively ushered in new expectations for the shared responsibility of preparing new health care team members.

RESEARCH METRICS
PHSA OVERALL

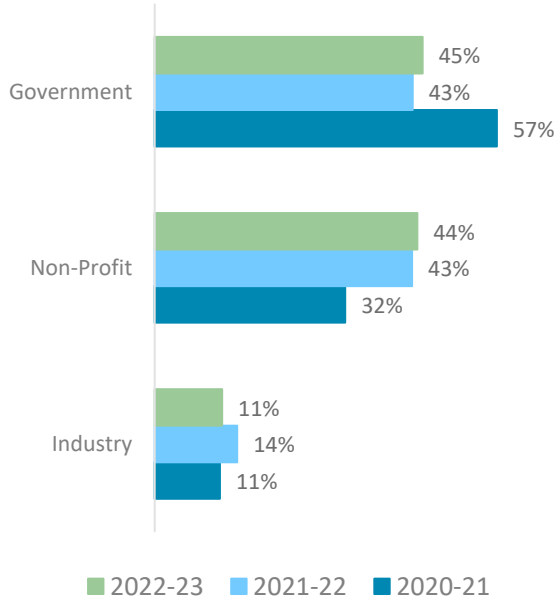
Provincial Health Services Authority
Province-wide solutions. Better health.

PRODUCING AND ADVANCING KNOWLEDGE

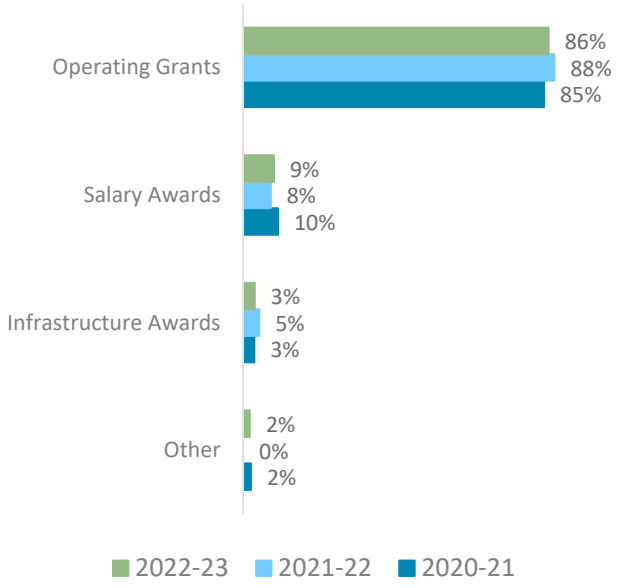
$190 Million

in TOTAL GRANTS AWARDED in FY 22-23
$177 Million in FY 21-22

$ BY SECTOR



$ BY AWARD TYPE



PUBLICATIONS

BCCHR	1,403
BCCRI	940
WHRI	1,244
BCCDC	308
BCMHSUS	127

100%

% of CIHR competitions above National AVG SUCCESS RATE in FY 22-23

100% in FY 21-22

ECONOMIC BENEFITS & INNOVATION

$1.8M
of REALIZED REVENUE
in FY 22-23
$3.4M in FY 21-22

3 new
ACTIVE LICENSES
in FY 22-23
7 new in FY 21-22

15 patents filed
42 patents issued
in FY 22-23
115 Filed / 30 Issued in FY 21-22

20 spin-offs (2 new)
# of ACTIVE SPIN-OFFS in FY 22-23
19 (1 new) in FY 21-22

BUILDING RESEARCH CAPACITY

963
OF RESEARCHERS
in FY 22-23
940.5 in FY 21-22

3,120
OF TRAINEES
in FY 22-23
2,917 in FY 21-22

$ 4.1Million
RESEARCH SUPPORT
FUND GRANTS
in FY 22-23
$4.3 Million in FY 21-22

HEALTH & POLICY BENEFITS

706
OF CLINICAL TRIALS
in FY 22-23
695 in FY 21-22

37,266
TOTAL CUMULATIVE
SUBJECT ENROLLMENT
at the end of FY 22-23
36,287 at the end of FY 21-22

40%
% INDUSTRY FUNDED
TRIALS in FY 22-23
39%% in FY 21-22

223 requests
165 approved
REGISTRY ACCESS REQUESTS/
APPROVALS in FY 22-23
273 requests / 257 approvals in FY 21-22

STUDENT EDUCATION METRICS
PHSA OVERALL

Provincial Health Services Authority
Province-wide solutions. Better health.

BUILD PRACTICE EDUCATION CAPACITY

344,384
STUDENT HOURS
in FY 22-23
315,031 in FY 21-22

2,260
TOTAL # OF STUDENTS*
in FY 22-23
2,130 in FY 21-22

*Excludes undergraduate and postgraduate medical students

130
Estimated FTE to PRECEPTOR Students
in FY 22-23
112 in FY 21-22

419
Medical Doctor Undergraduate Students in FY 22-23
492 in FY 21-22

563
PRECEPTORS had an active placement in FY 22-23
377 in FY 21-22

888
Postgraduate Medical Education Residents in FY 22-23
858 in FY 21-22

BUILD EFFECTIVE PARTNERSHIPS & COLLABORATION TO SUPPORT INNOVATION

TOP 5

EDUCATION INSTITUTIONS BY STUDENT HOURS in FY 22-23

1. BC Institute of Technology (71,642)
2. University of BC (60,198)
3. Justice Institute of BC (57,114)
4. Douglas College (26,566)
5. Columbia Paramedic Academy (23,296)

DISTRTIBUTION OF STUDENT HOUR by PRACTICE EDUCATION SETTING in FY 22-23*

*excludes undergraduate and post-graduate medical students

Hospital (54%)
On Car (23%)
Outpatient/Mixed (19%)
Other (4%)

43

# of ACADEMIC PARTNERS WITH AN ACTIVE PLACEMENT in FY 22-23

50 in FY 21-22

QUALITY OF CLINICAL LEARNING ENVIRONMENT & RESULTS

TOP 5

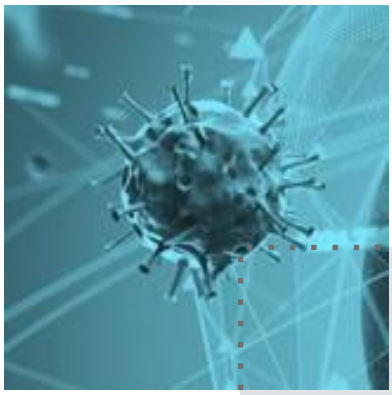
EDUCATION INSTITUTIONS FOR STUDENT PLACEMENT for NEW HIRES in FY 22-23

1. BC Institute of Technology
2. Justice Institute of BC
3. University of BC
4. Vancouver Community College
5. Stenberg College

12%

of new hires with a PHSA PLACEMENT in FY 22-23

12% in FY 21-22



BC Cancer Research Institute (BCCRI)

RESEARCH METRICS
STUDENT EDUCATION METRICS

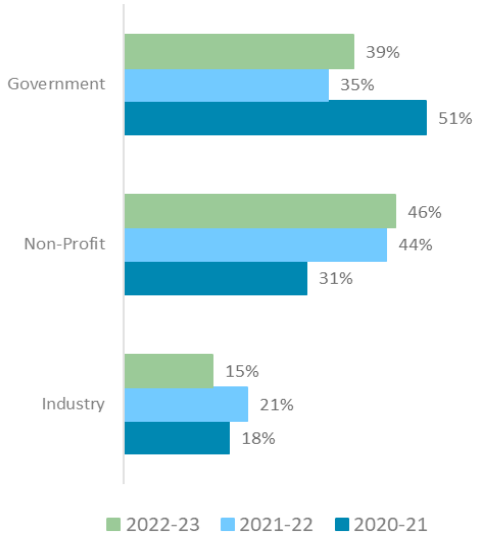
RESEARCH METRICS
BCCRI

PRODUCING AND ADVANCING KNOWLEDGE

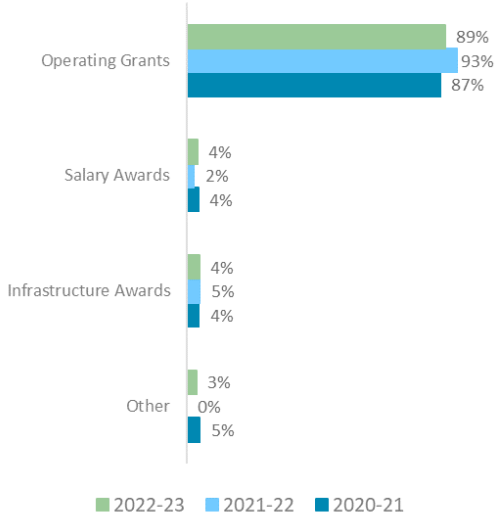
$107 Million

in TOTAL GRANTS AWARDED in FY 22-23
$94 Million in FY 21-22

$ BY SECTOR



$ BY AWARD TYPE



940 TOTAL
OF PUBLICATIONS
in FY 22-23
761 in FY 21-22

772
JOURNAL ARTICLES
in FY 22-23
615 in FY 21-22

99%
PEER REVIEWED
in FY 22-23
99% in FY 21-22

50%
% of CIHR competitions
above National AVG
SUCCESS RATE
in FY 22-23
50% in FY 21-22

ECONOMIC BENEFITS & INNOVATION

$855K
of REALIZED REVENUE
in FY 22-23
$2.2M in FY 21-22

10 patents filed
36 patents issued
in FY 22-23
114 filed / 25 issued in FY 21-22

52
ACTIVE LICENSES
(7 new) in FY 22-23
7 new in FY 21-22

16 spin-offs (2 new)
# of ACTIVE SPIN-OFFS in FY 22-23
15 (1 new) in FY 21-22

BUILDING RESEARCH CAPACITY

349.5
OF RESEARCHERS*
in FY 22-23
321.5 in FY 21-22

727
OF TRAINEES
in FY 22-23
657 in FY 21-22

$1.4Million
RESEARCH SUPPORT
FUND GRANTS
in FY 22-23
$1.5 Million in FY 21-22

*excluding affiliate investigators

HEALTH & POLICY BENEFITS

378
OF CLINICAL TRIALS
in FY 22-23
388 in FY 21-22

8,821
TOTAL CUMULATIVE
SUBJECT ENROLLMENT
at the end of FY 22-23
7,369 at the end of FY 21-22

52%
% INDUSTRY FUNDED
TRIALS in FY 22-23
51% in FY 21-22

TOP 3 RESEARCH ACHIEVEMENTS BC CANCER

Details available in Supplementary Report

1

Establishment of the Rising Stars Awards

The Rising Stars Awards: In celebration of the incredible accomplishments of Dr. Connie Eaves, BC Cancer, with support from the BC Cancer Foundation, established the Rising Star Awards. This first of its kind award is dedicated to support BC Cancer trainees with a $25,000 per year award for 2 years to support their research. To help foster equity, diversity, and inclusion, a portion of the awards granted will be allocated for academically outstanding women, applicants who identify as Indigenous, applicants who are Black and applicants who are from underrepresented communities.

2

Received a $150M BC Government Grant to enhance Clinical Research and Trials Capabilities

A $150M BC Government Grant to the BC Cancer Foundation will provide critical funding to enhance clinical research and trial capabilities across BC Cancer. Undertaking research and integrating findings is also critical for providing the best cancer care in B.C. The province is providing a grant to the BC Cancer Foundation to support cancer research and attract highly skilled cancer-care providers.

3

Tier 1 Canada Research Chair awarded to BC Cancer researcher

Dr. Aly Karsan was awarded a Tier 1 Canada Research Chair in Myeloid Cancers. Acute myeloid leukemia is an aggressive blood cancer that is extremely difficult to treat because it is spread by rare leukemic stem cells that can evade most current therapies. Dr. Aly Karsan is trying to understand how these cells resist therapy and figure out how to target them using new treatments.

TABLE 1 BCCRI Outcomes

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes ), and COVID-19 Related if icon appears.
Implementation of risk model-based approach to lung cancer screening using low-dose computed tomography (LDCT). A phased rollout across BC started in May of 2022. It is now fully operational in 36 screening sites.	Lung cancer screening using LDCT saves lives by finding lung cancer early. The program also sets the framework to improve lung cancer care in BC from prevention, early detection, rapid diagnosis, and timely treatment.	Patient: Access to new treatment/technology
Results from the first 30 patients treated with made-in-Victoria CLIC1901 anti-CD19 CAR-T cells as part of the CLIC-01 clinical trial for adults with CD19 +ve B-cell leukemia and lymphoma's were compiled and published in December 2022.	The CLIC-01 clinical trial is the first trial from a collaborative Canadian effort to make personalized CAR-T cell therapy more accessible to Canadians. The method for manufacturing the CAR-T cells was developed at BC Cancer's Deeley Research Centre in Victoria and approved by Health Canada. The lab in Victoria receives white blood cells from patients with leukemia and lymphoma across the country and grows and expands these cells with a CAR which is trained to search and destroy the cancerous cells. To date 60 patients from across Canada, who have no other treatment options available to them, have been treated with this revolutionary treatment. Over half of the patients who have received this therapy, and would otherwise have not survived over 6 months, have had complete remission of their leukemia or lymphoma. Very few side effects have been seen with people treated with these CAR-T cells. Results from the first 30 patients treated with made-in-Victoria anti-CD19 CAR-T cells as part of the CLCI-01 clinical trial for adults with CD19 +ve B-cell leukemia and lymphoma's were published in December 2022.	Patient: Delay of disease progression/survival
Under the guidance of the Canadian Cancer Clinical Trials Network, BC Cancer researchers have been running the CRAFT project since 2021. CRAFT stands for the Canadian Remote Access Framework for Clinical Trials and is an initiative at 3 Canadian centres (BC Cancer Prince George/Kelowna; Sudbury, Ontario and St. John's, Newfoundland). These three primary cancer centres chose one clinical trial each for which a satellite site in a remote region has been set up. For BC, Mills Memorial Hospital in Terrace (Primary site – Prince George) and Kootenay Boundary Hospital in Trail (Primary site – Kelowna) were involved.	In Terrace, the General Practitioner in Oncology (GPO) has been fully trained on clinical trial regulations and the COMET-3 clinical trial protocol. This now allows patients from the North-West region, who have had radiation treatment in Prince George under the COMET-3 protocol, to have their follow up visits conducted in Terrace instead of in Prince George. This decreases their one-way travel time from on average 6 hours to 1 hour. In the 2022-2023 fiscal year, the first follow up visit has been conducted in Terrace.	Patient: Other type (please specify below) Patient: Access to care/ clinical trial

TABLE 1 BCCRI Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
Two economic evaluations were completed that informed policy, practice, and drug pricing and implementation at BC Cancer. The research questions were: What is the effectiveness and cost-effectiveness of entrectinib for BC Cancer patients with unresectable locally advanced or metastatic extracranial solid tumours that have NTRK gene fusion compared to the current standard of care? and What is the effectiveness and cost-effectiveness of larotrectinib for BC Cancer patients with unresectable locally advanced or metastatic extracranial solid tumours that have NTRK gene fusion compared to the current standard of care? Current evidence does not support the use of entrectinib or larotrectinib for patients with NTRK gene fusion at a willingness-to-pay threshold of $100,000/QALY. The weighted mean ICERs (without testing costs) produced from the current analysis are $342,965/QALY and $351,174/QALY for entrectinib and larotrectinib, respectively. Discounted drug costs of 50% for entrectinib and 60% for larotrectinib would be required to obtain ICER values below the $100,000/QALY threshold (with an ICER of $77,330/QALY for entrectinib and an ICER of $93,565/QALY for larotrectinib). Incorporating testing costs increased the weighted ICERs to $2,550,592 and $1,377,779 for entrectinib and larotrectinib, respectively.	The benefit to patients, population health, and sustainability are: (1) describing which populations benefit most from implementation of these molecules (patients and populations) (2) articulating their cost-effectiveness, which supports sustainability of the system (3) describing the price at which these molecules are cost-effectiveness, which informs efficiency, sustainability, and population health. This evidence was used to inform a decision about funding these particular drugs and the testing strategy for NTRK rearrangements in BC over the next couple of years. Specifically, various subject matter experts were engaged from the tumour groups and CGL to review the inputs - the CADTH and BC Cancer PEC submissions and reviews, pricing information and this cost effectiveness analysis to create a briefing note and recommendation. This was presented to BC Cancer executive for the final decision which has now been implemented.	System: Efficiency, cost/ benefits or sustainability
BC Cancer researchers published two important scientific papers advancing use of new drugs created at BC Cancer. 1. Anthracyclines Strike Back: Rediscovering Non-Pegylated Liposomal Doxorubicin in Current Therapeutic Scenarios of Breast Cancer. Schettini F, Giuliano M, Lambertini M, Bartsch R, Pinato DJ, Onesti CE, Harbeck N, Lüftner D, Rottey S, van Dam PA, Zaman K, Mustacchi G, Gligorov J, Awada A, Campone M, Wildiers H, Gennari A, Tjan-Heijnen VCG, Cortes J, Locci M, Paris I, Del Mastro L, De Placido S, Martín M, Jerusalem G, Venturini S, Curigliano G, Generali D. Cancers (Basel). 2021 Sep 1;13(17):4421. doi: 10.3390/cancers13174421. 2. Efficacy and safety of CPX-351 versus 7 + 3 chemotherapy by European LeukemiaNet 2017 risk subgroups in older adults with newly diagnosed, high-risk/secondary AML: post hoc analysis of a randomized, phase 3 trial. Cortes JE, Lin TL, Asubonteng K, Faderl S, Lancet JE, Prebet T. J Hematol Oncol. 2022 Oct 26;15(1):155. doi: 10.1186/s13045-022-01361-w	Experimental Therapeutics has over the past 3 decades been involved in the development if three liposomal drug formulations that have been approved for use in humans. The first was a non-PEGylated liposomal doxorubicin, the second was a liposomal formulation of Vincristine (Marqibo) and the third was a combination of daunorubicin and cytarabine in a liposomal formulation referred to as Vyxeos. While Marqibo was approved by the FDA, it has not been used much. However, both the non-PEGylated liposomal doxorubicin and Vyxeos continue to receive positive attention in the scientific press. These drugs which are having a positive impact on patients today.	Patient: Access to new treatment/ technology

TABLE 1 BCCRI Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
The latest research findings from this past year by BC Cancer researchers and the OVCARE team on their ongoing research related to opportunistic salpingectomy as an ovarian cancer prevention strategy: 1. The first evidence/initial efficacy data that opportunistic salpingectomy is an effective ovarian cancer prevention strategy. https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2788855 2. Uptake of this life-saving procedure is highest in BC compared to other provinces across Canada where there was significant variation in uptake. https://www.cmajopen.ca/content/10/2/E466	As uptake was variable across Canada, it is estimated that within the study period (described in the CMAJ publication), 1600 Canadian women missed an opportunity for prevention of ovarian cancer. The OVCARE team is now working with jurisdictions/provinces across Canada to increase the uptake of this life-saving procedure.	Patient: Protocols and guidelines Patient: Other Type – Change in surgical practice to prevent cancer
Pembrolizumab is a type of immunotherapy that can be used as a first treatment for some patients with advanced nonsmall cell lung cancer. The medication can cause some side-effects which, if not detected early, can cause severe morbidity or mortality. During COVID-19, many pre-treatment appointments were changed from in-person to virtual in attempt to protect patients and healthcare providers from potential infection with SARS-CoV-2. It had not previously been studied whether this change in mode of healthcare delivery might be associated with increased side-effects.	We compared the incidence of severe adverse events and survival for patients treated with pembrolizumab before and during the COVID-19 pandemic. There was no difference in the incidence of severe adverse events or survival between the 2 cohorts. This can provide assurance to patients and healthcare providers that virtual care is a safe option. The findings are published in the Journal of Cancer Research and Clinical Oncology https://doi.org/10.1007/s00432-022-04181-0	Other type (please specify below) Real world evidence 

TABLE 1 BCCRI Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
Based on the ground-breaking research by a BC Cancer researcher and the OVCARE team in their development of the ProMisE molecular classifier for endometrial cancer, the World Health Organization in 2020 recommended the integration of molecular classification into pathology reporting for endometrial cancers. BC Cancer researchers have led his implementation into standard of care both globally and locally. This past year two publications by the OVCARE team on stratification in endometrial cancers by Estrogen Receptor (ER) status resulted in a change to reflex ER IHC being done on all endometrial cancers in the Province. The team advocated for and secured provincial funding for POLE testing for all endometrial cancer patients where their clinical care would be impacted. Through this team's work, all components of testing are now available for free in British Columbia and considered standard of care. Classification impacts referral to BC Cancer for planning primary surgery and directs adjuvant therapy. These changes in clinical practice have been championed by this team with a summary of surgical triage and adjuvant treatment guidelines based on molecular features updated on the BC Cancer website at the following link: http://www.bccancer.bc.ca/books/endometrium/management	Through the OVCARE team's research and work with the BC Cancer Gyne-Tumour Group, all components of testing are now available for free in British Columbia and considered standard of care. VALUE ADDED FOR PATIENTS Molecular classification provides consistent pathologic categorization of ECs, provides prognostic information, and helps inform which treatments work best and/or which patients may not need any treatment beyond surgery (predictive). MMR, p53 and ER IHC TO BE PERFORMED FOR ALL NEWLY DIAGNOSED ECs All newly diagnosed endometrial cancers in British Columbia must have immunohistochemistry (IHC) performed for mismatch repair status (MMR, 2 or 4 marker panel), p53 and estrogen receptor (ER)- and these results reported with their pathology. POLE TESTING WHERE IMPACTS TREATMENT For cases where knowing POLE mutation status would impact adjuvant treatment decisions, next generation sequencing (DNA-based assay) should be performed and pathogenic POLE mutations reported e.g., order POLE for any stage I/II ECs (except St IA Gr 1/2 endometrioid MMRp, p53wt EC where no treatment needed), and selectively for stage III/IV ECs. REFER EARLY Early referrals (e.g. as soon as pathology back from local hysterectomy specimens) are essential to enable the highest quality of care for our patients; providing opportunities for patients to participate in clinical trials and/or get the additional molecular testing and treatment they need in a timely fashion.	Patient: Access to new treatment/technology Patient: Protocols and guidelines Patient: Other type - Molecular classification for precision diagnostics and treatment

STUDENT EDUCATION METRICS
BC CANCER

BC CANCER
Provincial Health Services Authority

BUILD PRACTICE EDUCATION CAPACITY

37,380
STUDENT HOURS
in FY 22-23
30,775 in FY 21-22

135
TOTAL # OF STUDENTS*
in FY 22-23
139 in FY 21-22

*Excludes undergraduate and postgraduate medical students

19
Estimated FTE to PRECEPTOR Students
in FY 22-23
16 in FY 21-22

137
Medical Doctor Undergraduate Students
in FY 22-23
136 in FY 21-22

48
PRECEPTORS had an active placement in FY 22-23
14 in FY 21-22

263
Postgraduate Medical Education Residents
in FY 22-23
228 in FY 21-22

BUILD EFFECTIVE PARTNERSHIPS & COLLABORATION TO SUPPORT INNOVATION

TOP

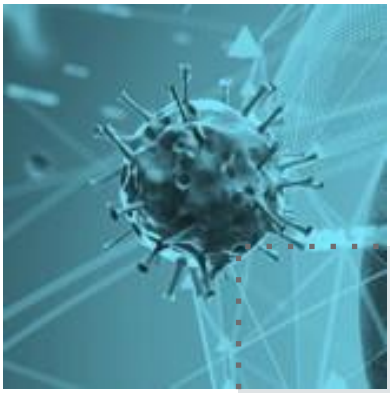
EDUCATION INSTITUTIONS BY PLACEMENT HOURS in FY 22-23

1. BC Institute of Technology (22,908)
2. University of BC (5,156)
3. CDI College (1,160)
4. University of Fraser Valley (1,131)
5. Stenberg College (1,120)

20

# of ACADEMIC PARTNERS WITH AN ACTIVE PLACEMENT in FY 22-23

17 in FY 21-22



BCCHR/BC Children's Hospital and Sunny Hill Health Centre

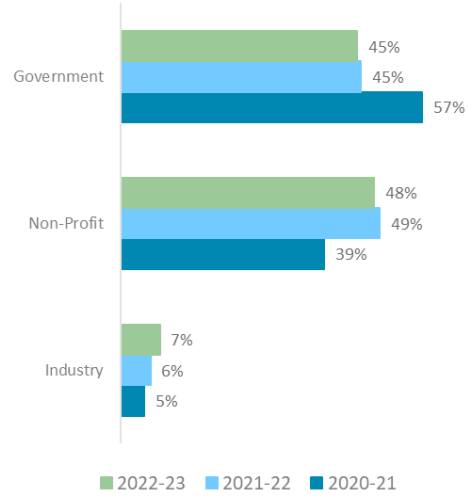
RESEARCH METRICS
STUDENT EDUCATION METRICS

RESEARCH METRICS
BC CHILDREN'S HOSPITAL RESEARCH

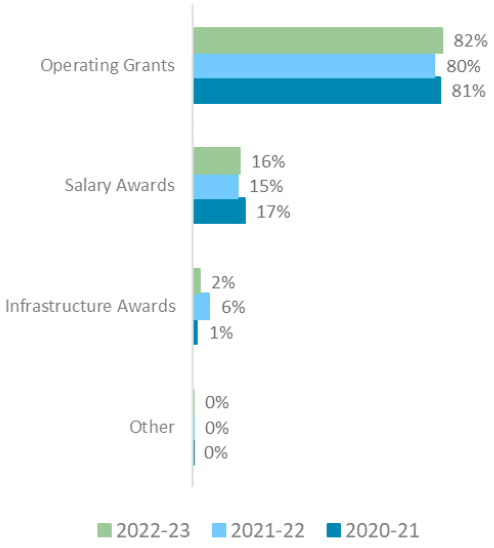
PRODUCING AND ADVANCING KNOWLEDGE

$68.8 Million
in TOTAL GRANTS AWARDED in FY 22-23
$66.8 Million in FY 21-22

$ BY SECTOR



$ BY AWARD TYPE



1,403 TOTAL
OF PUBLICATIONS
in FY 22-23
1,284 in FY 21-22

1,247
JOURNAL ARTICLES
in FY 22-23
1,123 in FY 21-22

99%
PEER REVIEWED
in FY 22-23
99% in FY 21-22

100%
% of CIHR competitions
above National AVG
SUCCESS RATE
in FY 22-23
50% in FY 21-22

ECONOMIC BENEFITS & INNOVATION

$912K
of REALIZED REVENUE
in FY 22-23
$1.2M in FY 21-22

5 patents filed
6 patents issued
in FY 22-23
1 filed, 5 issued in FY 21-22

81
ACTIVE LICENSES
(0 new) in FY 22-23
0 new in FY 21-22

4 spin-offs (0 new)
# of ACTIVE SPIN-OFFS in FY 22-23
4 (0 new) in FY 21-22

BUILDING RESEARCH CAPACITY

331.5
OF RESEARCHERS*
in FY 22-23
307 in FY 21-22

1,027
OF TRAINEES
in FY 22-23
935 in FY 21-22

$ 2.1 Million
RESEARCH SUPPORT
FUND GRANTS
in FY 22-23
$2.2 Million in FY 21-22

*Excluding affiliate investigators

HEALTH & POLICY BENEFITS

248
OF CLINICAL TRIALS
in FY 22-23
240 in FY 21-22

17,667
TOTAL CUMULATIVE
SUBJECT ENROLLMENT
at the end of FY 22-23
22,016 in FY 21-22

29%
% INDUSTRY FUNDED
TRIALS in FY 22-23
28% in FY 21-22

TOP 3 RESEARCH ACHIEVEMENTS
BC CHILDREN'S HOSPITAL RESEARCH INSTITUTE

Details available in Supplementary Report

1

New precision oncology platform stands to save young lives across Canada

The Better Responses through Avatars and Evidence (BRAvE) Initiative will enable more children with cancer to receive treatments specifically targeted at their individual tumour.

To find the individual vulnerabilities of each child's cancer, researchers will use cutting-edge technologies to grow an avatar model of the child's tumour in the lab. This avatar allows researchers to understand how the tumour might grow and respond to different medications. This allows clinicians to prepare the best way to treat the child's cancer should it return or prove difficult to treat with conventional therapies and help reduce the long-term health impacts of treatment.

2

Examining youth mental health and well-being during the COVID-19 recovery phase in B.C.

Dr. Hasina Samji and Dr. Evelyn Stewart produced a report, "Improving Youth Mental Health and Well-Being During the COVID-19 Recovery Phase in BC," to identify strategies to support youth mental health and well-being during the pandemic recovery period.

They found that on average, youth broadly reported poorer mental health during the pandemic compared to before the pandemic. But specific groups of youth - girls, sexual and gender minority youth, and those with poorer pre-COVID mental health - were impacted more severely.

The researchers presented three priority recommendations: prioritize actions to address mental health disparities among underserved populations; improve youth mental health partner integration and collaboration; and enhance social and emotional learning strategies for youth.

3

Equity, diversity, and inclusion in research highlights

Equity, diversity, and inclusion is a cornerstone of the entire ecosystem at BCCHR. BCCHR has made progress on incorporating EDI into everything it does and recognizes there is still much more to be done.

One focus is on training and education. Several initiatives are already underway, including providing supports and creating opportunities for students and trainees from Indigenous communities and marginalized populations.

The other focus is on ensuring research is more equitable and diverse. Current efforts focus on ensuring the research is relevant and positively impacts all BC Children's Hospital communities, and that families from all backgrounds are invited to participate. By ensuring inclusion of all voices, research findings will better reflect the diversity within BCCH communities and provide data that will help all children and families.

TABLE 2 BCCHR Outcomes

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
BC Children's administrators, staff and investigators carried out a study to learn more about pain management communication between families and nurses. Parents said there was too much variation in what they were hearing; for example, one surgeon would instruct them to use a certain medication, another would suggest a different medication, and nurses would advise something else. To improve communication, the team took the research findings and created a pain management handout for families. Information is filled out by the surgeon and then checked by the nurse during discharge communications. This pamphlet is now a key part of the care that kids and families receive in the day surgery unit. The pamphlet includes a detailed written medication schedule for the first 24 hours, plus information on pain management.	Pain management is one of the most challenging areas for families and children undergoing day surgery. Parents are often overloaded with information on postoperative care at a time when they are experiencing emotional distress. The new pain management handout helps parents and children have a better postoperative experience.	Patient: Improvements in timely access to care
BC Children's researchers developed an online decision aid that can be used on a mobile device called DECIDE for parents considering genome-wide sequencing for their child. DECIDE has been used at the pre-test stage and helps parents decide whether genome sequencing is appropriate for their family. This decision aid has been translated into Arabic, Punjabi and simplified Chinese.	This tool can complement or replace genetic counselling at the pre-test stage when counsellors may not be available. Patients' feedback has been positive for this tool, and there has been a reduction in associated genetic counsellor time. Translation has helped to increase access to patients who do not have English as a first language.	Patient: Access to new treatment/ technology
BC Children's investigators developed surgical simulators that can convert computerized tomography (CT) scans into printed models. Surgical teams can use these simulators to practice and anticipate potential complications. The new simulators can assist with surgeries such as pediatric inguinal hernia, thoracoabdominal tumors and cochlear implantation.	These models allow surgical teams to practice and anticipate surgical complications by individualized preoperative rehearsal, presurgical visualization and planning, and inter-team communication. This ultimately leads to increased competency, improved patient surgical outcomes and reduced operating room time.	Patient: Access to new treatment/ technology
Two studies led by investigators from BC Children's Hospital and the BC Centre for Disease Control were used to guide the development of and are referenced in the BC Public Health Communicable Disease Guidance for K-12 Schools for the 2022/23 year, which is dated August 25, 2022.	This guidance is used to inform safe operation of schools in the province.	System: Other type Safe school environment

TABLE 2 BCCHR Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
In November 2022, Vaccine Evaluation Center (VEC) researchers published "Child Transmission of SARS-CoV-2: A Systematic Review and Meta-Analysis." Understanding the role of children in COVID-19 transmission has significant implications for school and childcare policies, as well as appropriate targeting of vaccine campaigns. This systematic review helped identify the role of children in SARS-CoV-2 transmission to other children and adults.	This systematic review found children transmit COVID-19 at a lower rate to children than to adults. We now know household adults are at highest risk of transmission from an infected child, more so than adults or children in other settings. This study reinforced that school settings were not the primary setting for transmission in children, supporting decision-making around keeping schools open in B.C.	System: Knowledge dissemination — new policy
In April 2022, BC Children's researchers published an investigation into the diagnostic accuracy and predictive value of finger prick capillary dried blood spot (DBS) samples to detect COVID-19 antibodies after infection or vaccination.	This study demonstrates that DBS testing should be considered reliable at detecting COVID-19 seropositivity from natural infection or vaccination and that DBS samples have comparable diagnostic accuracy to serum collected by venipuncture when tested by an electrochemiluminescent assay for antibodies. This approach has now been used for many studies in thousands of individuals across Canada.	Patient: Protocols and guidelines
In May 2022, BC Children's and VEC researchers published a high-quality, population-level study about the effect of COVID-19 infection on pregnancy. The study describes maternal and perinatal outcomes associated with COVID-19 infection in pregnancy and assesses variables associated with severe disease in the pregnant population. It found that COVID-19 infection during pregnancy was significantly associated with increased risk of adverse maternal outcomes and preterm birth. The researchers also demonstrated in another study that COVID-19 mRNA vaccines have a good safety profile in pregnancy.	These data are being used to appropriately inform pregnant people regarding COVID-19 vaccines during pregnancy, and should be considered alongside effectiveness and immunogenicity data to make appropriate recommendations about best use of COVID-19 vaccines in pregnancy.	Patient: Protocols and guidelines
Investigators published the eighth edition of the BC Children's Pediatric Drug Dosage Guidelines under the direction of the BC Children's Hospital and BC Women's Hospital Pharmacy, Therapeutics and Nutrition Committee (PTN).	These guidelines serve as a reference for prescribers, pharmacists and nurses for drug dosing for neonatal and pediatric patients for medications used at BC Children's and BC Women's neonatal intensive care unit (NICU). Pharmacists across B.C. use these guidelines.	System: Process of care — standardization

TABLE 2 BCCHR Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
In November 2022, BC Children's and VEC researchers conducted a study looking into risk factors for severe COVID-19 in hospitalized children in Canada. Children living with chronic co-occurring conditions are at increased risk for severe COVID-19. However, there is limited evidence regarding the risks associated with specific conditions, and which children may benefit from targeted COVID-19 therapies.	While severe outcomes were detected at all ages and among patients with and without co-occurring conditions, VEC researchers found neurologic and pulmonary conditions were associated with increased risk of severe COVID-19. These findings help guide vaccination programs and prioritize targeted COVID-19 therapies for children.	Patient: Protocols and guidelines
To address transition of care for patients with home tracheostomies and ventilation (HTV) needs from the intensive care unit (ICU) to non-critical care areas within BC Children's, a multidisciplinary team across multiple sites at BC Children's developed a guideline and patient needs assessment framework for HTV care on the wards.	Implementation of the framework increased bed capacity in the pediatric intensive care unit by allowing HTV patients who require non-critical care to be admitted to the general medical ward. Implementation also improved HTV patients' access to care, education and teamwork on the ward.	Patient: Improvements in timely access to care
BC Children's investigators evaluated COVID-19 vaccine responses in pediatric patients with inflammatory bowel disease who are on biologic therapies.	Investigators found that antibody responses were reduced with some of the biologic agents, however, adequate antibody levels were reached with all therapies following two doses of the vaccine. Such evaluations are important to ensure newly developed vaccines are safe and effective for everyone, including those receiving treatment for pre-existing medical conditions. This is an integral part of vaccine policy.	Patient: Other type — monitoring of a new vaccine
Researchers with the Diagnosis Using Integrated Metabolomics And Genomics In Neurodevelopment (IMAGINE) research project, part of the CHILD-BRIGHT Network, have created a patient- and family-oriented resource to complement post-test genetic counselling. The Genomic Results e-Booklet helps families understand their genomic testing results and navigate available resources. Advances in genomics and metabolomics have allowed clinicians to better diagnose the metabolic and genetic causes of cerebral palsy. These insights will hopefully lead to more personalized treatments that improve the lives of these kids.	Cerebral palsy (CP) is a non-progressive, but variable condition that affects one out of every 500 Canadians. CP is a term used to describe a group of disorders affecting body movement and muscle coordination. Creating resources for families of children with genetic and metabolic causes of cerebral palsy can help families understand and navigate genomic testing results.	Patient: Improvements in timely access to care

TABLE 2 BCCHR Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
BC Children's investigators examined the safety of using hydroxyzine in children and the potential of neurodevelopmental outcomes. Hydroxyzine is a first-generation antihistamine commonly prescribed to infants and young children with skin conditions such as atopic dermatitis and eczema, allergy-related nasal congestion, anxiety and nausea. This antihistamine is considered psychotropic, because it impacts the mental state by causing sleepiness. In this first-of-its-kind research, they found that repeated use of hydroxyzine in young children, especially those with five or more prescriptions before reaching five years of age, was associated with a 55 per cent higher risk for specific psychomotor disorders such as tics, and a 34 per cent increased risk for mental health disorders, including anxiety or conduct disorders up to the age of 10.	Researchers now recommend alternative treatments for preschool age children when treating atopic dermatitis and similar conditions. If hydroxyzine must be administered, the shortest possible duration is recommended.	Patient: Protocols and guidelines
In August 2022, BC Children's and VEC researchers sought to estimate the risk of recurrence of adverse events following immunization (AEFIs) upon revaccination and to determine among patients with suspected vaccine allergy whether allergy skin test positivity was associated with AEFI recurrence. This study included patients assessed in the Canadian Special Immunization Clinic (SIC) Network from 2013 to 2019 with AEFIs who required revaccination with the vaccine temporally associated with their AEFI. Researchers followed up with participants after revaccination to capture AEFI recurrences.	The study found that most individuals with AEFIs were safely revaccinated. The benefit to patients is that among those with suspected vaccine allergy, skin testing may help determine the safety of revaccination. These tests have been directly implemented into practice at BC Children's.	Patient: Protocols and guidelines
BC Children's investigators with the TrustSphere project created a software platform that allows patients and clinicians to collaboratively share patient-generated health data and clinical care plans. This data includes information from diabetes devices, such as insulin pumps and continuous glucose monitoring systems, as well as patient-reported outcome and experience measures. A clinical pilot study of TrustSphere was launched in October 2022, and as of March 31, 2023, 19 patients and families living with type 1 diabetes and accessing care at BC Children's are using the platform.	Sharing data in a trusted manner improves the focus of clinical visits, provides critical information to clinicians, and allows patients to direct their data as they wish.	Patient: Access to new treatment/ technology

TABLE 2 BCCHR Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
The neurodevelopmental disorders (NDD) working group, which includes BC Children's Hospital investigators, developed evidence-based recommendations for genetic and metabolic investigation of children with global developmental delay, intellectual disability and autism spectrum disorder. In 2023, they authored a position statement regarding genetic and metabolic investigations for neurodevelopmental conditions from the Canadian College of Medical Geneticists. The previous guidelines vary considerably, and many were out of date or not appropriate for the Canadian health-care landscape	The position statement provides guidance for primary care and non-genetics specialists caring for these patients while awaiting consultation with a clinical geneticist or metabolic specialist. The aim is to improve diagnosis and care for patients with NDDs.	Patient: Protocols and guidelines
BC Children's investigators established Indigenous oversight leading to the creation of genetic variation reference data for rare disease diagnosis.	Indigenous patients have lower diagnostic success for rare disease identification using DNA sequencing, as there is no population-specific reference data available. Establishing Indigenous oversight has led to the establishment of the much-needed reference data through the Silent Genomes Project, enabling Indigenous populations to have increased access to genetic testing.	Patient: Access to new treatment/technology

STUDENT EDUCATION METRICS
BC CHILDREN'S HOSPITAL

BUILD PRACTICE EDUCATION CAPACITY

124,248
STUDENT HOURS
in FY 22-23
131,221 in FY 21-22

802
TOTAL # OF STUDENTS*
in FY 22-23
894 in FY 21-22

*Excludes undergraduate and postgraduate medical students

33
Estimated FTE to PRECEPTOR Students
in FY 22-23
35 in FY 21-22

353
Medical Doctor Undergraduate Students
in FY 22-23
405 in FY 21-22

385
PRECEPTORS had an active placement in FY 22-23
275 in FY 21-22

629
Postgraduate Medical Education Residents
in FY 22-23
630 in FY 21-22

BUILD EFFECTIVE PARTNERSHIPS & COLLABORATION TO SUPPORT INNOVATION

TOP

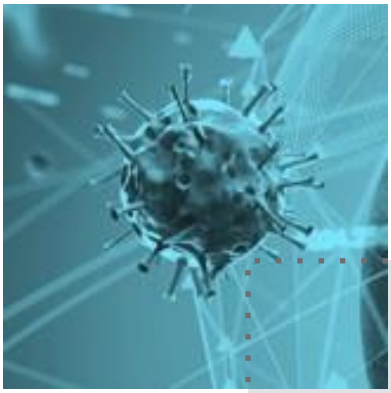
EDUCATION INSTITUTIONS BY PLACEMENT HOURS in FY 22-23

1. BC Institute of Technology (29,998)
2. University of BC (24,629)
3. Thompson Rivers University (19,355)
4. Douglas College (12,346)
5. Langara College (11,888)

19

# of ACADEMIC PARTNERS WITH AN ACTIVE PLACEMENT in FY 22-23

28 in FY 21-22



BCMHSUS Research Institute/BC Mental Health & Substance Use Services

RESEARCH METRICS
STUDENT EDUCATION METRICS

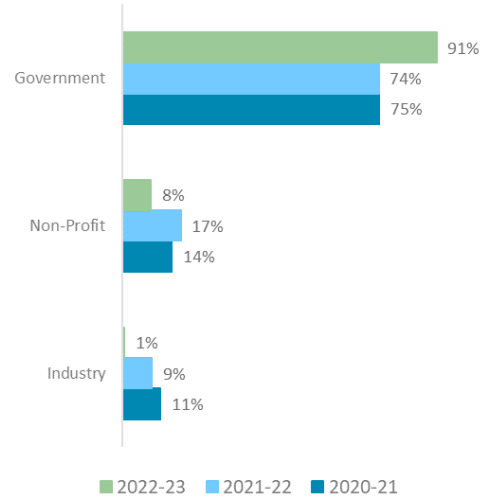
RESEARCH METRICS
BC MENTAL HEALTH & SUBSTANCE USE SERVICES RESEARCH INSTITUTE

BC MENTAL HEALTH & SUBSTANCE USE SERVICES
Provincial Health Services Authority

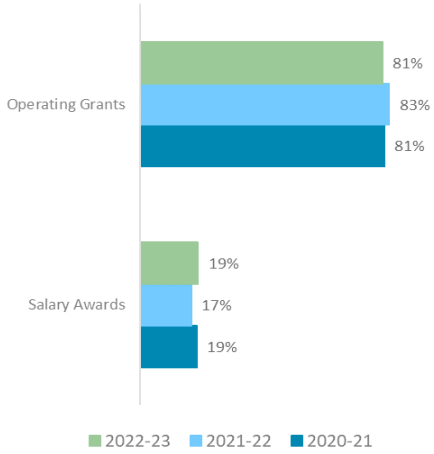
PRODUCING AND ADVANCING KNOWLEDGE

$1.1 Million
in TOTAL GRANTS AWARDED in FY 22-23
$1.25 Million in FY 21-22

$ BY SECTOR



$ BY AWARD TYPE



127 TOTAL # OF PUBLICATIONS in FY 22-23
151 in FY 21-22

114 JOURNAL ARTICLES in FY 22-23
145 in FY 21-22

97% PEER REVIEWED in FY 22-23
96% in FY 21-22

0% % of CIHR competitions above National AVG SUCCESS RATE in FY 22-23
50% in FY 21-22

BC MENTAL HEALTH
& SUBSTANCE USE SERVICES
Provincial Health Services Authority

BUILDING RESEARCH CAPACITY

13

OF RESEARCHERS*
in FY 22-23
14 in FY 21-22

178

OF TRAINEES
in FY 22-23
144 in FY 21-22

$86K

RESEARCH SUPPORT FUND GRANTS
in FY 22-23
$106K in FY 21-22

*excluding affiliate investigators

HEALTH & POLICY BENEFITS

8

OF CLINICAL TRIALS
in FY 22-23
8 in FY 21-22

523

TOTAL CUMULATIVE SUBJECT ENROLLMENT
at the end of FY 22-23
596 at the end of FY 21-22

0%

% INDUSTRY FUNDED TRIALS in FY 22-23
0% in FY 21-22

ECONOMIC BENEFITS & INNOVATION

No activity in FY 22-23

TOP 3 RESEARCH ACHIEVEMENTS
BCMHSUS RESEARCH INSTITUTE

Details available in Supplementary Report

1

Dr. Jehannine Austin advances international clinical practice in genetic counselling

Dr. Jehannine Austin has made significant contributions to international clinical practice guidelines including two published papers, one focusing on genetic counselling and translation considerations for polygenic scores and the other providing an updated assessment of standardized human pedigree nomenclature. Dr. Austin's pioneering work at the Adapt Clinic, driven by their groundbreaking research and expertise in the field, inspired the establishment of additional clinical services in Cardiff, UK, and Tennessee, USA.

2

Mental health researcher achieves top rank in April 2022 CIHR project grant

BCMHSUS postdoctoral research fellow, Dr. Heather Palis, received a Michael Smith Foundation for Health Research Trainee Award following her UBC Marshall Scholarship award and CIHR fellowship for her research which uses administrative health and corrections data to identify trends of overdose and recidivism among people with criminal justice system involvement and psychiatric disorders in BC.

3

Antipsychotics expert ranked in top 0.1% of published authors worldwide

Dr. Alasdair Barr's expertise in antipsychotic agents has earned him a ranking in the top 0.1% of researchers worldwide, and his influential publications, including systematic reviews and meta-analyses, have been highly regarded in the field, providing valuable evidence-based research for clinicians.

TABLE 3 BCMHSUS Outcomes

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
Delineation of an approach to assessing for progressive neurocognitive decline in patients presenting with schizophrenia. Colijn, M. A., Torres, I. J., Menon, M., Howard, A., Honer, W. G., & Stowe, R. M. (2022). Progressive neurocognitive decline in schizophrenia: A diagnostic dilemma for clinicians. Schizophrenia research, 241, 59-62.	This article provides step by step guidance to assist psychiatrists in differentiating between the neurocognitive decline that may occur in schizophrenia from that associated with numerous medical/neurological etiologies, including co-occurring dementias. This guidance paper is published in a top schizophrenia journal which provides access to and uptake by a broad range of clinicians working with this clinical population.	System: Process of care-standardization
A BCMHSUS researcher continues to work with an international group of clinicians and scientists to help optimize clozapine treatment in patients with treatment refractory schizophrenia. Clozapine is currently the only approved drug for treatment of refractory schizophrenia. Below, is a highlight of the international collaboration that includes: 1) The development of clozapine guidelines using ancestry-based dosing and titration, and 2) ancestry-based dosing recommendations for clozapine ultrarapid metabolizers resulting from weak induction. The Guidelines: They developed international guidelines that propose to improve clozapine package inserts worldwide by using ancestry-based dosing and titration. This guideline defines six personalized titration schedules for inpatients: 1) ancestry from Asia or the original people from the Americas with lower metabolism (obesity or valproate) needing minimum therapeutic dosages of 75-150 mg/day, 2) ancestry from Asia or the original people from the Americas with average metabolism needing 175-300 mg/day, 3) European/Western Asian ancestry with lower metabolism (obesity or valproate) needing 100-200 mg/day, 4) European/Western Asian ancestry with average metabolism needing 250-400 mg/day, 5) in the US with ancestries other than from Asia or the original people from the Americas with lower clozapine metabolism (obesity or valproate) needing 150-300 mg/day, and 6) in the US with ancestries other than from Asia or the original people from the Americas with average clozapine metabolism needing 300-600 mg/day. Baseline and weekly CRP monitoring for at least four weeks is required to identify any inflammation, including inflammation secondary to clozapine rapid titration.	Clozapine is currently the only approved medication for treatment refractory psychosis. Unfortunately, clozapine is under-utilized owing to factors that include tolerability, strict and frequent blood monitoring, and even physician's lack of knowledge and comfort in prescribing it. The focus of BCMHSUS researchers is to optimize the safe use of clozapine that includes an ancestry-based approach. Published guidance on the use of clozapine will help patients with treatment refractory psychosis benefit from receiving appropriate and optimal care.	Patient: Protocols and guidelines
A BCMHSUS researcher contributed as last author to new guidelines about how to draw medical pedigrees in a trans inclusive manner.	This guidance document ensures that healthcare providers are clear about the relevance of both sex and gender in taking a medical family history and provides guidance about how to collect and record this information in a manner that is trans inclusive.	Patient: Protocols and guidelines

TABLE 3 BCMHSUS Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
A BCMHSUS researcher is the Principal Editor of The Clinical Handbook of Psychotropic Drugs. The Handbook is a user-friendly and practical resource guide for health care practitioners working in any setting where psychotropic drugs are utilized. Its content is derived from various forms of published literature (including randomized controlled trials, scientific data such as pharmacokinetic trials, cohort trials, case series, and case reports) as well as from leading clinical experts. It is continually updated (every 2 years) as the scientific literature evolves, so that it reflects current evidence-based and clinically relevant information to optimize patient care. New sections, periodically added, reflect changes in therapy and in current practice. The 25th Edition of the Handbook was recently released at the American Psychiatric Association Annual Conference in San Francisco (May 2023). The Handbook is used by practitioners worldwide and is published in English, Chinese, Korean, German, Romanian, and Italian.	The Clinical Handbook of Psychotropic Drugs is a comprehensive resource that disseminates/translates ever evolving scientific literature in terms of pharmacological treatments and clinical practice guidelines. The Handbook is used world-wide by health-care practitioners as a quick reference to optimize treatment of patients with mental illnesses.	System: Knowledge dissemination-new policy
SWITCHRX Incorporated into Telus Health sponsored RAPIDS SwitchRx is a website co-developed by a BCMHSUS researcher and Telus Health. SwitchRx aims to provide healthcare professionals with the most current and useful information to guide their clinical practice when adjusting their patient's psychotropic treatment regimens. This resource features suggested tapering and titration schedules, clinical tips, detailed information on drug-drug interactions, pharmacokinetics, and other precautions. As of January 2023, there are almost 70,000 users, with approximately 500 visits/day and 50 new subscribers/day. SwitchRx has been included as an integral feature of the TELUS Mental Health sponsored RAPIDS (Rapid Accurate Personalized Informed Diagnosis and Solutions) project. RAPIDS incorporates technology (including SWITCHRX), evidence-based literature, and expert clinical expertise in order to develop a decision support system for clinicians caring for patients with mental health needs. Currently RAPIDS is being piloted in some primary care facilities for patients diagnosed with depression or bipolar disorder.	The goal is for RAPIDS to be implemented and fully integrated in the outpatient health-care setting (e.g., family practice clinics). In doing so, physicians and patients will benefit from a tool that uses evidenced based treatment pathways to optimize the care of patients that suffer from various mental health diagnoses.	System: Process of care-standardization
Two psychiatric genetic counseling clinics have started up based on the model established at PHSA by a BCMHSUS researcher- one in Cardiff, UK, the other in Tennessee, USA.	The establishment of these clinics, which are based on a learning health system model, improves patient care in these other jurisdictions.	Patient: Access to new treatment/technology

STUDENT EDUCATION METRICS
BC MENTAL HEALTH & SUBSTANCE USE SERVICES

BC MENTAL HEALTH & SUBSTANCE USE SERVICES
Provincial Health Services Authority

BUILD PRACTICE EDUCATION CAPACITY

42,455
STUDENT HOURS
in FY 22-23
38,909 in FY 21-22

283
TOTAL # OF STUDENTS*
in FY 22-23
262 in FY 21-22

*Excludes undergraduate and postgraduate medical students

13
Estimated FTE to PRECEPTOR Students
in FY 22-23
12 in FY 21-22

9
Medical Doctor Undergraduate Students
in FY 22-23
5 in FY 21-22

108
PRECEPTORS had an active placement in FY 22-23
80 in FY 21-22

9
Postgraduate Medical Education Residents
in FY 22-23
5 in FY 21-22

BC MENTAL HEALTH
& SUBSTANCE USE SERVICES
Provincial Health Services Authority

BUILD EFFECTIVE PARTNERSHIPS & COLLABORATION TO SUPPORT INNOVATION

TOP

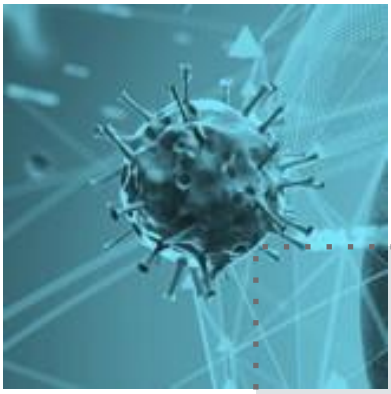
EDUCATION INSTITUTIONS BY PLACEMENT HOURS in FY 22-23

1. Douglas College (12,262)
2. University of BC (7,692)
3. Kwantlen Polytechnic University (5,500)
4. Stenberg College (3,600)
5. BCIT (2,076)

21

# of ACADEMIC PARTNERS WITH AN ACTIVE PLACEMENT in FY 22-23

26 in FY 21-22



BC Centre for Disease Control/UBC CDC

RESEARCH METRICS
STUDENT EDUCATION METRICS

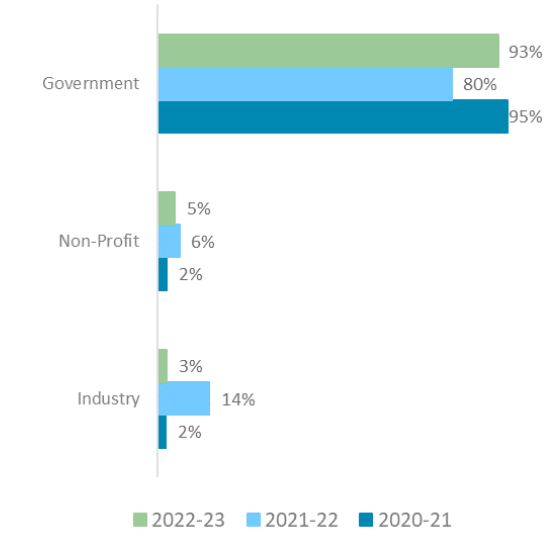
RESEARCH METRICS
BC CENTRE FOR DISEASE CONTROL/UBC CDC

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

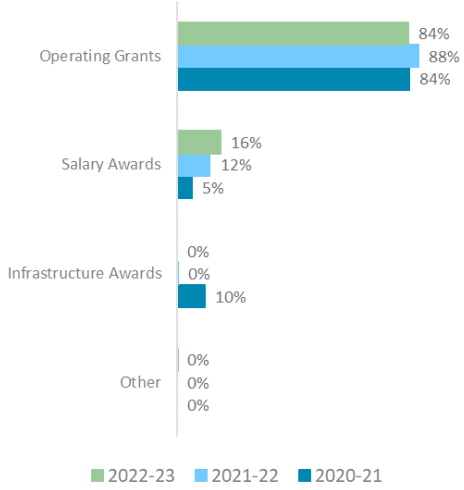
PRODUCING AND ADVANCING KNOWLEDGE

$6.2 Million
in TOTAL GRANTS AWARDED in FY 22-23
$5.8 Million in FY 21-22

$ BY SECTOR



$ BY AWARD TYPE



308 TOTAL
OF PUBLICATIONS
in FY 22-23
301 in FY 21-22

146
JOURNAL ARTICLES
in FY 22-23
149 in FY 21-22

90%
PEER REVIEWED
in FY 22-23
75% in FY 21-22

50%
% of CIHR competitions
above National AVG
SUCCESS RATE
in FY 22-23
50% in FY 21-22

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

BUILDING RESEARCH CAPACITY

48.5
OF RESEARCHERS*
in FY 22-23
47.5 in FY 21-22

167
OF TRAINEES
in FY 22-23
197 in FY 21-22

$225K
RESEARCH SUPPORT FUND GRANTS
in FY 22-23
$175K in FY 21-22

*Excluding affiliate investigators

HEALTH & POLICY BENEFITS

15
OF CLINICAL TRIALS in FY 22-23
14 in FY 21-22

5,233
TOTAL SUBJECT ENROLLMENT
in FY 22-23
3,613 in FY 21-22

0%
% INDUSTRY FUNDED TRIALS in FY 22-23
0% in FY 21-22

ECONOMIC BENEFITS & INNOVATION

No activity in FY 22-23

TOP 3 RESEARCH ACHIEVEMENTS
BCCDC/UBC CDC

Details available in Supplementary Report

1 Wastewater analysis initiated as research established as key public health tool

During the pandemic, wastewater became an important tool for monitoring SARS-CoV-2 in the community and UBC/BCCDC were at the forefront of this work. This work started as an externally funded research project by a UBC laboratory embedded at BCCDC Public Health Laboratory. Since then, the work has expanded to include additional viruses (influenza A, influenza B, RSV and norovirus) and sequencing of SARS-CoV-2 to detect emerging variants. Furthermore, routine testing has transitioned to the Public Health Laboratory, while research and development for new targets continues in the UBC research laboratory. This is a fantastic example of the impact of cutting-edge translational research and the benefit of research and service laboratories being co-located at the BCCDC.

2 Emphasis on community engagement and Indigenous partnerships by the overdose research program

BCCDC researchers launched several new projects focused on partnering with people with lived experience of incarceration and substance use. These projects included a Health Canada funded initiative known as PREVAIL that provided 120 men and women leaving correctional centres who are at high risk of overdose cellular phones, care and medicine bundles designed by a formerly incarcerated person through a partnership with Chee Mamuk, peer support through Unlocking the Gates Non-Profit Society, and harm reduction supplies including take home naloxone.

3 UBCCDC project management team helps BCCDC researchers successfully compete for more than $26M in grants

The UBCCDC Project Management Team helped coordinate, support, and enhance COVID-19 research projects resulting in 42 successful applications for a total value of over $26M. This included eight from CIHR, nine for Genome BC, seven from the Michael Smith Foundation for Health Research (MSFHR is now Health Research BC), six from the Public Health Agency of Canada, three joint Genome BC, MSFHR and BCCDC Foundation projects, and nine other funders.

TABLE 4 BCCDC Outcomes

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
BCCDC researchers on the BC COVID Therapeutics Committee contributed to the development of the Clinical Practice Guide for the Use of Therapeutics in Mild-Moderate COVID-19.	These guidelines will help prioritize populations for treatment eligibility in times of limited supply.	Patient: Access to new treatment /technology
Researchers in the BCCDC TB Services contributed to the development of the Post-TB International Standards.	This guide helps set treatment standards for people after TB therapy in hopes to reduce the mortality rates and comorbidity burden in this population.	Patient: Protocols and guidelines
BCCDC Public Health Laboratory researchers developed a new in house Mpox PCR test.	This new in-house PCR test allows more rapid testing and reporting of Mpox infection. This PCR testing is also key for both clinical management and public health control measures in BC.	Patient: Access to new treatment/technology
Researchers at BCCDC published the COVID-19 Outbreak Management Protocol for Long-Term Care and Seniors' Assisted Living Settings.	This guideline will help healthcare workers working in long-term care facilities or seniors' assisted living facilities in managing COVID-19 cases and contacts during an outbreak.	Patient: Protocols and guidelines
BCCDC researchers at the National Collaborating Centre for Environmental Health (NCCEH) developed a new, plain-language guide for doing in-person and remote health checks.	The guide provides protocols for untrained personnel to follow in in-person and remote heath checks during extreme heat events, highlighting the symptoms and areas that they should be paying attention on during the checks. This guide also includes information on how to recognise and respond to heat-related illness and offers actions for reducing body and indoor temperatures.	Patient: Protocols and guidelines
Research from the BCCDC Environmental Health Services led to the addition of schizophrenia and mental health as risk factors in guidance documents for extreme heat events. The audience for these documents includes all levels of government and the general public.	This protocol helps increase awareness of the health of individuals with schizophrenia and mental health issues during heat events and gather resources to support those populations during extreme heat events.	Patient: Protocols and guidelines
BCCDC researchers contributed to the development of Guidance on take-home naloxone (THN) distribution and use by community responders in Canada. This guidance entailed an environmental scan of THN programs across Canada, followed by systematic reviews of scientific and grey literature and community evidence reflecting 11 years of THN distribution and use in Canada.	The guidance will provide national recommendations in 3 priority subject areas of community THN program: (1) routes of naloxone administration, (2) THN kit contents, and (3) overdose response	Patient: Protocols and guidelines

TABLE 4 BCCDC Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
Researchers at BCCDC contributed to findings reported to leaders in the provision of mental health and substance use services with BC Corrections. These findings were also used to inform substance use screening protocols conducted at admission to provincial correctional centres in BC. Their study evaluated the increased risk of overdose death for people with a history of stimulant use disorder following release from provincial correctional centres.	This protocol helps inform provincial correctional facilities in effectively providing people with mental health and substance use needs services in custody and bridging them to community care upon discharge. This protocol aims to reduce the risk of overdose and overdose death for people with history of stimulant use disorder following their release from provincial correctional centrs.	Patient: Protocols and guidelines
BCCDC researchers contributed to findings reported to decision-makers at the Select Standing Committee on Health and in the BC Coroner's Service 2022 Death Review Panel Report on Illicit Drug Toxicity Deaths. BCCDC researchers studied guidelines introduced by BC Ministry of Health and Addictions and the BC Centre on Substance Use that enabled health care professionals to prescribe safer alternatives to people who use substances. The study also involved examining toxicology data from the BC Coroner's Service and analyze linked administrative health data on prescribed safer supply that is available at the BCCDC.	This work helped guide provincial decision makers in expanding prescribed safer supply beyond the context of the COVID-19 public health emergency and providing evidence for the importance of alternatives to the toxic drug supply in BC.	System: Process of care-protocol implementation

STUDENT EDUCATION METRICS
BC CENTRE FOR DISEASE CONTROL

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

BUILD PRACTICE EDUCATION CAPACITY

7,246
STUDENT HOURS
in FY 22-23
3,674 in FY 21-22

19
TOTAL # OF STUDENTS*
in FY 22-23
16 in FY 21-22

*Excludes undergraduate and postgraduate medical students

4
Estimated FTE to PRECEPTOR Students
in FY 22-23
2 in FY 21-22

0
Medical Doctor Undergraduate Students
in FY 22-23
5 in FY 21-22

8
PRECEPTORS had an active placement in FY 22-23
2 in FY 21-22

32
Postgraduate Medical Education Residents
in FY 22-23
22 in FY 21-22

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

BUILD EFFECTIVE PARTNERSHIPS & COLLABORATION TO SUPPORT INNOVATION

TOP

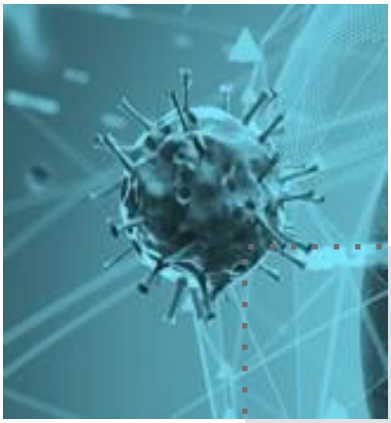
EDUCATION INSTITUTIONS BY PLACEMENT HOURS in FY 22-23

1. University of BC (3,040)
2. McMasters University (1,680)
3. Simon Fraser University (1,648)
4. University of Victoria (450)
5. University of Guelph (420)

6

# of ACADEMIC PARTNERS WITH AN ACTIVE PLACEMENT in FY 22-23

6 in FY 21-22



Women's Health Research Institute / BC Women's Hospital & Health Centre

RESEARCH METRICS
STUDENT EDUCATION METRICS

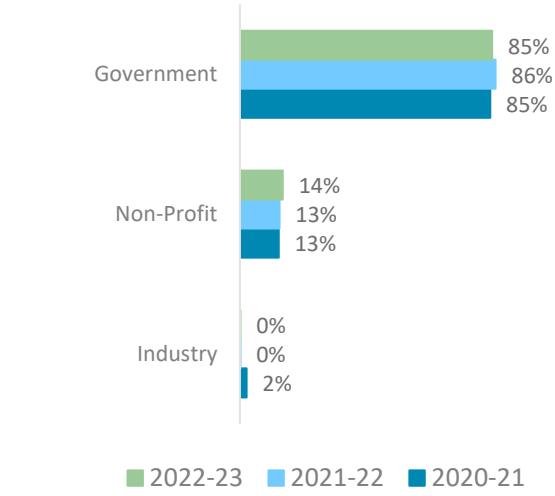
RESEARCH METRICS
WOMEN'S HEALTH RESEARCH INSTITUTE

WOMEN'S HEALTH RESEARCH INSTITUTE AT BC WOMEN'S

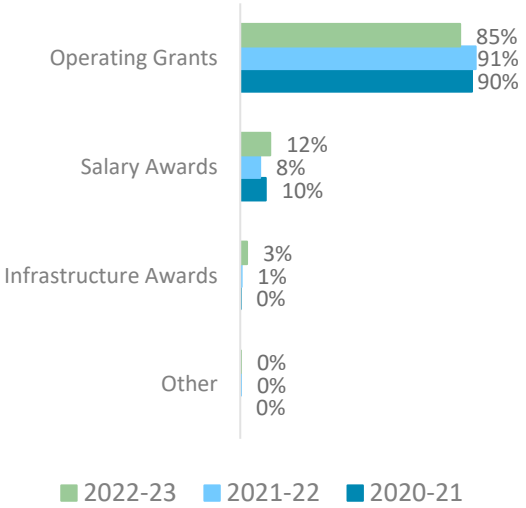
PRODUCING AND ADVANCING KNOWLEDGE

$7.2 Million
in TOTAL GRANTS AWARDED in FY 22-23
$9.2 Million in FY 21-22

$ BY SECTOR



$ BY AWARD TYPE



1,244 TOTAL
OF PUBLICATIONS in FY 22-23
1,006 in FY 21-22

337
JOURNAL ARTICLES
in FY 22-23
295 in FY 21-22

95%
PEER REVIEWED
in FY 22-23
97% in FY 21-22

100%
% of CIHR competitions
above National AVG
SUCCESS RATE
in FY 22-23
100% in FY 21-22

BUILDING RESEARCH CAPACITY

544

WHRI MEMBERSHIP
in FY 22-23
465 in FY 21-22

1,021

OF TRAINEES
in FY 22-23
984 in FY 21-22

$ 334K

RESEARCH SUPPORT FUND GRANTS
in FY 22-23
$290K in FY 21-22

HEALTH & POLICY BENEFITS

45

OF CLINICAL TRIALS
in FY 22-23
22 in FY 21-22

4,309

TOTAL CUMULATIVE SUBJECT ENROLLMENT
at the end of FY 22-23
1,941 at the end of FY 21-22

31%

% INDUSTRY FUNDED TRIALS in FY 22-23
14% in FY 21-22

ECONOMIC BENEFITS & INNOVATION

No activity in FY 22-23

TOP 3 RESEARCH ACHIEVEMENTS
WHRI

Details available in Supplementary Report

1

Research and knowledge mobilization by WHRI investigator resulted in British Columbia being the first province in Canada to offer free prescription contraception

Based on research evidence and advocacy by WHRI researcher Dr. Wendy Norman and her Contraception and Abortion Research Team, in partnership with BC Women's Hospital + Health Centre (BWC), British Columbia is now the first province in Canada to offer free prescription contraception for residents. This policy change is intended to ensure equitable access to contraception and to reduce the rate of unintended pregnancies, ultimately saving money for the province's healthcare system. Dr. Norman's research has been working toward this goal since 2011, gathering data to support evidence-informed policy development. In partnership with BCW, Dr. Norman and her team were influential in bringing about this policy change through research, advocacy and implementation planning with the provincial government and other partners.

2

The WHRI and BCCHR partner to launch a joint Digital Health Research Office for the Oak Street Campus to support digital innovations in women's, newborn's and children's health

Recognizing the rapid advances within the technology and digital health sector, the WHRI and BCCHR have partnered to create a joint Digital Health Research Office. Staff in this office will work to build the digital health research program for the Oak Street Campus by creating opportunities to share knowledge related to digital innovations in women's, newborn's and children's health. Digital Health Research Office staff will actively engage with decision makers in government, health authorities and other partners to accelerate the implementation of evidence-based, locally produced digital health research interventions. This office will build on ongoing digital health initiatives, including a monthly seminar series, Digital Health week programing and the development of a shared research agenda in perinatal digital innovation.

3

A publication from a WHRI investigator demonstrates that a novel community-based method of cervical cancer screening can be integrated into the health system in low-resource setting

A publication in Nature Medicine by WHRI researcher Dr. Gina Ogilvie and her team demonstrated the feasibility of integrating a community-based self-collected HPV-based cervix screening into an existing health system in a low-resource rural setting with a high burden of cervical cancer. Conducted in the Mayuge region of Uganda, this study compared the effectiveness of two community-based cervical cancer screening models: 1) community health worker recruitment (door-to-door); and 2) community health meetings. The findings showed that door-to-door HPV screening led to better attendance of follow-up treatment services when compared to health meetings. Theses results will inform the national cervical cancer screening in Uganda, aligning with the World Health Organization's target of achieving cervical cancer elimination through increased HPV screening coverage.

TABLE 5 WHRI Outcomes

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes) , and COVID-19 Related if icon appears.
Research evidence and advocacy by a WHRI investigator and their research team were used as justification for a provincial health policy change which saw British Columbia becoming the first province in Canada to offer free prescription contraception for residents (starting April 1, 2023).	Findings from a line of research initiated in 2011, which included a large-scale, province-wide door-to-door sexual health survey, were used to gather data to support evidence-informed policy development. This policy change (to offer free prescription contraception to BC residents) is intended to ensure equitable access to contraception and to reduce the rate of unintended pregnancies, ultimately saving money for the province's healthcare system. In partnership with BC Women's Hospital, this investigator and their research team were influential in bringing about this health care policy change through research, advocacy and implementation planning with the provincial government and other partners.	Patient: Access to new treatment/technology; Improvements in timely access to care System: Efficiency, cost/benefits or sustainability
WHRI researcher was co-author of a national clinical practice guideline: Management of Dichorionic Twin Pregnancies	Improved outcomes for maternal and fetal health through the use of evidence-based recommendations to optimize the management of twin pregnancies and to reduce neonatal and maternal morbidity and mortality.	Patient: Protocols and guidelines System: Knowledge dissemination-new policy
WHRI/BCCHR researcher was one of the authors of the United Nations Inter-agency Group for Child Mortality Estimation and its Core Stillbirth Estimation Group's report: Never Forgotten: The Situation of Stillbirth Around the Globe	The United Nations recognizes the stillbirth rate as a core progress indicator for global health. This report highlights the immense and continued annual burden of stillbirths globally and demonstrates the need for collaborative work to produce timely, reliable estimates to drive evidence-based decision making. This report presents specific goals that can be adopted locally, nationally and globally in order to reduce preventable stillbirths.	Patient: Protocols and guidelines System: Knowledge dissemination-new policy
Three WHRI researchers were co-authors of a national clinical interim guidance document: Society for Obstetricians and Gynaecologists of Canada's Interim Guidance on Monkeypox Exposure for Pregnant People	There is a paucity of data on the impact of monkeypox in pregnancy, but signals of profound morbidity for the pregnancy exist. This guidance document recommends pregnant individuals exposed to moneypox be given the smallpox vaccine as post-exposure prophylaxis and be managed by an interdisciplinary care team. These recommendations will result in improved maternal and fetal outcomes in those exposed to moneypox via targeted treatment and appropriate follow-up.	Patient: Delay of disease progression/survival; Protocols and guidelines System: Knowledge dissemination-new policy
WHRI researcher participated in the Society for Obstetricians and Gynaecologists of Canada's Genetics Committee that developed the national clinical practice guideline: Folic Acid and Multivitamin Supplementation for Prevention of Folic Acid-Sensitive Congenital Anomalies	Oral folic acid supplementation, or dietary folate intake combined with a multivitamin supplement, is associated with lower rates of neural tube defects, other folate-sensitive birth defects, and obstetrical complications. Implementation of the guideline will result in improved fetal health outcomes and reduced healthcare costs due to decreased risk of folate-sensitive birth defects.	Patient: Protocols and guidelines System: Knowledge dissemination-new policy

TABLE 5 WHRI Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
WHRI researcher was the lead author for the International Planned Parenthood Federation's global technical brief: Fulfilling the sexual and reproductive rights of women living with HIV, preventing coerced and forced sterilization	Despite the scientific knowledge gained in the forty years of the HIV pandemic, HIV-related stigma and discrimination continue to drive sexual and reproductive rights violations. The purpose of this technical brief is to promote gender-transformative, rights-based, and scientifically accurate information for advocacy and service delivery in order to fulfill the sexual and reproductive rights of women, girls and people who have the capacity to become pregnant, who are living with HIV.	Patient: Protocols and guidelines System: Knowledge dissemination-new policy
WHRI researcher was one of the authors of a national communications guidebook: Social Media Crisis Communication Guidebook for Public Health	Based on evidence from a scoping review, this guidebook aims to ensure effective social media crisis communication during emerging infectious diseases and has been distributed nationally via partnerships with the Canadian Public Health Association and the National Collaborating Centre for Methods and Tools. The use of this guide will result in improved population health outcomes due to more effective social media crisis messaging during emerging health emergencies.	Patient: Protocols and guidelines System: Knowledge dissemination-new policy
WHRI researcher participated in the Society for Obstetricians and Gynaecologists of Canada's Genetics Committee that developed the national clinical practice guideline: Routine Non-Invasive Prenatal Prediction of Fetal RHD Genotype	Rhesus disease is a condition where antibodies in a pregnant woman's blood destroy her fetus' blood cells. If a pregnant individual is RHD negative, there can be complications that arise if their fetus is RHD positive. This guideline will result in improved fetal outcomes for RHD negative pregnant individuals through optimal management based on the non-invasive antenatal prediction of fetal D-blood group by cell-free DNA in maternal plasma, with targeted prophylaxis for women carrying RHD-positive fetuses.	Patient: Delay of disease progression/survival; Protocols and guidelines System: Knowledge dissemination-new policy
WHRI researcher created an online toolkit to support family doctors in diagnosing and managing vulvodynia: The Vulvodynia Primary Care Toolkit (https://www.vulvodyniatoolkitbc.ca/)	Vulvodynia, or chronic vulvar pain without an identifiable cause, affects between 7 – 16% of women and other individuals with vulvas. This accessible online toolkit will lead to improved outcomes for individuals with Vulvodynia due to increased knowledge among family physicians and other providers on the diagnosis and management of this condition.	Patient: Protocols and guidelines System: Process of care-protocol implementation

TABLE 5 WHRI Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
Research findings from a WHRI investigator were included in the in the American Society of Clinical Oncology's care guideline: Exercise, Diet, and Weight Management During Cancer Treatment	Findings from research which identified key exercise recommendations for individuals with bone metastases were included in an international oncology care guidance document. This guideline will lead to improved outcomes for oncology patients due to improved exercise recommendations, including regular aerobic and resistance exercise, during active treatment with curative intent.	Patient: Protocols and guidelines System: Process of care-protocol implementation
Four WHRI researchers contributed to the development of a validated tool to measure pregnancy-specific anxiety and its severity: Pregnancy-Specific Anxiety Tool (PSAT).	Pregnancy-specific anxiety is a distinct construct from general anxiety and depression. The creation of this measurement tool will lead to improved screening and monitoring of pregnancy-specific anxiety and the identification of those pregnant individuals who require further assessment.	Patient: Access to new treatment/ technology System: Knowledge dissemination-new policy
Research findings from a WHRI investigator on urinary tract infection post- pelvic reconstructive surgery inspired a bundle of care aimed at reducing the rate of post-surgical infections.	Findings from research on urinary tract infections developing after pelvic reconstructive surgery were used to create a bundle of care to manage post-surgical infections. The implementation of this care bundle was shown to significantly decrease the rate of urinary tract infections post-pelvic reconstructive surgery from 18% to 6% and decreased hospitalization by one day post-surgery, which translates into cost benefits for the health care system.	Patient: Protocols and guidelines System: Efficiency, cost/benefits or sustainability; Process of care-protocol implementation
WHRI researcher participated in the creation of a Perinatal Services BC toolkit to help primary care practitioners discuss and manage gestational weight with their patients: The 5As of Healthy Pregnancy Weight Gain Toolkit	Evidence indicates that pregnant individual who have weight gain discussions with their health care providers are more likely to gain weight within the recommended range. This tool is intended to help primary care practitioners discuss and manage gestational weight with their patients. The 5As (Ask, Assess, Advise, Agree, and Assist) framework ensures sensitive, realistic, measureable, and sustainable obesity management strategies that focus on improving health and well-being, rather than simply aiming for numbers on a scale.	Patient: Protocols and guidelines System: Process of care-standardization

TABLE 5 WHRI Outcomes (continued)

Description of any guideline, drug, diagnostic agent, device or novel and transformational research design or methodology adopted or approved in FY 2022-23 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.	Type of Benefit, Result of Internal Collaboration (if Yes), and COVID-19 Related if icon appears.
WHRI/BCCHR researcher was one of the lead authors of a GeneReview, an international point-of-care resource, on a rare vascular condition: Isolated and Classic Cutis Marmorata Telangiectatica Congenita.	Isolated and classic cutis marmorata telangiectatica congenita (CMTC) is a rare vascular condition. The creation of a new GeneReview for this condition will result in care providers worldwide having access to clinically relevant and medically actionable information (covering diagnosis, management, and genetic counseling for patients and their families) for this inherited condition, which will lead to standardized and improved care for individuals with this condition.	Patient: Protocols and guidelines System: Process of care-standardization
A WHRI researcher and their team developed two new types of software that can be used to analyse short tandem repeat expansions in sequencing datasets in the context of genomic sequencing.	Expansions of short tandem repeats are the cause of many neurogenetic disorders including familial amyotrophic lateral sclerosis, Huntington disease, and many others. A team of WHRI and BCCHR researchers have developed two computational tools for genomic sequencing: 1) REViewer (https://pubmed.ncbi.nlm.nih.gov/35948990/) and 2) Linked-read sequencing. (https://pubmed.ncbi.nlm.nih.gov/35672336/). Both these methods improve the clinical utility of genomic sequencing and enable the detection and analysis of short tandem repeat expansions.	Patient: Access to new treatment/technology System: Other type (New technology for use in clinical investigations)

STUDENT EDUCATION METRICS
BC WOMEN'S HOSPITAL & HEALTH CENTRE

BC WOMEN'S HOSPITAL+ HEALTH CENTRE
An agency of the Provincial Health Services Authority

BUILD PRACTICE EDUCATION CAPACITY

50,668
STUDENT HOURS
in FY 22-23
45,954 in FY 21-22

357
TOTAL # OF STUDENTS*
in FY 22-23
362 in FY 21-22

*Excludes undergraduate and postgraduate medical students

19
Estimated FTE to PRECEPTOR Students
in FY 22-23
14 in FY 21-22

225
Medical Doctor Undergraduate Students
in FY 22-23
212 in FY 21-22

385
PRECEPTORS had an active placement in FY 22-23
275 in FY 21-22

260
Postgraduate Medical Education Residents
in FY 22-23
295 in FY 21-22

BC WOMEN'S HOSPITAL+ HEALTH CENTRE
An agency of the Provincial Health Services Authority

BUILD EFFECTIVE PARTNERSHIPS & COLLABORATION TO SUPPORT INNOVATION

TOP

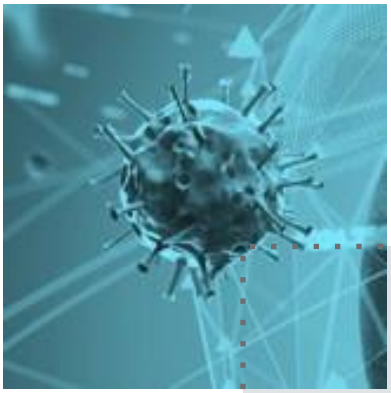
EDUCATION INSTITUTIONS BY PLACEMENT HOURS in FY 22-23

1. University of BC (19,480)
2. BC Institute of Technology (16,660)
3. Langara College (6,192)
4. Vancouver Community College (2,244)
5. Douglas College (1,568)

20

# of ACADEMIC PARTNERS WITH AN ACTIVE PLACEMENT in FY 22-23

11 in FY 21-22



BC Emergency Health Services

STUDENT EDUCATION METRICS

STUDENT EDUCATION METRICS
BC EMERGENCY HEALTH SERVICES

BCEHS | BC Emergency Health Services

BUILD PRACTICE EDUCATION CAPACITY

80,162
STUDENT HOURS
in FY 22-23
61,668 in FY 21-22

645
TOTAL # OF STUDENTS
in FY 22-23
439 in FY 21-22

41
cost of STUDENT SUPERVISION
in FY 22-23
32 in FY 21-22

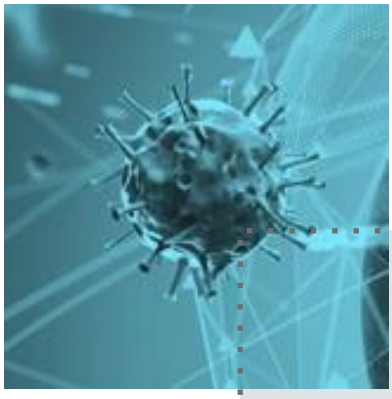
208
# of PRECEPTORS
in FY 22-23
275 in FY 21-22

BUILD EFFECTIVE PARTNERSHIPS & COLLABORATION TO SUPPORT INNOVATION

TOP
EDUCATION INSTITUTIONS BY PLACEMENT HOURS in FY 22-23

1. Justice Institute of BC (56,866)
2. Columbia (23,296)

2
# of ACADEMIC PARTNERS WITH AN ACTIVE PLACEMENT
in FY 22-23
5 in FY 21-22



PHSA Registries & Datasets

RESEARCH METRICS

RESEARCH METRICS
REGISTRIES & DATASETS

Registries are the result of significant infrastructure investment in the collection of longitudinal data that are regional, provincial or national in scope regarding provision of services to specific population(s), maintained for the purposes of undertaking analysis, surveillance and/or research.

REGISTRY/DATASET DESCRIBED

14

REGISTRIES & DATASETS

representing

13

PHSA PROGRAMS

REGISTRY/DATASET USES

93 % (13)

USED FOR RESEARCH

TOP3 RESEARCH SUPPORT ACTIVITIES

1. Identifying Knowledge Gaps &Improvement Needs
2. Managing & Linking Data
3. Ensuring Studies Meet Regulatory Requirements

11 of 14

REGISTRY/DATASETS submit to Provincial, Federal or International datasets for purposed of research

NATURE OF RESEARCH ACTIVITIES

223/165

DATA ACCESS requests/approvals in FY 22-23

8/14

registries ranked CLINICAL & HEALTH SERVICES RESEARCH as predominant types of research in FY 22-23

TABLE 6 These are examples of the types of research questions posed by investigators using data from PHSA registries and datasets in FY 22-23

BCCH's Biobank	Role of SLC43A3 in the therapeutic efficacy and adverse effects of 6-mercaptopurine
	Can extracellular vesicles be used to detect high-risk pediatric acute lymphoblastic leukemia?
	Epigenetics of OCD in response to CBT treatment.
	Assessing the immunopathogenesis of novel germline variants in IKZF2.
	Single cell profiling of hematopoietic stem and progenitor cells in pediatric aplastic anemia.
	Genomic and epigenomic sequencing to understand resistance and relapse in AML.
	Prevalence of A1AT deficiency variant alleles in pregnancies affected by COVID-19 syndrome.
	Biomarker development for clinical diagnosis of stage and response to treatment in inflammatory bowel diseases.
	Evaluation of the impact of chronic graft versus host disease and graft versus leukemia on the marrow microenvironment after hemopoietic stem cell transplant in pediatric ALL patients.
	Personalize Molecular Characterization. BRAvE.
BC Cardiac Registry	CSBC received a data request for research about access to timely percutaneous intervention (PCI) for ST-elevated myocardial infarction (STEMI). The research request overlapped with an ongoing quality initiative at CSBC.
EPPIC	What is the prevalence, types, and risk factors of short-term complications following endometriosis surgery?
	What are the clinical and demographic variables that predict poor mental health outcomes for patients with endometriosis or pelvic pain during the COVID-19 pandemic?
	Are there identifiable factors that influence surgical outcomes in patients who undergo conservative surgery versus hysterectomy?
	What was the impact of the COVID-19 pandemic on East, South, and South-East Asians experiences of endometriosis, and related mental health and quality of life?
BCCDC – COVID-19 Dataset	Is COVID-19 associated with an increased risk of diabetes following acute infection?
	What is COVID-19 vaccine effectiveness among people living with HIV compared to people without HIV?
	How does population-level burden of COVID-19 hospitalizations compare to influenza?
	Are COVID-19 vaccines associated with an increased risk of myocarditis?
	What is the clinical severity of SARS-CoV-2 variant Omicron compared to Delta?
	To what extent do SARS-CoV-2 variant of concerns mediate the relationship between income and clinical severity?
	Is COVID-19 vaccination or SARS-CoV-2 infection associated with a greater risk of myocarditis?
	What is the extent of healthcare utilization among people with long-COVID compared to people who did not develop long-COVID?
	Can diagnostic codes from physician billing data be used as syndromic surveillance to track trends in respiratory diseases?
	How has the COVID-19 pandemic impacted trends in medical visits for mental health disorders?
PROMIS-Renal	Impact of COVID on progression of kidney disease
	Prevalence of sustained hyperkalemia in CKD patients and prescriptions for K+ binder use
	Value of KFRE on planning vascular access in patients choosing HD
	Impact of changing eGFR equation on classification and planning in patients with CKD in BC
PROMIS - Transplant Registry	What is the organ non-recovery and discard rates in British Columbia and Ontario and recipient outcomes for utilized kidneys as a function of Kidney Donor Profile Index (KDPI).
	What are the changes in demographics of patients who are referred, assessed, or transplanted for alcohol related liver disease in BC since the change in criteria for transplantation in ALD.
	Is there a lower incidence of RV failure in patients who undergo LVAD insertion via a newer minimally invasive technique as opposed to the traditional median sternotomy.
	How does a novel clinical indicator called unadjusted glomerular filtration rate (uGFR) compare to the standard measure of adjusted GFR in modelling risk of kidney transplant graft outcomes.

TABLE 6 Example Research Questions by Registry/Dataset (continued)

PROMIS - Transplant Registry (continued)	Assess the safety, PK, and efficacy of AT-1501 in patients undergoing kidney transplantation.
	Determine the incidence of urinary tract infections and systemic infections post stent removal in kidney transplant recipients. Determine the effectiveness of targeted antibiotic prophylaxis in preventing UTIs and systemic infections and characterize factors associated with UTIs.
	How can Tregs isolated from pediatric thymuses be used as a third party (i.e., non-autologous) cell-based therapy in transplantation.
	What is the mortality rate of lung transplant recipients infected with Mycobacterium abscessus prior to transplantation compared to those who are not infected with M. abscessus
	Is there an increase in post operative complications in patients undergoing nighttime liver transplant surgery compared to daytime?
	Is a newly developed enzyme that converts A and B blood group antigens to O blood group antigens safe and effective?
Perinatal Services BC	The prevalence of demographic and clinical risk factors for adverse birth outcomes increased among women across all maternity care providers, however, we may observe a disproportionate increase in these risk factors in each group. The proportion of women who chose a midwife or a family physician for prenatal care but were delivered by an obstetrician also increased, however, we will likely observe no changes in the demographic characteristics of women who had the same type of provider throughout the pregnancy and delivery (a midwife, or a family physician). The aims of this study with respect to temporal trends in adverse neonatal and maternal outcomes are hypothesis generating and will provide preliminary data on temporal changes in birth outcomes in relation to changes in maternity care provider preferences in BC. To examine temporal trends in prevalence of demographic and clinical risk factors for adverse birth outcomes among women with respect to the type of maternity care provider and the type of attendant at delivery (i.e., midwife, family physician, and obstetrician) in BC, from 2004/05 to 2019/20. To examine temporal trends in pregnancy complications and adverse birth outcomes among women with various types of maternity care (according to care provider), with and without adjustment for timing of initiation and frequency of prenatal care visits, delivery attendant, and maternal risk factors.
	What are the incidence and characteristics at biopsy for each type of GN in BC, including MN, FSGS, IgAN, MCD, lupus nephritis, and anti-neutrophil cytoplasmic antibody (ANCA) vasculitis, and do these vary by geographic region, era, race, or income level? What is the risk of death and progression to ESRD for each type of GN in BC, and do these vary by geographic region, era, race, immunosuppression (IS) exposure, or income level? What is the risk of cardiovascular events for each type of GN in BC and do these vary by geographic region, era, race, IS exposure, or income level? What proportion of patients with GN in BC is managed according to established GN recommendations, and does this vary by geographic region, era, race, or income level? What proportion of patients with GN in BC experience serious infectious or malignancy complications, and does this differ by geographic region, era, race, IS exposure, or income level? What is the risk of a serious complication after renal biopsy in patients with GN in BC, and does this vary by geographic region, era, race or income level? What is the frequency of visits with nephrologists and other physicians or hospitalizations in patients with GN in BC, and does this vary by geographic region, era, race or income level? What is the cost-effectiveness of different guideline-based immunosuppression treatments for GN?
	To determine if the proportion of women who received standard of care cervical cancer screening increased after the transfer of responsibility for healthcare to the Ministry of Health compared with pre-transfer, among women who experienced imprisonment in BC. To determine if the proportion of pregnant women who received the recommended number of prenatal care visits increased after the transfer of responsibility for healthcare to the Ministry of Health compared with pre-transfer, among women who experienced imprisonment in BC.

TABLE 6 Example Research Questions by Registry/Dataset (continued)

Perinatal Services BC (continued)	Conduct a drug utilization analysis of opioid use during pregnancy and use of opioids combined with other psychotropic drugs during pregnancy in two Canadian jurisdictions. Investigate provider characteristics and patterns of opioid prescribing to pregnant women. Determine whether prenatal exposure to opioids and/or opioids in combination with psychotropic medications is associated with adverse neonatal and childhood outcomes compared to non-opioid exposure or only opioid exposure (e.g., neonatal abstinence syndrome; early childhood developmental vulnerability). Determine whether prenatal exposure to opioids and/or opioids in combination with psychotropic medications is associated with adverse maternal outcomes compared to non-opioid exposure or only opioid exposure (e.g., breastfeeding initiation, postpartum psychological distress, opioid use disorder). The secondary objectives include: Compare characteristics of women who were prescribed opioids during pregnancy between BC and MB. Compare provider characteristics and opioid prescribing trends between BC and MB to see whether these rates have changed over the last 10 years.
	To understand how interventions during labor and delivery might influence risk for ASD in the child. Interventions would include epidural analgesia, oxytocin administration, other forms of labor induction, etc. To understand how maternal conditions, maternal health and wellbeing, and medical interventions during pregnancy and the preconception period may influence risk for ASD in the child. To understand how fetal exposures to different medications taken by the mother (e.g., antibiotics), behavior-related exposures (e.g., maternal smoking), and maternal chronic disease (e.g., diabetes, asthma, etc.) are related to later risk for ASD in the child. To continue to investigate how maternal mental health (i.e., mood, thought, somatic, substance use disorders) and psychotropic medication treatment may be associated with risk for ASD or other developmental disorders in the child. To understand whether environmental exposures (i.e., air pollution, green space, etc.) during pregnancy are associated with a higher risk for the development of ASD. Understand factors that alter developmental trajectories in children assessed for ASD, diagnosed with ASD, or diagnosed with other developmental disabilities compared to typically developing children. To examine the developmental trajectories of children diagnosed with ASD in terms of their social, emotional, and cognitive-academic development, social relationships, and participation during the elementary school years. To evaluate the relationship between gestational age, indicators of intrauterine growth (e.g., small for gestational age birth), and ASD, and to determine whether these factors are associated with different developmental trajectories among children with ASD and other developmental conditions compared to typically developing children. To determine whether familial context (e.g., maternal, and paternal mental health, SES, etc.) during childhood influences the developmental trajectories of children assessed for ASD, diagnosed with ASD, and/or diagnosed with other developmental conditions. To describe the role of pain, self-injurious behavior and aggression in the developmental trajectories of children with ASD.
	OVERALL AIM: Using PopData BC records from 2006 - 2020/21, we will examine health outcomes and health care utilization after surviving severe maternal morbidity. AIM 1: Estimate rates and risks of future non-obstetric health care utilization patterns, including outpatient general practitioner, specialist, emergency room, and allied health specialist visits, prescription drug use, and non-obstetric hospitalizations, following women from two years prior to delivery to two years after delivery or until death, loss to follow-up, or study end. AIM 2: Estimate both prevalence (i.e., proportion with pre-existing within 2 years prior to cohort entry) and incidence (i.e., rate, as of one year following delivery) of cardio metabolic NCDs (e.g., hypertension, diabetes mellitus, chronic kidney disease, cardiovascular disease), autoimmune conditions, and of mental illness (e.g., depression, anxiety, psychosis) in both groups, and the relative risks thereof over the study period, with censoring as per AIM 1.
	Assess accuracy of early pregnancy loss in administrative data.

TABLE 6 Example Research Questions by Registry/Dataset (continued)

Perinatal Service BC (continued)	Are there variations in rates of caesarean delivery and other intrapartum interventions among provinces? Are differences in operative delivery rates independent of population demographics and known risk factors? Endometriosis validation study: Can we build an algorithm using the diagnostic codes, fee items and procedures codes in the administrative data that will reliably identify pathologically confirmed endometriosis patients? Endometriosis treatments and live birth rates: How do live birth rates compare among different fertility-sparing endometriosis treatments? Are there some fertility-sparing treatments (or combination of treatments) that are associated with higher live birth rates in endometriosis patients? Endometriosis treatments and adverse pregnancy and labour & delivery outcomes: What are the rates of adverse pregnancy and labour & delivery outcomes for people with endometriosis? How do these rates compare across different endometriosis treatment histories? IVF and adverse pregnancy and labour & delivery outcomes: What are the rates of adverse pregnancy and labour & delivery outcomes for IVF-conceived pregnancies? How do these rates compare among patients with or without endometriosis?
BC Trauma Registry	The primary study objective is to analyze how COVID-19 with its associated interpersonal stressors and social restrictions has affected the overall volume of trauma team activations, as well as the rates of self-harm and interpersonal violence in trauma team activations at a large, level-1 trauma center in BC over the initial two years of the pandemic. Our hypothesis is that COVID-19 has resulted in no statistical difference in the volume of trauma team activations, but an increase in the rate of self-harm and interpersonal violence as a mechanism of trauma.
	The primary purpose of this study is to compare the accuracy and precision of several artificial intelligence algorithms that can retrospectively predict the length of stay and discharge disposition in trauma patients treated at VGH using BC Trauma Registry data.
	Primary objective is to describe the demographic characteristics of self-injury patients and determine the long-term outcomes of those treated in British Columbia, Canada (that are part of the BC Trauma Registry). Secondary objectives of this study include: ● Determine protective factors that support long term survival after violent suicide attempt ● Determine risks factors of self-injury recurrence and mortality ● Geographic mapping of all attempts
	The primary objective of this study is to define what relationship exists between pre-existing psychiatric disease and ventilator weaning/ extubation success in the ICU. Hypothesis: We hypothesize among mechanically ventilated patients in the ICU, those with pre-existing psychiatric diagnosis will have on average a lower number of ventilator-free days and increased number of failed spontaneous breathing/ weaning trials.
Tumour Tissue Repository	ACEi/ARBs oropharynx ca ~ ACEi/ARBs and Survival Outcomes in Squamous Cell Carcinoma of the Oropharynx (BoR BC Cancer Agency)
	Lifestyle factors and biomarkers of prognosis in colorectal tumours: a pilot study
	Use of the BC Cancer Clinical Guided PERT Tool in the identification and management of pancreatic enzyme insufficiency in pancreatic cancer.
	SABR-COMET-3: A Randomized Phase III Trial of Stereotactic Ablative Radiotherapy for the Comprehensive Treatment of 1-3 Oligometastatic Tumors
	A Phase III Randomized Study of Low Dose Rate compared to High Dose Rate Prostate Brachytherapy for Favorable Risk and Low Tier Intermediate Risk Prostate Cancer
	Analysis of Syntaxin4, Munc18c and MT1-MMP expression in human breast cancer tissues
	Advanced Precision Medicine in Radiation Oncology: Identifying Predictive Markers of Treatment Response
	A retrospective study of archival NSCLC biopsy samples to investigate the value of the DetermaIOTM gene expression assay in identifying immune checkpoint inhibitor response.
	CLIC-1901 for the Treatment of Patients with Relapsed/Refractory CD19 Positive Hematologic Malignancies (CLIC-01)

TABLE 6 Example Research Questions by Registry/Dataset (continued)

BC Cancer Registry	To determine the rates of progression-free survival and overall survival for all patients with central lung tumours treated in BC with stereotactic ablative radiotherapy, since SABR was first used across the province.
	To determine the progression free survival and overall survival among patients who received treatment intensification withdocetaxel, apalutamide or enzalutamide per treatment agent.
	Outline the landscape of gastric cancers in the Hereditary Cancer Program (HCP) by presenting a comprehensive analysis of referral rates and clinical and genetic alterations of index patients and at-risk relatives in a gastric-cancer cohort.
	A descriptive analysis of in-person and telehealth appointments for medical and radiation oncology services at BC Cancer during the COVID-19 pandemic
	This project develops a life-cycle health technology assessment framework for evaluating pre-reimbursed technologies and pilots this framework in an economic evaluation of the tumouragnostic molecule entrectinib.
	Real-World Outcomes of Patients with Adrenocortical Carcinoma and the Role of Systemic Therapy in British Columbia
Lung Cancer Screening Program	Comparison of the PLCOm2012 with the USPSTF lung cancer screening eligibility criteria
	AI research using screening LDCT
	Use of blood biomarkers to detect lung cancer
Breast Cancer Screening Database	Can volumetric breast density be used as an imaging biomarker for predicting breast cancer risk
	How well does an AI algorithm perform in breast cancer detection
Cervical Cancer Screening Program	What is the uptake of cervix self-screening?

APPENDIX 1
RESEARCH METRICS WORKING GROUP MEMBERSHIP*

Ellen Chesney
Chief Administrative Officer - Research, PHSA

Isabelle Linden
Director, jbResearch Services, BCCHR

Kathryn Dewar, PhD
Senior Research Manager, Women's Health Research Institute (WHRI)

Alan Worsley
Communications Specialist, Communications, BCCHR

Rhonda Ellwyn
Manager, Research Operation, BCMHSUS

Karen Hagan
Grants Officer, Office of Research Facilitation, BC Cancer

Nicholas Preston
Director of Research & Innovation, BCEHS

Kelly Chan
Senior Finance Manager, BCCHR

Beth Palacios
Consultant

Deborah Ross
Director, Research and Knowledge Exchange
BC Mental Health & Substance Use Services

Priscilla Vuong
Research Development Unit Manager, BC/UBC Centre for Disease Control

*As of September, 2023

APPENDIX 2
FRAMEWORK FOR PHSA RESEARCH METRICS

1. Indicator: Producing and Advancing Knowledge
   This category includes measures reflecting discoveries/new knowledge, and contributions to scientific literature.

   a. Total annual grant awards by agency/research entity and PHSA
   b. Total annual external grant awards by agency/research entity, identified by major funding categories
      (e.g., tri-council, provincial, Genome Canada/BC, international, private sector, etc.)
   c. Annual grant application success rate by agency/research entity and PHSA
   d. Total # Publications
   e. Citations

2. Indicator: Building Research Capacity
   This category includes measures reflecting enhancements to both human resource and infrastructure capacity.

   a. Total # trainees by agency/research entity
   b. Scholarships/fellowships by agency/research entity
   c. Total # researchers by agency/research entity
   d. Infrastructure investments
      i. E.g. - hospital research fund, BCCHR, capital projects etc.
      ii. Databases (patient, tissue) etc
   e. Research Support Fund grants

3. Indicator: Achieving Economic Benefits and Innovation
   This category includes measures reflecting commercialization of discoveries, revenues and other economic benefits resulting from discoveries, and general impacts on the BC economy.

   a. # Intellectual property disclosures, patents by agency/research entity
   b. Licenses, royalty income, spin-off companies
   c. New research hires to agency/research entity - job creation
   d. Policy initiatives

4. Indicator: Advancing Health and Policy Benefits
   This category includes measures reflecting individual and population health impacts of research in prevention, diagnosis and treatment.

   a. Clinical trials (translational research)/patient outcome data
   b. New clinical guidelines/patient outcome data
   c. New drugs funded/patient outcome data
   d. Policy initiatives/patient outcome data

APPENDIX 3
FRAMEWORK FOR PHSA STUDENT EDUCATION METRICS

1. Indicator: Build Practice Education Capacity

This category includes measures that demonstrate level of commitment to students, preceptors, and post-secondary institutions as part of mandate to provide excellence in education and training.

a. # of Students, Placement Hours by Discipline & Sub-Discipline
b. # of Medical Students (Under-grads and Post-grads) by Specialty
c. Estimated FTE of Staff Time in Direct Supervision of Students
d. # of Confirmed Placement Requests by Month
e. # of Confirmed and Declined Placements by Educational Institution for Priority Professions
f. # of Declines by Reason (Most Frequent)
g. # of Staff Participants in Preceptor/Educator Training
h. # of Preceptors in HSPnet With and Without a Placement

2. Indicator: Build Effective Partnerships and Collaborations that Support Innovation

This category includes quantitative measures of PHSA's relationships with academic partners.

a. # of Affiliation Agreements by Region and Sector
b. Top % of Education Institutions by Student Hours
c. Distribution of Student Hours by Practice Education Setting

3. Monitor the Quality of the Clinical Learning Environment and Results

This category includes measures for monitoring quality and outcomes.

a. # of hires at PHSA with a previous placement
b. # of Placements by Educational Institution for New Hires

APPENDIX 4
STUDENT EDUCATION COORDINATING COMMITTEE

Current Membership

Ellen Chesney[1]	Chief Administrative Officer – Research & Academic Services, Executive Sponsor
Christie Diamond[1]	Co-chair, Corporate Director, Academic Education
Andrea Acosta[3]	Clinical Nurse Educator, Inter-professional Practice
Miranda Barnas[2]	Clinical Nurse Educator, Inter-professional
Michelle de Jaray[4,5]	Coordinator, Academic Practice, New Knowledge & Innovation
Sandra Harris[4,5]	Senior Leader, Clinical Education, New Knowledge & Innovation
Simmie Kalan[1]	Senior Director, Clinical Education
Shaila Jiwa[7]	Director, Professional Practice
Jennifer Molhoj[6]	Manager, Program Support & Learning
Neeta Nagra[2]	Director, Professional Practice, Forensic Hospital
Alyssa Rafferty[2]	Director, Inter-professional Practice, Red Fish Healing Centre
Terri-Lee Seeley[2]	Director, Inter-professional Practice, Correctional Health Services
Sandy Tatla[4,5]	Director, New Knowledge & Innovation
Sarah Titcomb[1]	Coordinator - Academic Development
Heena Vadgama[3]	Education Coordinator
Sylvia Wu[4]	Manager, Education, UBC Dept. of Pediatrics

1. PHSA corporate services
2. BC Mental Health and Substance Use Services
3. BC Cancer Agency
4. BC Children's Hospital
5. BC Women's Hospital and Health Centre
6. BC Emergency Health Services
7. BC Centre for Disease Control
8. Lower Mainland Pathology and Laboratory Medicine