



PHSA RESEARCH METRICS

FISCAL YEAR 2020-21

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PHSA RESEARCH METRICS FISCAL YEAR SUMMARY – PHSA OVERALL

Indicator		Key Measure Description	FY 2018-19	FY 2019-20	FY 2020-21
			Value	Value	Value
Producing & Advancing Knowledge	1a	Total Annual Grant Awards by Type (including Major CFI Infrastructure grants)	\$134,292,906	\$145,597,847	\$139,869,312
		Salary Awards	13,121,094	13,788,858	14,651,948
		Infrastructure Awards	6,260,726	7,011,184	4,717,341
		Operating Grants	112,180,392	119,979,796	117,160,310
		Other	2,730,693	4,818,009	3,335,713
		COVID-19 Research Funding (included in above categories)	NA	NA	\$9,538,864
	1b	Total Annual Grant Awards by RISE Sector (including Major CFI infrastructure grants)			
		Government	65,855,459	66,778,795	76,330,526
		Non-Profit	50,949,809	60,676,760	47,325,166
		Industry	17,487,637	18,142,292	16,209,620
1c	CIHR Annual Grant Application Success Rate - PHSA Overall/ Nat'l				
	Foundation Grant (Open)	0%/13%	N/A	N/A	
	Fall Project Grant	17.7%/14.9%	25.3%/15.7%	22.4%/19.0%	
	Sprint Project Grants	20.3%/15.6%	19.7%/16.9%	22.0%/20.3%	
1d	Total # of Publications w/ Program Author				
	BCCHR	858	1,060	1,117	
	BCCRI	655	744	776	
	WHRI	670	752	950	
	BCCDC	305	161	243	
	BCMHSUS	61	127	133	
Building Research Capacity	2a	Total # of Research Trainees	2,315	2,601	2,663
	2c	Total # of Researchers (excluding Category 3 – Affiliate Investigator)	785	827.5	952
	2e	Research Support Fund Grants (Tri-Council only)	\$4,049,673	\$4,063,179	\$4,102,759
	NA	Canada Research Continuity Emergency Fund (CRCEF) (for COVID-19 impacts)	NA	NA	\$8,658,231
Achieving Economic Benefits & Innovation	3a	# of Invention disclosures	48	32	40
		# of Provisional Patent applications filed	24	24	18
		# of PCT applications filed	6	9	7
		# of Patents Filed/Issued	12/17	11/21	20/21
	3b	# Active License Agreements	116	123	125
		# of Spin-off Companies	14	17	18
	IP related revenue – Realized Revenue				
	BCCRI	\$445,861	\$432,697	\$1,117,445	
	BCCHR	\$66,713	\$93,000	\$665,041	
Advancing Health & Policy Benefits	4a	Clinical Trials (including Non-PHSA PIs utilizing PHSA facilities and resources)			
		# active trials at the end of the FY	619	656	657
		Cumulative Subject Enrollment-end of FY	47,600	21,400	20,591
4b	Registries as Research Resources				
	# of Research Requests/Approvals	240/227	236/226	208/193	

PHSA AGGREGATE ANALYSIS

Producing and Advancing Knowledge

In FY 2020-21, researchers affiliated with PHSa were awarded a total of \$139,869,312, a decrease of 3.9% from FY 2019-20. Operating grants continue to make up the largest portion (83.8%) of total funding received. Operating grants support specific, time-limited research projects. While operating grants are the “bread and butter” of research grants, salary awards are important to provide researchers with the protected time to successfully compete for operating grants and represent 10% of total awards for the past five fiscal years. A breakdown of funding types and subtypes by fiscal year can be found in Figure 1. For FY 2020-21, the subtype of **Operating or Project Operating Grants** garnered the largest portion of research funding.

As part of the Government of Canada’s economic response plan to COVID-19, a temporary program was established in May of 2020 to help sustain the research enterprise at Canadian universities and health research institutions. The **Canada Research Continuity Emergency Fund (CRCEF)** was designed to help reduce negative impacts of the pandemic and ensure that the benefits of significant investments to date in universities and health research institutions were protected. PHSa research institutes received a total of \$8,658,231 in CRCEF funds and is not included in the figures below. See Table 1 for breakdown of COVID-19 Research and CRCEF funding by program (research funding is included in Figure 1 totals).

FIGURE 1 Total PHSa Research Funding by Funding Type and Sub-Type by Fiscal Year

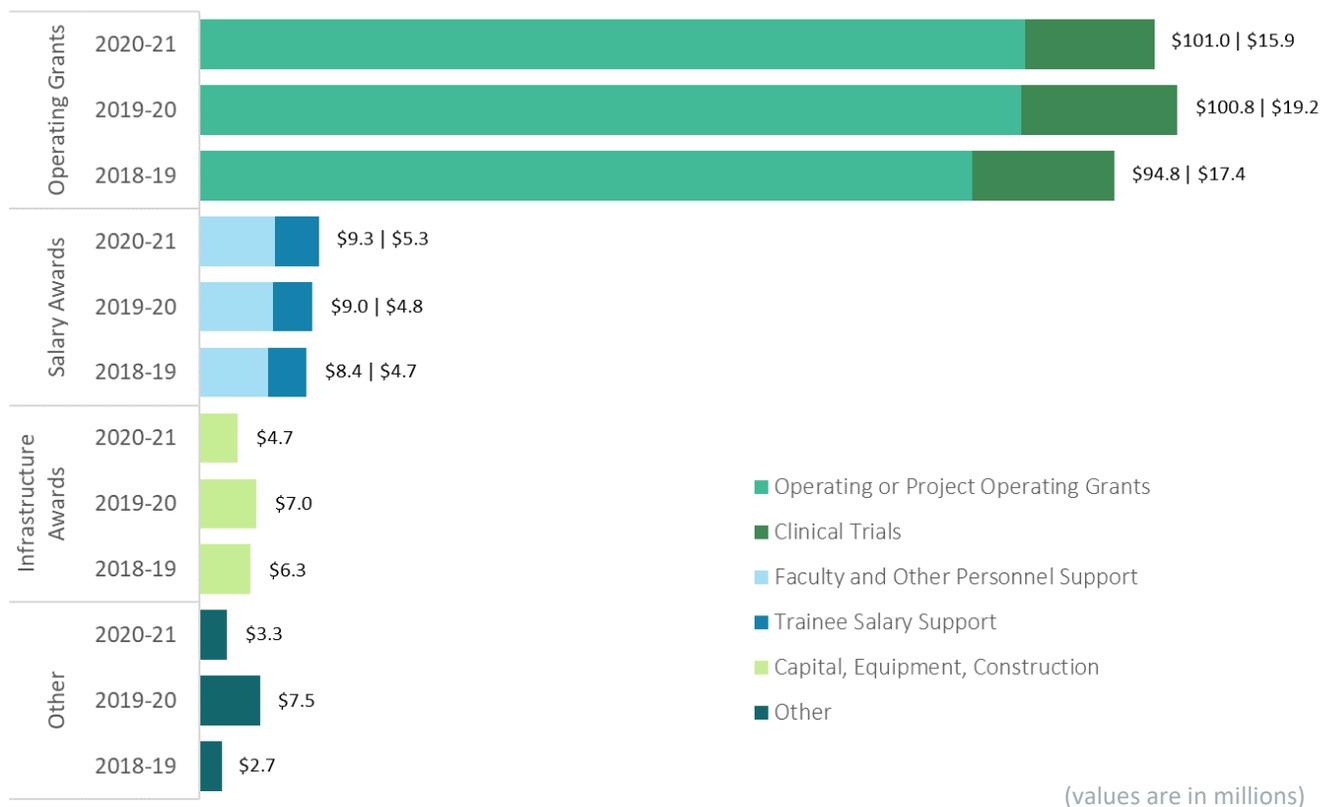


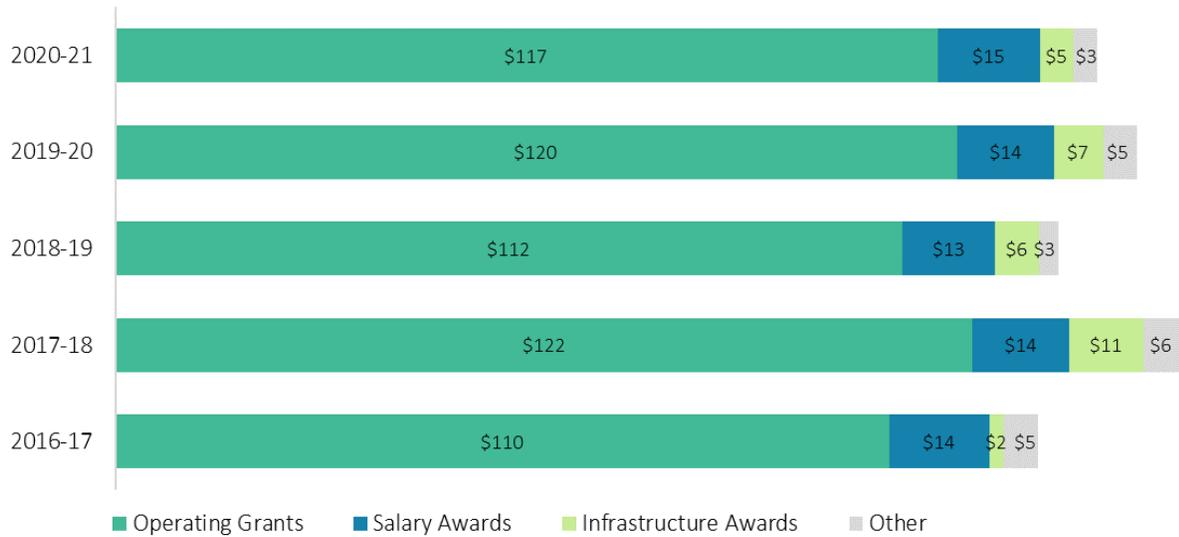
TABLE 1 COVID-19 Research and CRCEF Funding by Program – FY 2020-21

Program	CRCEF Funding	RESEARCH Funding	TOTAL
BCCRI	\$6,755,640	\$936,285	\$7,691,926
BCCHR	\$1,747,795	\$3,162,834	\$4,910,629
WHRI	\$154,795	\$850,367	\$1,005,162
BCCDC	0	\$4,556,951	\$4,556,951
BCMHSUS	0	\$32,367	\$32,367
TOTAL	\$8,658,231	\$9,538,864	\$18,197,095

Research Support Fund grants total \$4,102,759 and represent funding to support the indirect costs of research for tri-council awards but is not included in total research funding or the figures below. Because research support is a shared expense between UBC and PHSA research

programs, PHSA has negotiated to receive 66% of the applicable UBC Research Support grant. Figure 2 shows Total Research Funding by Fiscal Year and Type for the past five fiscal years.

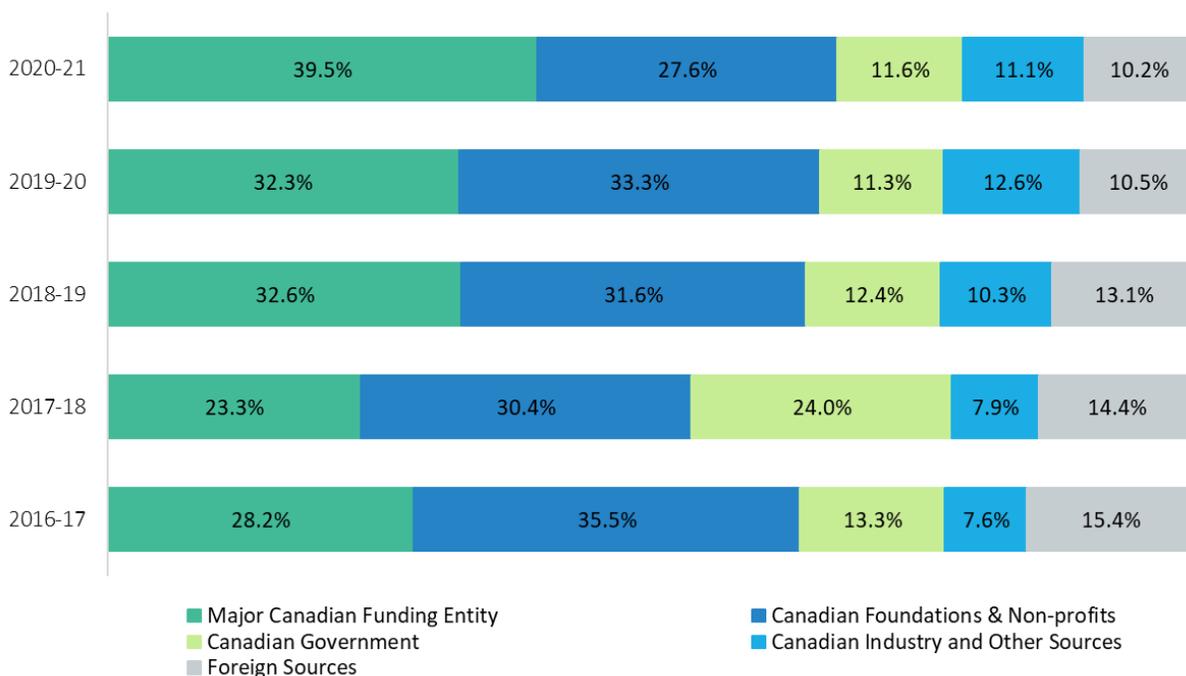
FIGURE 2 Total PHSA Research Funding by Fiscal Year and Type



A comparison of funding source by source category over five (5) fiscal years can be found in Figure 3. This figure, generated by compiling hundreds of potential sources into five categories, highlights the extent to which primary sources of funding vary from year to year. This year, Major Canadian Funding entities and Canadian Government sources represent 51.1% of the total funding, the largest

amount in the past 5 years. This can be attributed to increase CIHR funding for COVID-19 research which represents 73% of the year over year increase. The sharp decline in Canadian Foundations & Non-profits is also attributed to the impact of COVID-19. Canadian Industry and Other sources are increasing as Foreign sources continue to decline.

FIGURE 3 Percentage of PHSA Research Funding by Funding Source Category by Fiscal Year



In addition to the above, Figures 4 and 5 show the same award data by RISE sector (see Glossary – Appendix 1, pg. 63, for sector definition) both by fiscal year and by program for five fiscal years. The large increase in Government and

decrease in Non-profit funding in FY 2020-21 is attributed to the impact of COVID-19 research funding.

FIGURE 4 Percentage of PHSA Research Funding by RISE Sector and Fiscal Year

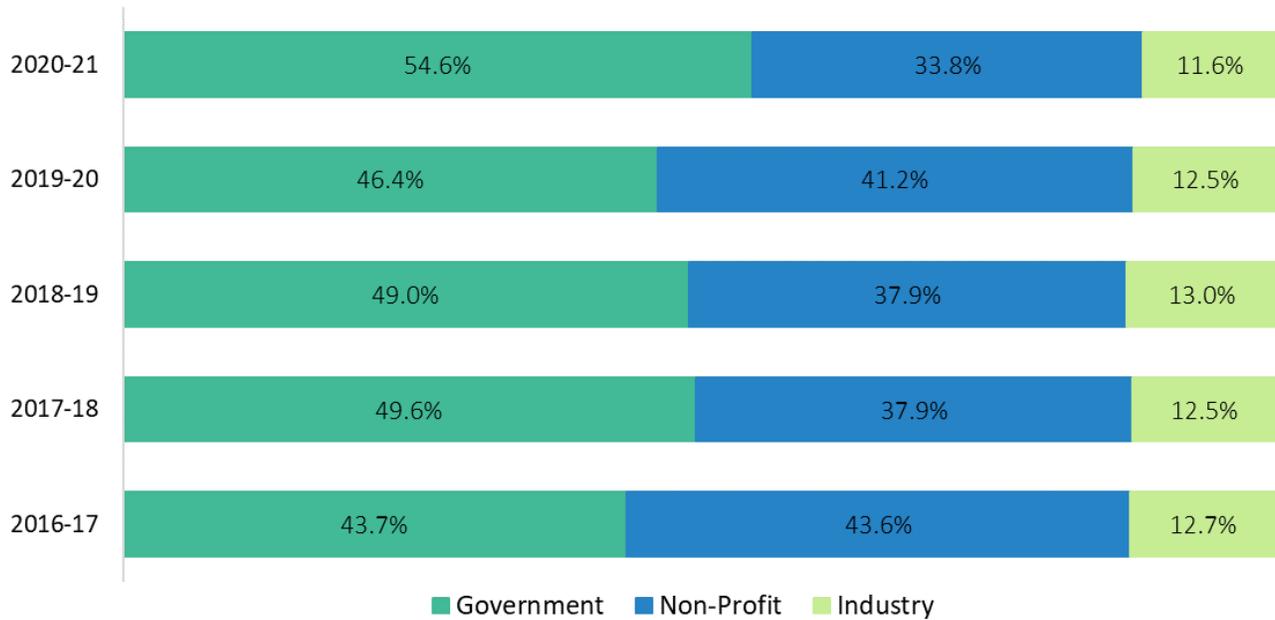
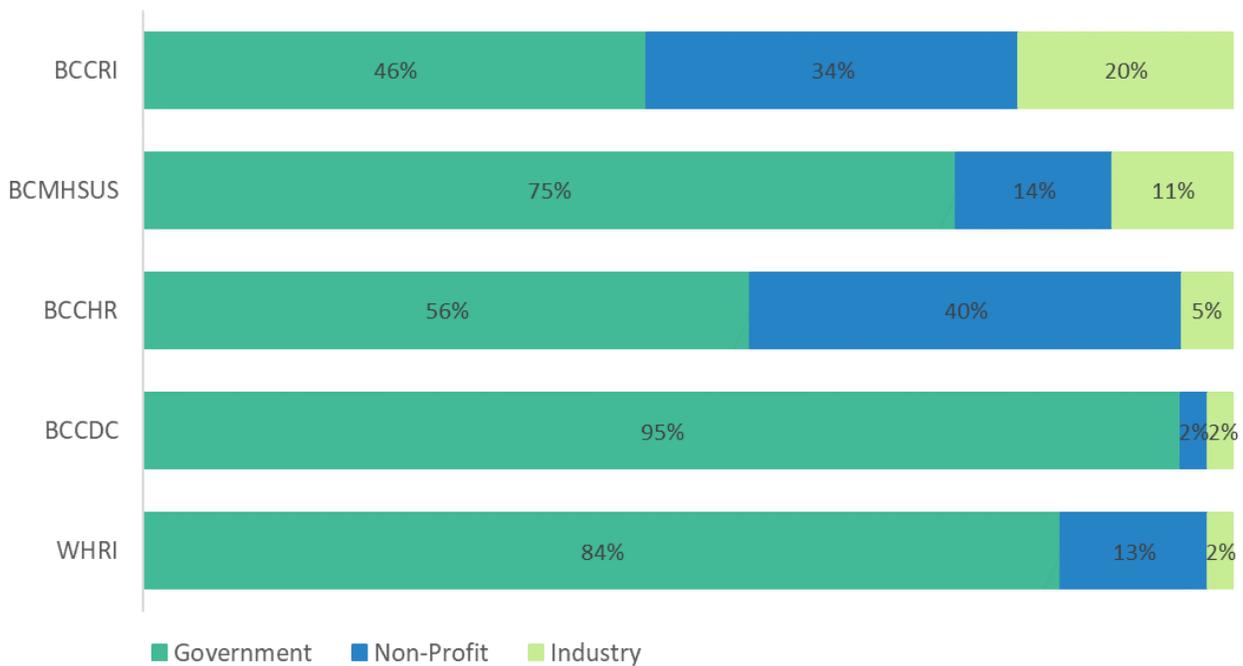


Figure 5 shows the percentage of funding by RISE sector and program for FY 2020-21. This graph reflects the variations in funding sources for all PHSA research entities, as BCMHSUS, BCCDC and WHRI rely heavily on government funding.

FIGURE 5 Percentage of PHSA Research Funding by RISE Sector and Program



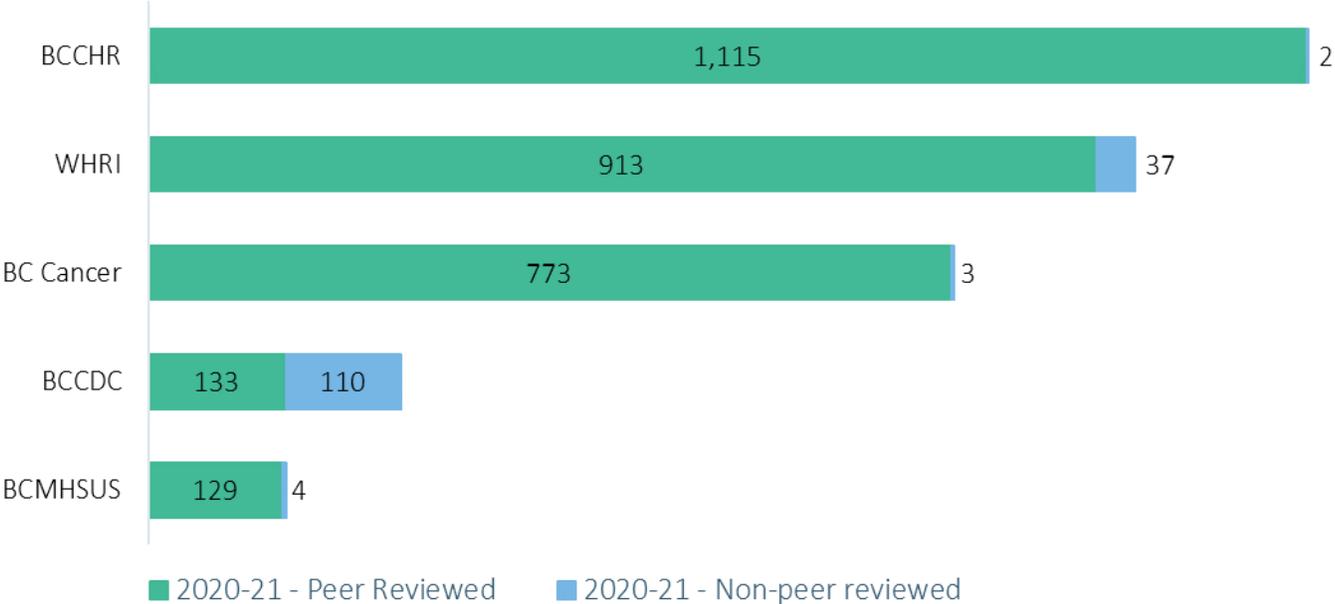
The application success rate is reported for the Fall 2020 and Spring 2021 CIHR project grant competitions. Results (see table 2) are shown for National and PHSA research entities combined. PHSA enjoyed success in both Project Grant programs and was above the national averages resulting in 38 awards.

TABLE 2 PHSA Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	PHSA Results % (Approved/Submitted)
2020-09 Project Grant	19.1% (451/2,358)	22.4% (17/76)
2021-03 Project Grant	20.4% (485/2,381)	23.1% (21/91)

Statistics for publications were collected utilizing SciVal with Scopus as the source. Publications were collected in the categories of books, book chapters, peer-reviewed publications inclusive of published journal articles, case reports, essays, literature reviews, and reports produced for government. See Figure 6 for a breakdown of total publications by program and category. Totals are reported by calendar year for all programs. A breakdown by types is shown in the program specific sections due to low sample size.

FIGURE 6 Total Number of Publications by Program and Category



Building Research Capacity

PHSA research entities identified 952 researchers in categories 1, 2, and 5 in FY 2020-21, up 125.5 from FY 2019-20 (see Figure 7). The increase is attributed to the growth in membership of WHRI and increases at both BCCDC and BCCRI. Category 3 researchers are defined as Affiliate Investigators and represent those researchers with a primary affiliation with a research or academic institution external to PHSA, but who wish to remain collaborators with PHSA researchers. PHSA does not track category 3 members funding, publications, or trainees. Details on affiliate members can be found in each program section. BCMHSUS, BCCHR and BCCRI are able to report their

researchers utilizing BCCHR defined categories, which highlight the amount of time protected for research purposes. BCCDC and WHRI define researchers utilizing a methodology that best reflects the type of work and relationships they have with their researchers. Further information on these methods can be found in specific program sections. An attempt to count each researcher only once was made by attributing each researcher to the entity where the bulk of salary and/or support are received. Category 1 researchers are best positioned to compete for external grants.

FIGURE 7 Total Number of PHSA Researchers by Category and FY

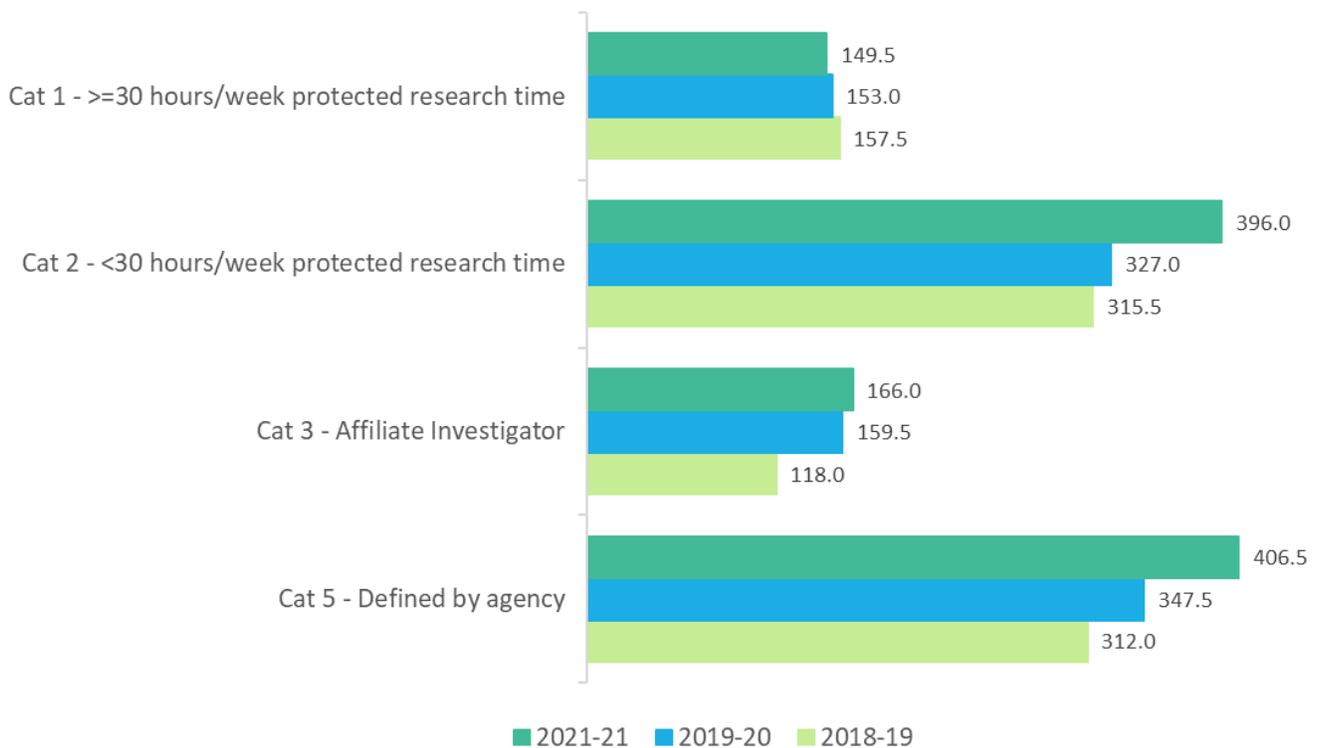


Table 3 provides summary statistics by program at the Principal Investigator (PI) level. PHSA received funding for 407 Principal Investigators collaborating with 1,582 UBC co-investigators for 1,303 unique studies in FY 2020-21. This

excludes Salary and Other award types as these are not designated for specific studies and the number of co-investigators from other academic institutions.

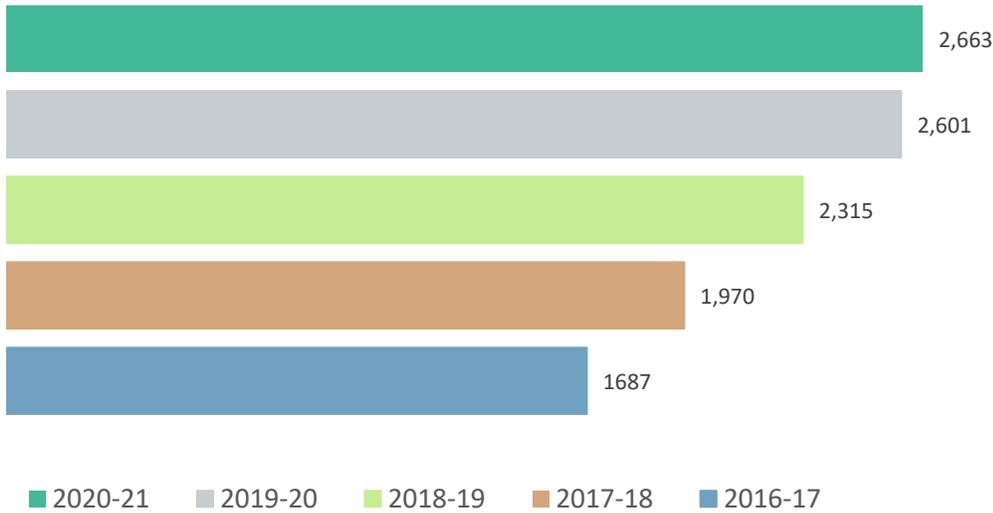
TABLE 3 Number of Funded Studies, PI's, UBC Co-PI's and Award Amount by Program

Program	# of Unique Studies	# of Unique PI's by Program	# of UBC Co-PI's by Program	Total Award Amount
BCCRI	574	161	620	\$66,350,738
BCCHR	606	181	662	\$51,116,856
WHRI	60	34	175	\$4,980,325
BCCDC	51	23	115	\$7,072,597
BCMHSUS	12	8	10	\$1,015,365
Grand Total	1,303	407	1,582	\$130,535,881

During FY 2020-21, PHSA researchers provided training and supervision to a total of 2,663 research trainees, an increase of 62 from FY 2019-20. This is a significant metric because the training of Post-doctoral fellows (PDFs), Doctoral, and Masters Trainees in particular is a major indicator of the degree to which PHSA and its research entities are supporting their academic mandate and

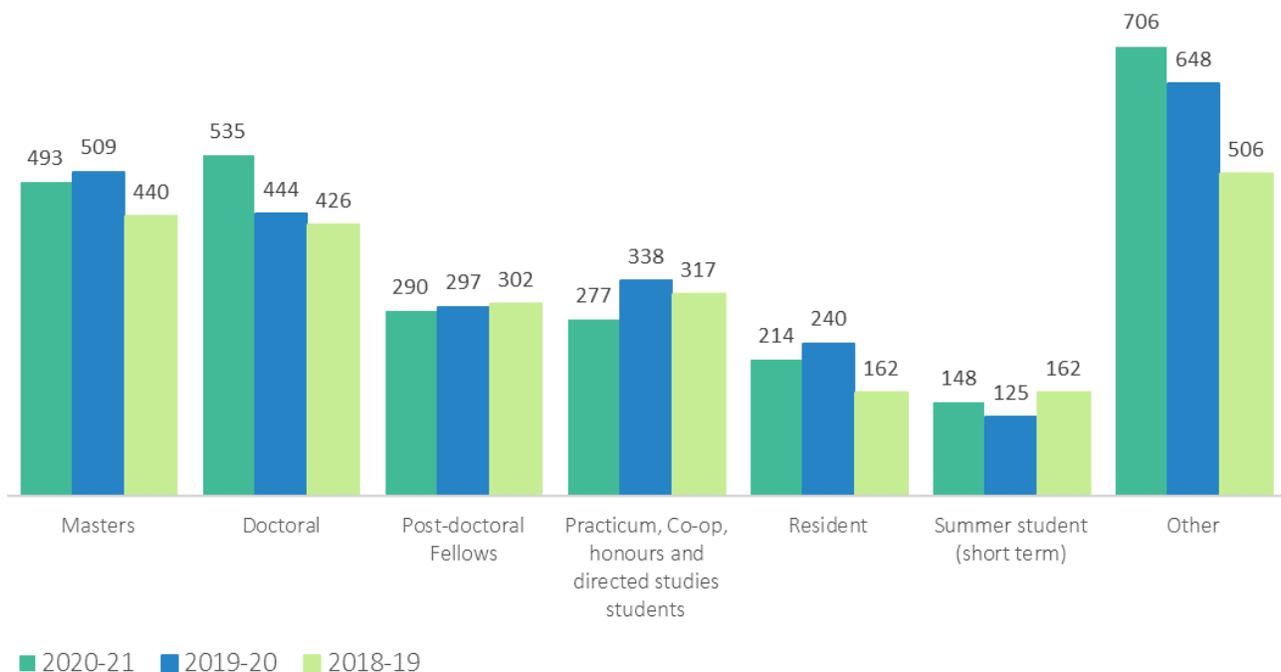
ensuring the next generation of highly qualified research personnel. In addition, Post-doctoral fellows and Doctorals contribute significantly to the conduct of research under the supervision of principal investigators. See Figure 8 and 9 for the number of trainees by type and fiscal year for PHSA overall.

FIGURE 8 Total Number of PHSA Trainees by Fiscal Year



The breakdown of trainees stayed relative the same for the past three years with the largest increase seen in the Doctoral category in FY 2020-21.

FIGURE 9 Total Number of PHSA Trainees by Type by Fiscal Year



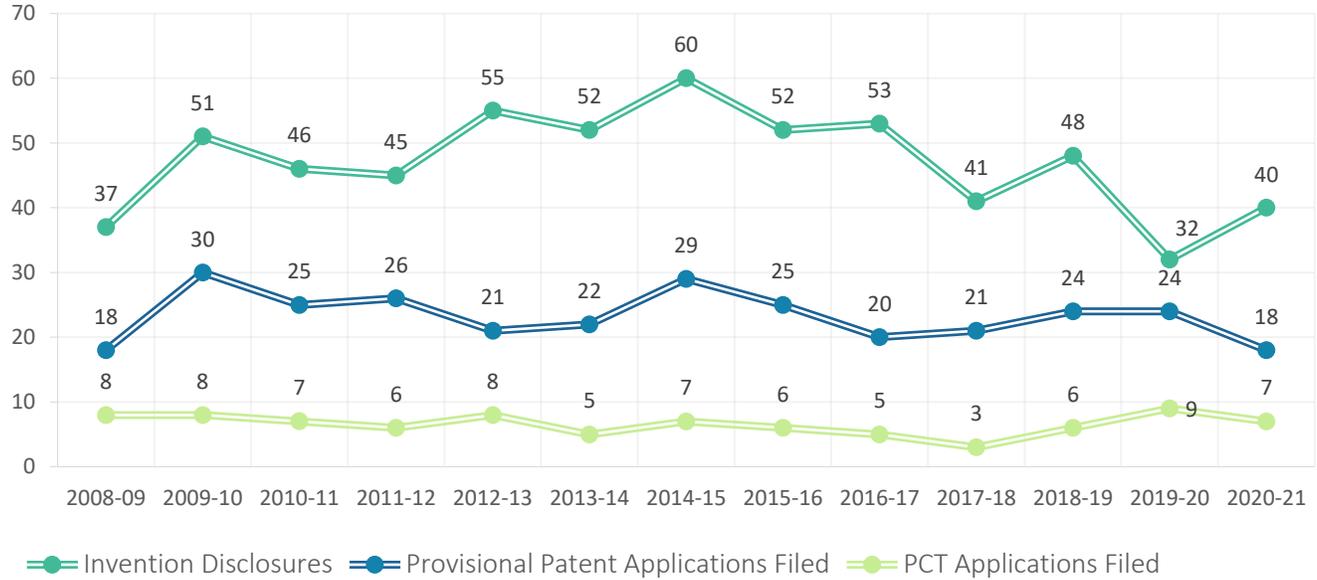
Achieving Economic Benefits and Innovation

The patent process, along with data on licensing and spin-off companies, is provided to measure the commercialization of discoveries, and other economic benefits resulting from these discoveries. Data are included for BCCRI and BCCDC (through the TDO), and BCCHR (through UILO). Program specific IP related revenue data is provided in program sections.

applications filed by fiscal year. Invention disclosures are primarily internal documents, filed with TDO to inform the decision of whether or not to proceed with the patent process. The next stage in the patent process is to file provisional patent applications followed by patent cooperative treaties, or PCTs, which act as a gateway to world-wide patents, each step involving greater specificity.

See Figure 10 for total number of invention disclosure, provisional patent and patent cooperative treaties (PCT)

FIGURE 10 Total # of Invention Disclosures, Provisional Patent and PCT Applications Filed by Fiscal Year



See Figure 11 for the number of national provisional patent applications filed and issued. Applications filed in a given

year represent different applications than those which are approved in that same year.

FIGURE 11 Total # of National Provisional Patent Applications Filed and Issued by Fiscal Year

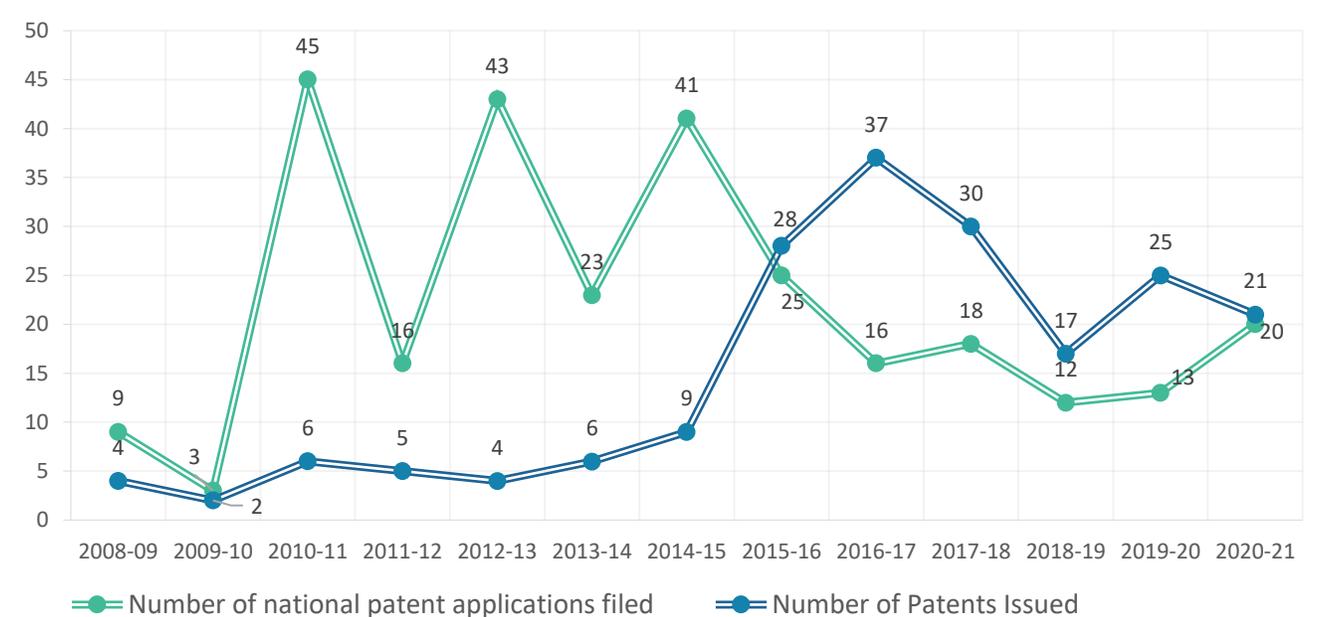
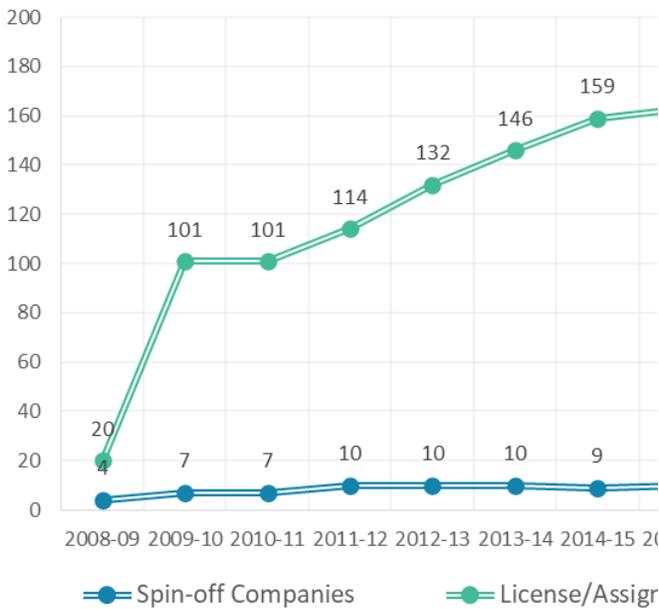


Figure 12 shows all licensing/assignment agreements and spin-off companies for PHSA Overall, combined for the past 13 years. Data is collected from PHSA's Technology Development Office (TDO) and through UBC's University-

Industry Liaison Office (UILO) which includes activities from BCCHR and BCMHSUS researchers. Program specific numbers can be found in the BCCRI and BCCHR program sections. One spin-off was created; Vita (BCCRI).

FIGURE 12 License/Assignment Agreements and Spin-Off Companies by Fiscal Year

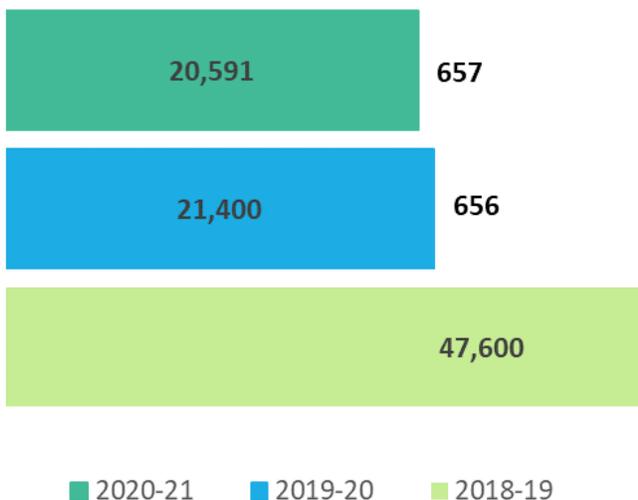


For FY 2020-21, the number of clinical trials stayed relatively the same. The impact of COVID-19 on Clinical Trials was significant for two locations at BCCRI: Surrey and Kelowna. See Figure 13 for number of Clinical Trials and Total Cumulative Subject Enrollment by Fiscal Year.

to participate in clinical evaluation of new drugs, many of which achieve therapeutic benefits beyond those offered by standard of care treatment. Clinical trials also represent the final step in the translational research continuum, which begins with basic or discovery research, includes development of products, and culminates with the testing of those products in rigorous trials

The opportunity to participate in clinical trials is an important metric because it offers patients the opportunity

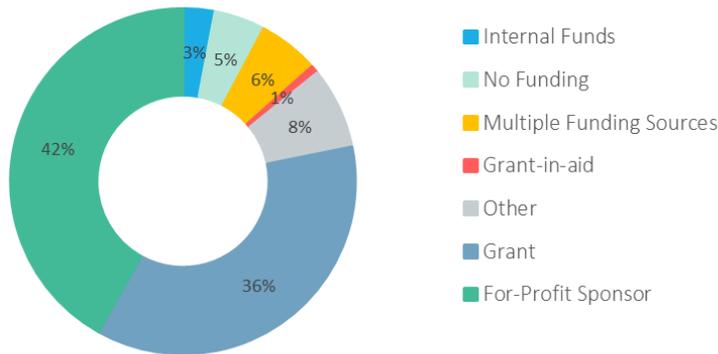
FIGURE 13 Total Cumulative Subject Enrollment and # of Clinical Trials by Fiscal Year



Grant funding type for Clinical Trials (CT) is sourced from the REB (Research Ethics Board) file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1, page 65 for a definition of funding types). The percentage of trials that are industry sponsored (For-Profit Sponsor) was 42% in FY 2020-21, the same as in FY 19-20.

See Figure 14 for a breakout of trials by funding type percentage and the details on the number of trials in each category. The Other category includes CTs with no funding type or with funding types that cannot be classified into one of the other categories.

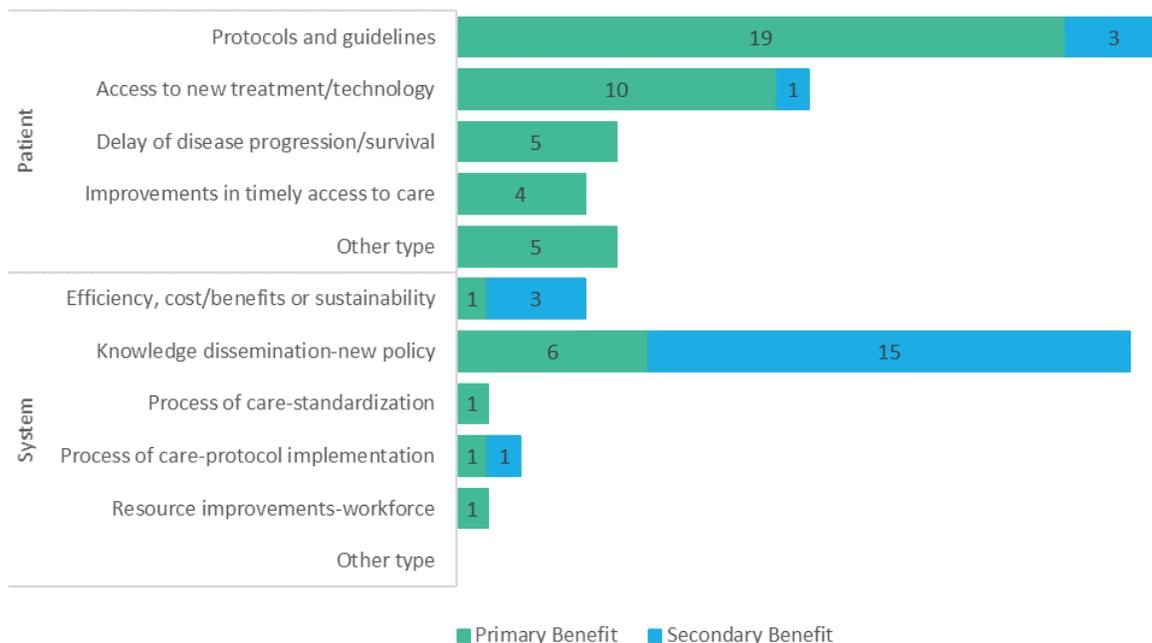
FIGURE 14 PHSA Percent of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY



In FY 2020-21, the programs completed the survey that asked respondents to identify guidelines, drugs, diagnostic agents or devices adopted or approved in FY 2020-21, and new this year, any new and adopted novel and transformational research designs or methodologies resulting from research driven by PHSA researchers or collaborative research in which PHSA researchers were key participants. Program specific outcomes can be found in the *PHSA Research and Student Education Metrics Consolidated Summary Report*. The survey was not intended to be exhaustive, but to capture the significant, top of mind advancements, and, further, asked

respondents to identify the benefits to patients, population health, and/or health system sustainability of those advancements. Figure 15 is a summary of the classification of benefits realized through research. These represent both primary and secondary benefits. The Other Patient benefits included Improved Pharmacotherapy and Changes (2) in Clinical Guidelines and Standard of Care (3). Given that many researchers participated in research related to COVID-19, we also asked them to identify if the outcome was related to COVID-19. Of the 53 outcomes reported, 28 (53%) were related to COVID-19.

FIGURE 15 Classification of Benefits Summary for All Programs



BC CANCER RESEARCH INSTITUTE (BCCRI)



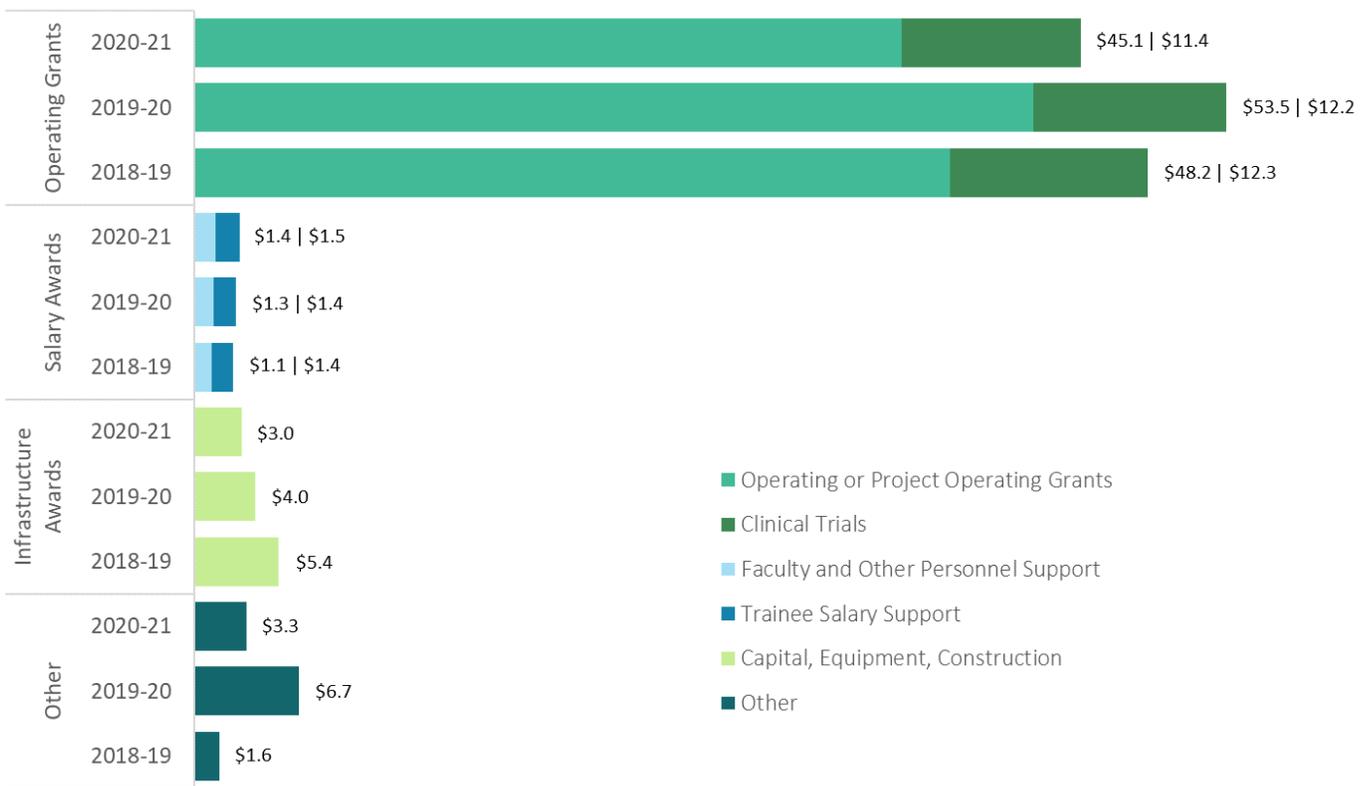
Producing and Advancing Knowledge

In FY 2020-21, researchers affiliated with BCCRI were awarded a total of \$65,824,217 in research funding which represents a 13.8% decrease over FY 19-20. Operating Grants (\$56,553,092) represent 85.9% of total awards. A breakdown of funding types and subtypes can be found in Figures 16.

funding or the figures below. BCCRI’s portion of the Canada Research Continuity Emergency Funds (CRCEF) totalled \$6,755,640. Total Covid-19 research funding was \$936,285 and is included in the figure 16. A breakdown of COVID-19 Funding Type is in the table below figure 16.

BCCRI’s portion of the Research Support Fund grant for FY 2020-21 is \$1,511,467 but is not included in total research

FIGURE 16 Total BCCRI Research Funding by Funding Type and Sub-type by Fiscal Year



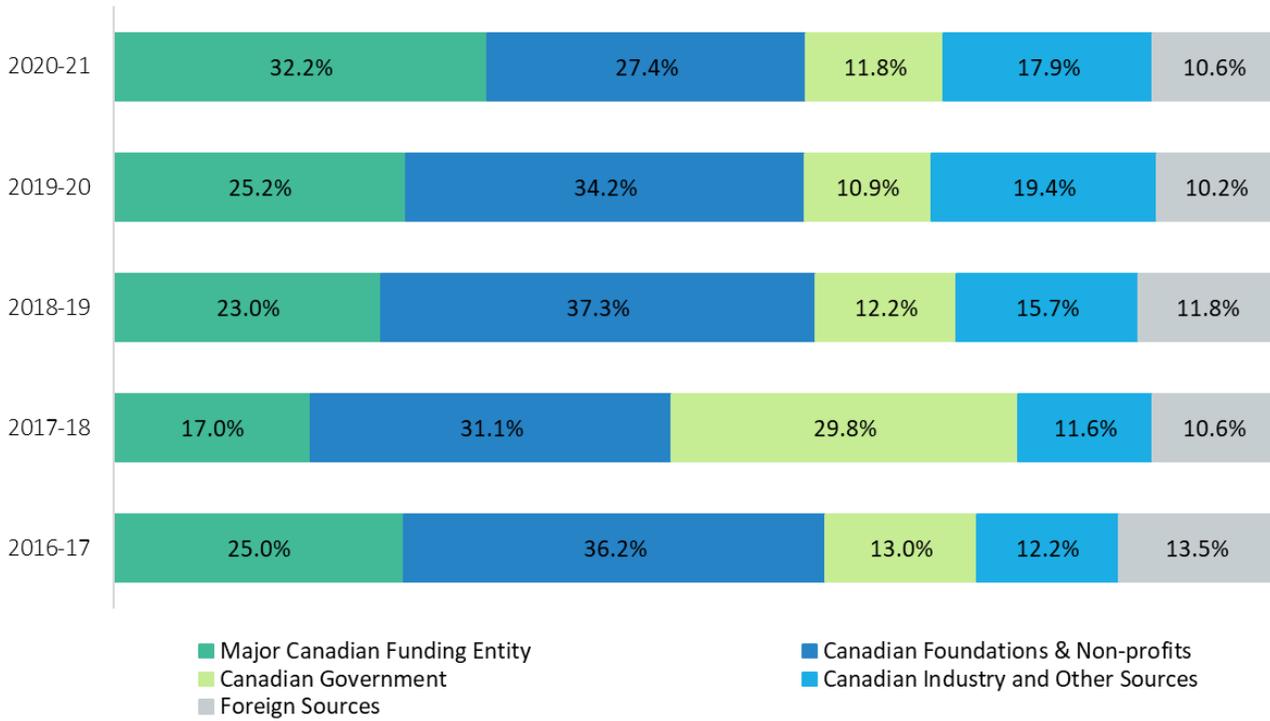
(values are in millions)

Funding Type	Operating Grants	Salary Award	Infrastructure Award	Total
BCCRI COVID-19 Research	\$543,547	\$15,000	\$377,738	\$936,285

Figure 17 shows the percentage of funding by funding source category for the past 5 fiscal years. The Major Canadian Funding Entity category includes CIHR and its Institutes, Genome Canada and the Provincial Genome Agencies, Michael Smith Foundation for Health Research (MSFHR), Natural Sciences & Engineering Research Council

(NSERC), and the Social Sciences & Humanities Research Council (SSHRC). While there has been fluctuation between categories, Canadian sources of funding have remained approximately 80% of total funding, each year. Canadian Government and the Major Canadian Funding Entities saw an increase due to COVID-19 funding.

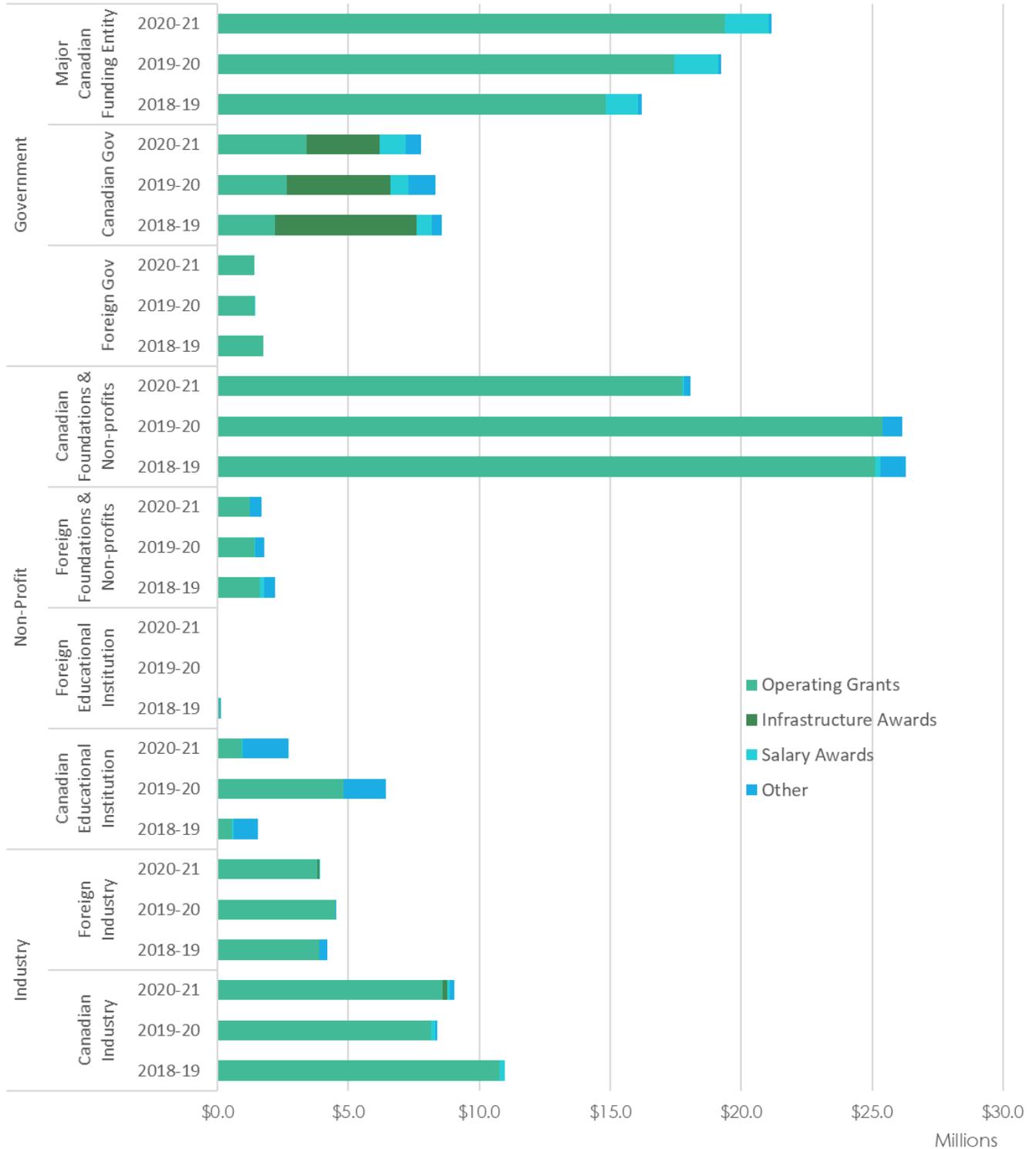
FIGURE 17 Percentage of BCCRI Research Funding by Funding Source Category by Fiscal Year



BCCRI's Total Award Funding is shown by RISE sector, Funding Source Category and Funding Type. In FY 2020-21, the top funding sources are, Major Canadian Funding Entities (32.2%), Canadian Foundations & Non-profits

(27.5%), and Canadian Industry (13.8%). Figure 18 details the funding categories by RISE sector, funding source category and funding type.

FIGURE 18 BCCRI Research Funding by RISE Sector, Funding Source Category and Type by Fiscal Year



The application success rate is reported for the Fall 2020 and Spring 2021 CIHR grant competitions. Results (see table

4) are shown for National and BCCRI. BCCRI was successful in the Project Grant competitions for a total of 9 awards.

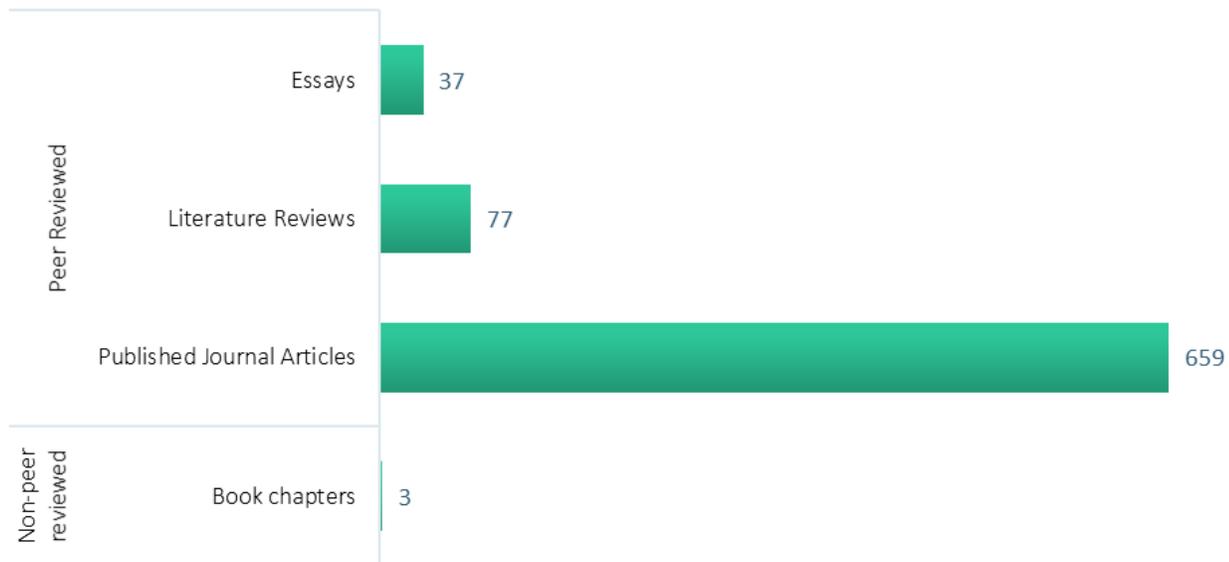
TABLE 4 BCCRI Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BCCRI Results % (Approved/Submitted)
2020-09 Project Grant	19.1% (451/2,358)	9.4% (3/32)
2021-03 Project Grant	20.4% (485/2,381)	16.2% (6/37)

Total number of publications by type and category of peer vs. non-peer review is seen in Figure 19. BCCRI had a total

of 776 publications, with a majority (659) of published journal articles.

FIGURE 19 Total Number of BCCRI Publications by Type and Category

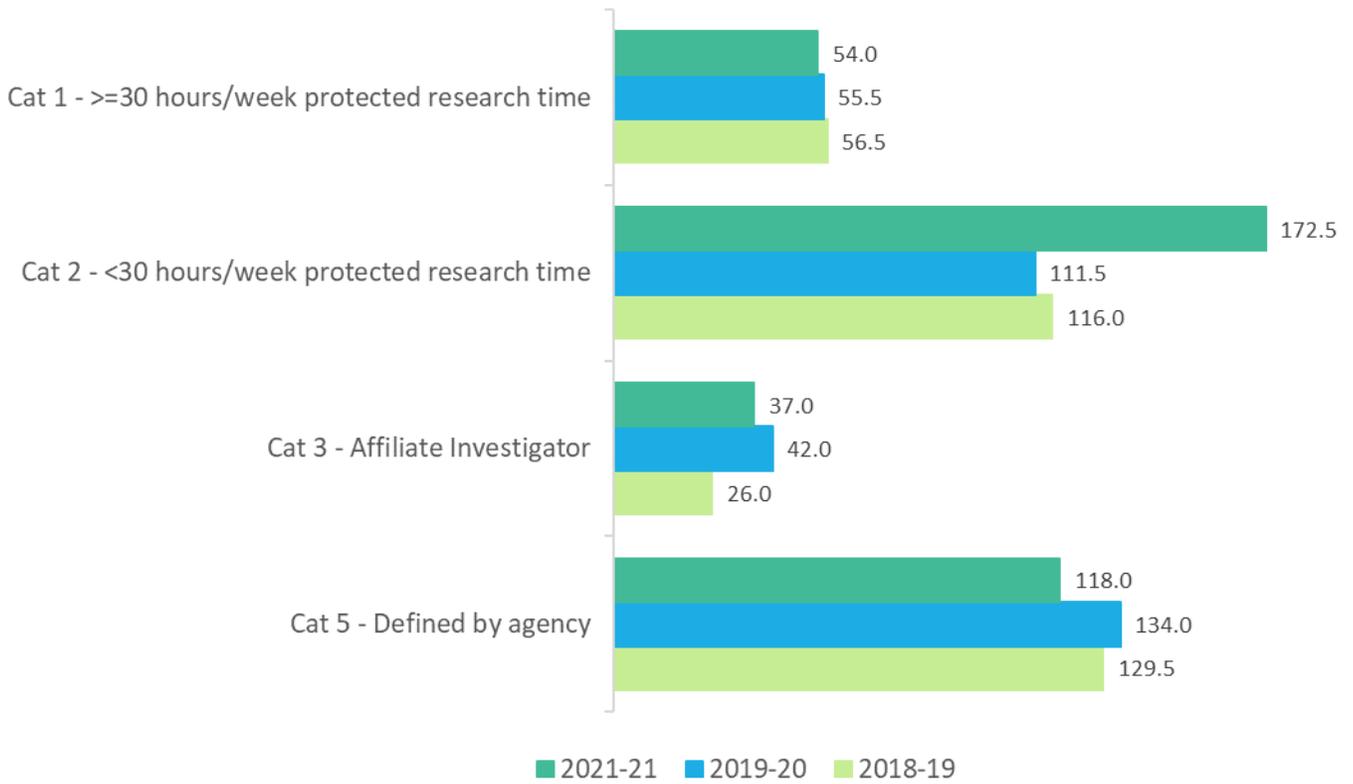


Building Research Capacity

BCCRI has a total of 344.5 researchers in FY 2020-21 in categories 1, 2, and 5, an increase of 43.5 over FY 2019-20. While adoption of the BCCHR category classifications is in place, a significant amount (118) of the total researchers are in Category 5, which is a program specific category used to describe researchers that do not meet BCCHR category classifications. For BCCRI, the majority of Category 5

researchers are Medical or Radiation Oncologists, Program or Practice Leaders, and Nurses. As in past year's reports, researchers whose funding is officially split 50/50 between research entities are classified as 0.5. See Figure 20 for the number of researchers by category.

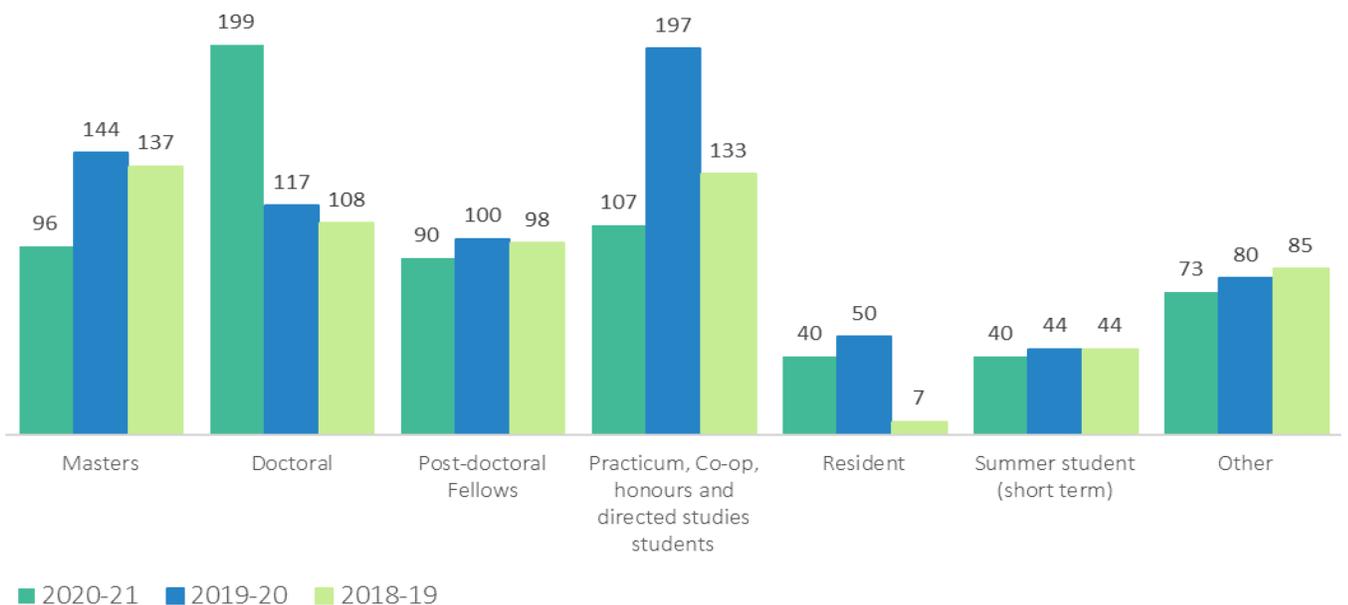
FIGURE 20 Total Number of BCCRI Researchers by Category and Fiscal Year



During FY 2020-21, BCCRI researchers provided training and supervision to a total of 612 trainees, a decrease of 120 from FY 19-20. See Figure 21 for the number of trainees by type. Factors influencing the number of trainees include but

are not limited to, operating grant success rates; whether trainees can obtain fellowships to secure their own funding, and how often trainee competitions are held and the envelope of funding.

FIGURE 21 Total Number of BCCRI Trainees by Type and Fiscal Year



Achieving Economic Benefits and Innovation

Patent Activity has remained relatively stable over the last five fiscal years (see Figure 22 & 23). Invention disclosures are primarily internal BCCRI documents, filed with the Technology Development Office (TDO) to inform the decision of whether to proceed with the patent process. The next stage in the patent process is to file provisional patent applications followed by patent cooperative treaties, or PCTs, which act as a gateway to world-wide patents.

National patent applications are then filed with each step involving greater specificity. Of the patents issued, 4 were licensed to Veracyte, 4 were licensed to Essa Pharma, 2 were licensed to ExCellThera, and 2 were licensed to Alpha-9 Theranostics. See Figure 23 for a breakdown by fiscal year.

FIGURE 22 BCCRI Invention Disclosures, Provisional Patent and PCT Applications by Fiscal Year

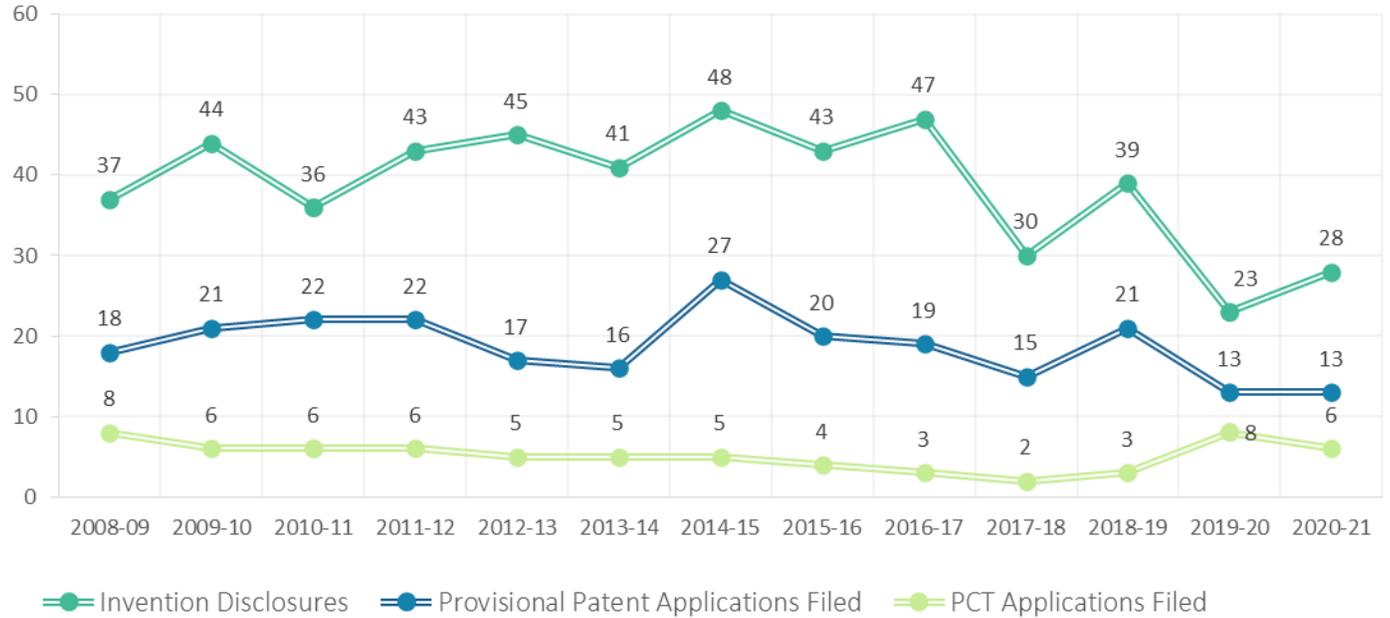
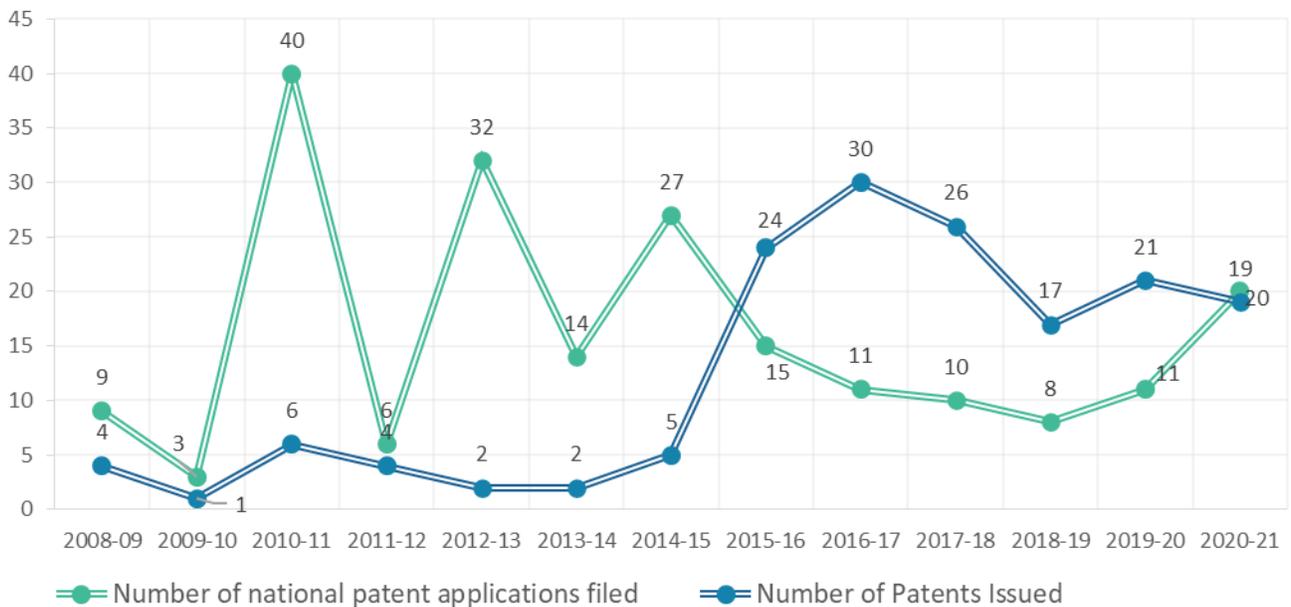


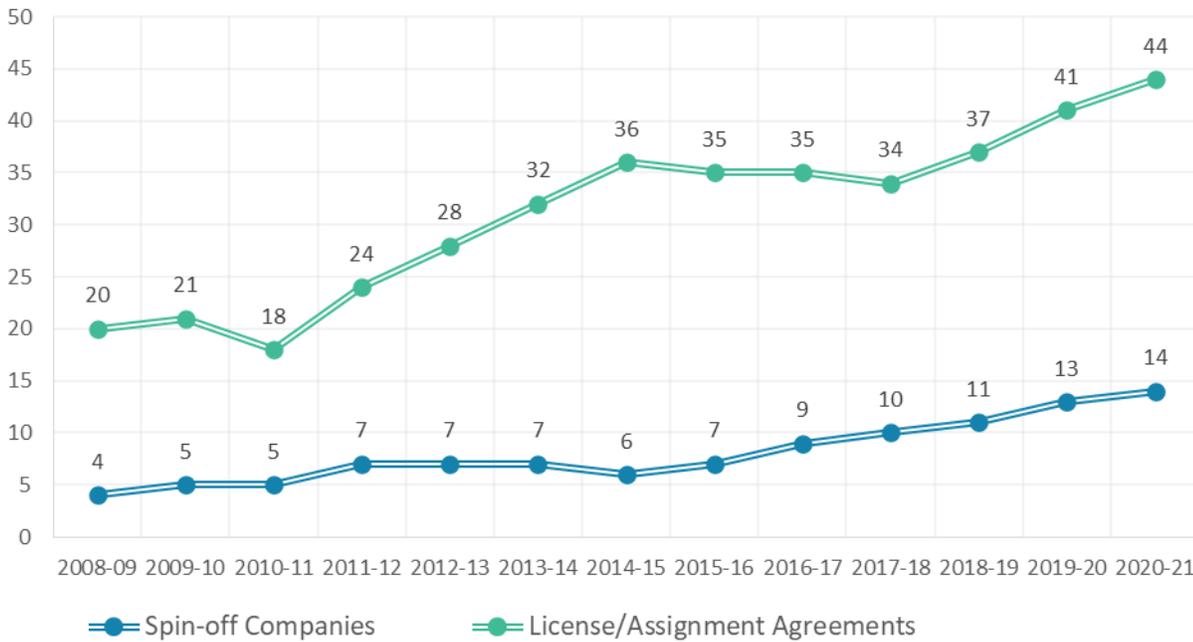
FIGURE 23 BCCRI National Patent Activity by Fiscal Year



In FY 2020-21, there were 44 active license agreements (see Figure 24), including five (5) new licenses/ assignment agreements. There was one (1) new spin-off company created, Vita: This is a new startup based out of California that uses technology created solely by BCCRI and PHSA. The product is a light/optics technology that can be used for non-invasive rapid diagnosis of skin lesions. The underlying technology uses Raman spectroscopy to provide a chemical

fingerprint of the suspicious lesion with the potential to use for other sites via endoscope such as GI. Vita is currently preparing to apply to the FDA for approval. Other active spin-off companies include Alpha9 Theranostics, Innovakine Therapeutics Inc., Aquinox Pharmaceuticals, Essa Pharmaceuticals, Repeat Diagnostics, Logipath Medical, Qing Bile Therapeutics, Metera Pharma, Fusion Genomics, ARTMS Products and CPI.

FIGURE 24 BCCRI License Agreements and Spin-Off Companies by Fiscal Year



IP related revenue, in accordance with UBC (University Industry Liaison Office UILO) definitions (see Glossary – Appendix 1, page 61) is reported in Table 5. Expenses related to patenting, license IP and legal costs totaled \$312,411.49 in FY 2020-21. Realized licensing revenue per the distribution agreements totals \$1,117,444.89 with

\$614,428 to PHSA and \$503,017 to BC Cancer departments. While distribution agreements vary, typically the inventor receives 50% of the net licensing revenue, with the remainder split between PHSA, BC Cancer departments, and UBC for those researchers with a UBC affiliation.

TABLE 5 TDO IP Related Revenue

IP RELATED REVENUE	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Royalties	\$765,483.79	\$410,845.30	\$637,718.79	\$729,984.18	\$1,701,269.06
Equity Liquidated	\$101,351.28	\$303,880.54	\$122,861.33	\$31,375.94	\$123,470.15
License Fees	\$149,840.95	\$113,517.95	\$251,513.80	\$302,783.22	\$956,452.72
License Management	\$237,120.85	\$154,190.87	\$112,066.91	\$134,207.37	\$217,182.20
Option Fees	0	0	0	0	0
GROSS LICENSING REVENUE (TOTAL)	\$1,253,796.85	\$982,434.66	1,127,160.83	\$1,198,350.71	\$2,998,374.13

Advancing Health and Policy Benefits

See Table 6 for a detailed breakdown of clinical trial activity by fiscal year. The percentage of BCCRI trials that had no enrollment figures was 20.5% in FY 2020-21.

TABLE 6 BCCRI Clinical Trials

Fiscal Year	15-16	16-17	17-18	18-19	19-20	20-21
Total Number of Clinical Trials active during the FY	303	321	309	337	370	362
Status of the Trial at the end of the FY:						
Total Number of Active Trials	249	265	257	277	290	290
Total Number of Trials that closed during the FY	54	56	52	60	90	72
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	41,598	44,305	43,064	47,366	48,768	22,566
Total Cumulative Subject enrolment at the end of the FY	29,244	30,084	34,573	34,341	8,344	6,982

Grant funding type is reported for Clinical Trials in figure 25. This information is sourced from the REB file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1, page 65 for a definition of

funding types). This information can be used to trend the percentage of trials that are industry sponsored. Fifty-seven percent (57%) of BCCRI Clinical Trials are Industry funded.

FIGURE 25 BCCRI Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY

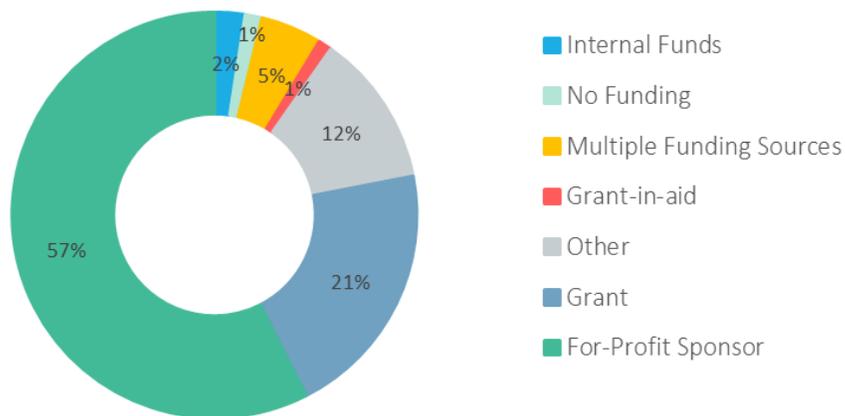


Table 7 reflects BCCRI's Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in

progress or historical, and be relevant to FY 2020-21 timeframe (April 1, 2020 - March 31, 2021).

TABLE 7 BCCRI Top Three Achievements/Accomplishments/Highlights

A FORMALIZED PARTNERSHIP AND A NEW NAME: ANNOUNCING THE BC CANCER RESEARCH INSTITUTE
<p>2020 was a formative year for the BC Cancer Research Institute (BCCRI). In March, BC Cancer Research formally became a research institute in partnership with the University of British Columbia (UBC) and the Provincial Health Services Authority (PHSA) – a move that enhances British Columbia’s leadership position in cancer research innovation. With a formalized partnership, the BC Cancer Research Institute (BCCRI) increases its strength as a hub for cancer research activity across the province, advancing cancer research discoveries and transformational technologies and treatments. The BCCRI is led by Dr. François Bénard, senior executive director, research, BC Cancer, and professor in the Department of Radiology and associate dean, research, UBC Faculty of Medicine. The move will also allow BCCRI to leverage existing resources and infrastructure to improve the health and wellbeing of British Columbians and beyond.</p> <p>The BCCRI has academic and research programs spanning across BC Cancer’s many provincial locations and across several UBC faculties and departments. With more than 800 trainees at any given time, the Institute attracts a vibrant student, medical resident, and postdoctoral fellow community. It is also home to enhanced postgraduate training programs in oncology and bioinformatics, helping equip scientists and health professionals with the tools they need to support patients and families affected by cancer.</p> <p>The BCCRI is also home to many leading research programs, from genomics at the Michael Smith Genome Sciences Centre, cancer, and stem cell biology at the Terry Fox Laboratory, to translational research, clinical trials, and population-level cancer control research. BCCRI continues to maintain strong academic relationships with Simon Fraser University, the University of Victoria, and the University of Northern British Columbia.</p>
LAUNCH OF THE FIRST LUNG SCREENING PROGRAM IN CANADA
<p>BCCRI researcher Stephen Lam and the province announced the first provincial lung screening program in Canada. The first-of-its-kind program comes from years of hard work and dedicated research by clinicians and researchers, spearheaded by Dr. Stephen Lam, distinguished scientist, Leon Judah Blackmore Chair in lung cancer research, and director of the MDS/Rix Early Lung Detection Program at BC Cancer. By detecting and treating lung cancer in its early stage, survival outcomes for those who are diagnosed can be significantly improved. Once fully implemented by 2022, approximately 20,000 people per year will be provided lung cancer screening; it is hoped that this screening will lead to 340 diagnoses each year with more than 75 per cent of those cases diagnosed at an early stage when more treatment options are available. Following an initial lung screen, clinicians can further personalize surveillance screening interval or necessity for referral to specialty centres for diagnosis based on lung cancer risk using a deep learning approach. Research in the effect of cumulative exposure to outdoor air pollution on lung cancer risk at the individual level in relation to sex and ethnicity/race and biomarkers research using blood or breath samples are promising approaches to identify high risk non-smokers and light smokers who would benefit from lung cancer screening and chemoprevention.</p>
NEW METHOD POISED TO IMPROVE DIAGNOSIS AND TREATMENT OF BLADDER CANCER
<p>BCCRI researchers Alexander Wyatt, Bernie Eigl and Kim Chi were part of a team that published a large study from over 100 patients of a blood-based minimally invasive ctDNA “liquid” biopsy method, comparing this new technique to patient-matched tumour tissue from invasive surgery for identifying tumour-specific mutations in bladder cancer. The researchers demonstrated the liquid biopsy is sufficient to detect key tumour mutation events in ctDNA (circulating tumour DNA, which is DNA from the tumour that circulates in the bloodstream free from cells), suggesting future clinical protocols may be able to use less invasive blood draws to diagnose and treat bladder cancer. Bladder cancer is the tenth most common cancer and the sixth most common in men, where incidence and mortality rates are higher. Adoption of this new ctDNA liquid-biopsy diagnostic strategy for bladder cancer will offer potentially drastic clinical improvements for diagnosis and patient stratification for treatment across the spectrum of aggressive bladder cancer. This cost-effective and minimally invasive method for diagnosis and treatment will greatly simplify diagnosis and would improve the ability of physicians to make treatment decisions in biomarker-driven clinical trials. This research paves the way for future clinical trials of ctDNA liquid-biopsy for diagnosis and real-world precision oncology for bladder cancer. The study was published in Nature Communications in January 2021.</p>

BC CHILDREN'S HOSPITAL RESEARCH INSTITUTE (BCCHR)

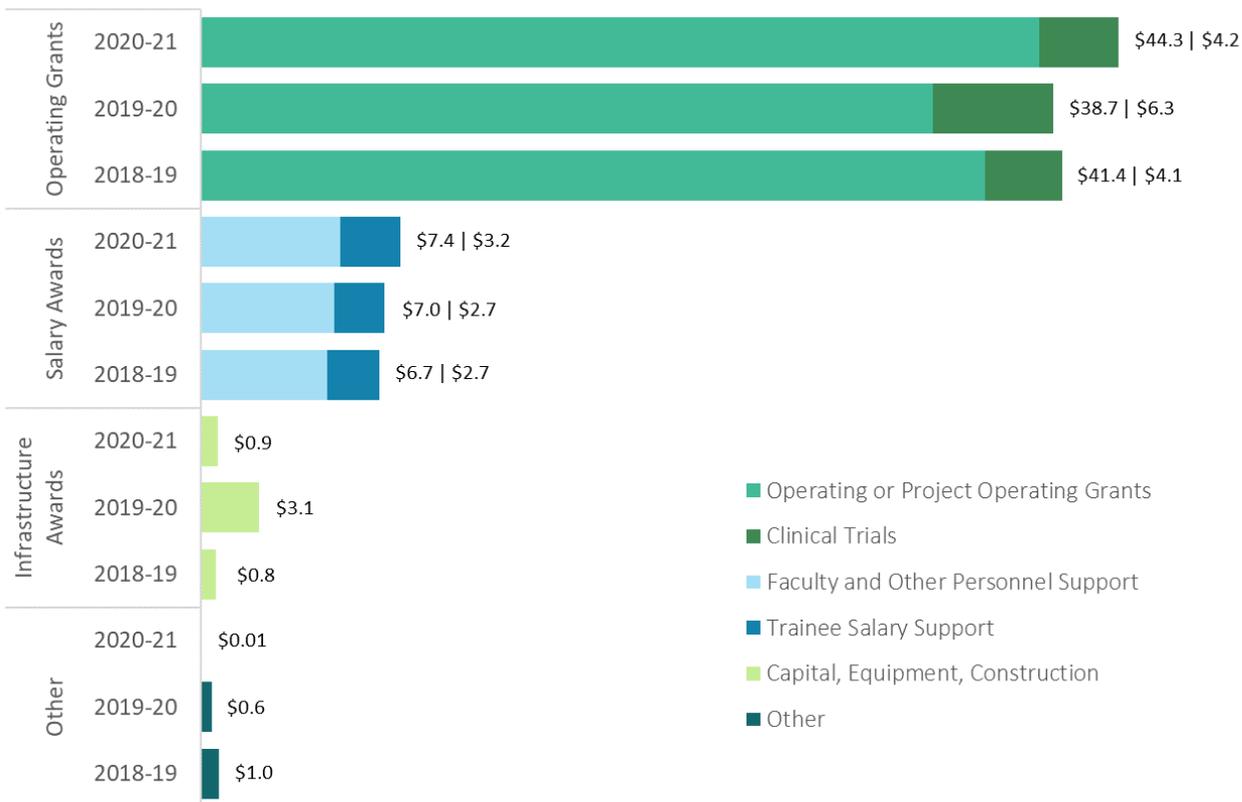


Producing and Advancing Knowledge

In FY 2020-21, researchers affiliated with BCCHR were awarded a total of \$61,687,120 in research funding, an increase of \$3,296,924 (15.3%) from last FY. The amounts awarded as Operating Grants (\$50,203,522) make up approximately 81% of total funding received. A breakdown of funding types and subtypes can be found in Figure 26. BCCHR's portion of the Research Support Fund Program

grant totaled \$2,111,052, for FY 2020-21 but is not included in total research funding or the figures below. BCCHR's portion of the Canada Research Continuity Emergency Funds (CRCEF) totalled \$1,747,795. Total Covid-19 research funding was \$3,162,864 and is included in the figure 26. A breakdown of COVID-19 Funding Type is in the table below Figure 26.

FIGURE 26 Total BCCHR Research Funding by Funding Type and Sub-type by Fiscal Year

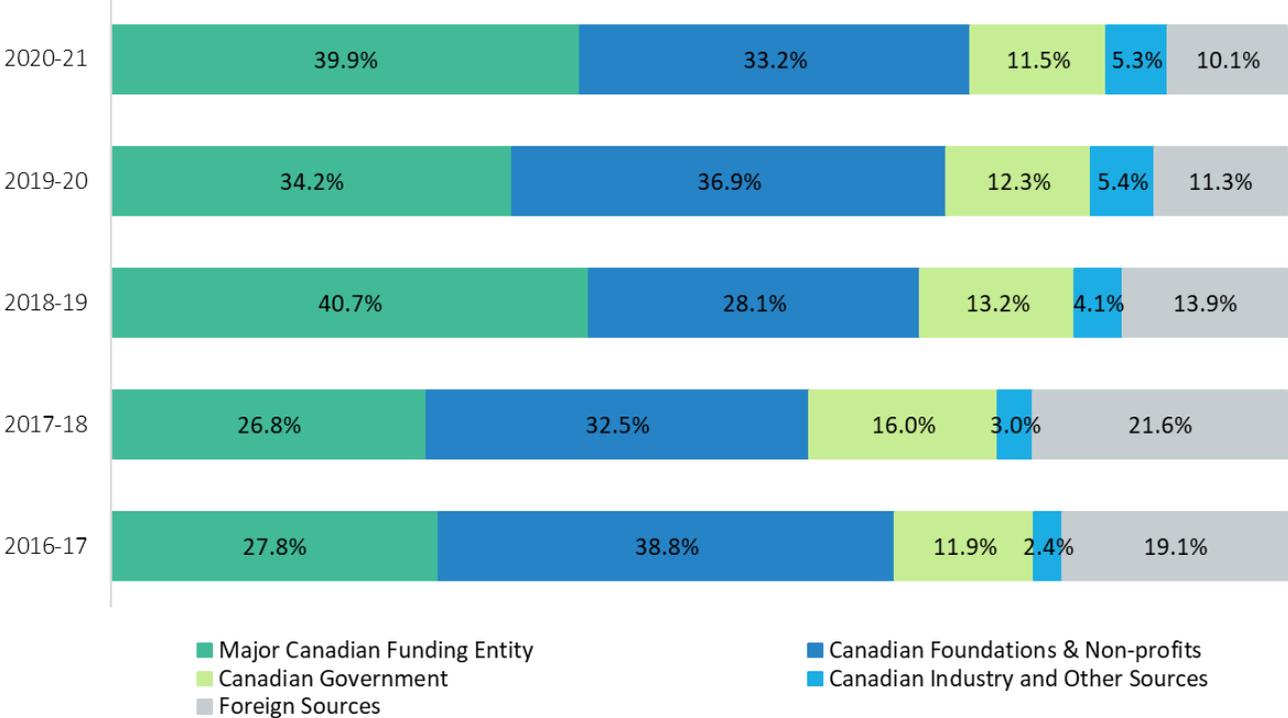


(values are in millions)

Funding Type	Operating Grants	Salary Award	Infrastructure Award	Total
BCCHR COVID-19 Research	\$3,062,834	\$10,000	\$90,000	\$3,162,834

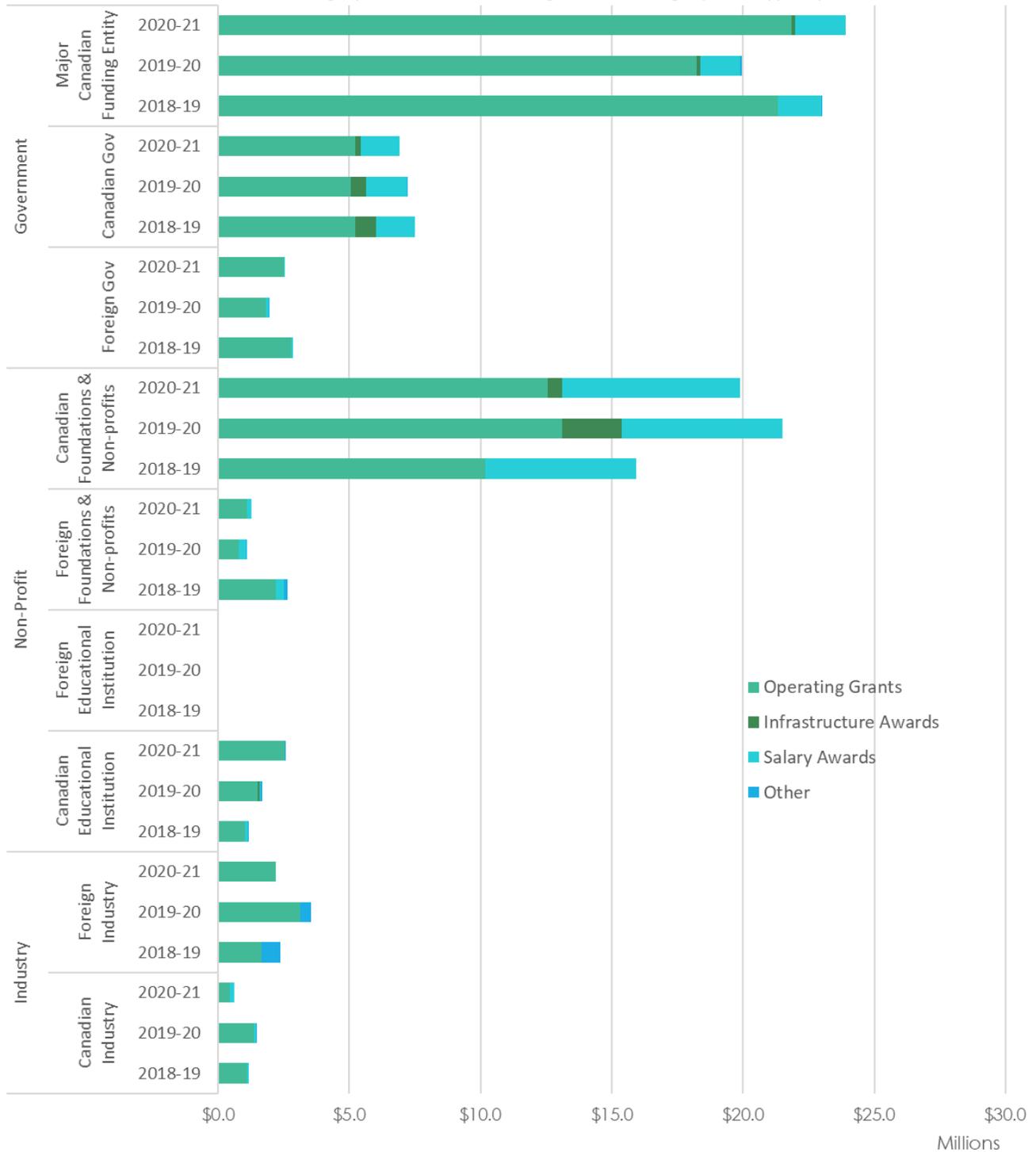
Figure 27 shows funding by funding source category. For FY 2020-21, funding categories remained fairly stable from the previous fiscal year, with an increase in Major Canadian Funding Entities due to COVID-19 funding.

FIGURE 27 Percentage of BCCHR Research Funding by Funding Source Category by Fiscal Year



The top three funding categories are Major Canadian Funding Entity (39.9%), Canadian Foundations & Non-Profits (33.2%), and Canadian Government (11.5%). Figure 28 details the funding categories by RISE sector, funding source category and funding type.

FIGURE 28 BCCHR Research Funding by RISE Sector, Funding Source Category and Type by Fiscal Year



The application success rate is reported for the Fall 2020 and Spring 2021 CIHR grant competitions. Results (see table 8) are shown for National and BCCHR. BCCHR was

successful in the Project Grant competitions for a total of 21.5 awards, beating the national average in both the Fall and Spring Project competitions.

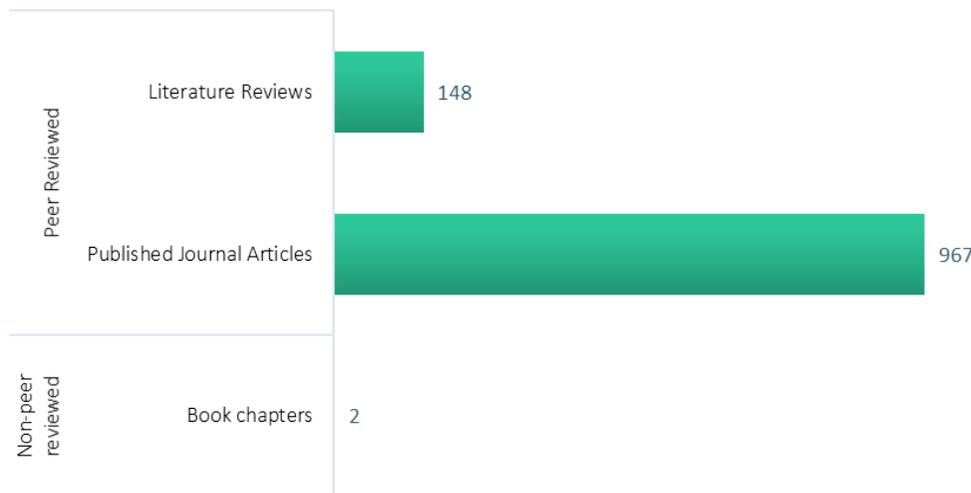
TABLE 8 BCCHR Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BCCHR Results % (Approved/Submitted)
2020-09 Project Grant	19.1% (451/2,358)	34.9% (11/31.5)
2021-03 Project Grant	20.4% (485/2,381)	28.8% (10.5/36.5)

BCCHR had 1,117 publications in calendar year 2020, with 99% of them being peer reviewed. Total number of publications by type and category of peer vs. non-peer reviewed, is seen in Figure 29. Peer review represents the gold standard for scientific credibility. The program total represents the number of publications where at least one

program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program. BCCHR includes case reports and essays in journal articles and accepts e-journal articles.

FIGURE 29 Total Number of BCCHR Publications by Type and Category



Three full fiscal years' worth of data is provided for the BCCHR four research specific social media channels in Table 9; Facebook (member since July 2011); Twitter (member since March 2009); Instagram (member since January 2018); and LinkedIn (member since 2015). Tracking and reporting of this data is a measure of knowledge translation in addition to meeting the following goals with regard to BCCHR research activities:

- To increase online visibility of and traffic to BCCHR website
- To have our audience complete a specific ask, such as sign up for our newsletter, request information about a study, donate to research
- To further disseminate the knowledge that's produced here to the public, to our own PIs and trainees, and to our colleagues at BCCHF, BCCH and PHSA
- To engage and connect internal audiences including researchers and students

These metrics are a measure of reach and engagement and provide an indication of the volume of activity. They also include data that shows activity after a program posts content. These would include conversation rate (# of comments your content generated); amplification rate (the # of times your content was shared) and applause rate (# of likes or favorite clicks per post).

In addition to the below activity, many BCCHR researchers maintain their own professional accounts to engage peers, funders, and patients, but this information is not tracked.

TABLE 9 BCCHR Social Media Statistics

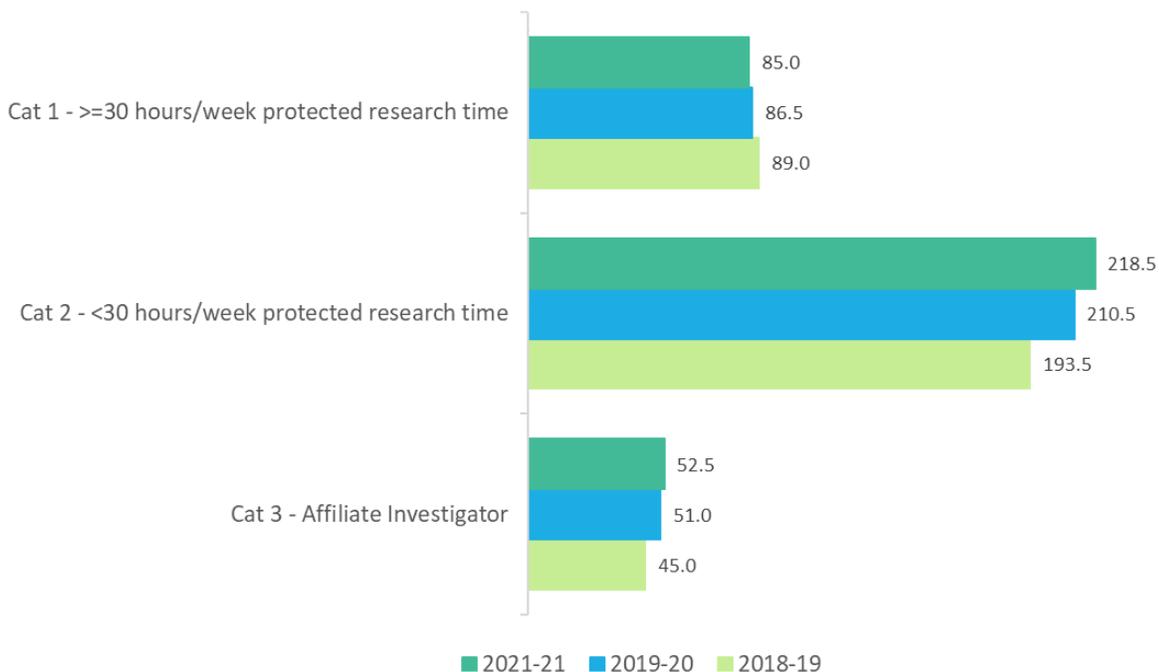
Social Media Channel		Followers			Activity Rate			
		# of Followers	# of New Followers	% change	# of likes	% change	# of shares	% change
Twitter	FY 2020-21	4,154	825	25%	3,871	-32%	1,069	-34%
	FY 2019-20	3,329	924	38%	5,676	+34%	1,619	+8%
	FY 2018-19	2,405	626	+35%	4,228	+36%	1,505	+3%
LinkedIn	FY 2020-21	3,372	557	68%	3,128	+21%	155	+80%
	FY 2019-20	2,011	705	+54%	2,586	+143%	86	21%
	FY 2018-19	1,306	389	+42%	1,063	+20%	71	+255%
Facebook	FY 2020-21	2,166	360	+68%	4,663	-39%	482	-43%
	FY 2019-20	1,806	581	+47%	7,641	+96%	850	+80%
	FY 2018-19	1,225	324	+36%	3,895	+17%	473	+64%
Instagram	FY 2020-21	2,507	889	+55%	11,139	+116%	NA	NA
	FY 2019-20	1,618	1,138	+237%	9,641	+525%	NA	NA
	FY 2018-19	480	151	+32%	1,543	+197%	58	+107%

Building Research Capacity

BCCHR has a total of 303.5 researchers in categories 1 and 2. The distribution of these researchers is represented in Figure 30. Researchers in categories 1 and 2 are primarily based on the Children’s & Women’s Health Centre of BC campus with the largest proportion of the members being split between Category 1 – those that have greater than 30 hours per week of their time protected for research and Category 2 – those that have less than 30 hours per week of protected research time. Category 3 members are affiliate investigators that are not based on site but who collaborate

with BCCHR members and are affiliated with a research theme. Their primary affiliation will be with another academic and/or research institution. The purpose of this category is to provide official recognition for these individuals who collaborate with BCCHR members on a regular basis. The BCCHR does not track category 3 members funding, publications, or trainees. These numbers exclude Emeritus/Emerita Investigators who have prior status as investigators with BCCHR.

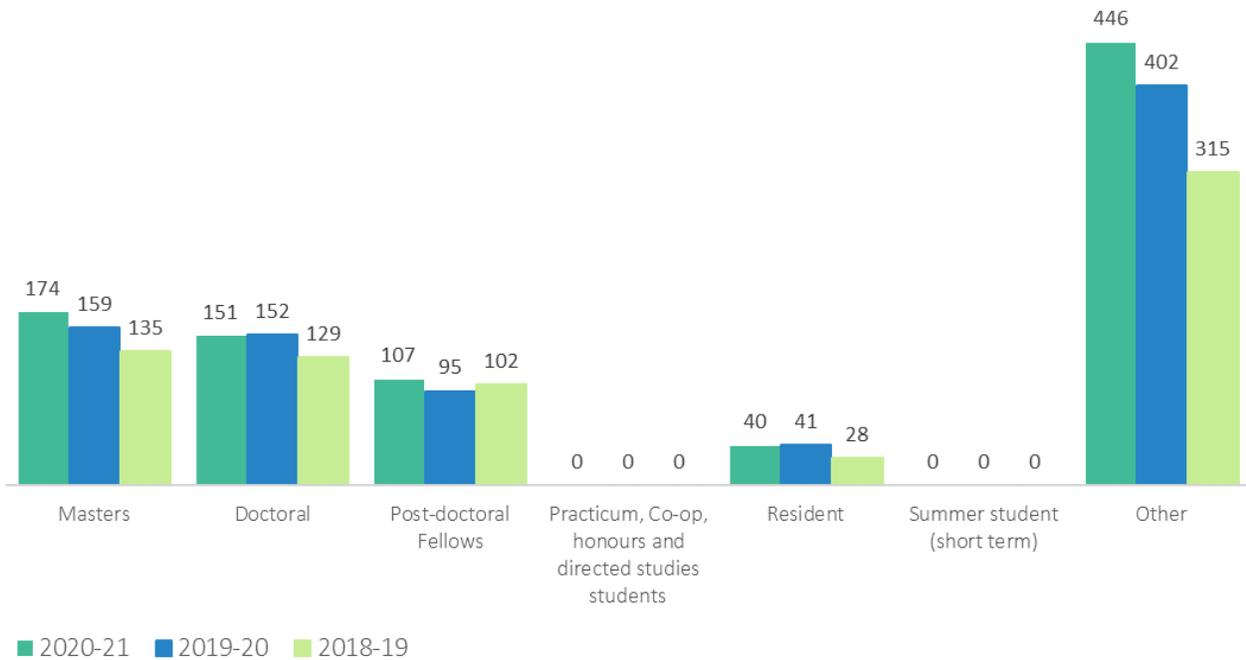
FIGURE 30 Total Number of BCCHR Researchers by Category



During FY 2020-21, BCCHR researchers provided training and supervision to a total of 709 (down 140 from FY 2019-20) trainees. The Other category is large due to the tracking of Practicum, Co-op, honours and directed studies students in addition to summer students in one combined

category, without the ability to differentiate type. See Figure 31 for number of trainees by type. BCCHR currently tracks full-time research trainees (masters, doctoral and postdoctoral fellows) and undergraduate students undertaking their training at BCCHR.

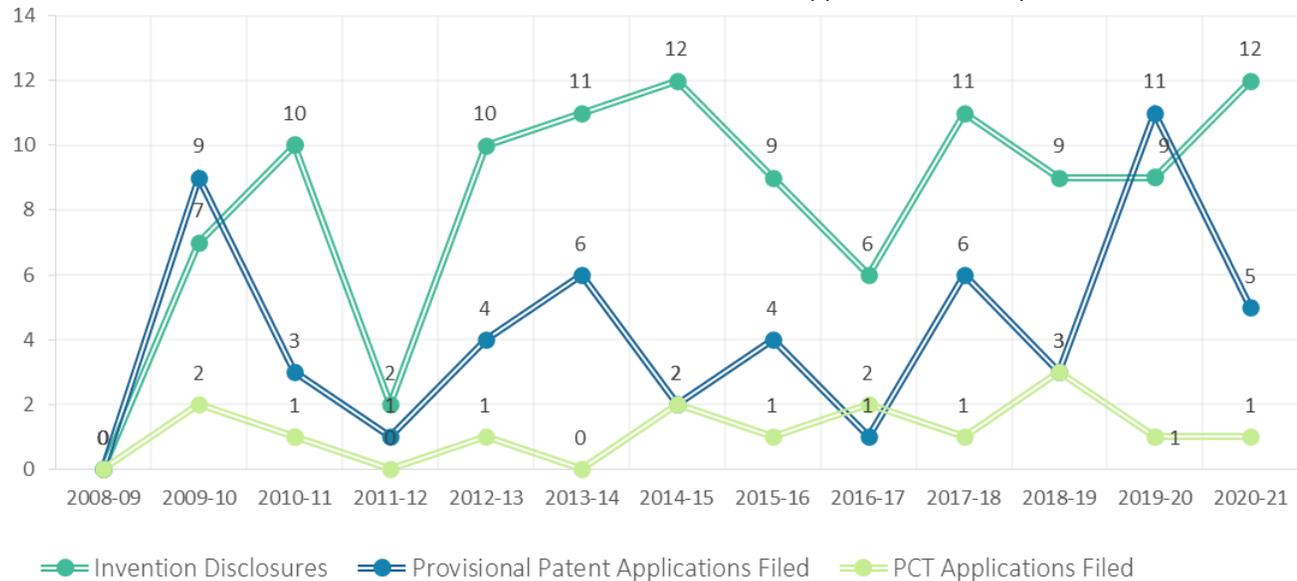
FIGURE 31 Total Number of BCCHR Trainees by Type



Achieving Economic Benefits of Innovation

The number of invention disclosures, provisional patent and PCT applications filed by fiscal year are shown in Figure 32

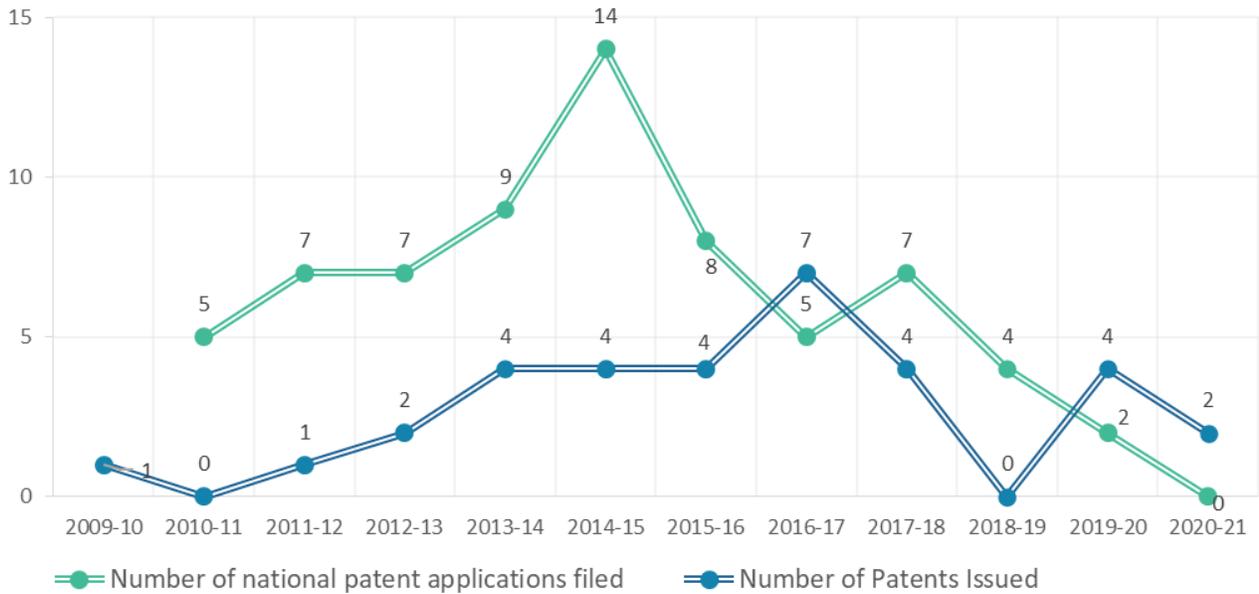
FIGURE 32 BCCHR Invention Disclosures, Provisional Patent and PCT Applications Filed by Fiscal Year



Patents are reported in Figure 33 below. Applications filed in a given year represent different applications than those which are approved in that same year (which typically are the result of applications in previous years).

Data is collected and reported by the University of British Columbia University-Industry Liaison Office (UILO).

FIGURE 33 BCCHR National Patent Activity by Fiscal Year



In FY 2020-21 there were 81 active license/assignment agreements in place (See Figure 34), ten (10) new. No new spin-off companies were created in FY 2020-21. BCCHR holds shares in: Incisive Genetics, Lions Gate Technologies,

ME Therapeutics, and Xenon Pharmaceuticals (private) which is held in trust by UBC.

FIGURE 34 BCCHR License/Assignment Agreements and Spin-off Companies by Fiscal Year



IP related line-item revenue data for FY 2020-21 is shown below. Expenses related to patenting, license IP and legal costs totaled \$62,383 in FY 2020-21.

TABLE 10 BCCHR IP Related Revenue

IP RELATED REVENUE	FY 2016-17	FY 2017-18	FY 2018-19	FY 19-20	FY 20-21
Royalties	\$258,100	NA	\$313,462.10	\$635,065.03	\$727,424.30
Equity Liquidated					
License Fees			\$50,000.00		
License Management	\$36,600	NA			
Option Fees					
GROSS LICENSING REVENUE (TOTAL)	\$225,800	NA	\$363,452.79	\$635,065.03	\$727,424.30

Advancing Health and Policy Benefits

See Table 11 for a detailed breakdown of clinical trial activity by fiscal year. The percentage of BCCHR trials that had no enrollment figures (16.5%) declined 2.5% in FY 2020-21.

TABLE 11 BCCHR Clinical Trials

Fiscal Year	15-16	16-17	17-18	18-19	19-20	20-21
Total Number of Clinical Trials active during the FY	180	198	195	212	200	228
Status of the Trial at the end of the FY:						
Total Number of Active Trials	152	154	153	175	153	188
Total Number of Trials that closed during the FY	28	44	42	37	47	40
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	103,936	106,212	102,916	108,147	104,957	110,337
Total Cumulative Subject enrolment at the end of the FY	26,846	57,789	108,720	6,564	5,632	8,855

Grant funding type is reported for Clinical Trials in Figure 35. This information is sourced from the REB (Research Ethics Board) file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1,

page 65 for a definition of funding types). Fifty-six percent (56%) of BCCHR’s Clinical Trials are Grant funded, with 24% Industry funded.

FIGURE 35 BCCHR Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY

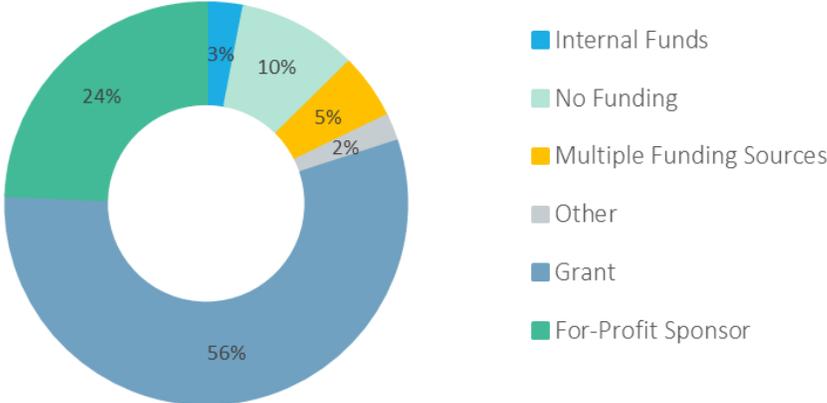


Table 12 reflects BCCHR’s Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical, and be relevant to FY 2020-21 timeframe (April 1, 2020 - March 31, 2021).

TABLE 12 BCCHR Top Three Achievements/Accomplishments/Highlights

BC CHILDREN’S HOSPITAL RESEARCHERS DEVELOP LESS INVASIVE AND MORE COMFORTABLE COVID-19 TEST
<p>BC Children’s Hospital investigators, in collaboration with BC Centre for Disease Control colleagues, led research efforts that culminated in a new COVID-19 test that involves less invasive saline gargle samples rather than nasopharyngeal swabs. This new mouth rinse and gargle sample collection method for COVID-19 testing was officially announced on Sept. 17, 2020 and provides an alternative for children in B.C. to the traditional swab test of the upper part of the throat behind the nose, which many find uncomfortable.</p>
NEW STUDY HELPS IMPROVE BESPOKE IMMUNE CELLS’ ABILITY TO PREVENT TRANSPLANT REJECTION IN PATIENTS WITH DONATED TISSUE
<p>When sick children require an organ transplant, they usually also need immunosuppressive drugs to keep their immune system from attacking the donated cells or tissues. Unfortunately, these medications can leave patients more vulnerable to subsequent infections or other diseases. BC Children’s Hospital research further refined a new approach to preventing transplant rejection by using genetically engineered versions of specialized immune cells called T regulatory cells (T regs). These modified cells can dampen down the immune system should it mount a response to transplanted tissues. This study systematically investigated several potential ways to manipulate these T regs to ensure the development of the best possible therapy for these patients.</p>
BC CHILDREN’S HOSPITAL RESEARCHERS IMPROVE ACCURACY OF EPILEPSY DIAGNOSIS AND TREATMENT
<p>Different types of pediatric epilepsy are diagnosed based on age of onset, seizure triggers, time of day when seizures occur, and brain scan results. Self-limited epilepsies tend to respond well to seizure medication and eventually subside by a certain age. Non-self-limited epilepsies, on the other hand, are lifelong conditions that may worsen over time. It’s not always clear which type of epilepsy a child has. BC Children’s researchers looked at 26 years of data from pediatric epilepsy patients that helped them identify clinical and brain imaging features that show up in certain types of epilepsy. They found that the presence of a specific EEG characteristic and eye movements during a seizure are together predictive of self-limited epilepsy. This information can aid clinicians in providing patients and their families with more accurate details regarding epilepsy type, as well as treatment strategies tailored to the individual.</p>

BC MENTAL HEALTH & SUBSTANCE USE SERVICES RESEARCH INSTITUTE (BCMHSUS)



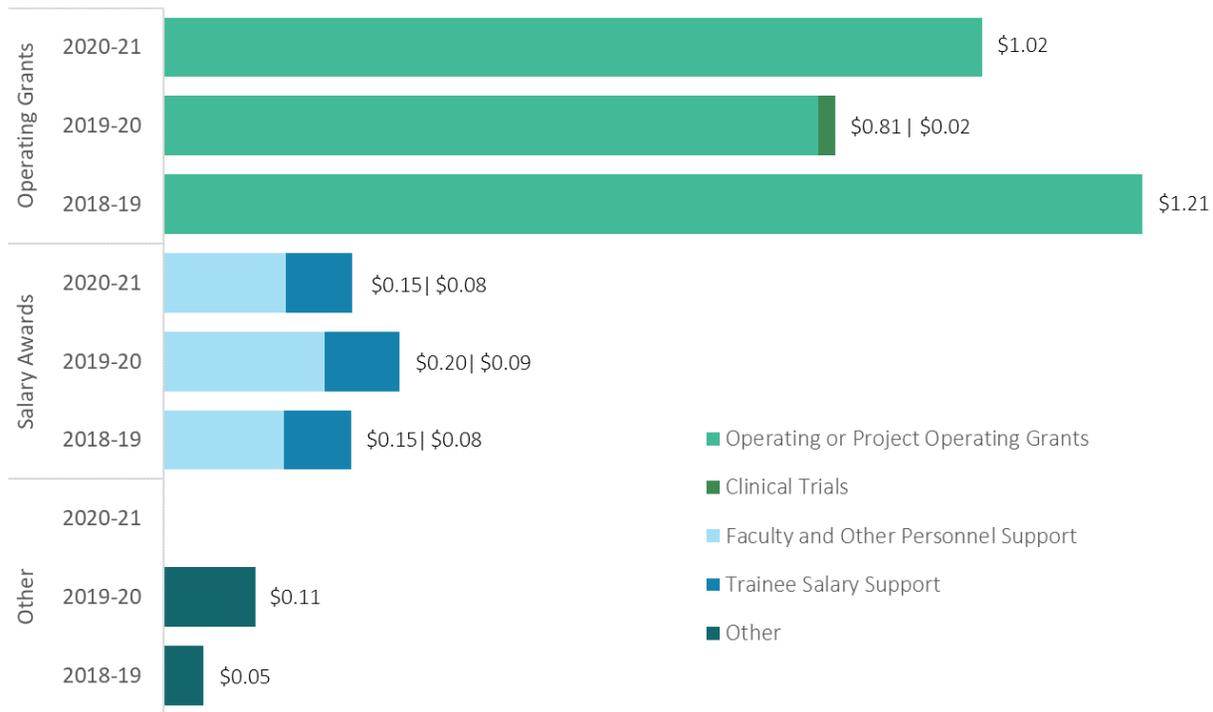
BC MENTAL HEALTH & SUBSTANCE USE SERVICES
Provincial Health Services Authority

Producing and Advancing Knowledge

In FY 2020-21, researchers associated with BCMHSUS, were awarded a total of \$1,249,396. Operating grants make up the majority (82%) of awards. A breakdown of funding types and subtypes can be found in Figure 36. BCMHSUS's portion of the Research Support Fund Program grant

totaled \$135,180 for FY 2020-21 but is not included in total research funding or the figures below. BCMHSUS's did not receive any Canada Research Continuity Emergency Funds (CRCEF). Total Covid-19 research funding was \$32,426 of Operating Grants and is included in the Figure 36

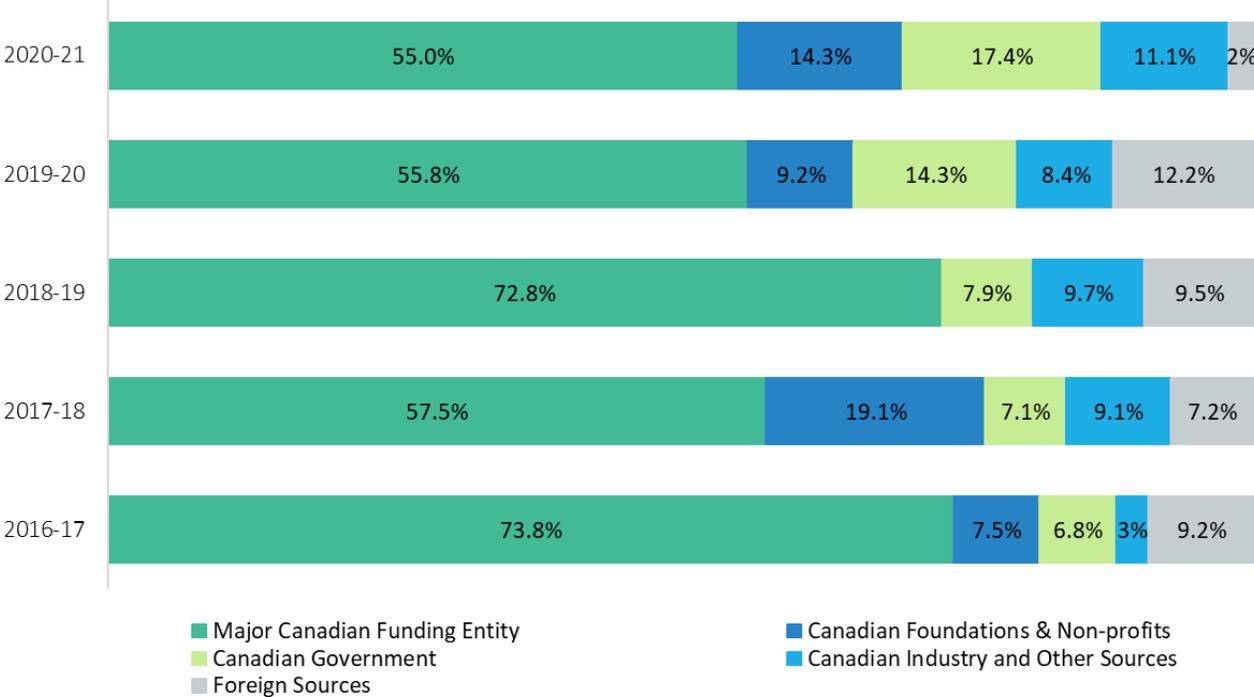
FIGURE 36 BCMHSUS Research Funding by Funding Type and Sub-type by Fiscal Year



(values are in millions)

Figure 37 shows funding by funding source category. The Canadian Government category and the Canadian Foundations & Non-profits both increased over the previous fiscal year. Due to the small number of awards, the category percentages fluctuate year over year.

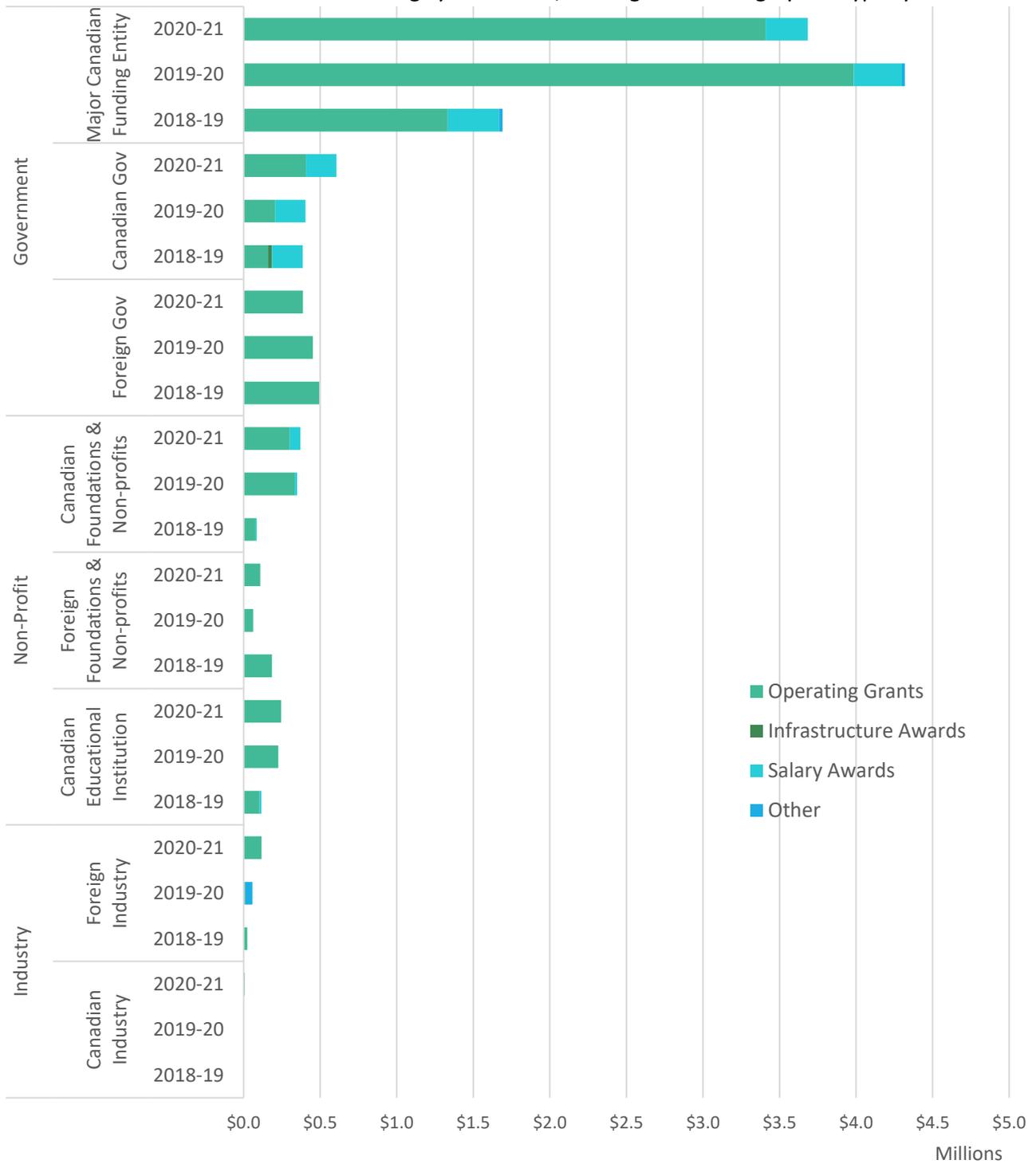
FIGURE 37 Percentage of BCMHSUS Research Funding by Funding Source Category by Fiscal Year



The top 3 funding categories are Major Canadian Funding Entities (55%), Canadian Government (17.4%) and Canadian Foundations & Non-profits (14.3%).

Figure 38 details the funding categories by RISE sector, funding source category and funding type.

FIGURE 38 Total BCMHSUS Research Funding by RISE Sector, Funding Source Category and Type by Fiscal Year



The application success rate is reported for the Fall 2020 and Spring 2021 CIHR grant competitions. BCMHSUS had no successful applications out of 17 applications.

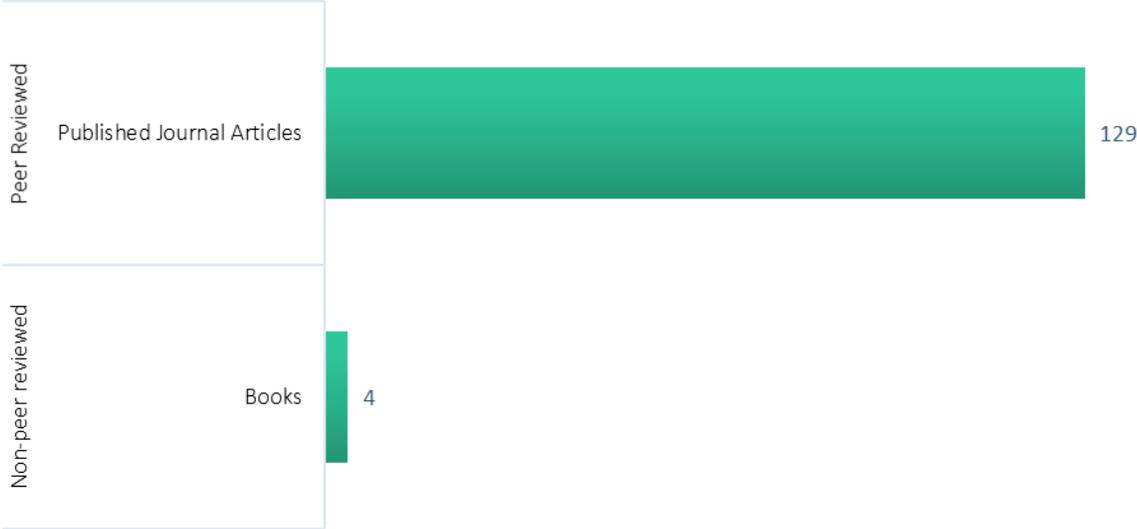
TABLE 13 BCMHSUS Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BCMHSUS Results % (Approved/Submitted)
2020-09 Project Grant	19.1% (451/2,358)	0% (0/8)
2021-03 Project Grant	20.4% (485/2,381)	0% (0/9)

BCMHSUS had a total of 133 publications of which 97% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 39. The program total represents the number of

publications where at least one program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program.

FIGURE 39 Total Number of BCMHSUS Publications by Type and Category

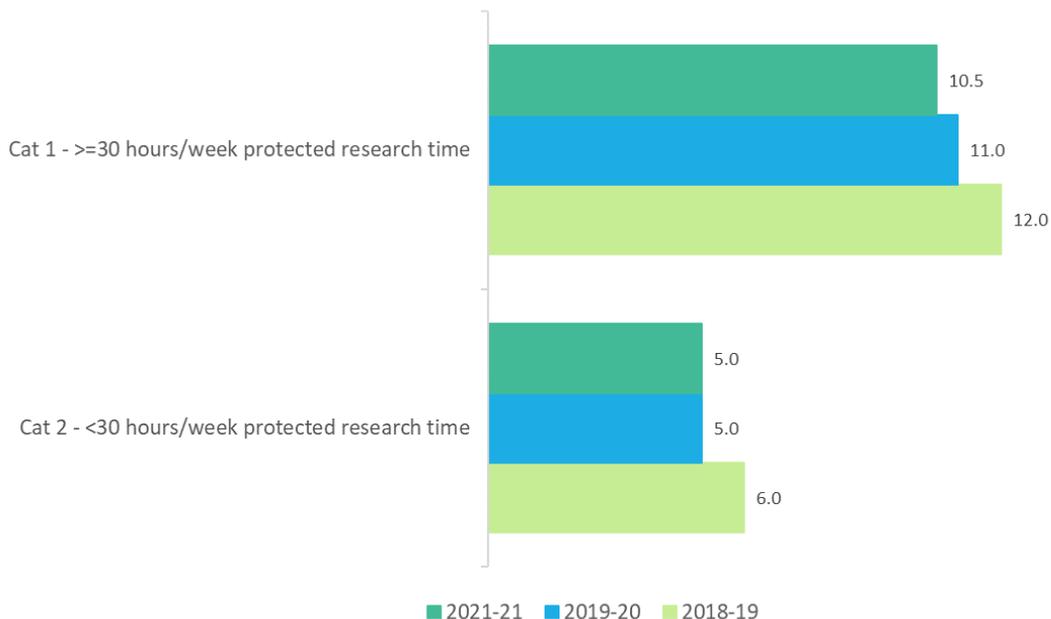


Building Research Capacity

BCMHSUS had a total of 15.5 researchers in FY 2020-21, with 10.5 having greater than 30 hours of protected research time per week (Figure 40). While this is a decrease from previous years, a number of BCMHSUS clinicians

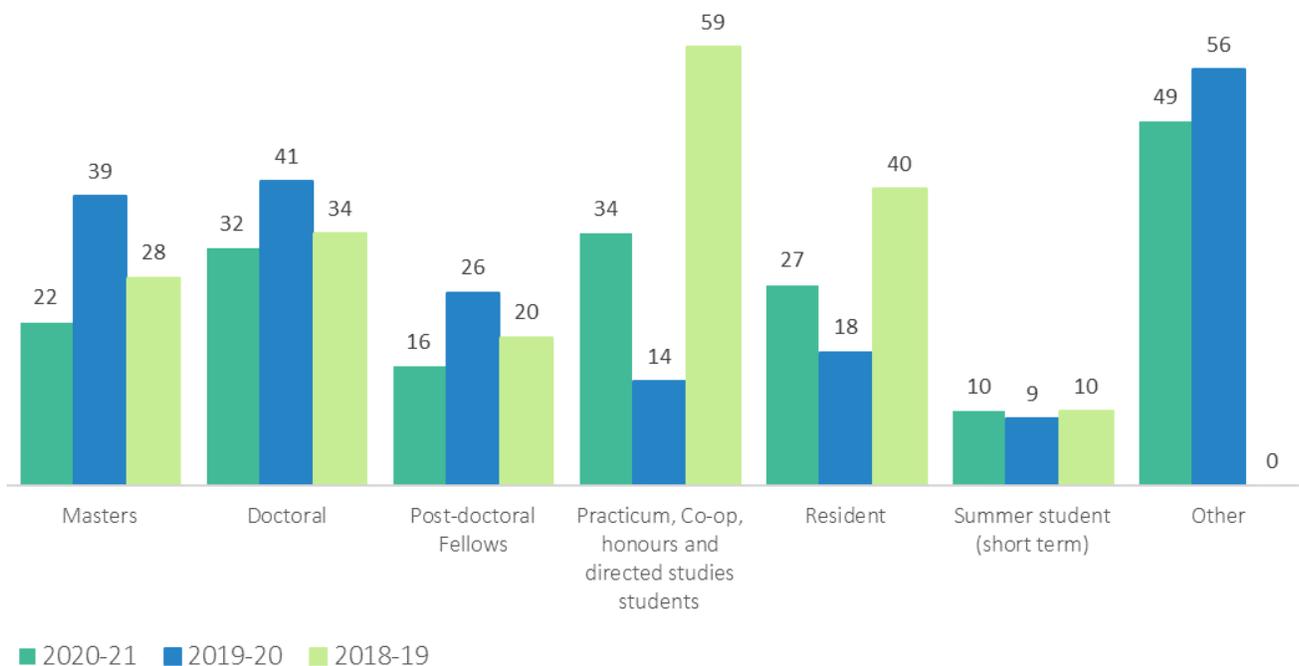
engaged in research are now counted in the BCCHR totals following the operational transfer of Child & Youth Mental Health back to BC Children's Hospital.

FIGURE 40 Total Number of BCMHSUS Researchers by Category



During FY 2020-21, BCMHSUS researchers provided training and supervision to a total of 191 trainees, a decrease of 12 over last FY (see Figure 41).

FIGURE 41 Total Number of BCMHSUS Trainees by Category



Advancing Health and Policy Benefits

See Table 14 for a detailed breakdown of clinical trial activity by fiscal year. Of note is that all of BCMHSUS trials contained enrollment figures in all REB (Research Ethics Board) records.

TABLE 14 BCMHSUS Clinical Trials

Fiscal Year	15-16	16-17	17-18	18-19	19-20	20-21
Total Number of Clinical Trials active during the FY	4	2	5	7	7	5
Status of the Trial at the end of the FY:						
Total Number of Active Trials	4	2	5	7	7	4
Total Number of Trials that closed during the FY	0	0	0	0	0	1
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	640	450	902	1,217	1,320	1,115
Total Cumulative Subject enrolment at the end of the FY	228	244	423	465	565	551

Grant funding type is reported for Clinical Trials in Figure 42. This information is sourced from the REB (Research Ethics Board) file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1, page 65 for a definition of funding types). The majority, eighty percent (80%) of BCMHSUS’ Clinical Trials are Grant funded.

Figure 42

FIGURE 42 BCMHSUS Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY

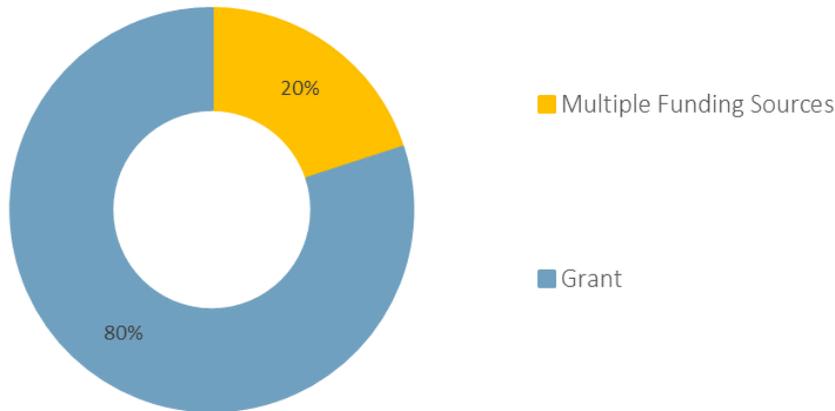


Table 15 reflects BCMHSUS' Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical, and be relevant to FY 2020-21 timeframe (April 1, 2020 - March 31, 2021).

TABLE 15 BCMHSUS Top Three Achievements/Accomplishments/Highlights

<p>BCMHSUS PHD RECEIVES THE MARSHALL POSTDOCTORAL FELLOWSHIP AWARD AND SCHIZOPHRENIA ENDOWMENT FROM THE INSTITUTE OF MENTAL HEALTH</p>
<p>Dr. Melissa Woodward, a postdoctoral research fellow with Dr. William Honer, won the Marshall Postdoctoral Fellowship Award and Schizophrenia Endowment from the Institute of Mental Health (IMH) for her project: "The age of Fentanyl – Overdose, Hypoxia, and Microvascular Damage." This work was also awarded the Djavad Mowafaghian Centre for Brain Health (DMCBH) 2020 Endowment Award.</p>
<p>PHD CANDIDATE WINS THE 2020 VANIER SCHOLARSHIP FOR HIS WORK WITH TRAUMATIC BRAIN INJURY AND INDIVIDUALS WHO ARE HOMELESS AND PRECARIOUSLY HOUSED</p>
<p>Jacob Stubbs received the CIHR Doctoral Award (Frederick Banting and Charles Best Canada Graduate Scholarship) and 2020 Vanier Scholarship for his work: "Longitudinally evaluating the impact of traumatic brain injury on the brain structure and health of individuals who are homeless and precariously housed." Mr. Stubbs is supervised by Dr. William Honer and Dr. William Panenka, BCMHSUS researchers who continue to run the Hotel Study: a longitudinal investigation of public health issues and access to public health systems in Vancouver's downtown eastside population. This research team was awarded a new CIHR grant in April 2020: "Neuropsychiatric complications of co-morbid illness in people living in homeless and precarious housing." Their recent research indicates a high prevalence of co-occurring addiction, mental and physical illness in people living in homelessness or precarious housing with a mortality rate over eight times higher than a Canadian sample matched for age and gender. Through neurological, cognitive, and brain imaging studies, they will learn how these risk factors act on the brain and identify targets for early intervention and rehabilitation.</p>
<p>ONLINE MEDICATION SWITCHING TOOL SWITCHRX.CA CONTINUES TO GROW AND SUPPORT CLINICIANS ACROSS THE COUNTRY</p>
<p>Dr. Ric Procyshyn, a clinical research psychopharmacologist at BCMHSUSRI and Dr. Diane McIntosh (Dalhousie University) co-developed an online medication switching tool to provide healthcare professionals with the most current and useful information to guide their clinical practice when adjusting their patients' psychotropic treatment regimens. This resource, SWITCHRX.CA features suggestions for tapering and titration schedules, clinical tips, detailed information on drug pharmacokinetics, and other precautions. SWITCHRX.CA has over 40,000 users with approximately 500 visits/day and 50 new subscribers/day. Dr. Procyshyn is also the principal editor for: "The Clinical Handbook of Psychotropic Drugs", which is currently published in five languages (i.e., English, Korean, German, Romanian, and Chinese) and was cited 565 times. Dr. Procyshyn has been awarded several teaching awards from the Faculty of Pharmaceutical Sciences, University of British Columbia, and acts as a consultant for the BC Psychosis Program.</p>

BC CENTER FOR DISEASE CONTROL/UBC CDC (BCCDC)

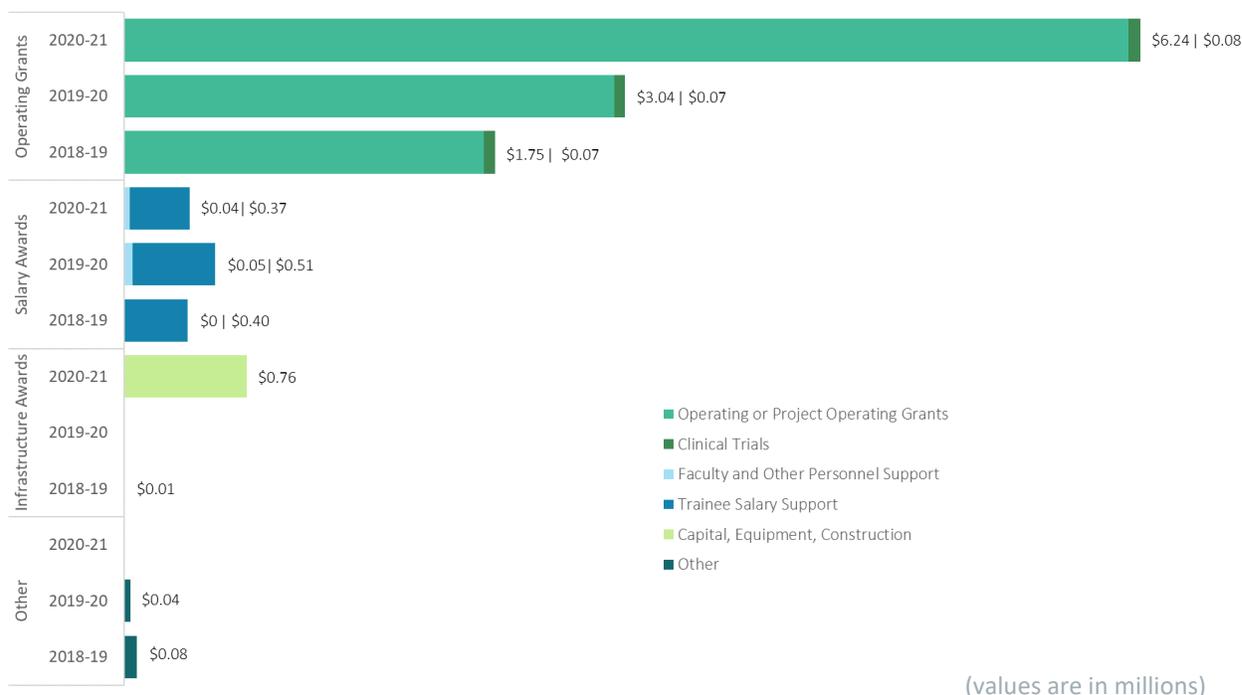


Producing and Advancing Knowledge

In FY 2020-21, researchers affiliated with BCCDC were awarded a total of \$7,478,455 in research funding, which represents a 101% increase over last fiscal year and the highest level since this report’s inception in 2008-09. This is entirely the result of BCCDC’s leadership role in management of the COVID-19 pandemic for the Province of BC. The awards related to COVID-19 totalled \$4,556,951 and were primarily from CFI, CIHR, MSFHR, and Genome BC. The amount awarded as Operating Grants (\$6,235,410) makes up 83% of total awards. The large infrastructure award is for a CFI study linking the transmission metadata to viral genotype & serological response of COVID-19. A breakdown of funding types and subtypes can be found in Figure 43 and by funding source category in Figure 44.

BCCDC’s portion of the Research Support Fund Program grant totalled \$149,986 for FY 2020-21 but is not included in total research funding or the figures below. Because of its public and population health mandate, research at BCCDC is very much embedded within its clinical mandate and, as such, is also supported by operating funding to a significant degree. BCCDC did not receive any Canada Research Continuity Emergency Funds (CRCEF). Total Covid-19 research funding was \$4,556,951 and is included in the figure 43. A breakdown of COVID-19 Funding Type is in the table below Figure 43.

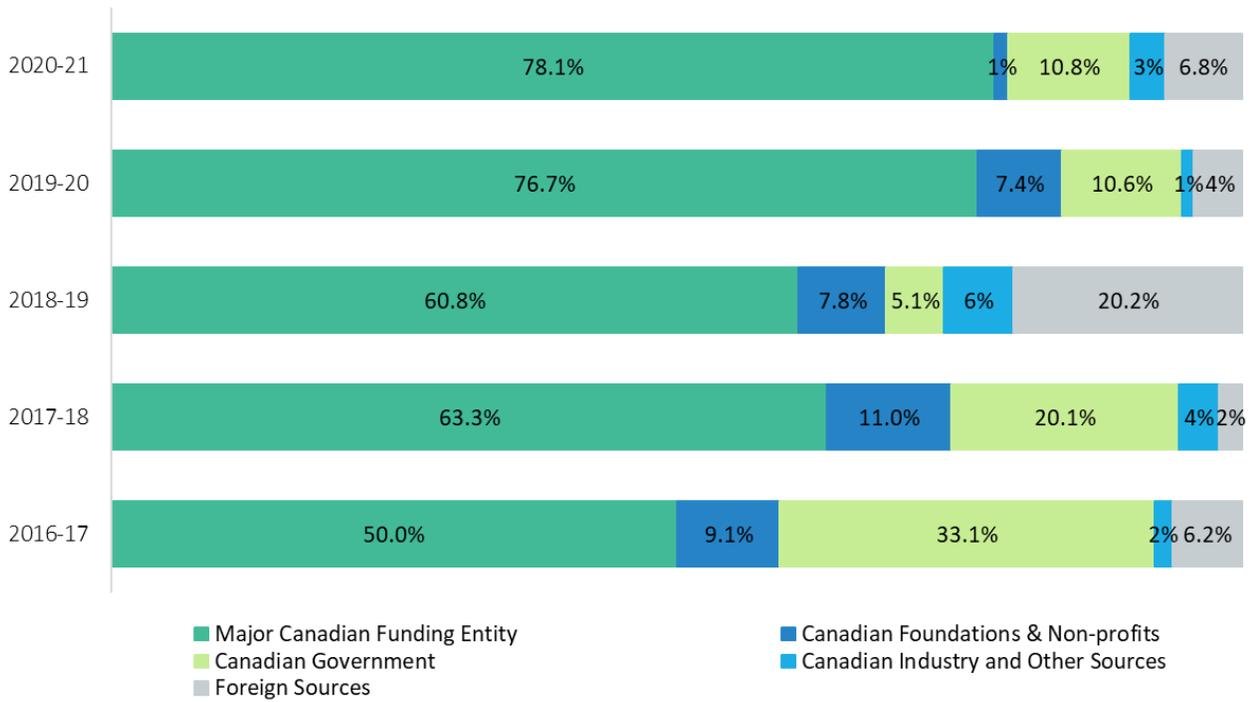
FIGURE 43 Total BCCDC Research Funding by Funding Type and Sub-type by Fiscal Year



Funding Type	Operating Grants	Salary Award	Infrastructure Award	Total
BCCDC COVID-19 Research	\$3,795,254	\$0	\$761,697	\$4,556,951

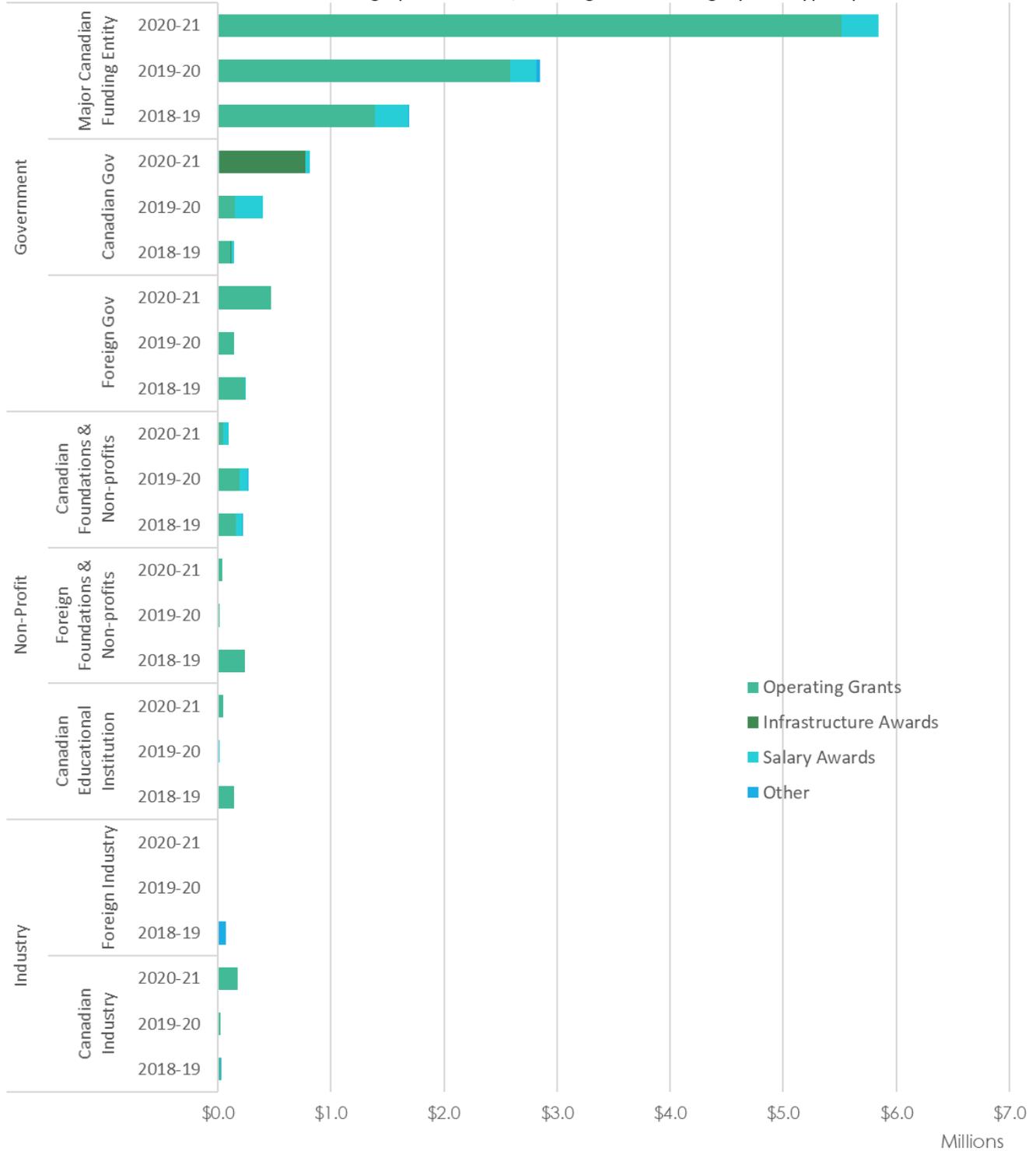
Figure 44 shows funding by funding source category.

FIGURE 44 Percentage of BCCDC Research Funding by Funding Source Category by Fiscal Year



The top two funding categories in FY 2020-21 are Major Canadian Funding Entity (78.1%) and Canadian Government (10.8%). Figure 45 details the funding categories by RISE sector, funding source category and funding type.

FIGURE 45 Total BCCDC Research Funding by RISE Sector, Funding Source Category and Type by FY



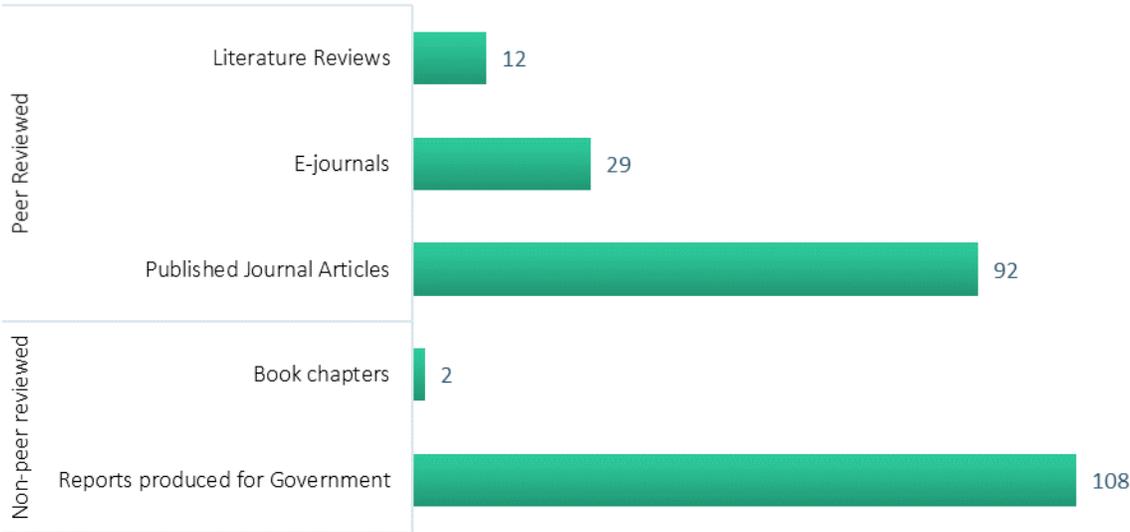
The application success rate is reported for the Fall 2020 and Spring 2021 CIHR grant competitions in Table 16. BCCDC was successful in the Spring Project Grant competitions for a total of 2 awards, beating the national average.

TABLE 16 BCCDC Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BCCDC Results % (Approved/Submitted)
2020-09 Project Grant	19.1% (451/2,358)	0% (0/1)
2021-03 Project Grant	20.4% (485/2,381)	50% (2/4)

BCCDC had a total of 243 publications of which 55% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 46. The program total represents the number of publications where at least one program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program.

FIGURE 46 Total Number of BCCDC Publications by Type and Category

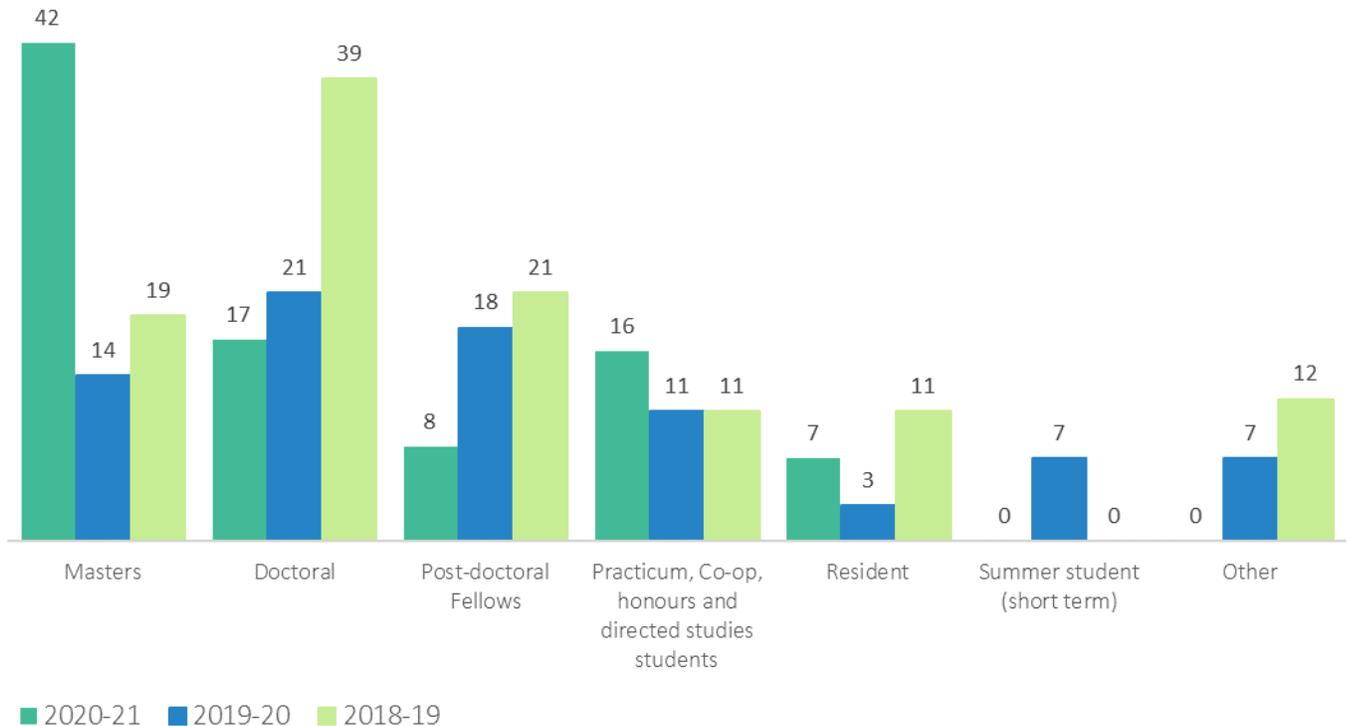


Building Research Capacity

BCCDC defines a researcher as any principal investigator or co-investigator involved in BCCDC research projects. BCCDC had a total of 42.5 researchers meeting this definition in FY 2020-21.

During FY 2020-21, BCCDC researchers provided training and supervision to a total of 90 trainees (see Figure 47) an increase of 9. The largest increase was in the Masters category.

Figure 47 Total Number of BCCDC Trainees by Type



Advancing Health and Policy Benefits

Clinical trial data from the REB is provided for a third year utilizing the same methodology as last year. See Table 17 for a detailed breakdown of clinical trial activity by fiscal year.

TABLE 17 BCCDC Clinical Trials

Fiscal Year	15-16	16-17	17-18	18-19	19-20	20-21
Total Number of Clinical Trials active during the FY	4	5	5	9	11	12
Status of the Trial at the end of the FY:						
Total Number of Active Trials	4	5	4	8	10	11
Total Number of Trials that closed during the FY	0	0	1	1	1	1
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	2,000	2,696	2,750	6,699	10,579	12,625
Total Cumulative Subject enrolment at the end of the FY	294	2,656	1,639	2,707	2,961	1,663

Grant funding type is sourced from the REB (Research Ethics Board) file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1, page 65 for a definition of funding types). Eighty-three

percent (83%) of BCCDC’s clinical trials are grant funded, 8.3% have multiple funders, with the remaining 8.3% with no funding.

Table 18 reflects BCCDC’s Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical, and be relevant to FY 2020-21 timeframe (April 1, 2020 - March 31, 2021).

TABLE 18 BCCDC Top Three Achievements/Accomplishments/Highlights

<p>BCCDC EXCEPTIONAL IN TEST, TRACE, AND TREAT, TO LEAD THE COVID-19 PANDEMIC RESPONSE LONG AND SHORT DESCRIPTION THE SAME</p>
<p>The backbone of pandemic response is: test, trace, treat. BCCDC proved exceptional in all three.</p> <p>Testing The BCCDC Public Health Laboratory developed a test within 10 days of genomic information being released—before BC had a single case. Alternative collection methods were also developed, such as gargle.</p> <p>Trace BCCDC supplemented traditional epidemiological tracing efforts by genomically fingerprinting positive test samples. This improved understanding of outbreaks identified new introductions, and transmission dynamics. Genomic sequencing proved invaluable in identifying variants of concern and guiding the public health response.</p> <p>Treatment While an effective treatment doesn’t exist for COVID-19, prevention is the best medicine. BCCDC provided information on infection control methods (hand washing, masking) and led efforts to secure and distribute COVID vaccines.</p>
<p>CONTINUED FOCUS ON THE OVERDOSE CRISIS IN BC IN THE CONTEXT OF COVID-19</p>
<p>Since the declaration of the COVID-19 public health emergency, the rate of overdose events and illicit drug toxicity deaths have increased and surpassed historic highs. While its COVID-19 work was ongoing, BCCDC maintained focus on other critical priorities including the overdose public health emergency. Researchers developed specific resources for harm reduction and overdose response in the context of COVID-19. BCCDC research also identified an emerging trend of more people smoking drugs instead of injecting them which resulted in funding from the BC Ministry of Mental Health and Addictions for inhalation overdose prevention services, provision of smoking supplies for clients, and additional research funding to support the needs of people who smoke drugs.</p>
<p>BCCDC AWARDED A CIHR INDIGENOUS COVID-19 GRANT TO DEVELOP TRUSTWORTHY AND CULTURALLY MEANINGFUL PUBLIC HEALTH GUIDANCE TO ADDRESS COVID-19 IN INDIGENOUS COMMUNITIES</p>
<p>In BC, the COVID-19 pandemic has been characterized by a misinformation ‘infodemic’. BCCDC’s research into COVID-19 misinformation and stigma led BCCDC and Indigenous partners to develop a number of resources specifically for Indigenous people in this province. BCCDC was also awarded a CIHR Indigenous COVID-19 grant to develop trustworthy and culturally meaningful public health guidance to address COVID-19 in Indigenous communities. The grant was led by an Indigenous research team with support from non-Indigenous research partners signaling a change in culture that has historically locked out Indigenous communities from research opportunities. Furthermore, First National Health Authority (FNHA) was the first health authority to be able to document community level impact of COVID-19 vaccine as a result of a province-wide focus on equitable vaccine access.</p>

WOMEN'S HEALTH RESEARCH INSTITUTE (WHRI)



Producing and Advancing Knowledge

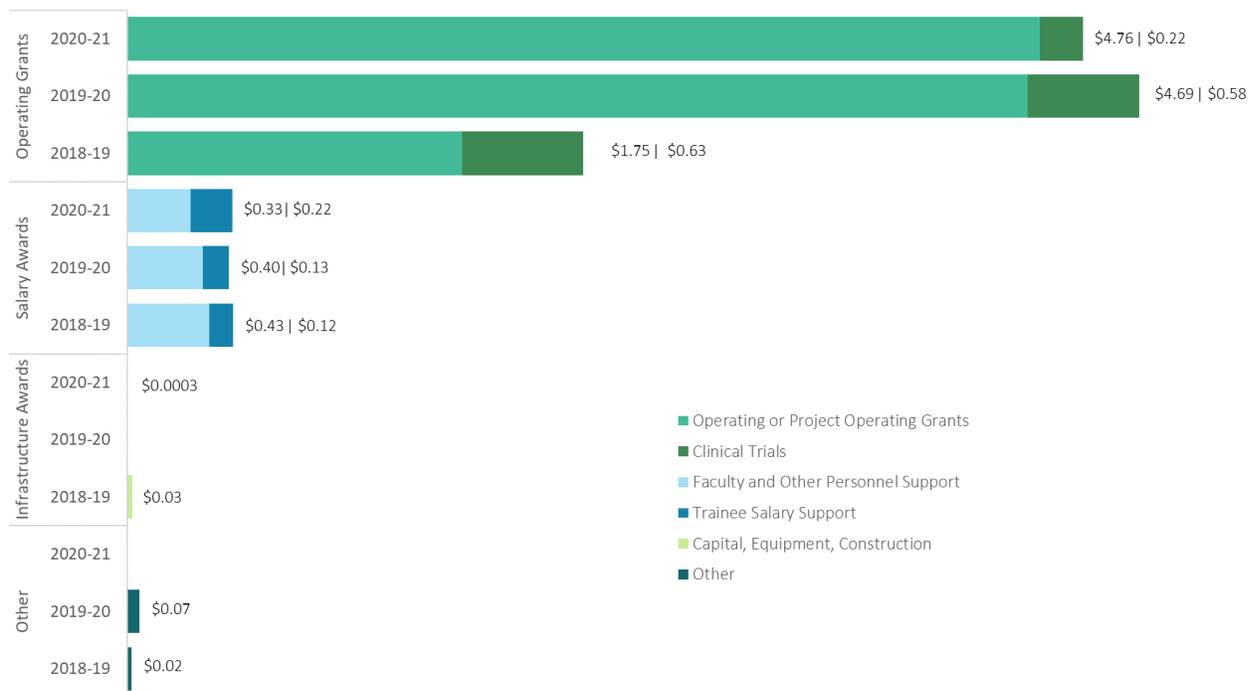
In FY 2020-21, researchers affiliated with WHRI were awarded a total of \$5,528,714 in research funding, which represents a 5% decrease over last year. The amount awarded as Operating Grants (\$4,755,137) makes up 86% of total awards. A breakdown of funding types and subtypes can be found in Figure 48 and by funding source category in Figure 49.

WHRI's portion of the Research Support Fund Program grant totaled \$195,074 for FY 2020-21 but is not included in

total research funding or the figures below. WHRI shares investigators with a number of other health research institutes and universities and benefits from additional external grant revenues linked to these investigators.

WHRI's portion of the Canada Research Continuity Emergency Funds (CRCEF) totalled \$154,795. Total Covid-19 research funding was \$850,367 and is included in the figure 48. A breakdown of COVID-19 Funding Type is in the table below Figure 48.

FIGURE 48 Total WHRI Research Funding by Funding Type and Sub-type by Fiscal Year

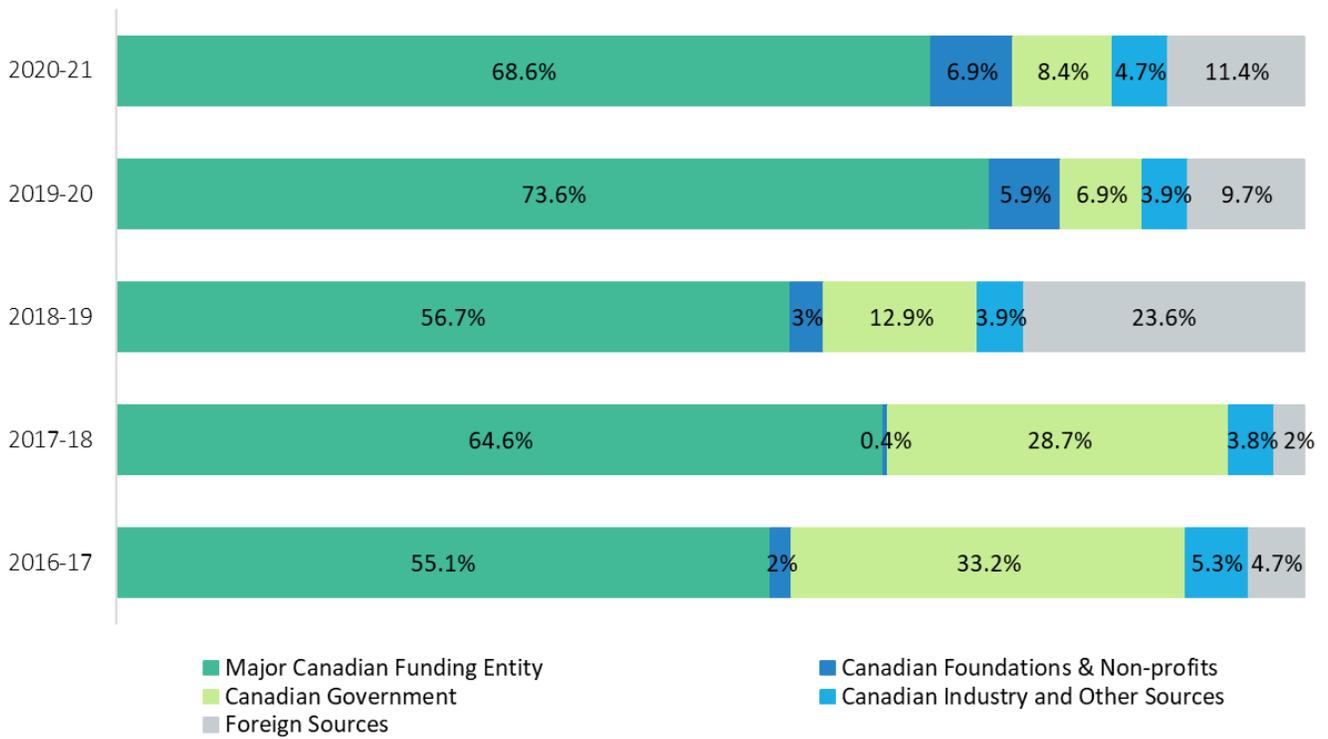


(values are in millions)

Funding Type	Operating Grants	Salary Award	Infrastructure Award	Total
WHRI COVID-19 Research	\$850,367	\$0	\$0	\$850,367

Figure 49 shows funding by funding source category.

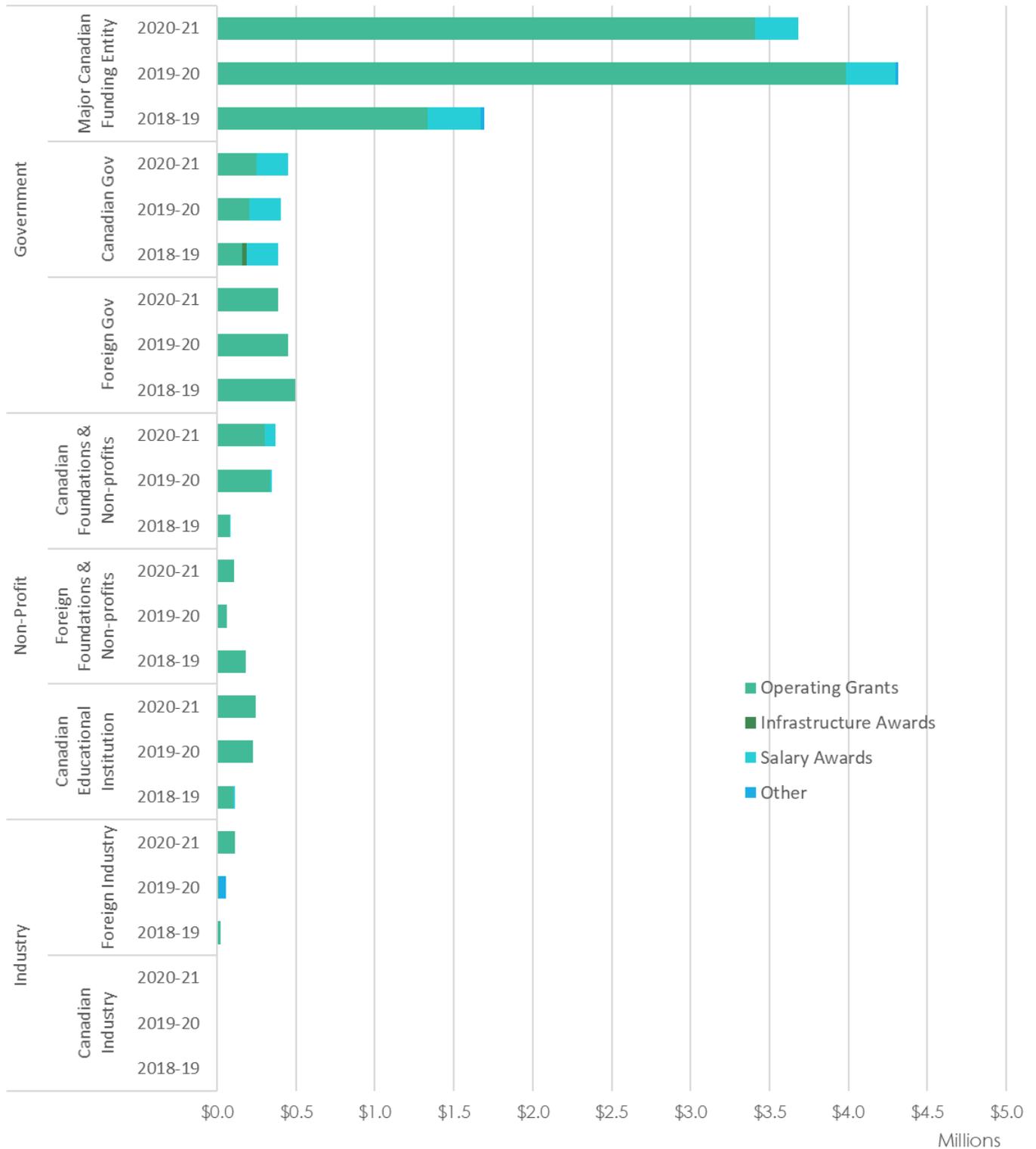
FIGURE 49 Percentage of WHRI Research Funding by Funding Source Category by FY



In FY 2020-21, the top two funding categories are Major Canadian Funding Entities (68.6%) and Canadian Government (8.4%). Figure 50 details the major funding

categories by RISE sector, funding source category and funding type.

FIGURE 50 Total WHRI Research Funding by RISE Sector, Funding Source Category and Type by Fiscal Year



The application success rate is reported for the Fall 2020 and Spring 2021 CIHR grant competitions. WHRI was successful in both Project Grant competitions with a total of 5.5 awards. In both Project Grant competitions, WHRI was

above the national average success rate. WHRI investigators apply for grant competitions that are offered by a variety of granting agencies.

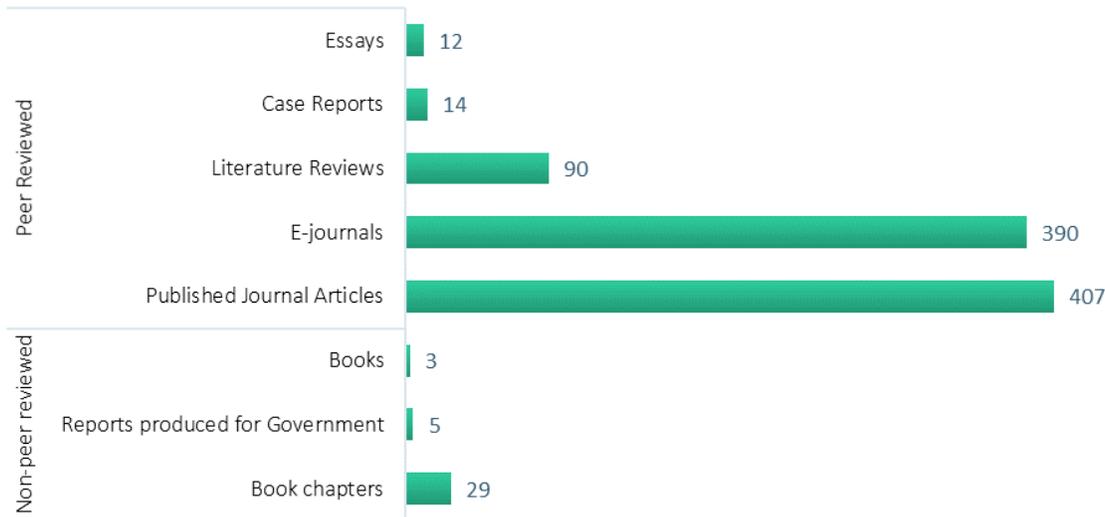
TABLE 19 WHRI Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	WHRI Results % (Approved/Submitted)
2020-09 Project Grant	19.1% (451/2,358)	85.7% (3/3.5)
2021-03 Project Grant	20.4% (485/2,381)	55.6% (2.5/4.5)

WHRI had a total of 950 publications in calendar year 2020 of which 96% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is shown in Figure 51. Peer review represents the gold standard for scientific credibility. The program

total represents the number of publications where at least one program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program.

FIGURE 51 Total Number of WHRI Publications by Type and Category



Two full fiscal years' worth of data is provided for WHRI 's four research specific social media channels; Facebook (member since Aug 2010); Twitter (member since August 2010); Instagram (member since May 2018; and LinkedIn (member since June 2017). Tracking and reporting of this data is a measure of knowledge translation in addition to meeting the following goals with regard to WHRI research activities:

- Increase traffic to the WHRI website
- Enhance the profile of the WHRI as one of only 3 women's research institutes in Canada
- Increase the number of times that WHRI researcher publications are cited
- Strengthen and track the impact of WHRI events (e.g. #WHRISym19, 18, 17, etc.)

- Disseminate research evidence to targeted knowledge users (e.g. patients, providers, prescribers, decision makers)
- Track the impact of KT/dissemination campaigns (e.g. #itsnotinyourhead)

Table 20 shows annual results of two fiscal years, compared to the previous fiscal year. These metrics are a measure of reach and engagement and provide an indication of the volume of activity. They also include data that shows what happens after a program posts content. These would include conversation rate (# of comments your content generated); amplification rate (the # of times your content was shared) and applause rate (# of likes or favorite clicks per post).

In addition to the below activity, many WHRI researchers maintain their own professional accounts to engage peers,

funders and patients, but this information is not tracked.

TABLE 20 WHRI Social Media Statistics

Social Media Channel		Followers			Activity Rate			
		# of Followers	# of New Followers	% change	# of likes	% change	# of shares	% change
Twitter	FY 2020-21	4,111	115	+3%	2,684	+2%	1,253	+57%
	FY 2019-20	3,996	1,833	+85%	2,643	-13%	800	-48%
	FY 2018-19	2,163	-	-	3,052	-	1,528	-
LinkedIn	FY 2020-21	406	205	+102%	41	+28%	6	+50%
	FY 2019-20	201	120	+148%	32	-16%	4	+33%
	FY 2018-19	81	36	+80%	38	-	3	-
Facebook	FY 2020-21	829	101	+12%	240	-27%	116	+85%
	FY 2019-20	728	108	+17%	329	-16%	63	+29%
	FY 2018-19	620	98	+19%	49	-	392	-
Instagram	FY 2020-21	1,167	309	+36%	1,361	+51%	NA	NA
	FY 2019-20	858	547	+176%	900	+267%	NA	NA
	FY 2018-19	311	56	+22%	245	-11%	4	-33%

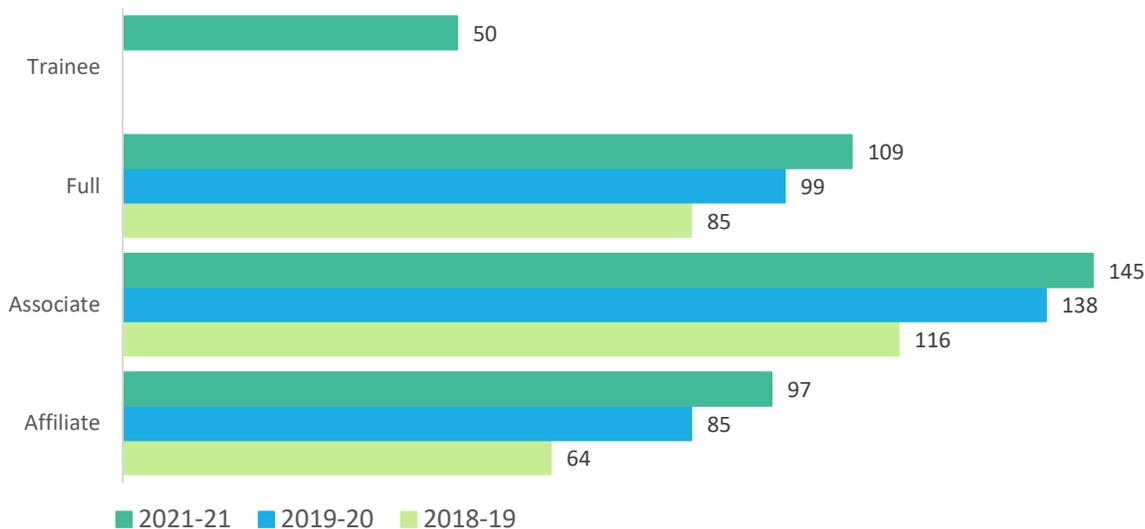
Building Research Capacity

In an effort to show WHRI’s activities, their membership statistics are shown (see Figure 52). In FY 2020-21, membership increased by 79 for a total of 401 members.

The increase is due in part to a new membership category introduced in FY 2020-21, Trainee Member (50). The membership categories are as follows:

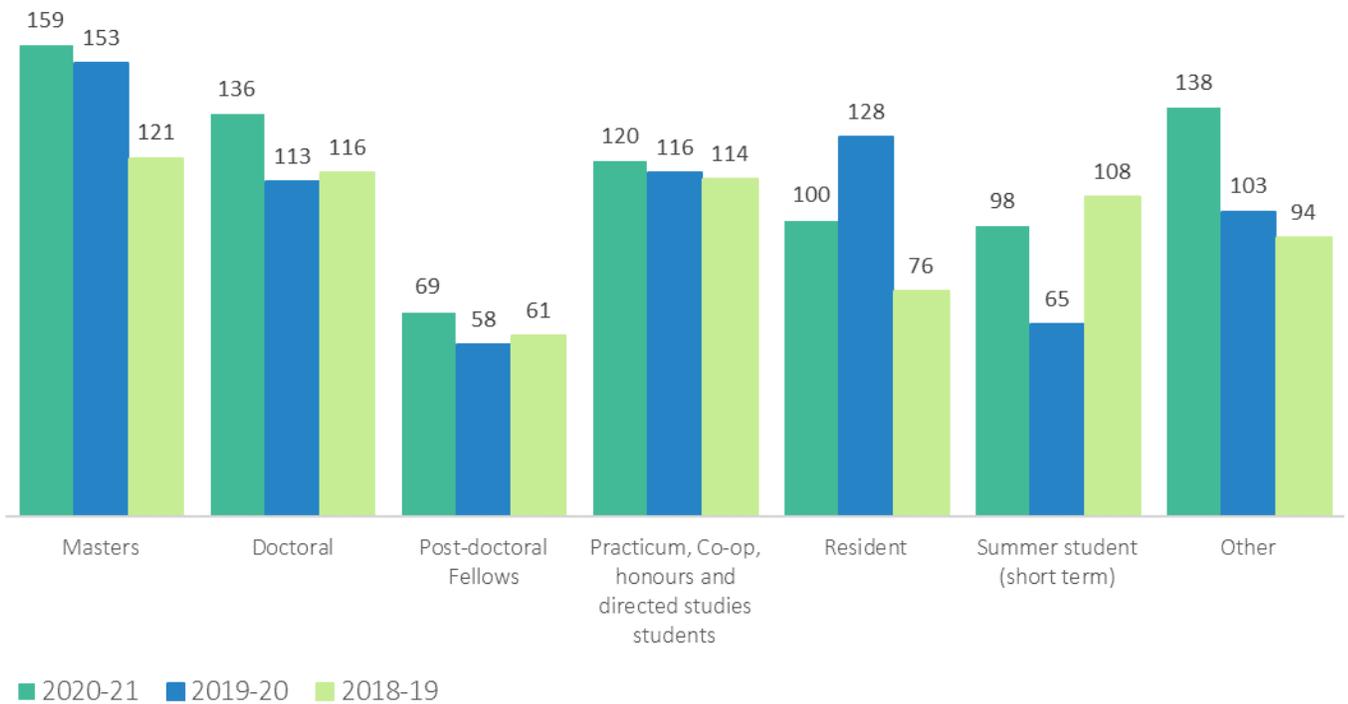
<i>Full Member</i>	Individuals involved in women’s health research for which the WHRI would be the only research institute affiliation.
<i>Associate Member</i>	Individuals who are involved in women’s health research, at least in part, but have a strong relationship with another research institute (e.g., BCCHR) that they wish to maintain; the result is a dual membership with the WHRI and their current affiliation.
<i>Affiliate Member</i>	Individuals who are extensively involved with another institute but may have projects that would overlap with WHRI.
<i>Trainee Member (new 2020-21)</i>	Individuals who are undergrads, grad students, medical students, research and clinical fellows, international students, and any person in a degree-granting program who is engaged in research.

Figure 52 Total WHRI Membership by Category



WHRI researchers provided training and supervision to a total of 820 trainees (see Figure 53) a increase of 130 over last fiscal year.

Figure 53 Total Number of WHRI Trainees by Type



Advancing Health and Policy Benefits

Clinical trial data from the REB (Research Ethics Board) is provided utilizing the same methodology as last year. See Table 21 for a detailed breakdown of clinical trial activity by fiscal year.

TABLE 21 WHRI Clinical Trials

Fiscal Year	15-16	16-17	17-18	18-19	19-20	20-21
Total Number of Clinical Trials active during the FY	28	11	31	38	20	23
Status of the Trial at the end of the FY:						
Total Number of Active Trials	24	7	23	30	16	17
Total Number of Trials that closed during the FY	4	4	8	8	4	6
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	4,058	1,162	6,653	10,928	8,838	8,864
Total Cumulative Subject enrolment at the end of the FY	2,360	545	3,092	3,160	1,507	1,938

Grant funding type is reported for Clinical Trials in figure 54. This information is sourced from the REB (Research Ethics Board) file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1, page 65 for a definition of funding types). Fifty percent (50%) of WHRI’s clinical trials are Grant funded, and 8% are Industry funded.

FIGURE 54 WHRI Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY

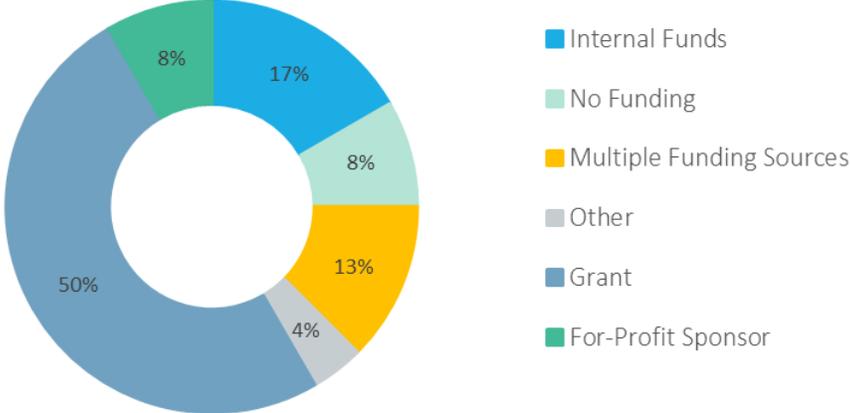


Table 22 reflects WHRI's Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical, and be relevant to FY 2020-21 timeframe (April 1, 2020 - March 31, 2021).

TABLE 22 WHRI Top Three Achievements/Accomplishments/Highlights

<p>WHRI RESEARCHER LEADING THE ONLY NATIONAL SURVEILLANCE PROJECT OF COVID-19 IN PREGNANCY</p>
<p>WHRI researcher, Dr. Deborah Money, is leading the "Canadian Surveillance of COVID-19 in Pregnancy: Epidemiology, Maternal and Infant Outcomes" project. Globally, there has been limited data available on the impacts of COVID-19 in pregnancy which could be used to inform recommendations for pregnant women and their care providers. This national surveillance project, which involves combining provincial/territorial data into a national dataset of cases, seeks to better understand the epidemiology and outcomes associated with COVID-19 in pregnancy in order to provide critical data to inform clinical recommendations for pregnant women and their infants. This project also lays the foundation for additional COVID-19 research through the establishment of a biospecimen repository from COVID-19 affected mother-infant pairs. As the pandemic progresses, interim findings from this project have been released regularly and have shown that expectant mothers with COVID-19 have a greater risk of hospitalization, ICU admission, early labour and stillbirth. Data from this surveillance project is being used at the local, national, and international level to inform public policy and evidence-based guidelines for clinical care of pregnant women and their infants during this rapidly evolving global pandemic.</p>
<p>WHRI LAUNCHES THE COVID-19 RESPPONSE (RAPID EVIDENCE STUDY OF A PROVINCIAL POPULATION BASED COHORT FOR GENDER AND SEX)</p>
<p>The WHRI launched the COVID-19 RESPPONSE (Rapid Evidence Study of a Provincial Population Based Cohort for Gender and Sex) study as a means of providing comprehensive, population-level data to determine the impact of COVID-19 and associated public health measures on British Columbians, grounded in a sex- and gender-based analysis. Led by investigators at WHRI, in partnership with BC Children's Hospital Research Institute, the Vaccine Evaluation Center, the University of British Columbia, and Simon Fraser University, this study provides the first provincial estimates of COVID-19 infection and identifies COVID-19's specific impacts on communities of diverse sexes, genders, ages and locations. Over 6300 British Columbians took part in the study, which involved the completion of online surveys and the self-collection of dry blood spot samples to test for COVID-19 antibodies. The results of this study provide a better understanding of the sex- and gender-based impacts of pandemic management on existing inequalities in BC and Canada. These outcomes will be used to inform future public health decisions, including the development of social policies to better support vulnerable populations during the current and future pandemics.</p>
<p>WHRI OPENS NEWLY CONSTRUCTED SKIDMORE GOODMAN RESEARCH LAB FOR WOMEN'S HEALTH</p>
<p>The WHRI opened the newly constructed Skidmore Goodman Research Lab for Women's Health. Thanks to a \$2.5M donation from the Skidmore family via the BC Women's Health Foundation and a Canada Foundation for Innovation Grant, awarded to WHRI member Dr. Denise Pugash, the WHRI was able to construct one-of-a-kind research facility that encompasses both the Perinatal Research IMaging Evaluation (PRIME) Centre and the Women's Health Research Wet Lab onsite at BC Women's Hospital. The PRIME Centre is an ultrasound imaging research facility (unique in Canada) dedicated to the development of new imaging technology to benefit maternal and fetal health. Equipped with the latest ultrasound imaging technology, the Centre is a shared resource for researchers interested in prenatal diagnostics. In the first wet lab dedicated specifically to women's health research in the province, local investigators can now undertake cutting-edge biological research into all aspects of a woman's health and will be able to pursue discoveries to better inform diagnostics, treatments, and health practices.</p>

REGISTRIES & DATASETS



Advancing Health and Policy Benefits

For the eighth year, data was collected from PHSA’s registries and data sets to capture information to allow identification of users of the databases, how the data support research and a benefit classification which provides a deeper understanding of the benefits resulting from the use of these data for research.

Data stewards for a total of 18 PHSA registries or datasets, were invited to participate in a survey designed to assess the research activities of the registry/dataset. Completed surveys from 15 out of the 18 registries/datasets were obtained. The Research Metrics working group drew a distinction between two types of databases that might be

counted. The first are those that serve as registries. These 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. They represent a significant resource for and investment in research. The second (not collected) are short-term, project-related databases that are primarily grant funded and are not maintained for use beyond the term of a given research project.

Registry/data set Definition/Purpose

The information on each registry/dataset was compiled from online resources and is described below.

REGISTRY/DATASET	PURPOSE
BC CANCER REGISTRY	The BC Cancer Registry is a population-based registry of all cancers diagnosed in British Columbia residents. It collects data and generates cancer statistics on the BC Population for the purpose of monitoring the burden of cancer in the province. It also serves as a source of information for research.
BC CARDIAC REGISTRY (HEARTIS)	Heart Information System (HEARTis) tracks a patient journey for all current and future cardiac procedures, throughout British Columbia, from registry on the waitlist to procedure completion and follow up. Its purpose is to support clinical care, quality assurance and improvement, and outcome-based research.
BCEHS CARDIAC ARREST REGISTRY (CAR)	The BCEHS Cardiac Arrest Registry captures comprehensive data on all out-of-hospital cardiac arrests attended by emergency medical services in British Columbia. The data is used to monitor response intervals, clinical practice guidelines and cardiac arrest patient outcomes. Additionally, the registry supports a significant research program into the care of cardiac arrest patients.
PARAMEDIC SYSTEM EVALUATION AND RESEARCH DATABASE (PSERD)	The (PSERD) contains data abstracted from electronic patient care records (ePCR), derived from all paramedic-patient encounters in the British Columbia Emergency Health Services (BCEHS). The PSERD also contains data from the computer aided dispatch system (911).
BCCDC COVID-19 DATASET	This is an integrated dataset utilized for the management of the COVID-19 pandemic and includes data from the Ministry of Health, Regional Health Authorities, and PHSA.
BC PERINATAL DATABASE REGISTRY (BCPDR)	The (BCPDR) contains data abstracted from obstetrical and neonatal medical records on nearly 100% of births in the province of British Columbia from over 60 hospitals as well as births occurring at home attended by BC registered midwives. The BCPDR also collects data on maternal postpartum readmissions up to 42 days post-delivery and baby transfers and readmissions up to 28 days after birth. Data access is provided for public-interest research purposes, surveillance, program delivery, and evaluation.
BC TRAUMA REGISTRY	Provides data collection, reporting and support of research and quality initiatives related to trauma care.

REGISTRY/DATASET	PURPOSE
BCCH'S BIOBANK	The mission of the BCCH BioBank is to provide a comprehensive service for the collection, processing, storage, rapid access and retrieval of biospecimens and clinical information for research projects using a professional and compassionate approach to patient consenting that adheres to the highest standards of research ethics and patient privacy. A single biospecimen from one patient has the ability to fuel numerous research projects, any one of which might lead to an important medical breakthrough. BC Children's Hospital BioBank collects samples from patients at both BC Children's Hospital and BC Women's Hospital.
ENDOMETRIOSIS AND PELVIC PAIN INTERDISCIPLINARY COHORT (EPPIC)	A prospective data collection to evaluate patient outcomes after interdisciplinary care for endometriosis and pelvic pain
PROMIS-BC RENAL/TRANSPLANT	Patient Records and Outcome Management Information System – is the renal care community's clinical information system. With data collected from the 39 renal units in British Columbia, PROMIS supports: Individual patient care management; Renal unit management; Continuous quality improvement and research; Outcomes-based planning. PROMIS database is used as a source of important epidemiological data in support of clinical trials and for assessing new therapies.
BREAST CANCER SCREENING DATABASE (PREVIOUS NAME - SCREENING MAMMOGRAPHY DATABASE)	Clinical system for scheduling, reporting and tracking of screening mammography exams.
SURGICAL PATIENT REGISTRY (SPR)	SPR is a provincial program involving the five regional Health Authorities, the Provincial Health Services Authority (PHSA) and the Ministry of Health (MoH). SPR tracks patients waiting for surgery in British Columbia and provides information to evaluate and monitor surgical wait times in the province.
TUMOUR TISSUE REPOSITORY (TTR)	TTR is a provincial resource to support translational cancer research at BC Cancer, across Canada and internationally. The TTR is a state-of-the-art tumour bank that collects tissues, blood, and clinical information and processes these to create anonymous cases that can be studied by cancer researchers to understand how cancer develops, how it grows, how it spreads, and how it responds to treatment.

Supporting Research Activities

For FY 2020-21, thirteen (13) of registries/datasets are used for the purpose of research as defined by UBC (see Glossary – Appendix 1, page 66). In addition, respondents were asked to identify other activities they provide in support of research. Table 23 lists the support activities by

registry/dataset and shows the number of times in the past three fiscal years that a registry has provided a particular support activity. These research support activities are ranked from most provided to least over the three-year period.

TABLE 23 Research Activities Supported by Registries and Datasets

Research Support Activity	Cancer	Cardiac	Perinatal	Renal	Breast Cancer	Transplant	Trauma	TTR	Biobank	EPIC	BCEHS-CAR	BCEHS-Paramedic	BCCDC	Grand Total
Support in managing and linking data	3	3	3	3	3	2	3	2	2	2	2	3		31
Assist in identifying knowledge gaps and improvement needs	3	3	3	3	3	3	3		1	3	2	3	1	31
Support in designing research studies	2	3	3	3	3	2	3	2	1	3	2	3		30
Facilitate communication to identify pertinent research question		3	2	3	3	2	2		1	2	1	3	1	23
Support in ensuring studies meet regulatory standards	1	3	3	2	3	2	2	2	1	1				20
Provide specialized and multidisciplinary methodological expertise	1	3	2	3	2	1	3	1		3			1	20
Support in conducting biostatistical analysis		3	3	3	3	2	2			3			1	20
Application of new technical capabilities to provide more timely access to wider range of data	1	2	3	1		1	3		1	1		3		16
Teaching and hands on training for the above		1	2	3				1	1	1				9
Support in providing and teaching project management skills			1	2					1	1				5
Grand Total	11	24	25	26	20	15	21	8	9	20	7	15	4	205

Respondents were asked if they submit data to external organizations for the purposes of research. See Table 24 for the breakdown of data set type by registry/dataset for FY 2020-21. This table lists the type of external data set and

shows the number of times in the past three years that the registry has submitted data. The type of dataset is ranked from most submitted to least.

TABLE 24 Provision of Data to external Data Sets by Registry

Type of External Data Set	Cancer	Cardiac	Perinatal	Renal	Breast Cancer	SPR	Transplant	Trauma	TTR	Biobank	Lung	EPPIC	BCEHS-Paramedic	BCEHS-CAR	Grand Total
Pan Canadian dataset	3	3	1	3	3	2	2	2	3	1	1				24
Provincial data		3	3	2		3				1				2	14
Cross feeding within PHSA		2	3	2		1	1	3				1	1		14
International dataset	2			2			3				1				8
Other		1	1									1			3
Grand Total	5	9	8	9	3	6	6	5	3	2	2	2	1	2	63

Names of the external datasets include:

Provincial:

- Chronic Disease Registry Initiative
- First Nations Health Authority
- Ministry of Health
- Population Data BC
- BC ROC (Resuscitation Outcomes Consortium)

Pan Canadian:

- Canadian Cancer Registry – Statistics Canada
- Canadian Joint Replacement Registry - CIHI
- Canadian Organ Replacement Registry (CORR)
- Canadian Ovarian Experimental Unified Resource (COEUR) – Terry Fox Research Institute
- Canadian Partnership for Tomorrow Project – Canadian Partnership Against Cancer
- Canadian Resuscitation Outcomes Consortium (CanROC)
- Canadian Tissue Repository Network (CTRNet)
- Institute for Clinical Evaluative Sciences (ICES)
- Pan-Canadian Early Detection of Lung Cancer Study
- Public Health Agency of Canada (Canadian Breast Cancer Screening Database)
- VIGOUR (Virtual Coordinating Centre for Global Collaborative Cardiovascular Research)

International:

- North American Association of Central Cancer Registries (NAACCR)
- International Agency for Research on Cancer (IARC – a division of the World Health Organization)
- International Cancer Benchmarking Partnership at Cancer Researchers UK
- International Society for Heart & Lung Transplant (ISHLT)
- Chronic Kidney Disease Prognosis Consortium (CKD-PC)
- ISHLT (International Society of Heart and Lung Transplant)

Nature of Research Activities

CIHR (Canadian Institutes of Health Research) categorizes health research into four broad themes: biomedical research, clinical research, health services research (research respecting health systems and services); and social, cultural, environmental and population health. Research pursued using the registries/datasets above are

categorized in Figure 55. Access requests are summarized in Figure 56. For examples of the types of research questions posed by researchers, please see Table 6 in the PHSA Research and Student Education Metrics Consolidated Summary Report.

FIGURE 55 Ranking of Predominant Nature of Research Questions Using Data from the Registries/Datasets

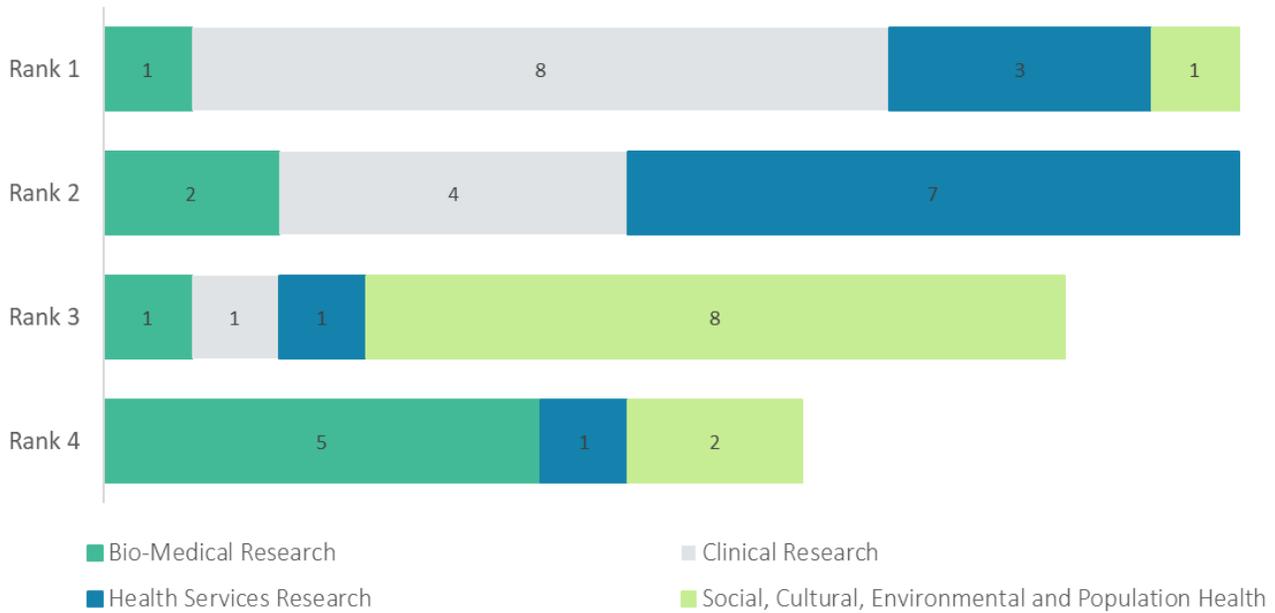
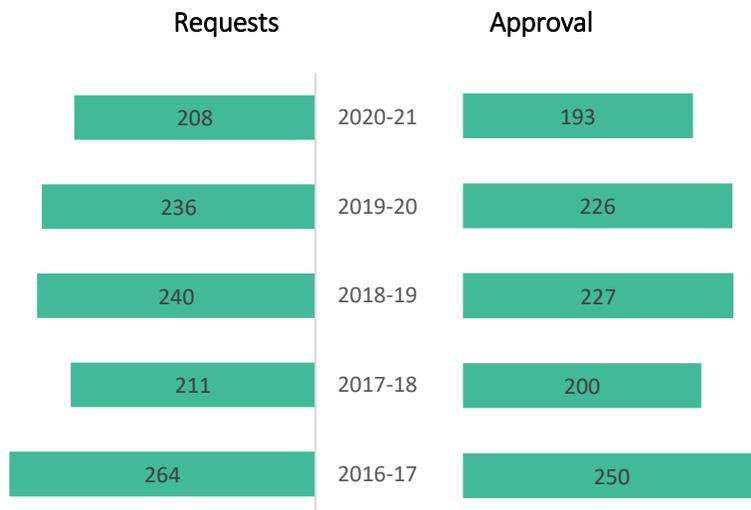


FIGURE 56 Research Access Requests and Approvals from Registry/Dataset by Fiscal Year



APPENDIX 1 - GLOSSARY

GLOSSARY	
TERM	DESCRIPTION <i>[DATA SOURCE]</i>
METRIC DEFINITIONS	
Metrics 1ab, 2b – Total annual grant awards, Total annual external grant awards by major funding categories by program or research entity	Total Annual Award (\$) for Grants, Awards and Contracts by Funding Source <i>[RISe annual file provided by UBC Office of Research Services]</i>
Metric 1c – Annual grant application success rate by program/research entity. Added in FY 09-10	Success rates for two CIHR operating grant competitions (March and September of applicable year) for BCCRI and BCCHR, BCMHSUS and WHRI. <i>[CIHR website for National results; Program results self-reported on the excel data collection form]</i>
Metric 1d – Total # of Publications Added in FY 10-11; Category addition in FY 11-12	Total number (of publications, not authors) published within applicable calendar year meeting the following criteria: Book, book chapter, reports produced for the government, peer-reviewed publication inclusive of published journal articles, case reports, essays, literature reviews, e-journals, and monographs. Excluded = abstracts, editorials, summaries, letters to the Editor, epubs, in press and submitted publications. <i>[Programs self-report utilizing SciVal to search Scopus utilizing researcher name; Program inputs data on excel data collection form]</i>
Metric 2a – Total number of trainees by program/research entity	Total Number (head count, not FTE) of Research Trainees by Student Type. (Exclude clinical trainees who are supported during their brief research rotations.) Research trainees counted will be any individuals who are primarily supervised by a researcher affiliated with the reporting unit, during all or a portion of the reporting year. <i>[Programs manually request trainee statistics from individual investigators and input data on excel data collection form]</i>
Metric 2c – Total number of researchers by program/research entity	List of Researcher Names including Research definition (This metric is to be collected based on BCCHR methodology category types wherever possible, if not available in that format, please designate your category as "5" and add your research definition in the space provided.) Added in FY 11-12 is a column to collect whether a researcher is a shared resource or 100% attributable to a specific program. <i>[Previous year's researchers are provided to each program from the researcher database in excel; Programs provide additions, deletions, changes on excel data collection form]</i>
Metric 2d - Infrastructure Investments - Major CFI Infrastructure Grants (Added FY 10-11)	Total FY \$ for Leading Edge Fund (LEF)/New Initiatives Fund (NIF) awards from Canada Foundation for Innovation. LEF projects sustain and further enhance the most advanced research and technology development efforts already supported by past CFI investments. LEF projects build on existing areas of research priority where institutions have a competitive advantage and a proven track record in enhancing Canada's science and technology capacity. NIF projects build Canada's capacity in new, promising areas of research and technology development. Also included in these amounts are the matching funds (industry, educational, charity, etc.) to these awards. Excluded from these amounts are \$'s associated with the Infrastructure Operating Fund (IOF) or Leaders Opportunity Fund (LOF) from CFI. These get reported under Infrastructure – HR awards and operating grant categories respectively.

TERM	DESCRIPTION [DATA SOURCE]
	<i>[RISe annual file provided by UBC Office of Research Services]</i>
Metric 2e – Research Support Fund Program grants (Added FY 12-13)	<p>A federally funded grant to Canadian post-secondary institutions to help pay the indirect costs of research (e.g., salaries for research administrative staff, administrative costs associated with patent activities, maintenance of lab space). These annual grants are based on a formula related to tri-council award amounts (CIHR, NSERC, and SSHRC) and are paid to the research institutes based on a formal revenue sharing agreement. Due to how UBC is now reporting revenue precipitated by policy changes of the CAUBO (Canadian Association of University Business Officers), PHSA includes revenue related to the Research Support Fund program.</p> <p><i>[RISe annual file provided by UBC Office of Research Services]</i></p>
Metric 3a - # of intellectual property disclosures, patents by program/research entity	<p>Total number of Invention Disclosure (internal documents), provisional patent and PCT applications by fiscal year.</p> <p><i>[BCTDO (for BC Cancer) and UILO (all other programs) complete the excel data collection form]</i></p>
Metric 3b – Licenses, royalty income and # spin-off companies (Revised FY 10/11) (Revised Net Licensing Rev definitions in FY 2013-14)	<p>Total number of active license/assignment agreements and spin-off companies. List the names of all active spin-off companies. These numbers represent cumulative totals from year to year and are no longer reported by region.</p> <p>IP related revenue shall follow the UILO (University-Industry Liaison Office) definitions from FY 2010-11 forward.</p> <p>Definitions:</p> <p>Gross licensing revenue = Royalties + Equity Liquidated + Option Fees + License Fees + License Management + Technology Assignment.</p> <p>Royalties - royalty payments including minimum annual royalty payments</p> <p>License Fees – upfront payments, milestone payments and other payments associated with the license</p> <p>License Management - legal fees incurred by TDO (Technology Development Office) or UILO relating to the licensed IP and reimbursed by licensees</p> <p>Total TDO Expenses for patenting and legal costs</p> <p>Expenses for Licensed IP – patenting, legal and related costs associated with licensed IP</p> <p>Realized revenue per distribution agreements – revenue accrued to PHSA program after distribution to inventors, obligations due to affiliated academic institutions, granting agencies and inventor departments.</p> <p>The revenue distribution varies by entity and will be noted in the narrative.</p> <p><u>Royalty, equity liquidated and licensee fees</u></p> <p>When the UILO licenses technology to a company, the terms of the license typically include a requirement to pay a % royalty on product sales, an upfront license fee and an annual license maintenance fee. The UILO may also negotiate an equity component (company stock) as part of the license agreement. Under the licensing scenario, the University still owns the technology but is granting a license to a third party.</p> <p><u>Option Fees</u></p> <p>This relates to the scenario when a company desires an option on a technology (essentially reserving/holding the technology). These are usually short-term contracts that have a modest option fee.</p>

TERM	DESCRIPTION [DATA SOURCE]
	<p>Technology Assignment</p> <p>This relates to the scenario when a company wishes to take ownership of the technology and in return pays an Assignment fee.</p> <p><i>[BCTDO (for BC Cancer) and UILO (all other programs) complete the excel data collection form]</i></p>
<p>Metric 4a – Clinical Trials Source: Ethics Module for all REBs</p>	<p>Number of active trials and cumulative subject enrollment at the end of the year. Includes CT data for all PHSA and non-PHSA PIs using PHSA facilities and resources</p>
FUNDING TYPE CATEGORIES (COLUMNS)	
Funding Types/Grant Types	The columns on worksheet 1ab, 2b that correspond to the funding types agreed to by the Research Metrics Working Group on July 22, 2009 and revised at the working group's direction in subsequent fiscal years.
SALARY AWARDS	
Faculty and other personnel support	Dollar amount for FY for supported faculty salary awards including chairs.
Trainee salary support	Dollar amount for FY for supported trainee salary awards including trainee research allowances.
INFRASTRUCTURE AWARDS	
Human Resources	Dollar amount for FY for Human Resource Infrastructure including Michael Smith Foundation for Health Research (MSFHR) - team start-up, team, research units, platforms, networks and institutional infrastructure, CFI Infrastructure Operating Fund (IOF) awards.
Capital, Equipment, Construction	Dollar amount for FY for capital, equipment, or construction awards including BC Knowledge Development Fund (BCKDF), matched sources (charities, industry) and other large equipment grants. Excluded are Canada Foundation for Innovation (CFI) awards (see next category).
Capital, Equipment, Construction - Major CFI (Added in FY 10-11)	Dollar amount for FY for capital, equipment, or construction Major Canada Foundation for Innovation (CFI) awards for Leading Edge Fund (LEF)/New Initiatives Fund (NIF) awards. Also included in these amounts are the matching funds (industry, educational, charity, etc.) to these awards. Excluded are \$'s associated with the Infrastructure Operating Fund (IOF) or Leaders Opportunity Fund (LOF) from DFI. These get reported under Infrastructure - HR and Operating Grant categories respectively. (see Metric definition 2d for further detail)
OPERATING GRANTS	
Operating or Project Operating Grants (not exclusive of the next three columns)	Dollar amount for FY for operating or project operating grants including when the salary component is embedded in a grant; includes establishment grants; includes development grants.
Clinical Trials (4a) (Definition clarified in FY 10-11)	Dollar amount for FY for any research project that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes. Health related interventions include any intervention used to modify a biomedical or health-related outcome, for example drugs, surgical procedures, devices, behavioral treatments, dietary interventions, and process-of-care changes. Health outcomes include any biomedical or health related measures obtained in patients or participants, including pharmacokinetic measures and adverse events.
Clinical Trials (4a) (Definition clarified in FY 10-11)	Dollar amount for FY for research involving a new laboratory technique or process, e.g., a new more cost-effective processing for a genetic diagnostic test, or a new

TERM	DESCRIPTION [DATA SOURCE]
	tissue preparation process, etc. Trials that may use clinical material but do not directly involve patients in the research or involve a risk to the patients (may involve their tissue or blood samples however).
Grant in Aid	<p>Dollar amount for FY for Grant-in-aid awards (Broad topic but not directed).</p> <p>A Grant-in-Aid is essentially a donation to one or more researchers, normally to conduct research in an area that is of mutual interest to both the donor and the researcher(s). These grants are normally in the form of a one-page letter addressed to a researcher and signed by the donor and accompanied by the grant funds.</p> <p>Characteristics:</p> <ul style="list-style-type: none"> • Sponsor supports research activities of an individual researcher or group of researchers. Sponsor does not restrict use of funds • Funds are paid in advance • No invoicing or financial statements are required by Sponsor • University/Host Institution retains all rights to inventions and other intellectual property • University/Host Institution is free to publish results • University/Host Institution provides the Sponsor with a final report only • Parties to the Agreement: University/Host Institution and Sponsor (may include University/Host Institution Affiliated Hospitals)
Other Funding Type – Service Contracts Added as sub-type of Other Funding Type category in FY2010-11; Combined into one “Other” category as of FY 14-15	Characteristics: (1) Solely for testing, evaluation or analysis of materials or compounds owned by the Sponsor with no intellectual input or value-added by UBC. (2) Sponsor retains all rights to intellectual property provided by the Sponsor for the services
Other Funding Type – Donations & Endowment Interest Added as sub-type of Other Funding Type category in FY2010-11; Combined into one “Other” category as of FY 14-15	<p>A donation is a gift given by an individual or an organization to a non-profit organization, charity, or private foundation in support of a specific purpose.</p> <p>Endowment – gift of money or income producing property to a public organization (such as a hospital foundation or university) for a specific purpose (such as research or scholarships). Generally, the endowed asset is kept intact and only the income (known as endowment interest) generated by it is consumed.</p>
Other Funding Type Combined into one “Other” category as of FY 14-15	Dollar amount for FY, combined, of any grant, award or contract that does not fit into the above categories. Please specify name of Funding Type in space provided.
FUNDING SOURCE CATEGORIES (ROWS)	
UBC RISE Sector	<p>Sector denotes an area of the economy in which the funder is assigned. This decision is based on how the organization is funded. Three sectors are currently utilized by UBC’s Research Information System (RISe) and include:</p> <p>Non-Profit – funding provided mostly by private donations and endowments.</p> <p>Industry – funding provided by a for-profit business in the private or commercial sectors of business.</p> <p>Government – funding provided by local, provincial, national, federal, or foreign government entity. [definitions to be further developed with input from Working Group and RISe personnel]</p>

TERM	DESCRIPTION [DATA SOURCE]
Funding Sources/Granting Program	The rows on worksheet 1ab, 2b that correspond to the funding sources agreed to by the Research Metrics Working Group on July 22, 2009 and modified in subsequent fiscal years.
CIHR and its institutes (included in Major Canadian Funding Category)	<p>The Canadian Institutes of Health Research and its thirteen subsidiary institutes:</p> <ul style="list-style-type: none"> * Aboriginal Peoples' Health * Aging * Cancer Research * Circulatory and Respiratory Health * Gender and Health * Genetics * Health Services and Policy Research * Human Development, Child and Youth Health * Infection and Immunity * Musculoskeletal Health and Arthritis * Neurosciences, Mental Health and Addiction * Nutrition, Metabolism and Diabetes * Population and Public Health
CCSRI (formerly NCIC/Canadian Cancer Society/CCSR) – (name changed to CCSRI for FY 11-12 and moved to CDN Foundation & Non-profit category)	On February 1, 2009, the Canadian Cancer Society integrated the operations of the National Cancer Institute of Canada (NCIC), creating the Canadian Cancer Society Research Institute. Grants from all three of these organizations should go in this category.
NSERC (included in Major Canadian Funding Category)	Natural Sciences and Engineering Research Council
SSHRC (included in Major Canadian Funding Category)	Social Sciences and Humanities Research Council
Genome Canada and provincial Genome agencies (included in Major Canadian Funding Category)	Genome Canada, and its regional centres: Genome BC, Genome Alberta, Ontario Genomics Institute, Genome Quebec, Genome Prairie, and Genome Atlantic
MSFHR (included in Major Canadian Funding Category)	Michael Smith Foundation for Health Research (BC)
Canadian Industry	Canadian-based for-profit corporations. Decisions on whether a funding source is Canadian or Foreign are driven by award payment or contract address.
Canadian Foundations & Non-Profits (name modified in FY 12-13 to align with UBC categories – all historical data was recoded)	Canadian not for profit organizations including foundations and charities. These include grants that are “internally” sourced (i.e., that are from BCCHR, BCCRI or their affiliated Foundations such as BCWF, BCCHF, and BCCF etc.)
Canadian Educational Institution	This was added in FY 09-10 as a separate Funding Source Category and includes all educational and/or academic institutions in Canada. Foreign Educational Institutions are categorized under Foreign Other Source.
Canadian Government	Provincial, municipal, territorial, or federal governments and crown corporations in Canada
Foreign Industry	For-profit corporations outside Canada. Decisions on whether a funding source is Canadian or Foreign are driven by award payment or contract address.

TERM	DESCRIPTION [DATA SOURCE]
Foreign Foundations & Non-Profits (name modified in FY 12-13 to align with UBC categories – all historical data was recoded)	Not for profit organizations including foundations and charities headquartered outside Canada, e.g., March of Dimes, American Cancer Society
Foreign Government	Provincial, municipal, territorial, or federal governments and government-controlled corporations outside Canada including the armed forces (e.g., US Military)
Foreign Other Source	All Foreign funding sources not captured in the above Foreign categories including Foreign Educational Institutions.
CLINICAL TRIAL GRANT FUNDING TYPES	
Source of funds refers to the funder, sponsor, grantor, or agency (government, industry, and non-profit) that is providing the funds needed to undertake the project. Projects are not considered “For-Profit” if a sponsor is only collaborating and not funding the study (e.g., providing study drug or lab space only).	
Grant	Funding provided for specific projects by sponsors in the government or non-profit sectors.
For-Profit Sponsor (Industry or Pharmaceutical)	Funding provided for specific projects by sponsors in the industry sector.
Grant-in-aid	Funding provided for general research activities by sponsors in any sector (Industry, Government or Non-profit)
Internal Funding	Funded by internal program department, program operational budget or non-profit foundation (e.g., salary award)
No Funding	No funding provided.
Other	Funding not yet known when ethics application was submitted.
Multiple Funding Type	Any combination of the above funding types.
RESEARCH TRAINEES’ CATEGORIES (COLUMNS)	
Research Trainee	Total number of research trainees by student type excluding clinical trainees who are supported during their brief research rotations. Research trainees counted will be any individuals who are primarily supervised by a researcher affiliated with the reporting unit, during all or a portion of the reporting year.
Masters	Graduate students enrolled in a full time master’s program who are supervised by a faculty member affiliated with the reporting organization.
Doctoral (changed from PhD in FY 2010-11)	Graduate students enrolled in a full time PhD program who are supervised by a faculty member affiliated with the reporting organization.
Post-doctoral	Full time post-doctoral fellows whose primary focus is research (NOT clinical fellows)
Summer students (short term)	High school and or university students who are engaged in a short-term program with the reporting program for a limited period (e.g., over the summer, a few weeks)
Residents	MDs engaged in a residency program that may include a research rotation
Practicum, co-op, honors and directed studies students	High school and/or university students whose assignment to the reporting organization is according to a practicum, co-op, honours and/or directed studies program
Other Research Trainee Type	(Reporting organization to specify definition)
RESEARCH TRAINEES (ROWS)	
Do you Support These Types of Research Trainees	To be answered Yes or No for each Research Trainee Category listed above. Is used to indicate that a research entity does have Research Trainees of this type but has no data collection ability. This will distinguish between those with zero (0) Trainee types from those that have them but can’t count them.

TERM	DESCRIPTION [DATA SOURCE]
Total Head Count	Total number of research trainees of that type, not an FTE (Full Time Equivalent number).
LIST OF RESEARCHER NAME (COLUMNS AND ROW)	
Category (modified to add Shared Membership sub-category under BCCHR categories 1-3 in FY 2010-11) Membership categories revised FY 16-17	<p>A number one through five (MUST have one selected).</p> <p>Categories 1-4 are as described in the BCCHR “Guide for Completing an Application for Membership” available online at http://www.cfri.ca/research_support/forms/membership.asp. These categories are based on a calculation of a given individual’s research hours/week.</p> <p>Category 5 will be for those research entities/programs who do not utilize the CFRI categories. If you utilize category 5, please indicate the definition that your research entity/program uses to define Researchers.</p> <p>A shared membership sub-category available in CFRI Categories 1-3 was added in FY 2010-11. This new category allows individuals to formally declare their alignments (including percentage affiliation) with more than one organization. Category 4 was clarified to include only affiliate investigators that are not based on site but who collaborate with program members. Their primary affiliation will be with another academic and/or research institution.</p> <p>New categories for FY 16-17: http://bcchr.ca/research-support/membership</p>
First, Last, Middle name	Self-explanatory, e.g., Jane Mary Smith
Short Name	Name as it would appear in PubMed, for example, Smith, JM
Count Attributed to Program Added in FY 11-12	An indication by number (1 or .5) of whether a researcher is attributable to applicable program 100% (full) or 50% (shared).
UBC’s definition of Research Added in FY 13-14	<p>UBC defines research involving human subjects as “any systematic investigation (including pilot studies, exploratory studies, and course-based assignments) to establish facts, principles or generalizable knowledge which involves living human subjects; or human remains, cadavers, tissues, biological fluids, embryos or fetuses.”</p> <p>It does not include...” quality assurance studies, performance reviews or testing within normal educational requirements, or activities undertaken for administrative or operational reasons...” unless they include an ‘element of research.’</p>
OTHER	
Fiscal Year	Includes data for April 1 - March 31 of applicable fiscal year (i.e., FY 14-15 is April 1, 2-14 – March 31, 2015)