FISCAL YEAR 2017–18

RESEARCH METRICS

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

SUPPLEMENTARY REPORT

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PHSA RESEARCH METRICS FISCAL YEAR SUMMARY PHSA OVERALL

Indicator		Key Measure Description	FY 2015-16	FY 2016-17	FY 2017-18
			Value	Value	Value
Producing & Advancing Knowledge	1a	**Total Annual Grant Awards by Type** (including Major CFI Infrastructure grants)	**$159,747,871**	**$131,522,583**	**$152,418,527**
		Salary Awards	13,306,431	14,205,812	13,731,347
		Infrastructure Awards	45,471,139	2,121,562	10,678,089
		Operating Grants	97,099,541	110,287,899	122,147,885
		Other	3,870,760	4,907,310	5,861,206
	1b	**Total Annual Grant Awards by RISe Sector** (including Major CFI infrastructure grants)			
		Government	92,657,320	57,406,340	75,675,710
		Non-Profit	55,124,321	57,394,081	57,711,527
		Industry	11,966,230	16,722,161	19,031,290
	1c	**CIHR Annual Grant Application Success Rate** - PHSA Overall/National**			
		2017-18 Foundation Grant (Open)	[See footnote]	[See footnote]	11.1%/11.9%
		2017-10 Project Grant			15.4%/15.9%
		2018-03 Project Grants			19.7%/15.5%
	1d	**Total # of Publications with Agency Author**			
		BCCHR	738	840	943
		BC Cancer	341	335	524
		WHRI	412	476	585
		BCCDC	228	211	215
		BCMHSUS	95	80	82
Building Research Capacity	2a	**Total # of Research Trainees**	1,293	1,687	1,970
	2c	**Total # of Researchers** (excluding Affiliate Investigator)	769.5	790	807
	2e	**Research Support Fund Grants** (Tri-Council only)	$4,010,692	$4,273,685	$3,973,494

*** CIHR phased out the Open Operating Program beginning in Fall 2014 and replaced it with the Foundation and Project Scheme Competitions so comparisons to previous FY's are not applicable.*

Indicator		Key Measure Description	FY 2015-16	FY 2016-17	FY 2017-18
			Value	Value	Value
Achieving Economic Benefits & Innovation (BC Cancer & BCCDC only)	3a	# of Invention disclosures	52	53	41
		# of Provisional Patent applications filed	25	20	21
		# of PCT applications filed	6	5	3
		# of Patents Filed/Issued	25/28	16/37	18/30
	3b	# Active License Agreements	163	167	175
		# of Spin-off Companies	10	12	12
		IP related revenue – Realized Revenue BC Cancer BCCHR	 $274,585 $41,295	 $258,713 $23,665	 $285,169 $40,921
Advancing Health & Policy Benefits	4a	**Clinical Trials** (including Non-PHSA PIs utilizing PHSA facilities and resources) # active trials at the end of the FY Cumulative Subject Enrollment at end of FY	 519 58,450	 541 92,366	 561 149,773
	4b,c,d	**Registries as Research Resources** # of Research Requests/Approvals	 189/180	 264/250	 211/200

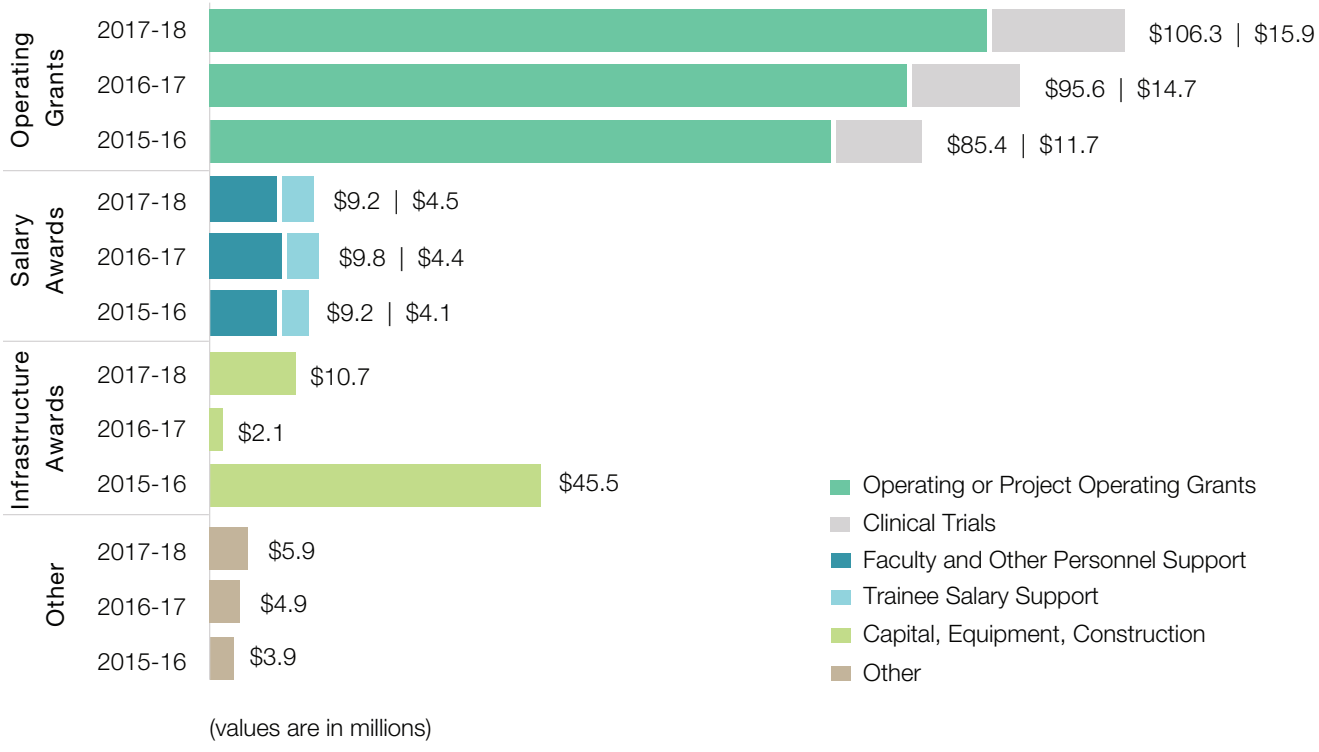
PHSA AGGREGATE ANALYSIS

Producing and Advancing Knowledge

In FY 2017-18, researchers affiliated with PHSA were awarded a total of $152,418,527 an increase of approximately 20 million from FY 2016-17. This is attributed solely to the major CFI or BCKDF grant competitions during the fiscal year. Operating Grants ($122,147,885) increased and reached its highest dollar amount since FY 13-14. They continue to make up the largest portion (80%) 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 approximately 9% of total awards for the past four fiscal years.

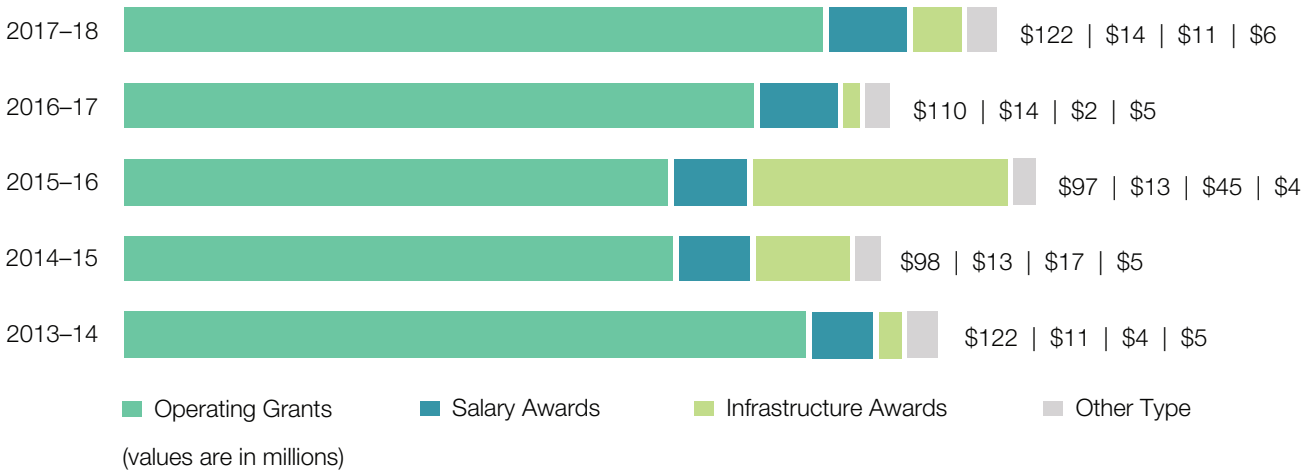
A breakdown of funding types and subtypes by fiscal year can be found in Figure 1. For FY 2017-18, the subtype of Operating or Project Operating Grants garnered the largest portion of research funding in its type category. Clinical Trials funding continued to increase (7.5%) over previous fiscal years.

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



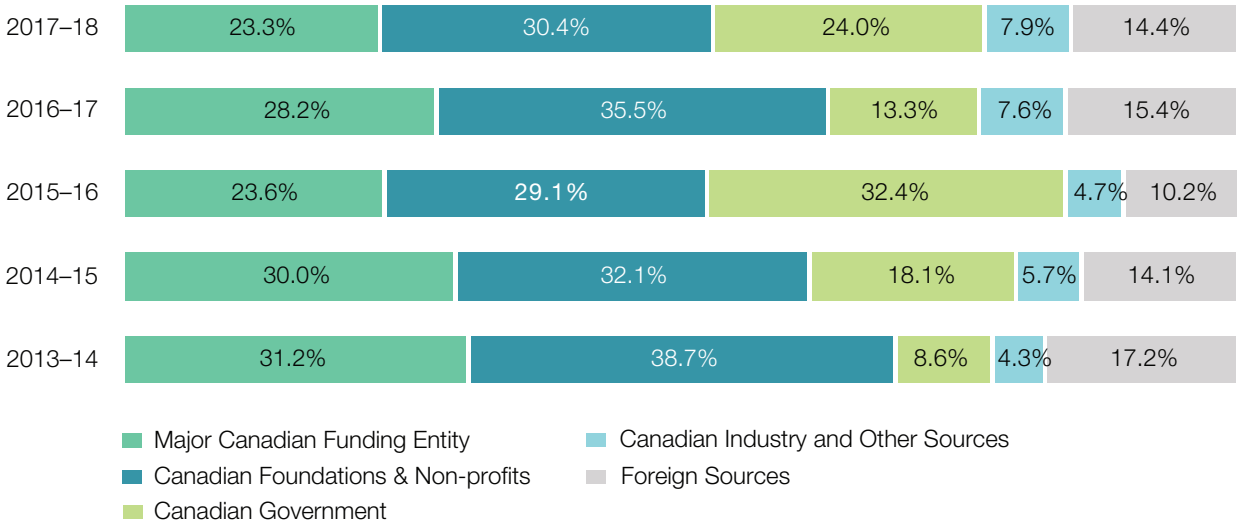
Research Support Fund grants total $3,973,494 and represent funding to support the indirect costs of research for tri-council awards, but is not included in total research funding or the figures below. Because research support is a shared expense between UBC and PHSA research agencies, PHSA has negotiated to receive 66% of the applicable UBC RSF grant. Figure 2 shows Total Research Funding by Fiscal Year and Type for the past five fiscal years. Of note is the increase in operating grant awards.

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, both Canadian Foundations & Non-profits and Major Canadian Funding entities decreased more than 5%. The increase in funding from Canadian Government is due to major CFI and BCKDF competitions this fiscal year. Canadian Industry and Foreign sources remained relatively stable from last year's levels.

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. 71, for sector definition) both by fiscal year and by agency for five fiscal years. As seen in previous graphs, the jump in Government sector funding is due to CFI and BCKDF infrastructure funding competitions. Of note is that overall funding has jumped 15.5% from FY 16-17 excluding the CFI/BCKDF funding.

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

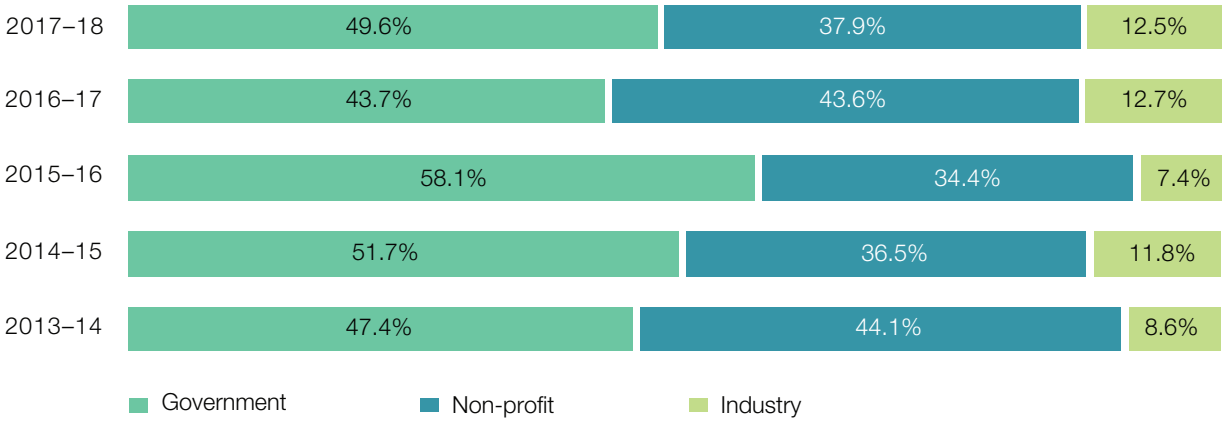
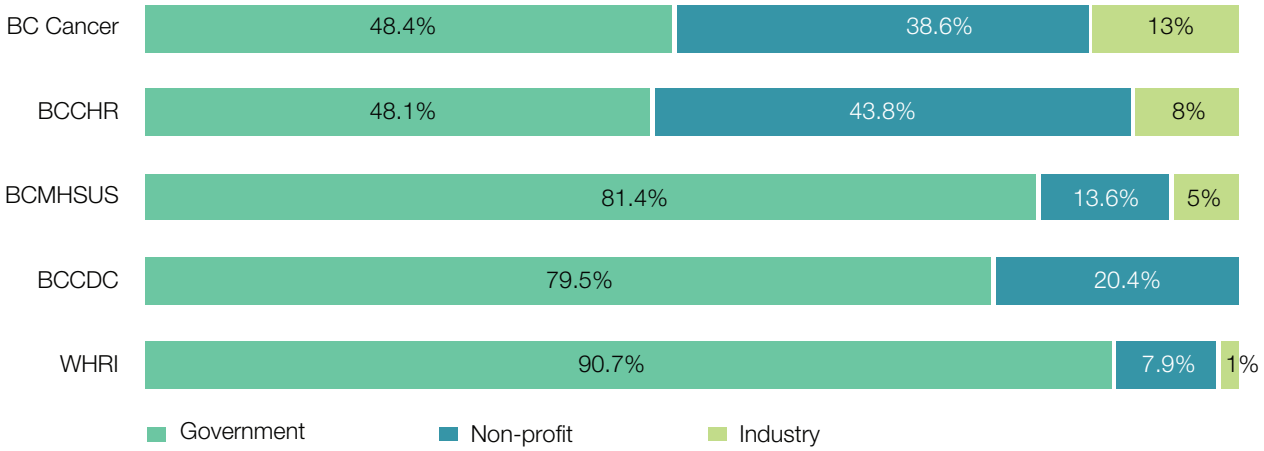


Figure 5 shows the percentage of funding by RISe sector and agency for FY 2017-18. This graph reflects the variations in funding sources for all PHSA research entities, as BCMHSUS, BCCDC and WHRI rely heavily on government funding.

FIGURE 5 Percentage of PHSA Research Funding by RISe Sector and Agency



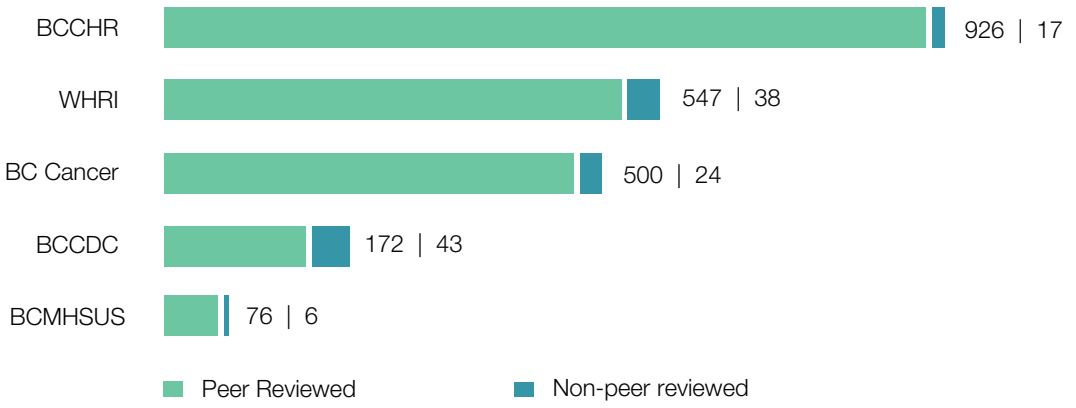
Now that the new CIHR funding scheme has been phased in, the application success rate is reported for three separate grant opportunities for FY 17-18: 1) The 2017-18 Foundation Grant Open competition, 2) The October 2017 Project Grant competition, and 3) The March 2018 Project Grant competition. Results (see table 1) are shown for National and PHSA categories. PHSA was close to the national average for the 2017-18 Foundation Grant Open and the October 2017 Project Grant Competitions, and above the national average for the March 2018 Project Grant Competition.

TABLE 1 PHSA Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	PHSA Results % (Approved/Submitted)
2017-18 Foundation Grant (Open-Stage 3)	11.9% (36/303)	11.1% (1/9)
2017-10 Project Grant	15.9% (545/3,415)	15.4% (14/91)
2018-03 Project Grants	15.5% (408/2,633)	19.7% (15/76)

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 agency and category. Totals are reported by calendar year for all agencies. A breakdown by types is shown in the agency specific sections due to low sample size.

FIGURE 6 Total Number of Publications by Agency and Category



Building Research Capacity

PHSA research entities identified 807 researchers in categories 1, 2, and 5 in FY 2017-18, up 17 from FY 2016-17 (see Figure 7). 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 agency section. BC Cancer, BCMHSUS and BCCHR 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 agency 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 Fiscal Year

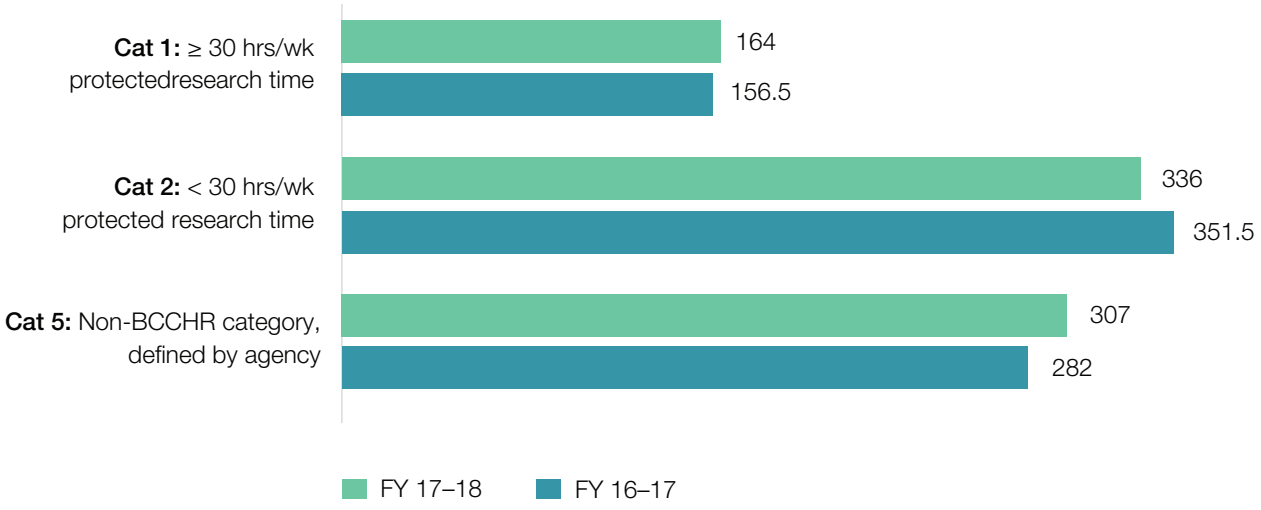


Table 2 provides summary statistics by agency at the Principal Investigator (PI) level. PHSA received funding for 378 Principal Investigators collaborating with 1,361 UBC co-investigators for 1,289 unique studies in FY 2017-18. This excludes Salary and Other award types as these are not designated for specific studies, and the number of co-investigators from other academic institutions.

TABLE 2 Number of Funded Studies, PI's, UBC Co-PI's and Award Amount by Agency

Agency	# of Unique Studies	# of Unique PI's by Agency	# of UBC Co-PIs by Agency	Total Award Amount
BC Cancer	557	150	677	79,758,637
BCCHR	623	176	485	46,333,776
WHRI	49	16	120	2,477,620
BCCDC	42	25	67	2,995,960
BCMHSUS	18	11	12	1,259,982
GRAND TOTAL	**1,289**	**378**	**1,361**	**$ 132,825,975**

During FY 2017-18, PHSA researchers provided training and supervision to a total of 1,970 research trainees, an increase of 283 or 17% from FY 2016-17. The increase in FY 17-18 can be attributed to more complete data collection, specifically in the Practicum, Co-op, Honours, and Directed Studies and Masters categories. 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

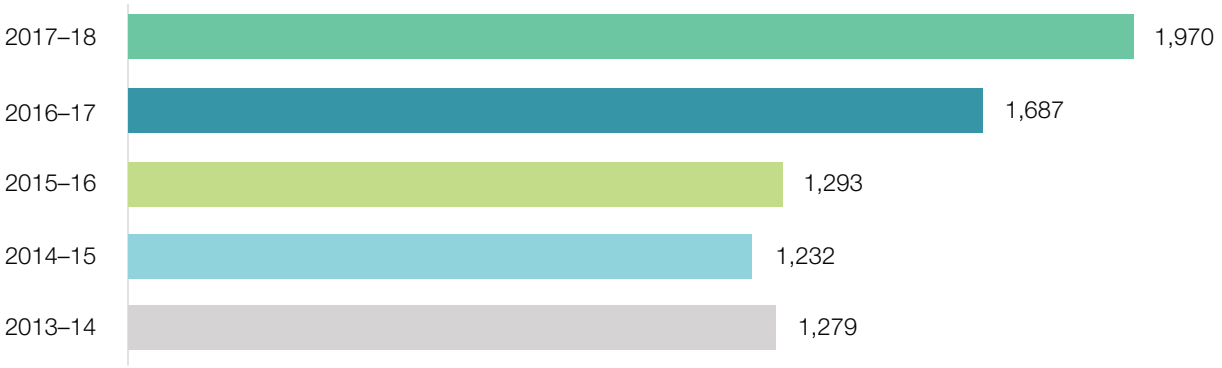
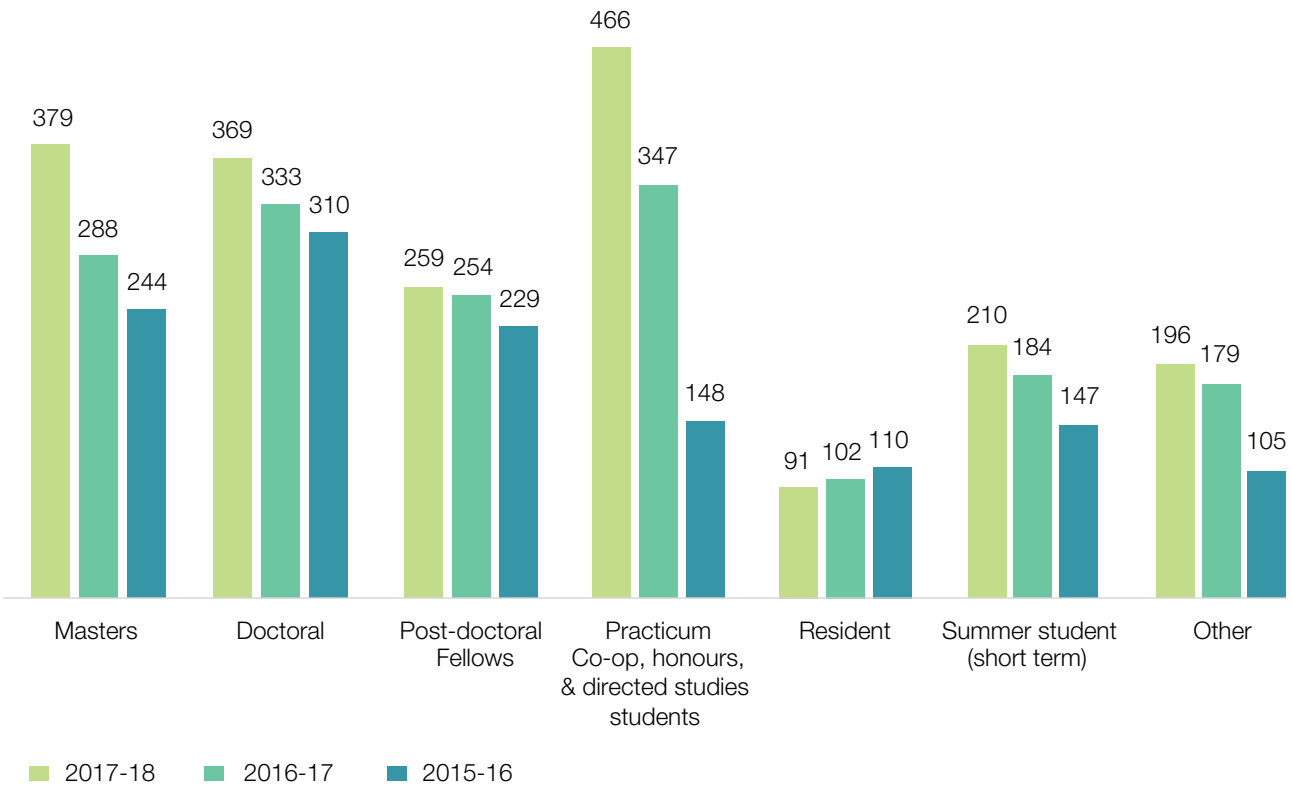


FIGURE 9 Total Number of PHSA Trainees by Type by Fiscal Year

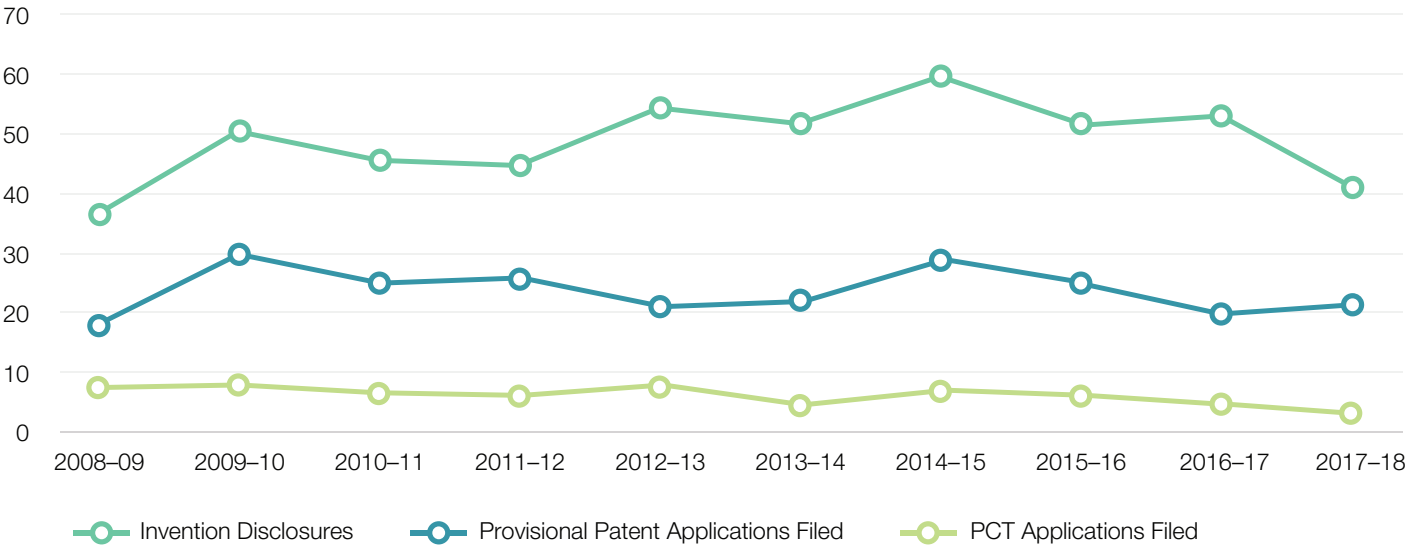


Achieving Economic Benefits and Innovation

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 BC Cancer and BCCDC (through the TDO), and BCCHR (through UILO). Agency specific IP related revenue data is provided in agency sections.

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

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

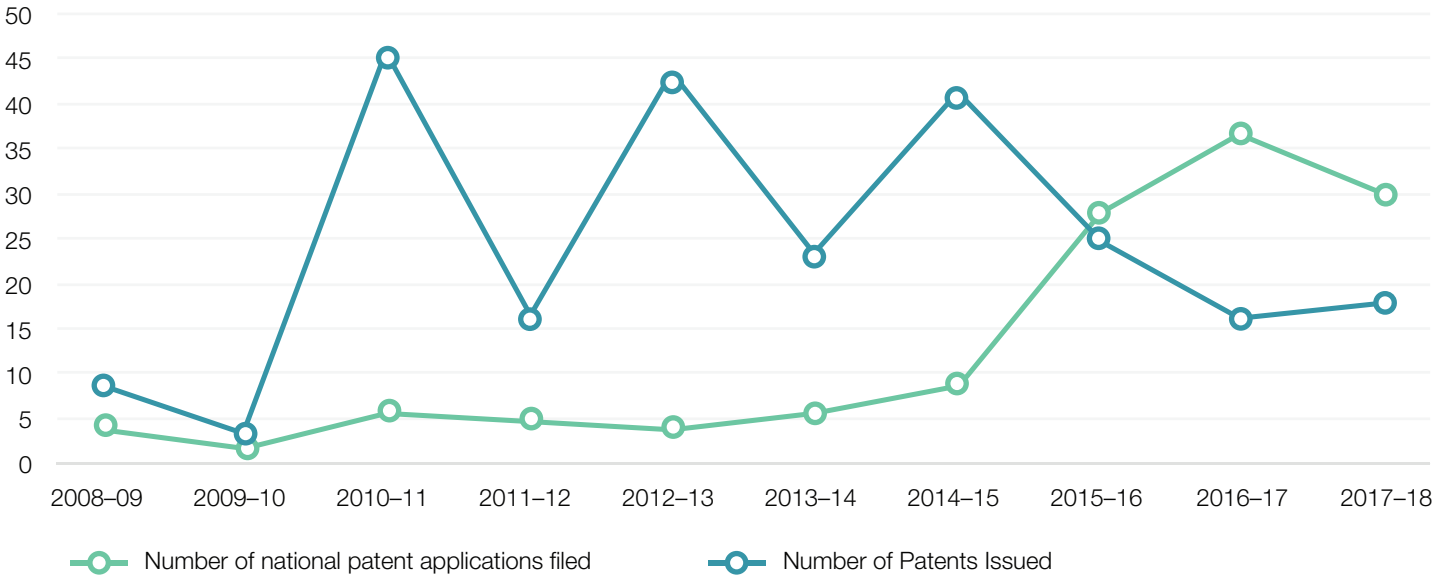
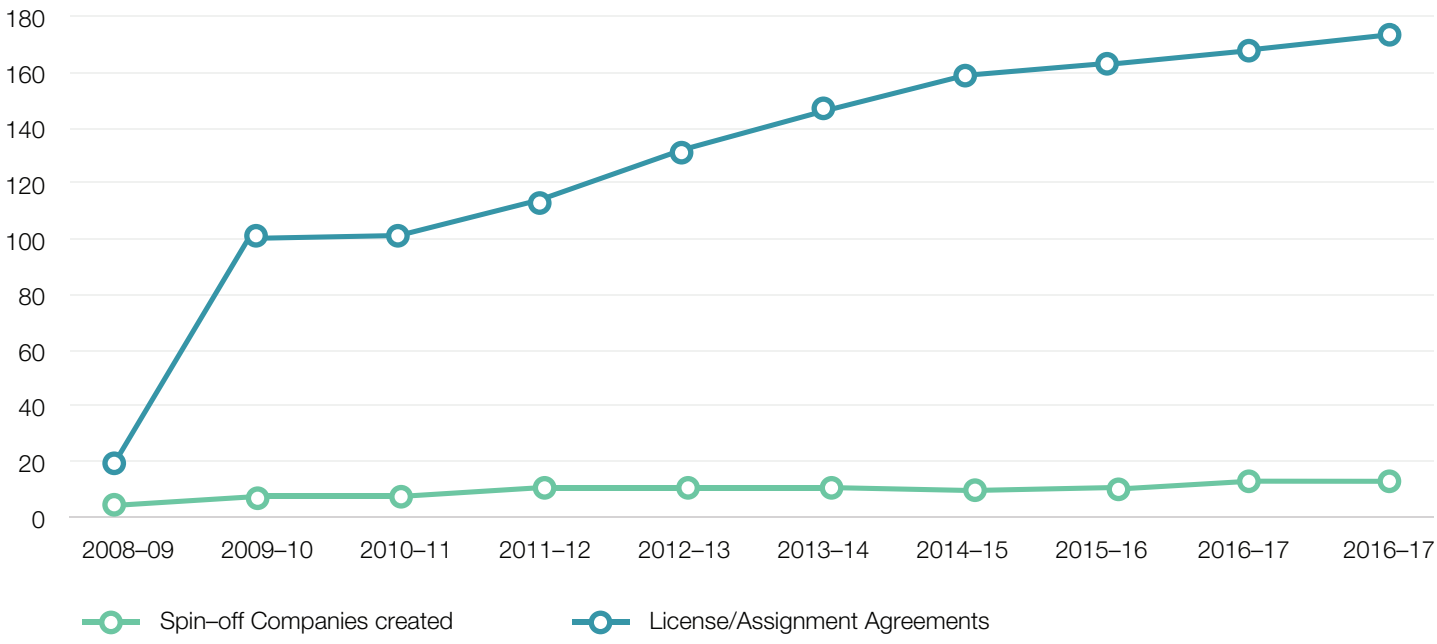


Figure 12 shows all licensing agreements and spin-off companies for both BC Cancer and BCCHR combined for the past 10 years. Agency specific numbers can be found in the agency section. Two spin-offs were created; Curvafix (BC Cancer) and ME Therapeutics (BCCHR).

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

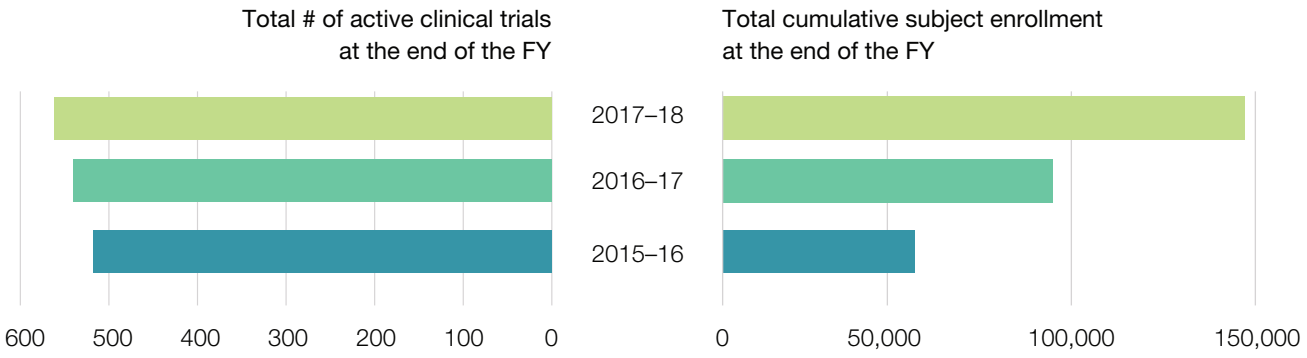


Advancing Health and Policy Benefits

For FY 2017-18, the number of clinical trials increased by 20 to 561. The large increase in enrollment, is primarily due to enrollment in the CLIP [Community Level Interventions for Pre-eclampsia) Study, which saw a 30,498 increase over last year. See Figure 13 for number of Clinical Trials and Total Cumulative Subject Enrollment by Fiscal Year.

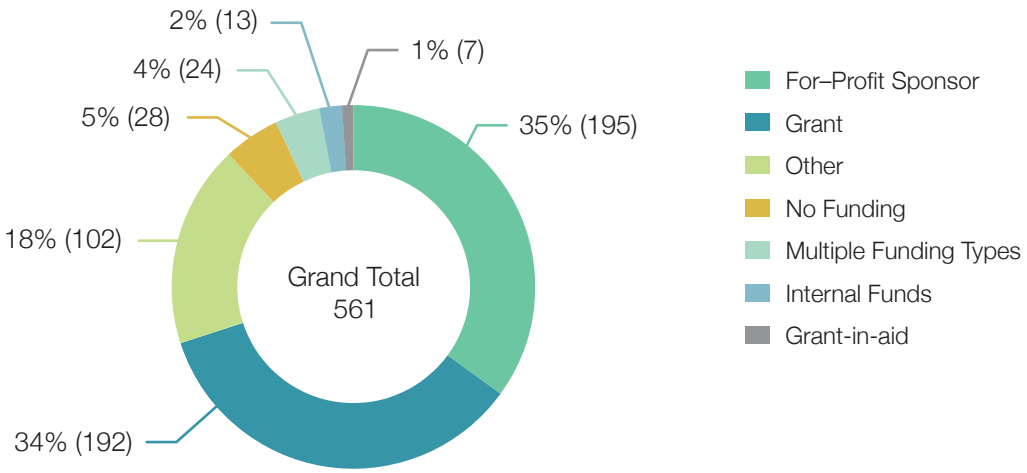
The opportunity to participate in clinical trials is an important metric because it offers patients the opportunity to participate in clinical evaluation of new drugs, many of which achieve therapeutic benefits beyond those offered by standard of care treatment. Clinical trials also represent the final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

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



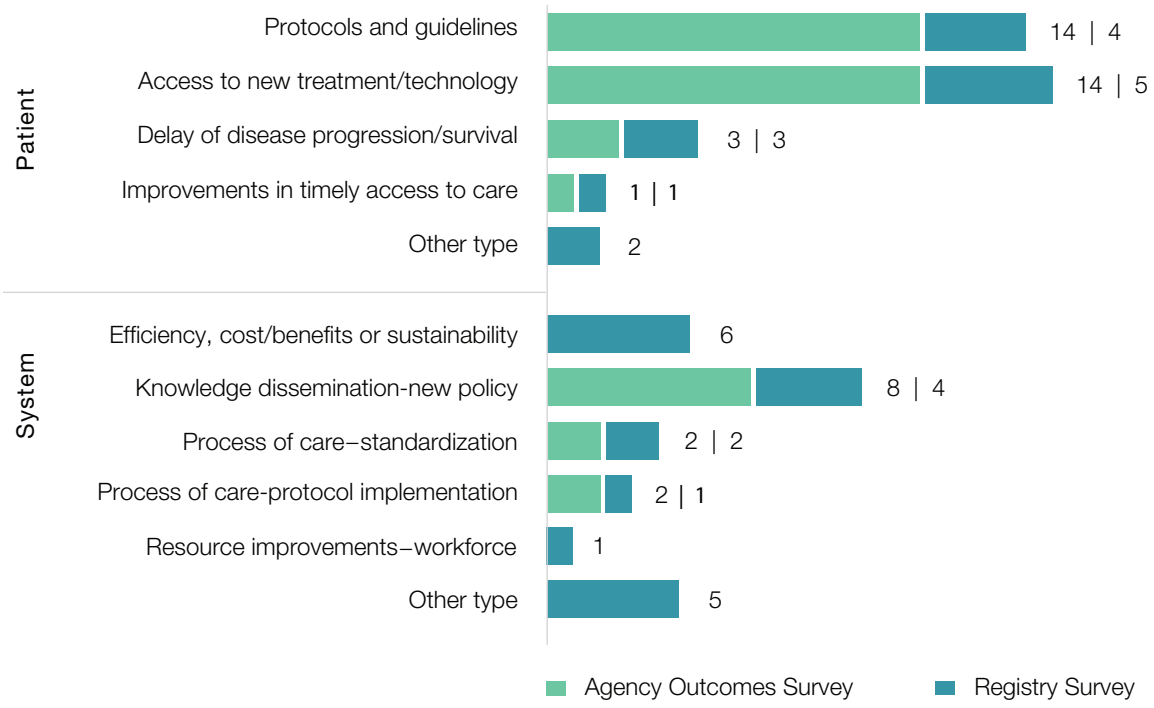
Grant funding type for Clinical Trials is sourced from the REB (Research Ethics Board) file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1, page 67 for a definition of funding types). The percentage of trials that are industry sponsored (For-Profit Sponsor) was 35%, down less than a half percent from FY 16-17. See Figure 14 for a breakout of trials by funding type percentage and the details on the number of trials in each category.

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



In FY 2017-18, the agencies completed the survey that asked respondents to identify guidelines, drugs, diagnostic agents or devices adopted or approved in FY 2017-18 because of research driven by PHSA researchers or collaborative research in which PHSA researchers were key participants. 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. Respondents were asked to classify the stated benefits into categories to more fully summarize the responses. These categories mirror the benefit categories utilized in the Registry Survey. Figure 15 is a summary of the classification of benefits realized through research at the agencies and with data from the registries, combined. These represent the top choice of category as many benefits were classified into more than one category (see agency sections for details). The other type category includes; engagement, research funding, standards and quality in biobanking, access to health controls, understanding outcomes, and injury prevention.

FIGURE 15 Classification of Benefits Summary for FY 2017-18 for All Agencies & Registries



BC CANCER

Producing and Advancing Knowledge

In FY 2017-18, researchers affiliated with BC Cancer were awarded a total of $86,000,114 in research funding which represents a $17,486,143 increase over FY 16-17. Of note is the amount awarded as Operating Grants ($71,752,208) which represents a 25% increase over FY 2014-15 levels that is independent of major infrastructure awards from CFI and BCKDF. Large infrastructure awards totaled $8,006,428 and were the results of large awards for the following; EPIC - Engineering precision immunotherapies for cancer; Rare isotopes for cancer therapy; Canada's genomics enterprise (CGEn): A national genomic tools network for transforming life science research; and CanDIG: Canadian distributed cyber-infrastructure for genomics. A breakdown of funding types and subtypes can be found in Figures 16.

BC Cancer's portion of the Research Support Fund grant for FY 2017-18 is $1,649,207 but is not included in total research funding or the figures below.

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

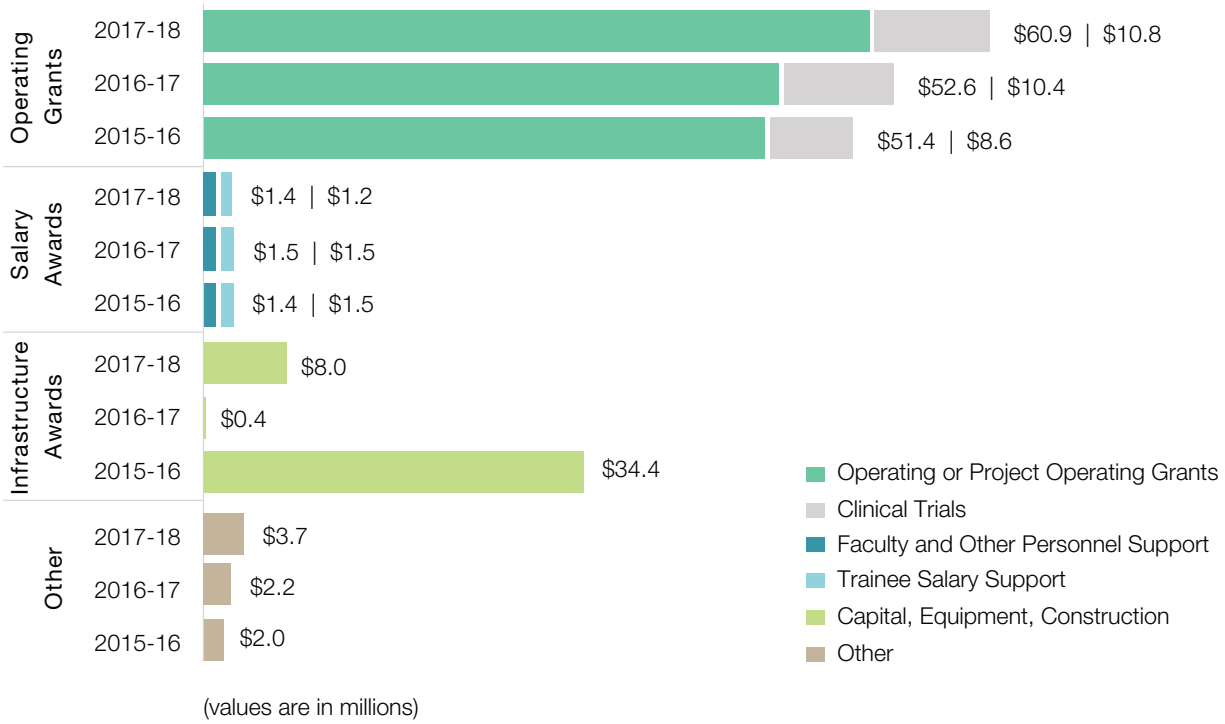
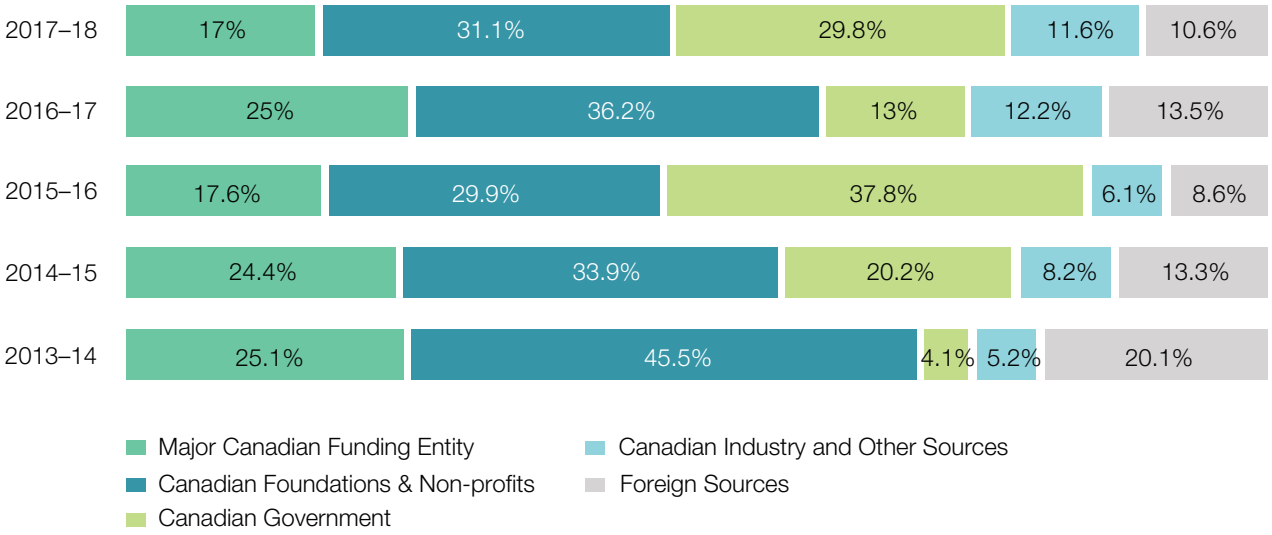


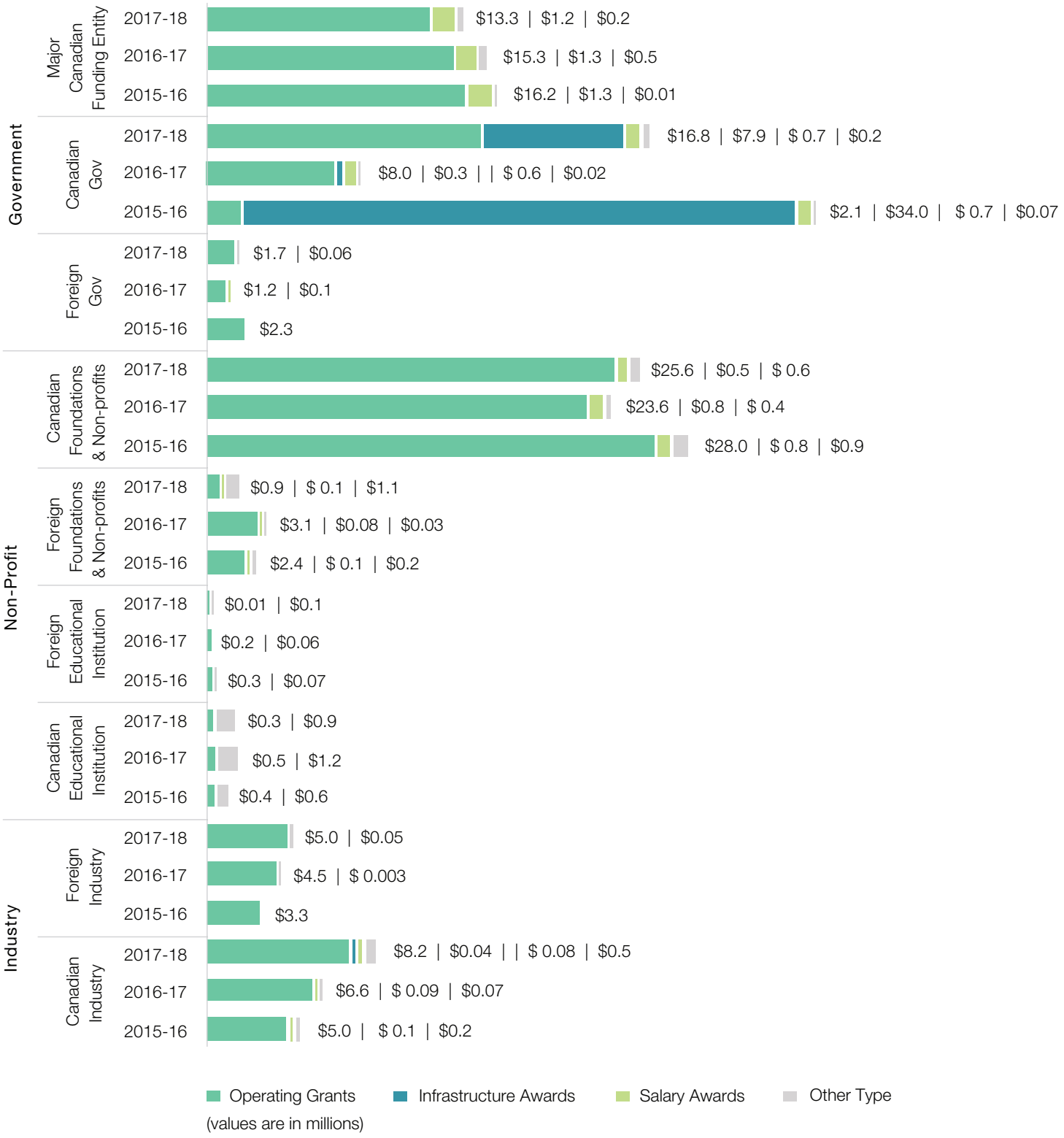
Figure 17 shows the percentage of funding by funding source category for the past 5 fiscal years. The Major Canadian Funding Entity category includes CIHR and its Institutes, Genome Canada and the Provincial Genome Agencies, Michael Smith Foundation for Health Research (MSFHR), Natural Sciences & Engineering 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. Of note this FY, is the increase in Canadian Government funding due to CFI/BCKDF infrastructure competitions during the fiscal year.

FIGURE 17 Percentage of BC Cancer Research Funding by Funding Source Category by Fiscal Year



As in the PHSA overall section, BC Cancer's Total Award Funding is shown by RISe sector, Funding Source Category and Funding Type. In FY 17-18, the top funding sources are Canadian Government, Canadian Foundations & Non-profits, and Major Canadian Funding Sources (CIHR, MSFHR, NSERC, SSHRC and Genome Canada). Figure 18 details the major funding categories by funding type.

FIGURE 18 BC Cancer Research Funding by RISe Sector, Funding Source Category and Type by Fiscal Year



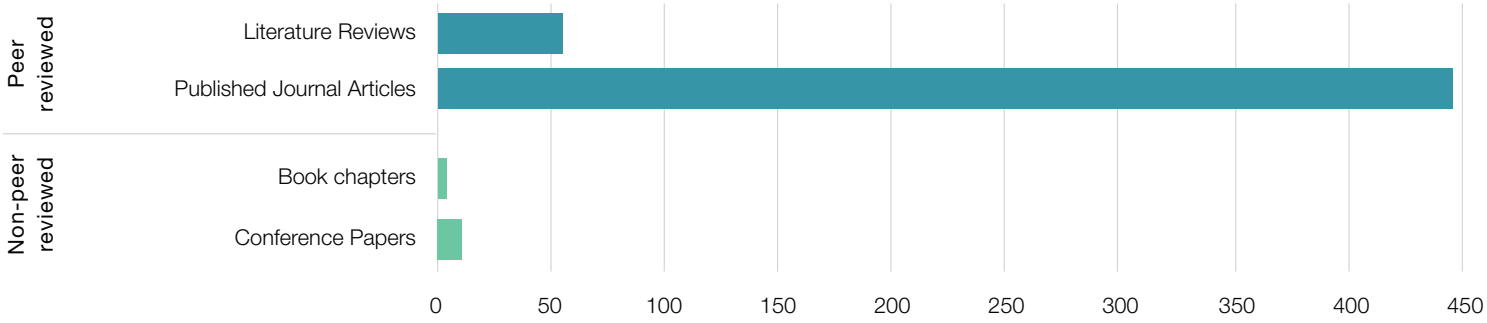
Reporting for CIHR Funding competitions includes one Foundation Grant and two Project Grant competitions during FY 2017-18. While BC Cancer did not receive any Foundation Grant awards, they were successful in both Project Grant competitions for a total of 8 awards, beating the national average in the March 2018 competition.

TABLE 3 BC Cancer Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BC Cancer Results % (Approved/Submitted)
2017-18 Foundation Grant (Open-Stage 3)	11.9% (36/303)	0% (0/5)
2017-10 Project Grant	15.9% (545/3,415)	8.8% (3/34)
2018-03 Project Grants	15.5% (408/2,633)	19.2% (5/26)

Total number of publications by type and category of peer vs. non-peer review is seen in Figure 19. BC Cancer had a total of 524 publications, with a majority of published journal articles. The large increase over last FY is due to the discovery of technical issues related to Scival data collection.

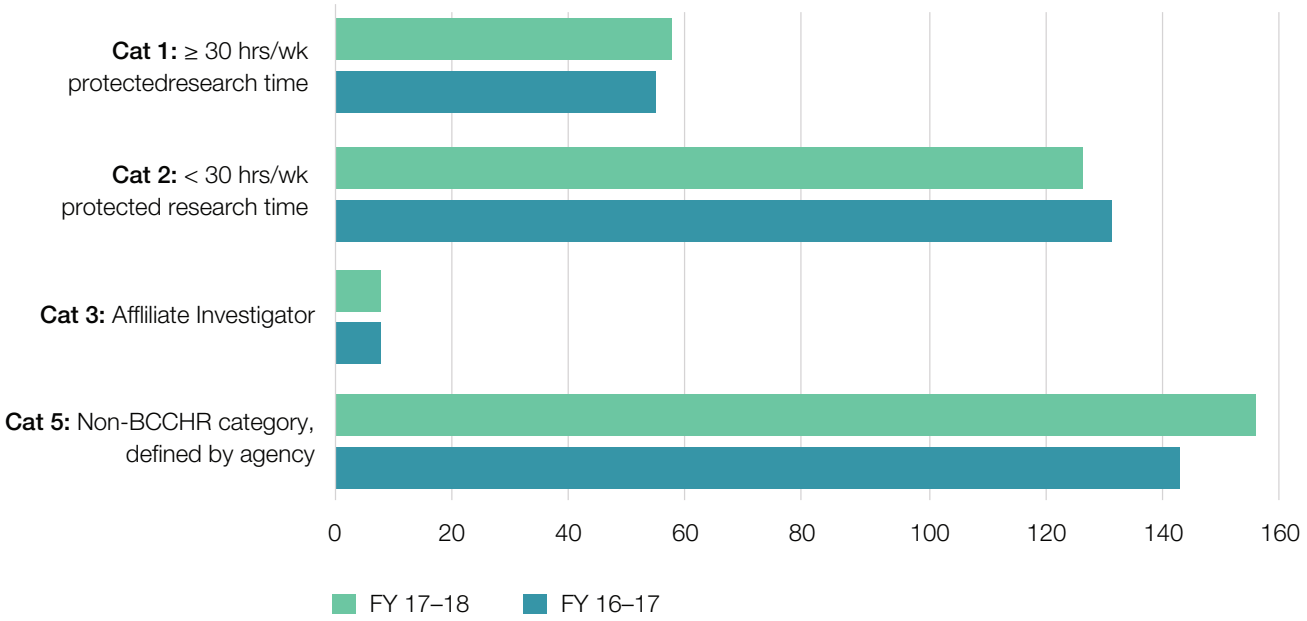
FIGURE 19 Total Number of BC Cancer Publications by Type and Category



Building Research Capacity

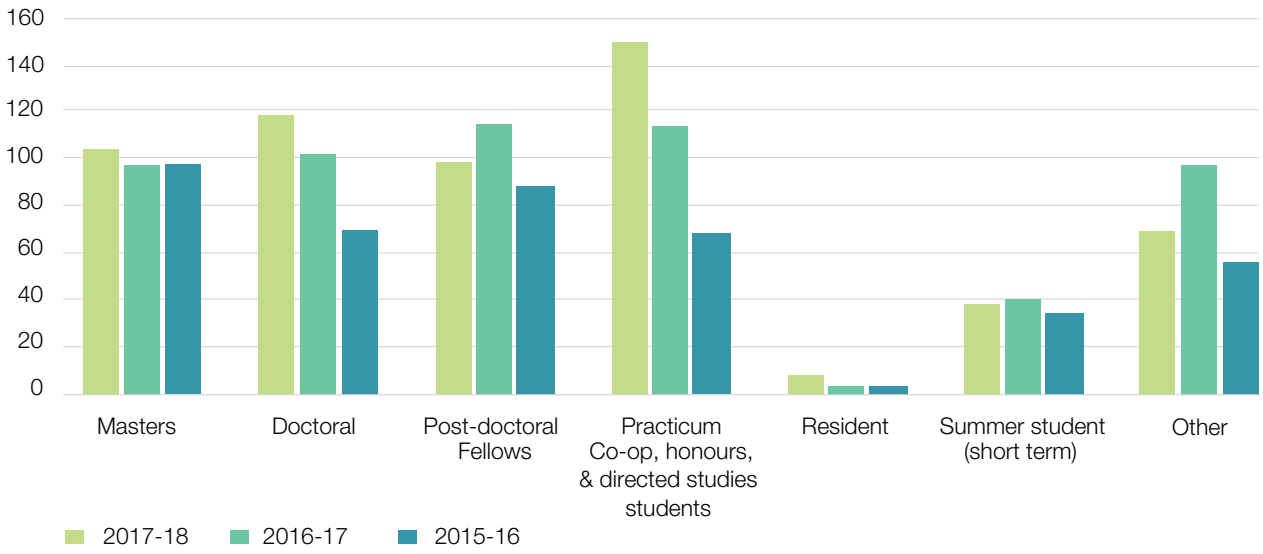
BC Cancer has a total of 342 researchers in FY 2017-18 in categories 1, 2, and 5. While adoption of the BCCHR category classifications is in place, a significant amount (157) of the total researchers are in Category 5, which is an agency specific category used to describe researchers that do not meet BCCHR category classifications. For BC Cancer, the majority of Category 5 researchers are Medical or Radiation Oncologists, Program or Practice Leaders, Research Scientists 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 BC Cancer Researchers by Category and Fiscal Year



During FY 2017-18, BC Cancer researchers provided training and supervision to a total of 580 trainees. 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. Some variability results from the manual data collection process.

FIGURE 21 Total Number of BC Cancer Trainees by Type and Fiscal Year



BC Cancer Technology Development Office (TDO) Activities

Patent Activity has remained relatively stable over the last ten fiscal years (see Figure 22). Invention disclosures are primarily internal BC Cancer documents, filed with 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. For a third year, there is a large number of issued patents during the FY. Top startups with issued patents include Essa (5), ARTMS (4) Coastal Genomics (2) and Verisante (2). A notable licensee with significant number of issued patents was Nanostring (4). Once technologies are licensed, then the partner typically funds patent filings in multiple countries and is especially true for new pharmaceuticals. See Figure 23 for a breakdown by fiscal year.

FIGURE 22 BC Cancer TDO Invention Disclosures, Provisional Patent and PCT Applications by Fiscal Year

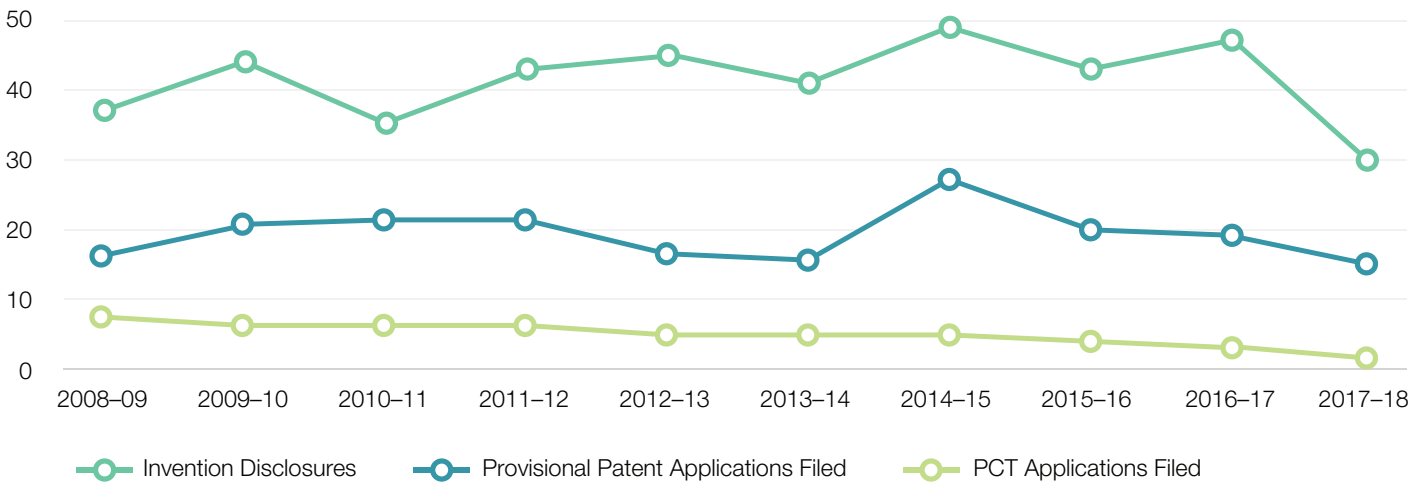
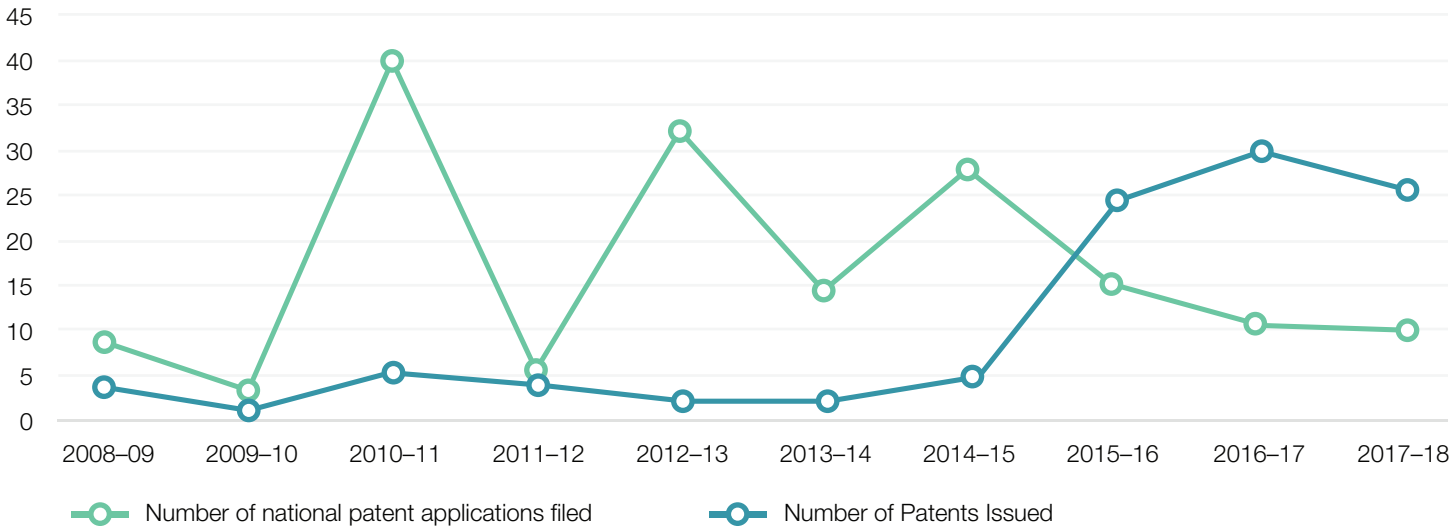
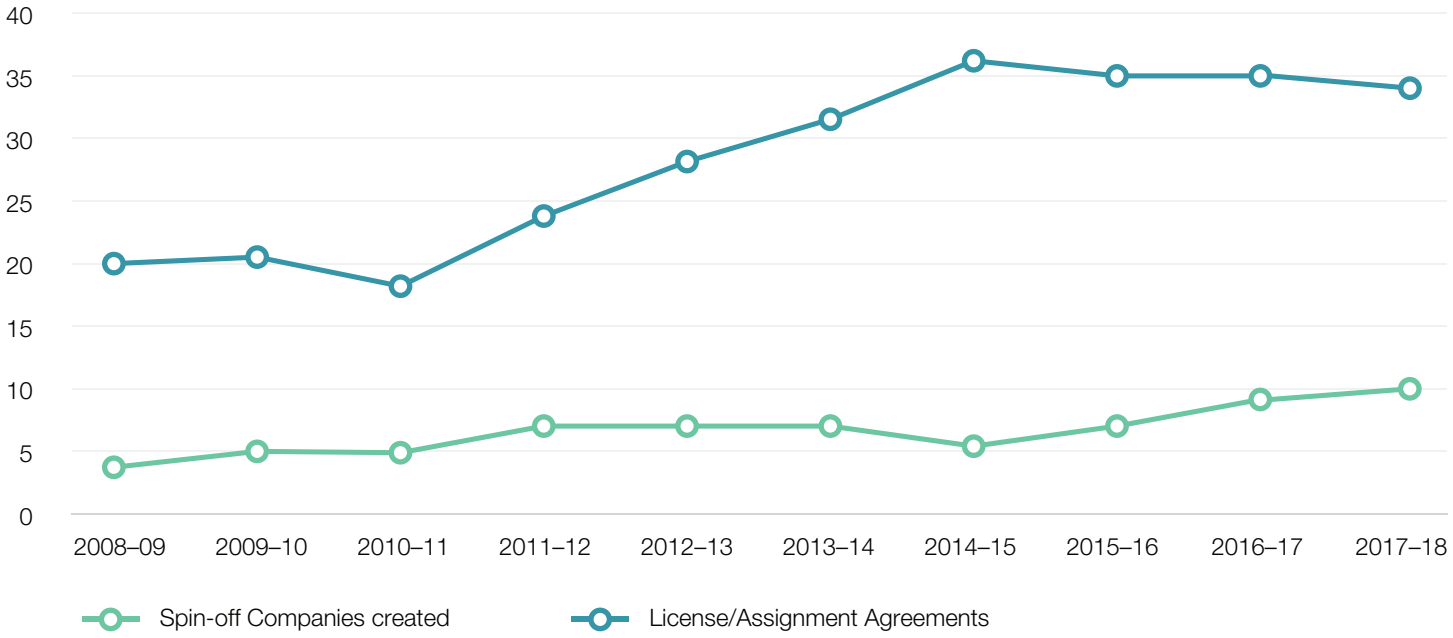


FIGURE 23 BC Cancer TDO National Patent Activity by Fiscal Year



In FY 2017-18, there were 34 active license agreements (see Figure 24), including four (4) new license/assignment agreements. There was one (1) new spin-off company created; Curvafix Inc., a new Seattle based startup company developing a surgical product for hip repair. It's intellectual property held jointly between UBC and a BC Cancer PI. Other active Spin-off companies include Aquinox Pharmaceuticals, Essa Pharmaceuticals, Repeat Diagnostics, Verisante, Logipath Medical, Qing Bile Therapeutics, Metera Pharma and Fusion Genomics.

FIGURE 24 BC Cancer 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 69) is reported in Table 4. Expenses related to patenting, license IP and legal costs totaled $372,583.35 in FY 2017-18. Realized licensing revenue per the distribution agreements totals $285,169.34 with $91,192.97 to PHSA and $193,976.37 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 4 TDO IP Related Revenue

IP Related Revenue	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18
Royalties	$731,038.63	$337,646.78	$765,483.79	$410,845.30
Equity Liquidated	$37,032.37	$257,794.00	$101,351.28	$303,880.54
License Fees	$200,740.00	$111,500.00	$149,840.95	$113,517.95
License Management	$358,490.88	$299,798.18	$237,120.85	$154,190.87
Option Fees		$5,000.00		
Technology Assignment				
GROSS LICENSING REVENUE (TOTAL)	**$1,327,301.88**	**$1,011,738.96**	**$1,253,796.85**	**$982,434.66**

Advancing Health and Policy Benefits

See Table 5 for a detailed breakdown of clinical trial activity by fiscal year. Of note, is that approximately 16% of BC Cancer trials had no enrollment figures in the REB applications, an improvement of 5% over last fiscal year. Once these fields are made mandatory as opposed to optional, enrollment figures should increase.

TABLE 5 BC Cancer Clinical Trials

	12-13	13-14	14-15	15-16	16-17	17-18
Total Number of Clinical Trials active during the FY	300	321	317	303	321	309
Status of the Trial at the end of the FY:						
Total Number of Active Trials	212	274	234	249	265	257
Total Number of Trials that closed during the FY	88	47	83	54	56	52
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	35,899	36,653	41,867	41,598	44,305	43,064
Total Cumulative Subject enrolment at the end of the FY	25,515	27,299	28,521	29,244	30,084	34,573

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 72 for a definition of funding types). This information can be used to trend the percentage of trials that are industry sponsored. Forty-three percent (43%) of BC Cancer Clinical Trials are Industry funded.

FIGURE 25 BC Cancer Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the Fiscal Year

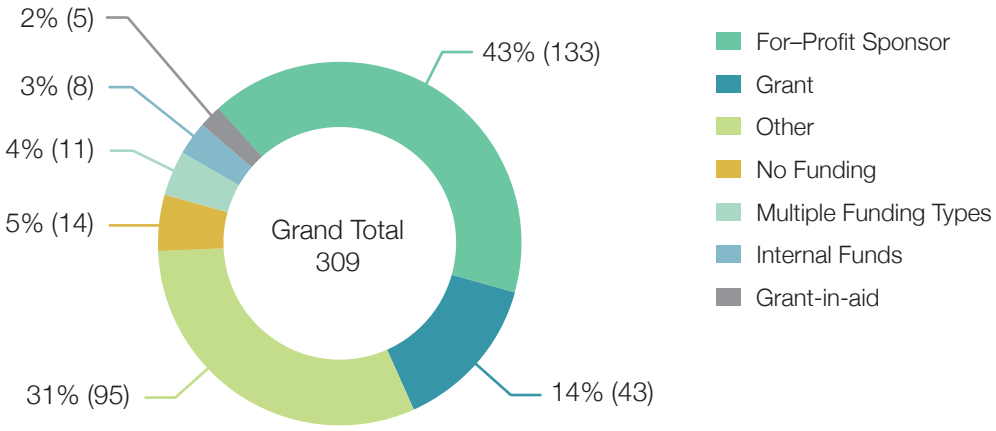


Table 6 reflects BC Cancer's Top Three Achievements/Accomplishments/Highlights which include awards, citations, or clinical programs, either in progress or historical, that are relevant to the FY 17-18 timeframe.

TABLE 6 BC Cancer Top Three Achievements/Accomplishments/Highlights

5-YEAR ANNIVERSARY OF POG - PERSONALIZED ONCOGENOMICS

The BC Cancer Personalized OncoGenomics (POG) program is a clinical research initiative studying the impact of embedding whole genome sequencing into real-time treatment planning for British Columbian patients with metastatic cancers. It is a collaborative research study including many BC Cancer oncologists, pathologists, other clinical staff, researchers and technical personnel.

Since the launch of the program in 2012, POG has successfully recruited 1,000 patients with metastatic cancer into the program, and completed sequencing and analysis on more than 600. For those 600 patients and their clinicians, they had access to additional personalized information to inform their treatment decision options through this research program. BC Cancer is the only centre in the world conducting a study of the scope and scale of POG.

The majority of the funding for the direct cost of POG come from BC Cancer Foundation and its donors, and that funding has been leveraged for even more funding to support advanced research equipment, trainees and related research programs such as the Terry Fox Research Institute's Canadian Comprehensive Cancer Centre Network and a new pan-Canadian clinical trial called CAPTUR, which will further align patients in POG with targeted treatments

In 2017, POG research resulted in eight publications in peer-reviewed journals, from studies identifying genomic signatures that can predict responses to some treatments for breast cancer patients and the molecular characterization of metastatic pancreatic tumours to analyzing the cost-trajectory of using whole-genome analysis to guide treatment decisions. Ten presentations were delivered at high profile clinical or scientific events and several news stories were published, including an award-winning documentary on CBC's Nature of Things called Cracking Cancer.

Over the past 5 years, the POG program team has grown to include more than 200 people from across BC Cancer, including at all regional centres. The impact and momentum of the resulting collaborations will continue to foster research studies and advances in clinical translation and outcomes for the foreseeable future.

ESTABLISHMENT OF BIOCANCER INITIATIVE

The Centre for Lymphoid Cancer at BC Cancer has recently joined forces with the breast and prostate tumor groups lead by Drs. Stephen Chia, Sam Aparicio and Kim Chi respectively to establish the BioCancer initiative. The purposes of this initiative are to create a province-wide BioBank to collect and store biospecimens for translational research and to build comprehensive research and clinical databases housing clinical outcome and analysis data for each tumor type. Its integrated system of six cancer centers across BC has allowed recruitment of cancer patients and specimen acquisition from across the province for translational research, overcoming under-representation of the patient population from remote areas such as the Northern region. This multi-disciplinary collaboration among the lymphoma, breast and prostate groups has built the core infrastructure system, which can be extended to other tumor groups within the BC Cancer for extensive tumor collection through this BioCancer Initiative. Using the biospecimens collected, we are able to study the fundamental biology of each tumor type and fully characterize genetic and molecular profiles which can be used to improve diagnostic precision and develop more effective therapies.

MOLECULAR AND CLINICAL CHARACTERIZATION DIFFUSE LARGE B CELL LYMPHOMA

Diffuse large B cell lymphoma (DLBCL) is an aggressive form of B-cell non-Hodgkin lymphoma (NHL) and the most common type of NHL. With its heterogeneous nature in clinical behavior, morphology and immune-phenotype, reliable biomarkers are needed to accurately categorize the tumor subtypes. Recent advancement in gene expression profiling has defined clinically important predictive biomarkers based on "cell-of-origin" (COO), which categorizes DLBCL into two specific subtypes with distinct mutational patterns and clinical outcomes. MYC and BCL2 translocations are other genomic characteristics which are used as an additional prognostic tool to further characterize the COO subtypes to determine prognosis for DLBCL patients. The Lymphoid Cancer Research team at BC Cancer aims to delineate molecular and clinical characterization of B-cell NHLs harboring MYC translocations and to develop assays that can be used in the clinic to identify MYC-rearranged DLBCL for clinical management of this aggressive disease. They have published their findings to date in the journal *Blood*.

BC CHILDREN'S HOSPITAL RESEARCH (BCCHR)

Producing and Advancing Knowledge

In FY 2017-18, researchers affiliated with BCCHR were awarded a total of $57,779,434 in research funding, an increase of $2,607,284 (5%) over last FY. The amounts awarded as Operating Grants ($43,814,531) make up approximately 76% of total funding received and represent a 6.5% increase over last FY. A breakdown of funding types and subtypes can be found in Figure 26.

BCCHR's portion of the Research Support Fund grant totaled $1,901,501, for FY 2017-18 but is not included in total research funding or the figures below.

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

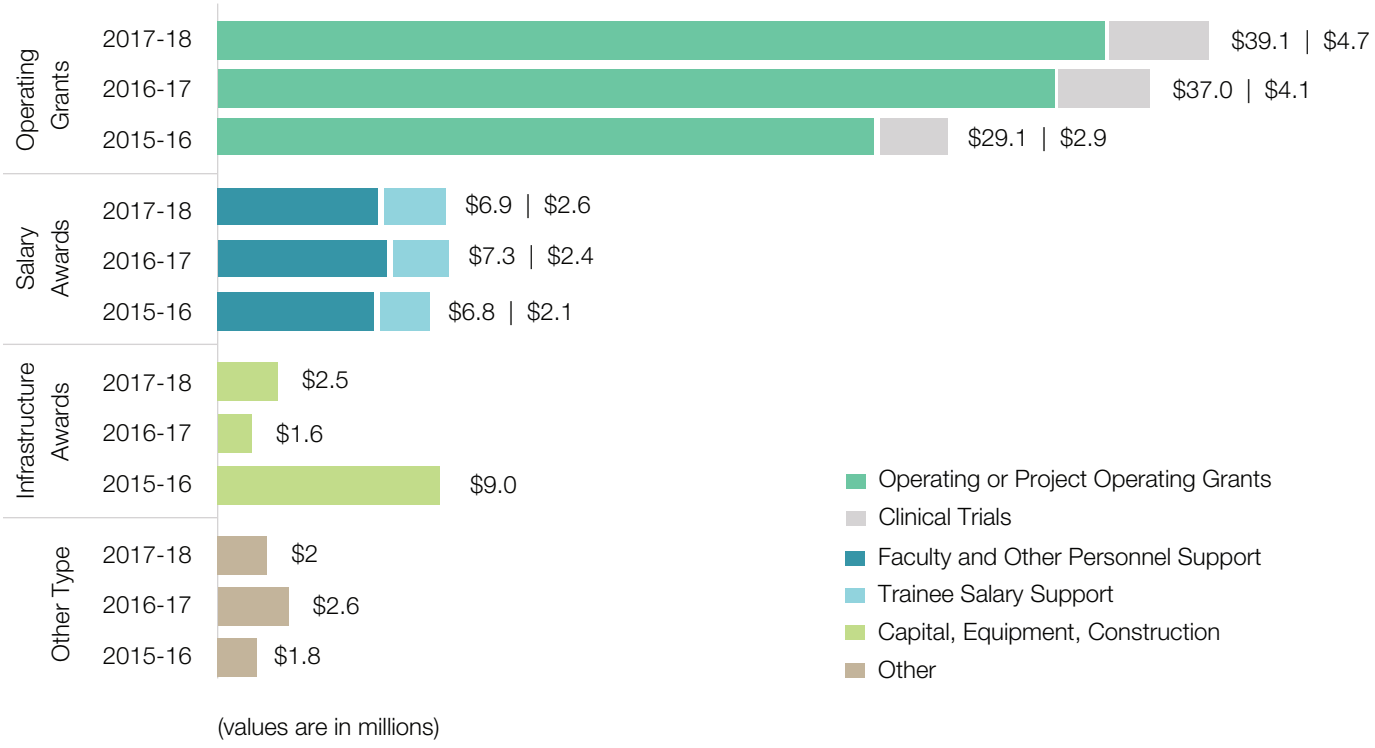
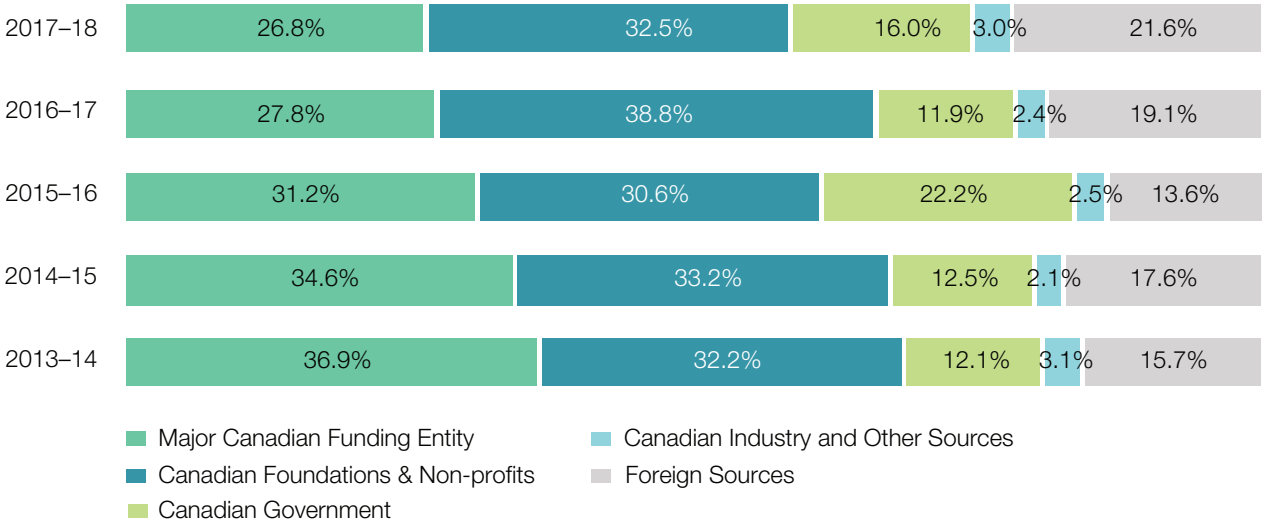


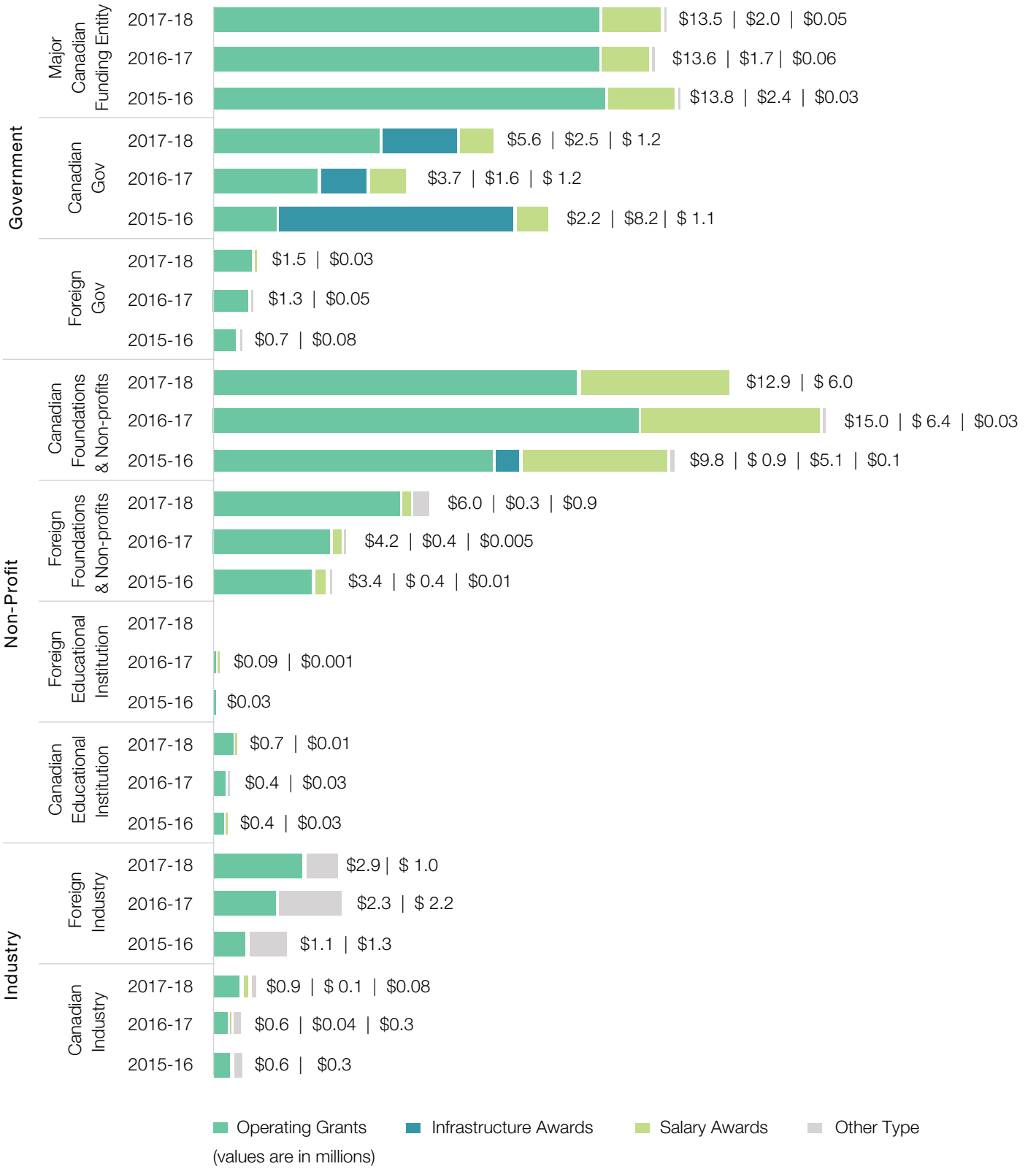
Figure 27 shows funding by funding source category. The change in percentage categories can be attributed to the CFI/BCKDF infrastructure awards in FY 17-18.

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



The top three funding categories are Canadian Foundations & Non-Profits (32.5%), Major Canadian Funding Entity (26.8%), and Canadian Government (16%). Figure 28 details the RISe sector and funding categories by funding type.

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



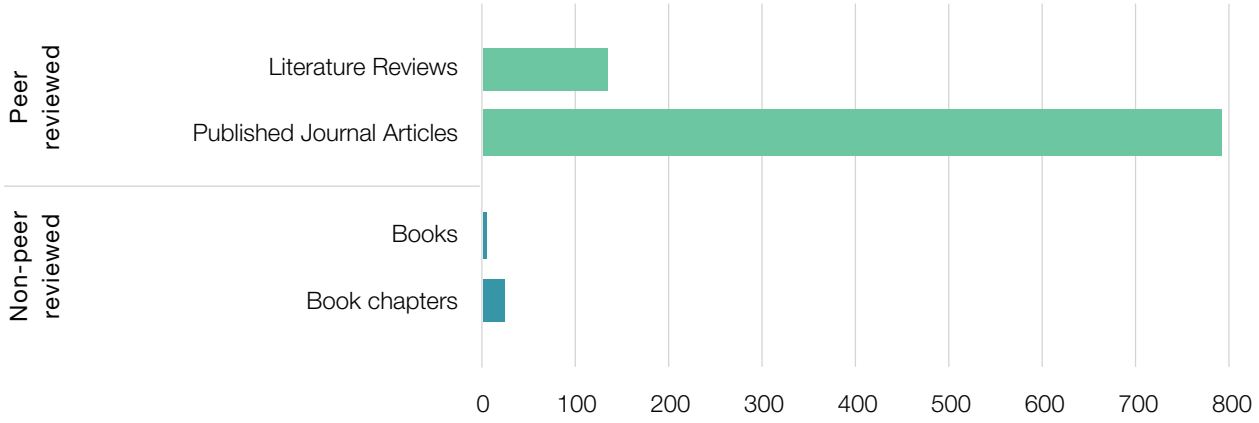
Reporting for CIHR Funding competitions includes one Foundation Grant and two Project Grant competitions during FY 2017-18. BCCHR received approval for one Foundation Grant award and was successful in both Project Grant competitions for a total of 13 awards, beating the national average in all three competitions.

TABLE 7 BCCHR Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BCCHR Results % (Approved/Submitted)
2017-18 Foundation Grant (Open-Stage 3)	11.9% (36/303)	50.0% (1/2)
2017-10 Project Grant	15.9% (545/3,415)	16.7% (6/36)
2018-03 Project Grants	15.5% (408/2,633)	19.4% (7/36)

BCCHR had 943 publications in calendar year 2017, with 98% 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 agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency. BCCHR includes case reports and essays in journal articles and accepts e-journal articles.

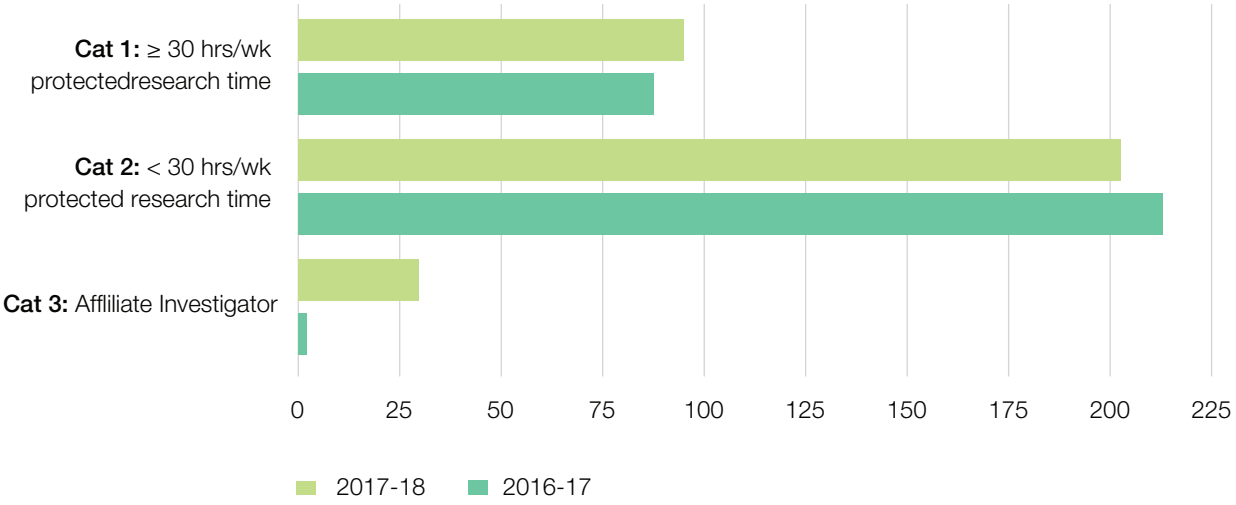
FIGURE 29 Total Number of BCCHR Publications by Type and Category



Building Research Capacity

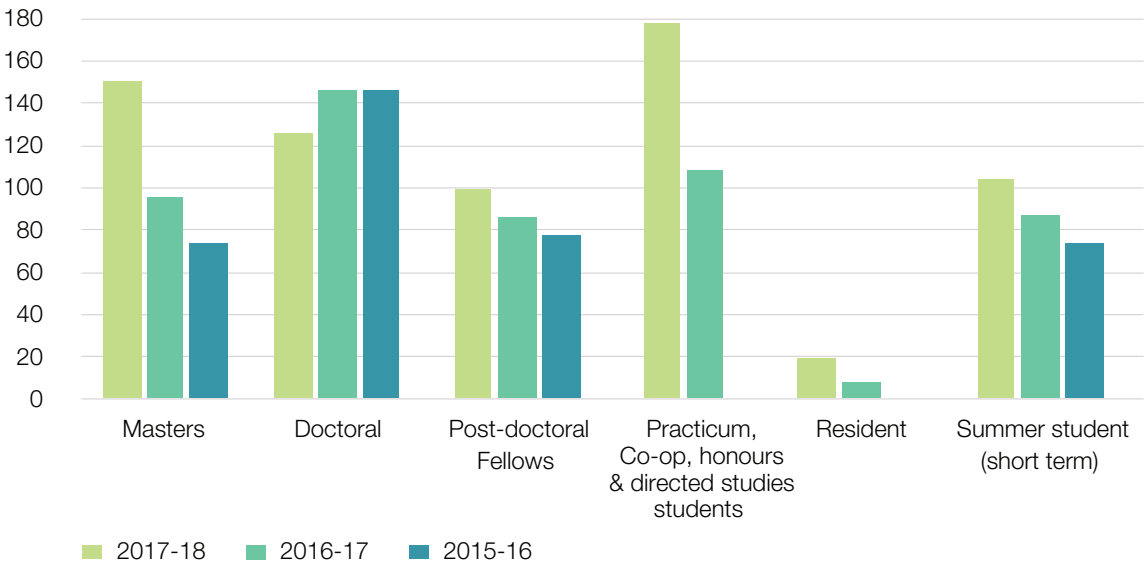
BCCHR has a total of 296 researchers in categories 1 and 2 and 30 affiliate researchers. The distribution of these researchers is represented in Figure 30. Researchers in categories 1 and 2 are primarily based on the Children's & Women's Health Centre of BC campus with the largest proportion of the members 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 (30 in FY 2017-18) 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. There is one additional category, Emeritus/Emerita Investigators who have prior status as an investigator with BCCHR.

FIGURE 30 Total Number of BCCHR Researchers by Category and Fiscal Year



During FY 2017-18, BCCHR researchers provided training and supervision to a total of 678 (up 148 from FY 2016-17) trainees. This increase was due to better data collection and definition of specific categories. See Figure 31 for number of trainees by type. BCCHR currently tracks full-time research trainees (masters, doctoral and postdoctoral fellows) and summer students undertaking their training at BCCHR.

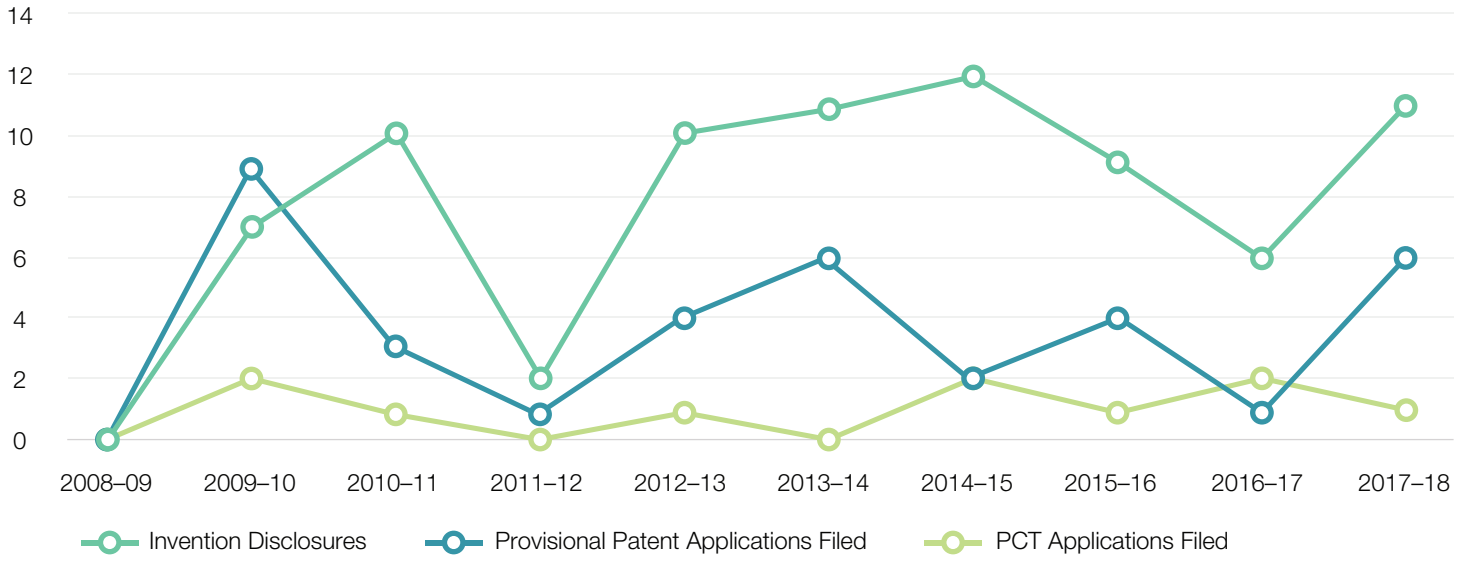
FIGURE 31 Total Number of BCCHR Trainees by Type and Fiscal Year



Achieving Economic Benefits and Innovation

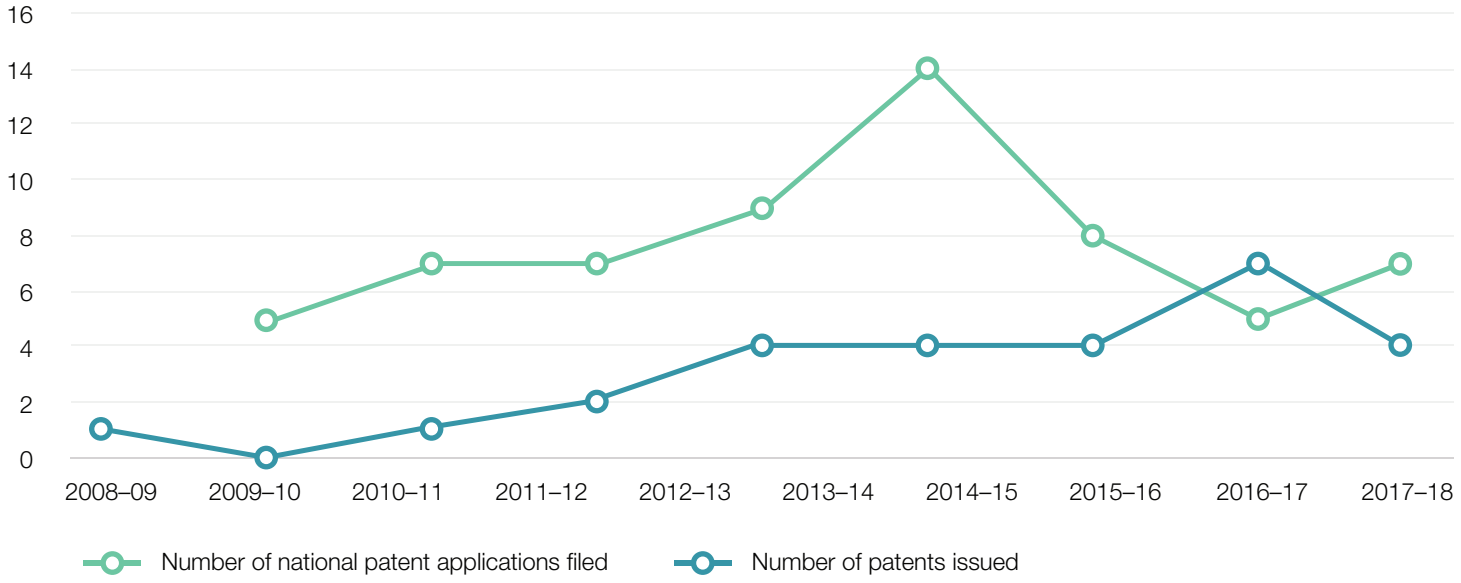
The number of invention disclosures, provisional patent and PCT applications filed by fiscal year are shown in Figure 32.

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



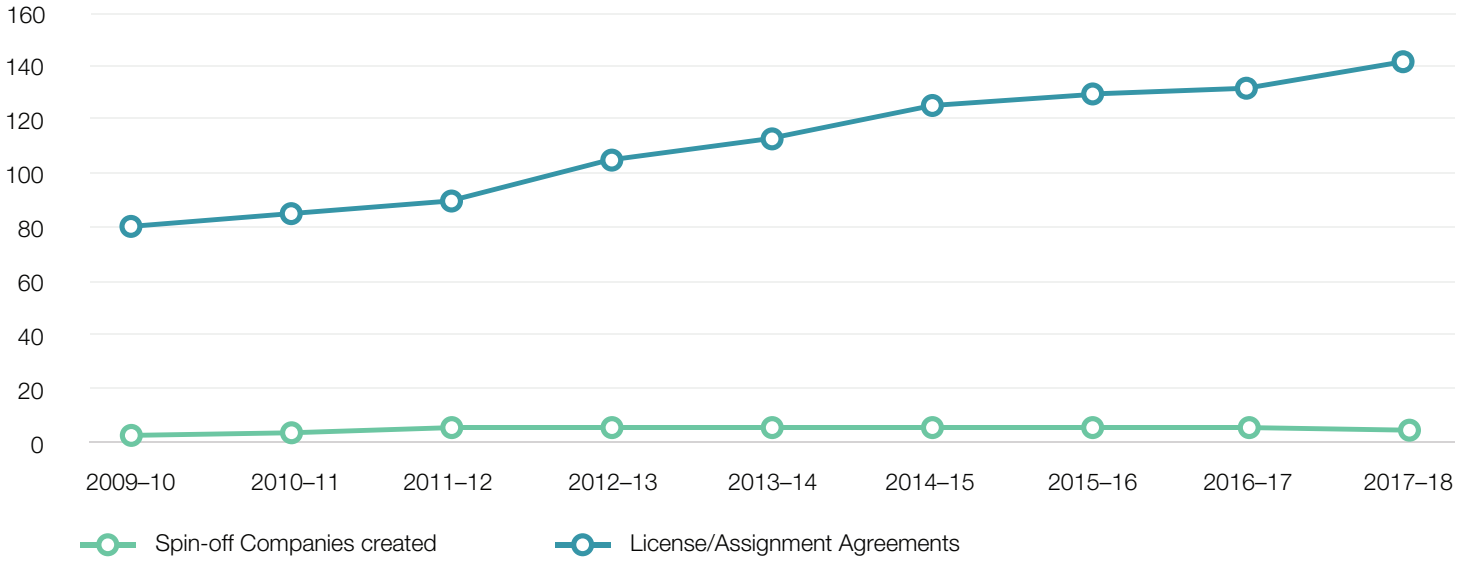
Patents are reported in Figure 33 below. Applications filed in a given year represent different applications than those which are approved in that same year (which typically are the result of applications in previous years). Data is collected and reported by the University of British Columbia University-Industry Liaison Office (UILO).

FIGURE 33 BCCHR National Patent Activity by Fiscal Year



In FY 2017-18 there were 141 active license/assignment agreements in place (See Figure 34), nine (9) new. One new spin-off company was created; ME Therapeutics, a company dedicated to the discovery and development of novel cancer immunotherapies. BCCHR also holds shares in Lions Gate Technologies. BCY Lifesciences and Urodymanix are both inactive. Xenon Pharmaceuticals (private) is held in trust by UBC so is not included in the totals below.

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



IP related line item revenue data for FY 17-18 is unavailable to report this year. BCCHR reported realized revenue per the distribution agreements for FY 2017-18 of $40,921.09.

TABLE 8 BCCHR IP Related Revenue

IP Related Revenue	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18
Royalties	$211,800	$178,795.65	$258,100	NA
Equity Liquidated				
License Fees				
License	$65,800		$36,600	NA
Option Fees				
Technology Assignment				
NET LICENSING REVENUE (TOTAL)	**$149,900**	**$178,795.65**	**$225,800**	**NA**

Advancing Health and Policy Benefits

See Table 9 for a detailed breakdown of clinical trial activity by fiscal year. There was no change in the percentage of BCCHR trials that had no enrollment figures (25%) and is high relative to the other agencies. The large increase in enrollment, is primarily due to enrollment in the CLIP [Community Level Interventions for Pre-eclampsia) Study. Once these fields are made mandatory as opposed too optional, enrollment figures should increase.

TABLE 9 BCCHR Clinical Trials

	12-13	13-14	14-15	15-16	16-17	17-18
Total Number of Clinical Trials active during the FY	154	166	183	180	198	195
Status of the Trial at the end of the FY:						
Total Number of Active Trials	101	133	143	152	154	153
Total Number of Trials that closed during the FY	53	33	40	28	44	42
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	10,037	120,491	102,505	103,936	106,212	102,916
Total Cumulative Subject enrolment at the end of the FY	1,851	7,023	31,379	26,846	57,789	108,720

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 67 for a definition of funding types). Sixty-three percent (63%) of BCCHR's Clinical Trials are Grant funded, with 27% Industry funded, a 6% increase of last fiscal year.

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

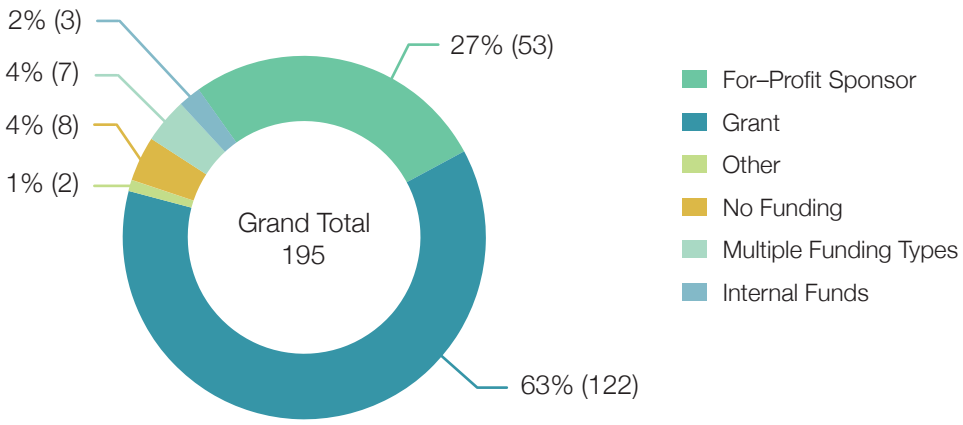


Table 10 reflects BCCHR's Top Three Achievements/Accomplishments/Highlights which include awards, citations, or clinical programs, either in progress or historical, that are relevant to the FY 17-18 timeframe.

TABLE 10 BCCHR Top Three Achievements/Accomplishments/Highlights

BC CHILDREN'S HOSPITAL RESEARCHERS SUCCESSFUL IN PRESTIGIOUS NATIONAL FUNDING COMPETITION, BRINGING THE BENEFITS OFGENOMICS AND PRECISION MEDICINE TO BC KIDS

BC Children's investigators led or co-led six of the 15 projects funded through Genome Canada's 2017 Large-Scale Applied Research Project competition. Four projects based at BC Children's were awarded $33.6 million to:

- Improve genetic testing and care for Indigenous children
- Develop new approaches to diagnose and prevent asthma
- Use genomic technology to prevent dangerous drug reactions in children with cancer
- Expand genetic counselling for families undergoing whole genome sequencing

Two projects co-led by BC Children's researchers but based at other sites will:

- Improve access to genomic sequencing to improve diagnosis of rare diseases
- Expand the use of non-invasive prenatal testing to improve prenatal diagnosis and give expectant families important health information earlier and at no cost

NEW RESEARCH COULD LEAD TO ADVANCES IN DIABETES TREATMENT THAT MAKE INSULIN INJECTIONS OBSOLETE

A study led by Dr. Francis Lynn published in Developmental Cell advances knowledge of how insulin-producing pancreatic cells develop before birth, which may help scientists grow these cells in the lab. Dr. Lynn and his research team studied how pancreatic cells form and found that a specific state of the cell cycle was critical to the formation of insulin-producing cells. By lengthening this stage, they were able to trigger the strong expression of a particular protein, which resulted in the production of an increased number of insulin-producing cells. This research could result in the ability to grow large numbers of functional insulin-producing cells in the lab, increasing the availability and safety of pancreatic cell transplantation. Pancreatic cell transplantation ends the need for daily insulin injections, effectively curing diabetes, but the procedure is not currently widely performed due to a lack of donors and the risk of life-threatening side effects.

DR. RUTH GRUNAU RECOGNIZED FOR HER LEADERSHIP IN RESEARCH ON INFANT PAIN

Dr. Ruth Grunau received the 2018 Jeffrey Lawson Award for Advocacy in Children's Pain Relief from the American Pain Society for recognition of her extraordinary career contributions to the understanding and prevention of infant pain. Early in her career, Dr. Grunau's research helped inform the growing consensus that newborn babies feel pain. She went on to conduct pioneering research showing that early pain exposure in very preterm babies alters brain development and stress programming, contributing to neurodevelopmental problems later in childhood. This work has led to changes in health care policy and clinical practice worldwide to improve pain management for preterm babies. Dr. Grunau continues to research the effects of pain in very pre-term infants and the best ways to manage pain in these babies while protecting the developing brain. She recently received a four year grant from the Canadian Institutes of Health Research to study the behavioural and cognitive development of babies born very pre-term throughout childhood.

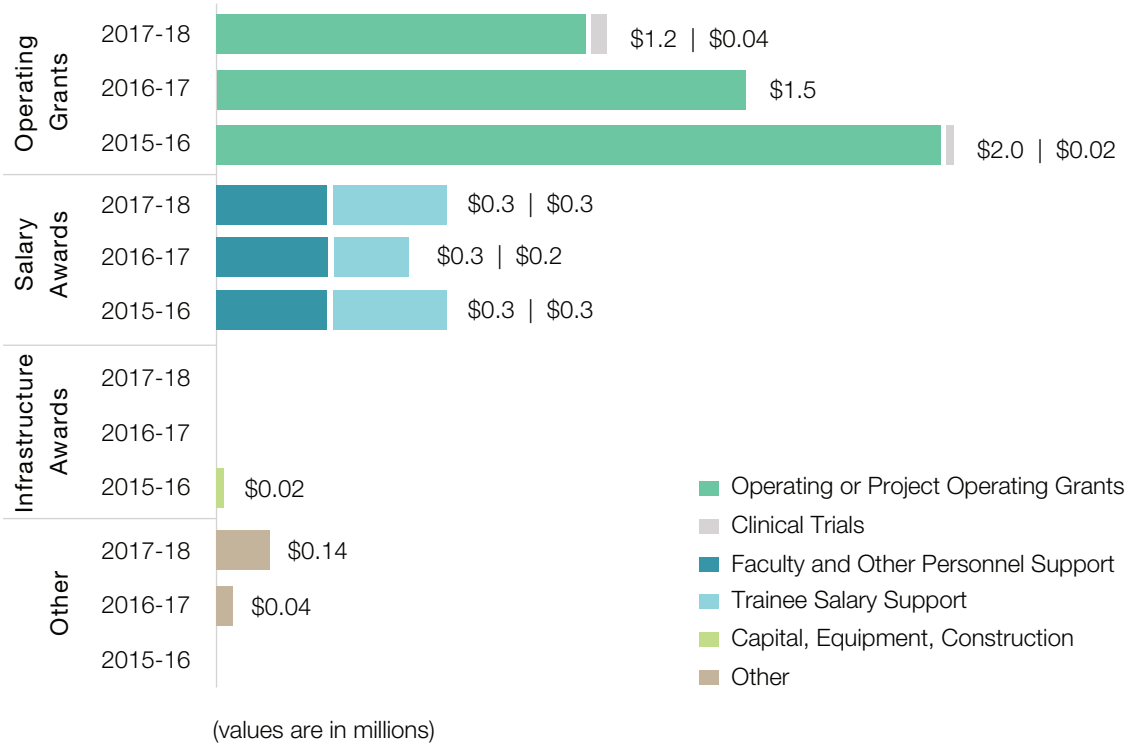
BC MENTAL HEALTH AND SUBSTANCE USE SERVICES (BCMHSUS)

BC MENTAL HEALTH
& SUBSTANCE USE SERVICES
An agency of the Provincial Health Services Authority

Producing and Advancing Knowledge

In FY 2017-18, researchers associated with BCMHSUS, were awarded a total of $1,996,361. Operating grants and Salary awards make up the majority (93%) of awards. A breakdown of funding types and subtypes can be found in Figure 36. The drop in award funding from FY 15-16 to FY 17-18 is influenced by a drop in the number researchers associated with BCMHSUS as well as a reduction in grant funds from the non-profit sector, and the conclusion of several large multi-year operating grants. BCMHSUS's portion of the Research Support Fund grant totaled $179,437 for FY 2017-18 but is not included in total research funding or the figures below.

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



(values are in millions)

Figure 37 shows total awards by funding source category, with Major Canadian Funding Entity (57.5%) sources being the largest and Canadian Foundations & Non-profits at 20%.

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

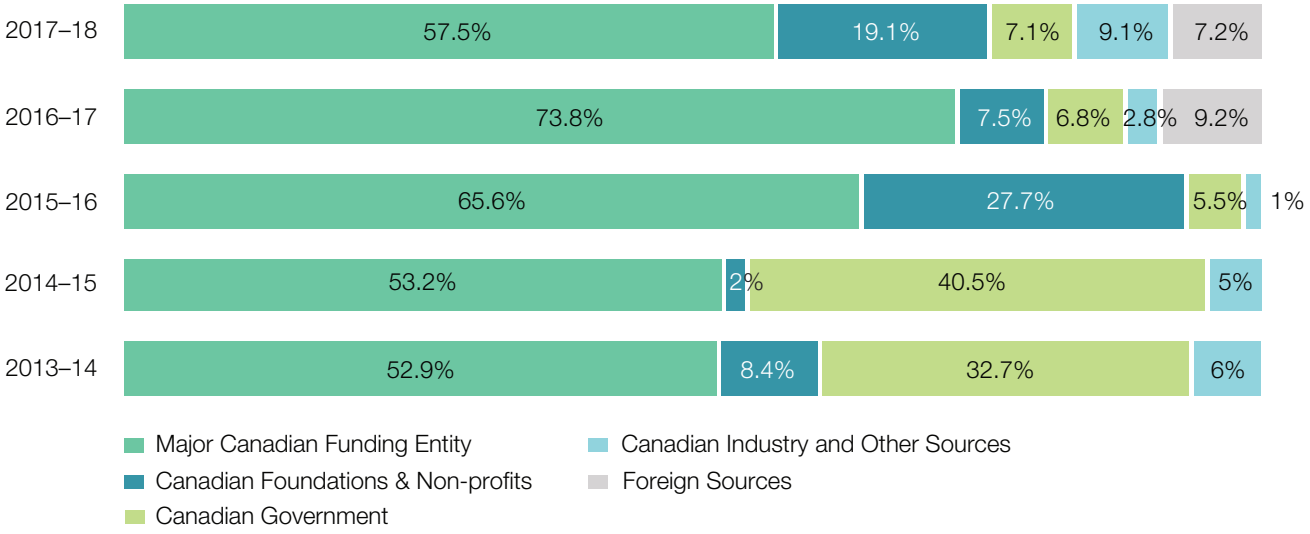
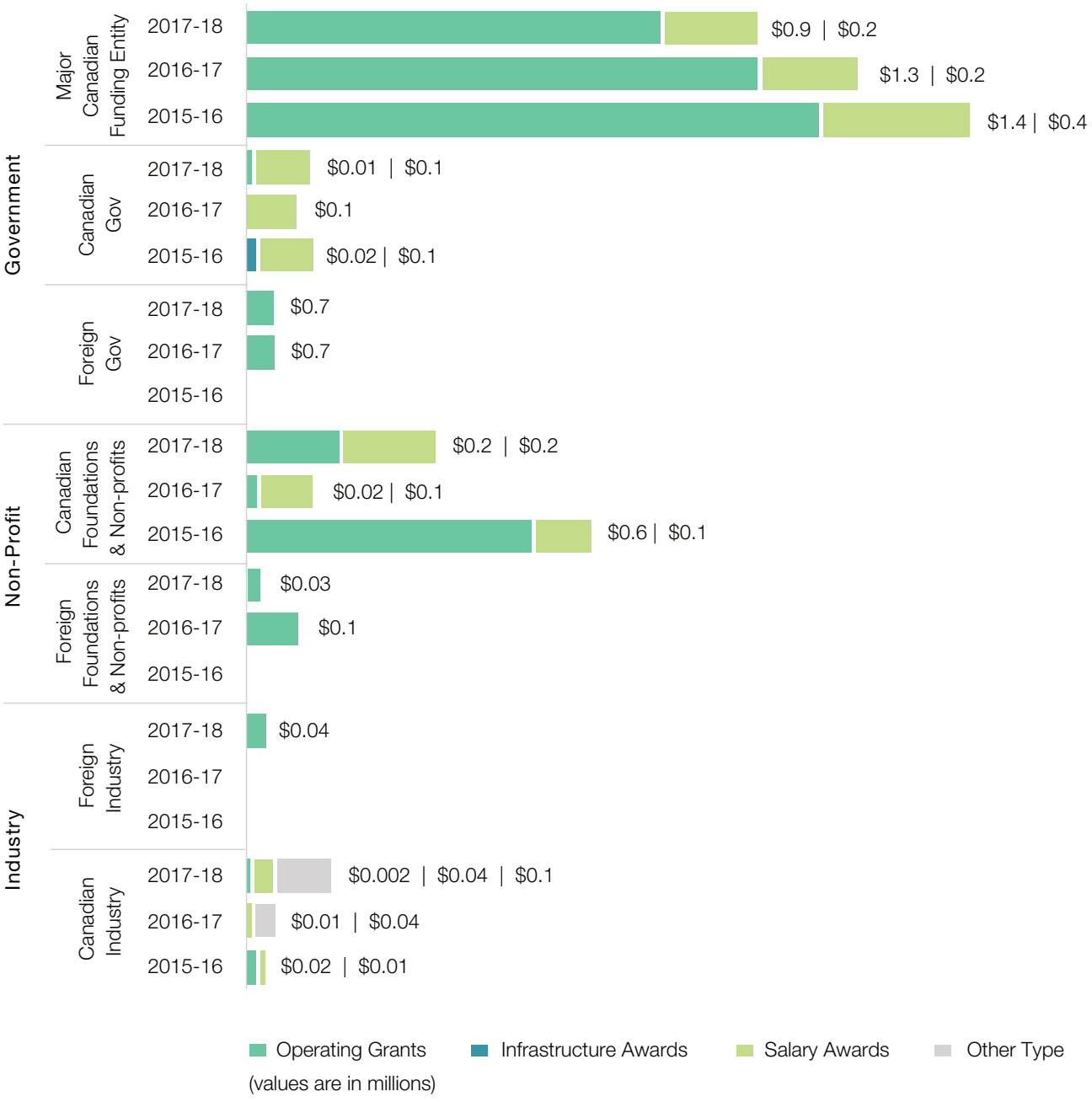


Figure 38 details the major funding categories by RISe sector, funding source category and funding type.

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



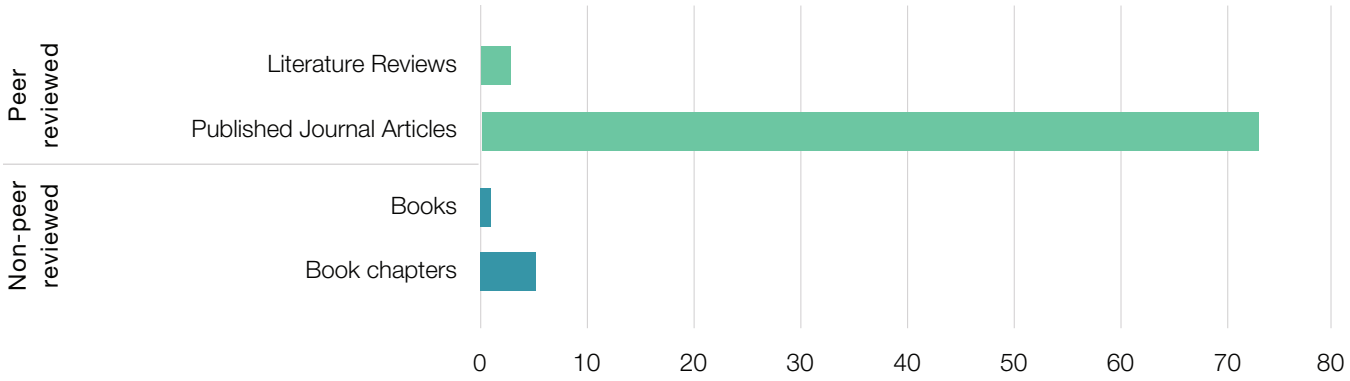
Reporting for CIHR Funding competitions includes one Foundation Grant and two Project Grant competitions during FY 2017-18. While BCMHSUS did not receive approval for either Foundation Grant submission they were successful in both Project Grant competitions for a total of 2 awards, beating the national average in the March 2018 competition.

TABLE 11 BCMHSUS Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BCMHSUS Results % (Approved/Submitted)
2017-18 Foundation Grant (Open-Stage 3)	11.9% (36/303)	0% (0/2)
2017-10 Project Grant	15.9% (545/3,415)	12.5% (1/8)
2018-03 Project Grants	15.5% (408/2,633)	25% (1/4)

BCMHSUS had a total of 82 publications of which 93% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 39. The agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency.

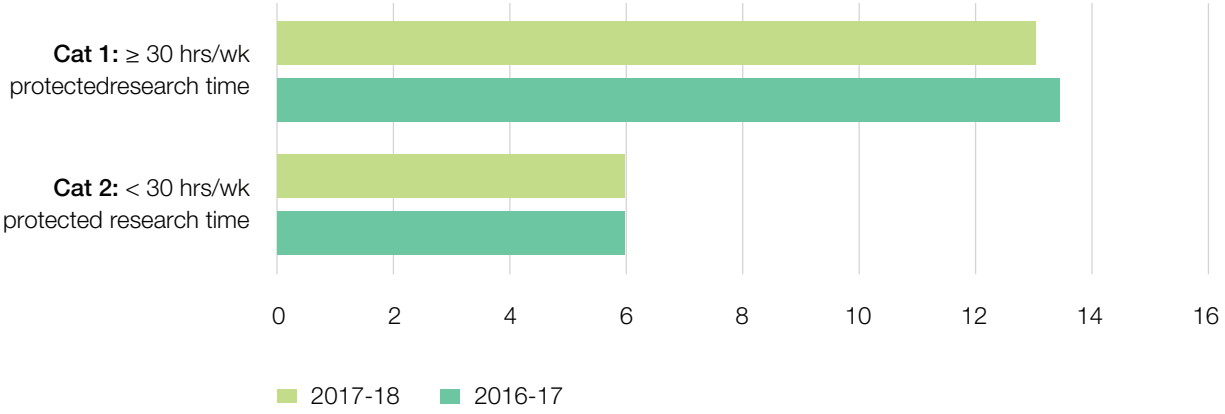
FIGURE 39 Total Number of BMHSUS Publications by Type and Category



Building Research Capacity

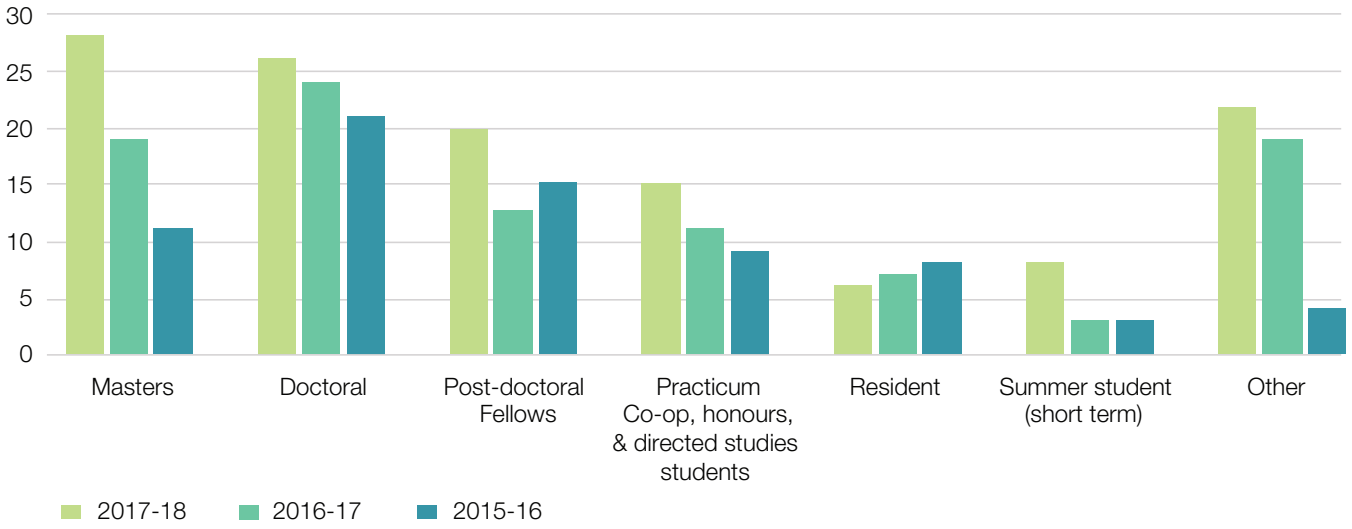
BCMHSUS had a total of 19 researchers in FY 2017-18, with 13 having greater than 30 hours of protected research time per week (Figure 40). While this is a decrease from previous years, a number of BCMHSUS clinicians engaged in research are now counted in the BCCHR totals following the operational transfer of Child & Youth Mental Health back to BC Children's Hospital.

FIGURE 40 Total Number of BCMHSUS Researchers by Category and Fiscal Year



During FY 2017-18, BCMHSUS researchers provided training and supervision to a total of 125 trainees (see Figure 41).

FIGURE 41 Total Number of BCMHSUS Trainees by Type and Fiscal Year



Advancing Health and Policy Benefits

See Table 12 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 12 BCMHSUS Clinical Trials

	12-13	13-14	14-15	15-16	16-17	17-18
Total Number of Clinical Trials active during the FY	10	7	5	4	2	5
Status of the Trial at the end of the FY:						
Total Number of Active Trials	10	7	5	4	2	5
Total Number of Trials that closed during the FY	5	2	0	0	0	0
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	828	688	563	640	450	902
Total Cumulative Subject enrolment at the end of the FY	16	56	77	228	244	423

100% of BCMHSUS' clinical trials are grant funded.

Table 13 reflects BCMHSUS' Top Three Achievements/Accomplishments/Highlights which include awards, citations, or clinical programs, either in progress or historical, that are relevant to the FY 17-18 timeframe..

TABLE 13 BCMHSUS Top Three Achievements/Accomplishments/Highlights

TWO BCMHSUS INVESTIGATORS NAMED AS CAMH DIFFERENCE MAKERS

In 2017, the Centre for Addiction and Mental Health (CAMH) in Toronto launched a national dialogue on mental health. The initiative started with a call from CAMH and a National Committee of leading experts and advocates for Canadians to nominate those making a difference in the mental health space, in any capacity, local or national. More than 3,700 names were put forward, and 150 people were named as Leading Canadians for Mental Health. Among those 150 award recipients were BCMHARI's Dr. Jehannine Austin and Dr. Todd Woodward.

CAMH recognized Dr. Austin as a trail blazer in psychiatric genetic counselling whose motivation stems from her own experience with depression. In 2012, Dr. Austin established the world's first specialty clinic for psychiatric genetic counselling. Through her work in her own clinic, and in mentoring other clinics around the country, Dr. Austin uses genetic counselling to help clients deal with the guilt, shame and stigma often attached to mental illness, while also helping them to develop strategies to protect their mental health.

Dr. Todd Woodward was recognized by CAMH for his work helping people living with schizophrenia learn how to manage their delusions. Dr. Woodward co-developed a program called metacognitive training (MCT), a free program that teaches people living with schizophrenia about common thinking patterns, and often harmful thoughts, and ways to counter them. The MCT manual has been downloaded more than 50,000 times, is available internationally and has been translated into 33 languages.

BCMHSUS INVESTIGATORS RECEIVE $1.6M GRANT TO CO-LEAD PRESTIGIOUS INTERNATIONAL STUDY IN CORRECTIONAL HEALTH

BCMHSUS investigators Dr. Johann Brink and Dr. Tonia Nicholls are co-leads (in partnership with PI: Dr. A. Simpson at CAMH) on a 5-year Networks of Centres of Excellence (NCE) grant worth $1.6 Million to advance evidence-based practice in correctional health with collaborators from Ireland, US, Australia, UK, and New Zealand. The NCE program supports large-scale, academically-led research networks that harness the creativity and inventiveness of Canadian health, natural and social scientists, and engineers.

The vision for I-CEIsMIC – International Collaboration for Excellence and Innovations in Me is to identify, develop, package, implement, and disseminate models to provide the highest quality mental health services to inmates of correctional facilities internationally. The mission is to establish a peak network of international partners and collaborators, with the ultimate objective of improving the health and well-being of inmates, the safety and security of institutions, promoting public safety and reducing the economic burden of crime.

NEW BCMHSUS INVESTIGATOR RECEIVES CIHR GRANT ON FIRST APPLICATION

Dr. Will Panenka, a new BCMHSUS investigator, won a $600K CIHR grant to study traumatic brain injury in Vancouver's marginally housed population. While this substantial multi-year grant is impressive in its own right, it is all the more so given it was Dr. Panenka's first CIHR grant application.

Dr. Panenka's study aims to define the relationship between brain injuries and the onset or exacerbation of neuropsychiatric problems and addictions in people who are homeless or tenuously housed and to discover, with advanced neuroimaging, which brain changes are important in imparting risk for prolonged or poor recovery from traumatic brain injury. This work will build on a ten-year CIHR-funded study that has been investigating persons at high risk for homelessness. Through the team's well-established links with clinical teams, municipal and provincial government and local police, this study is expected to immediately and meaningfully inform care and social policy.

BC CENTRE FOR DISEASE CONTROL/UBC CENTRE FOR DISEASE CONTROL (BCCDC/UBC CDC)

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

Producing and Advancing Knowledge

In FY 2017-18, researchers affiliated with BCCDC/UBC CDC were awarded a total of $3,675,499 in research funding. The amount awarded as Operating Grants ($2,995,960) makes up 82% of total awards. A breakdown of funding types and subtypes can be found in Figure 42 and by funding source category in Figure 43. BCCDC's portion of the Research Support Fund grant totaled $82,753 for FY 2017-18 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.

FIGURE 42 Total BCCDC/UBC CDC Research Funding by Funding Type and Sub-type by Fiscal Year

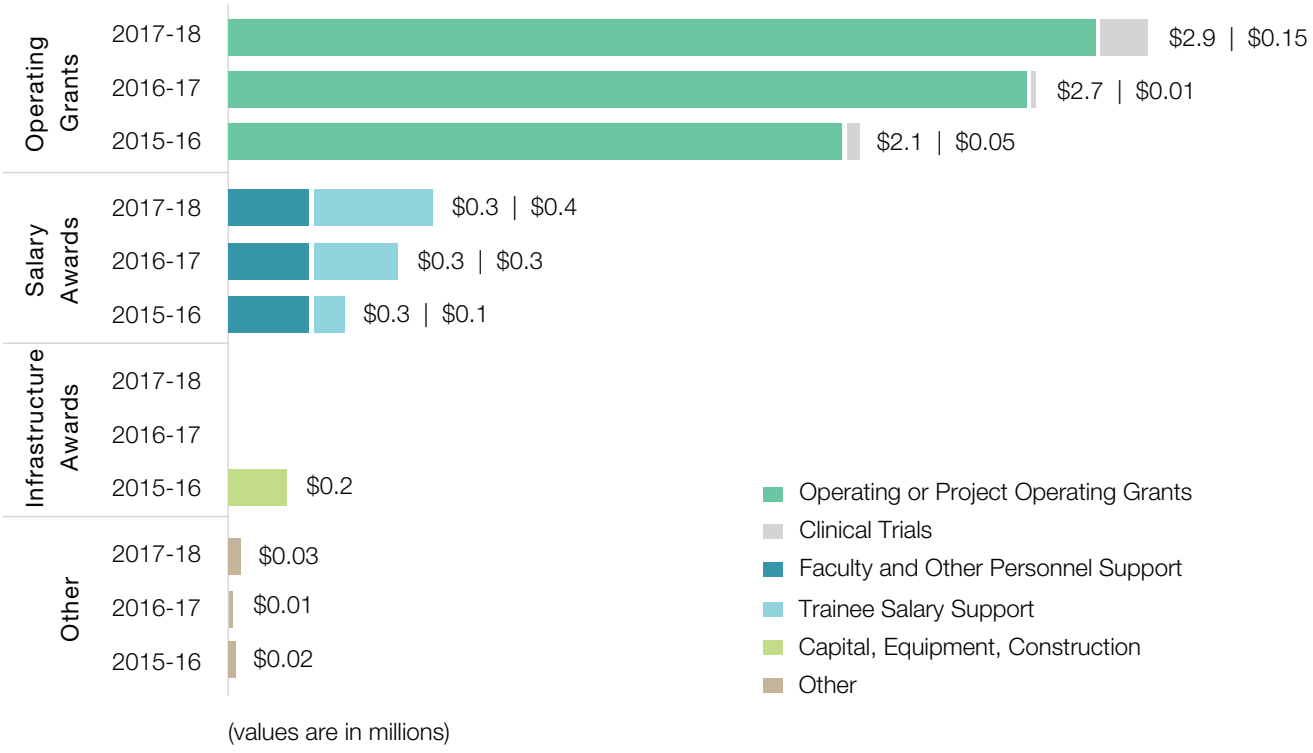
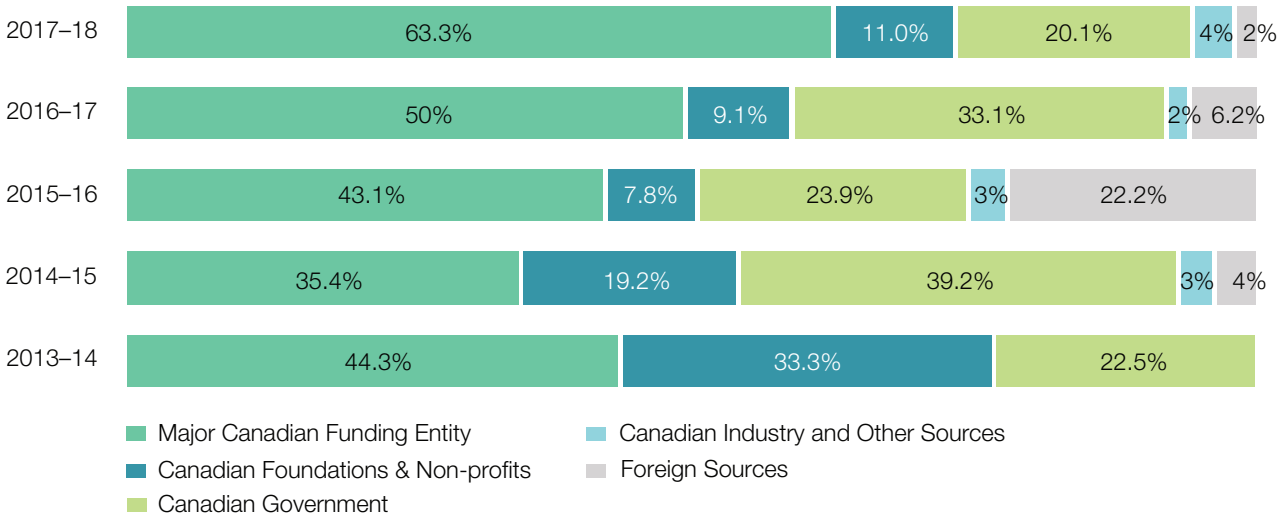


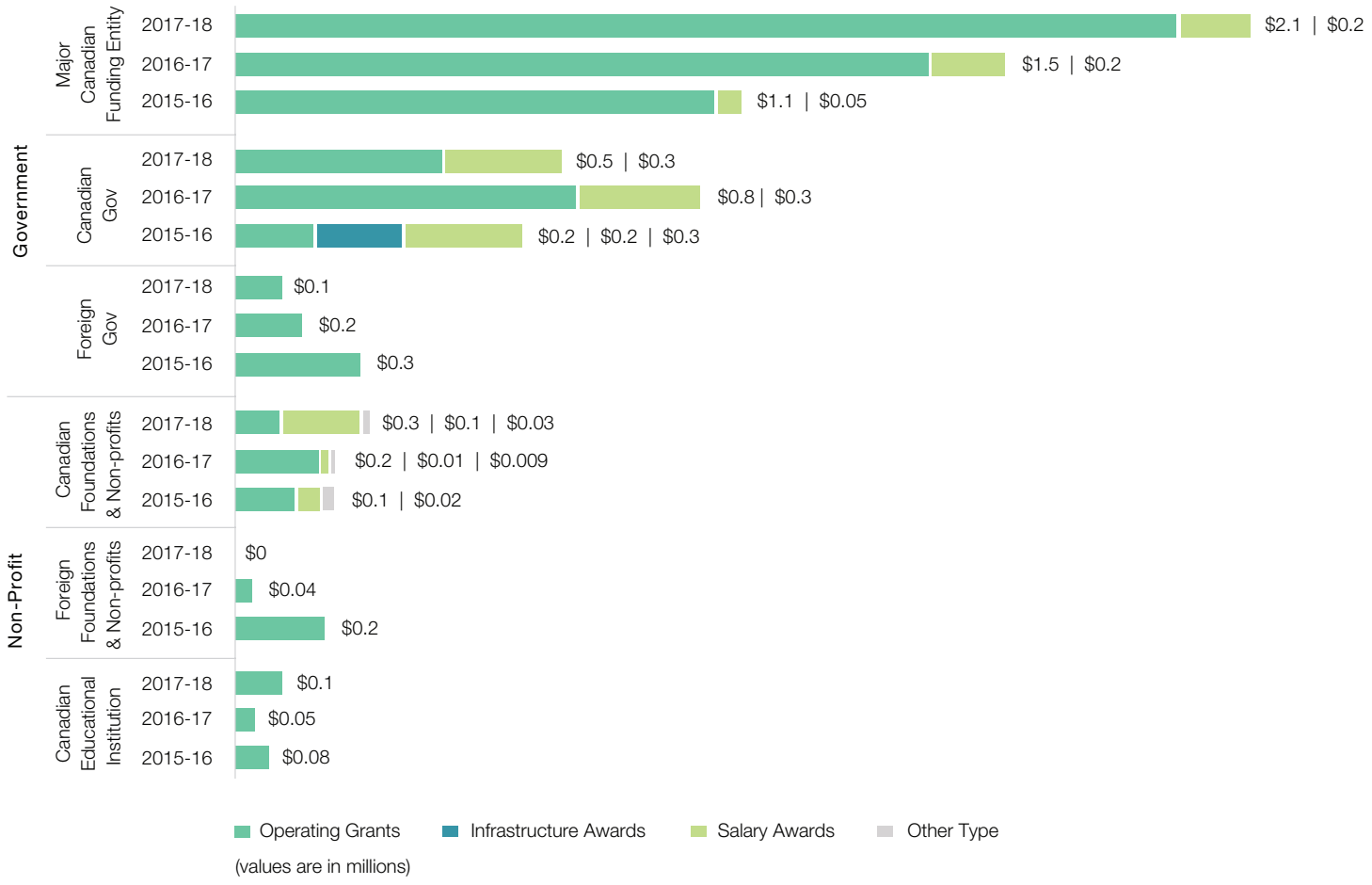
FIGURE 43 Percentage of BCCDC/UBC CDC Research Funding by Funding Source Category by Fiscal Year



The top two funding categories are Major Canadian Funding Entity (63%) and Canadian Government (20%).

BCCDC had no Industry Funding in the previous three fiscal years. Figure 44 details the RISe sector and major funding categories by funding type.

FIGURE 44 Total BCCDC/UBC CDC Research Funding by RISe Sector, Funding Source Category and Type by Fiscal Year



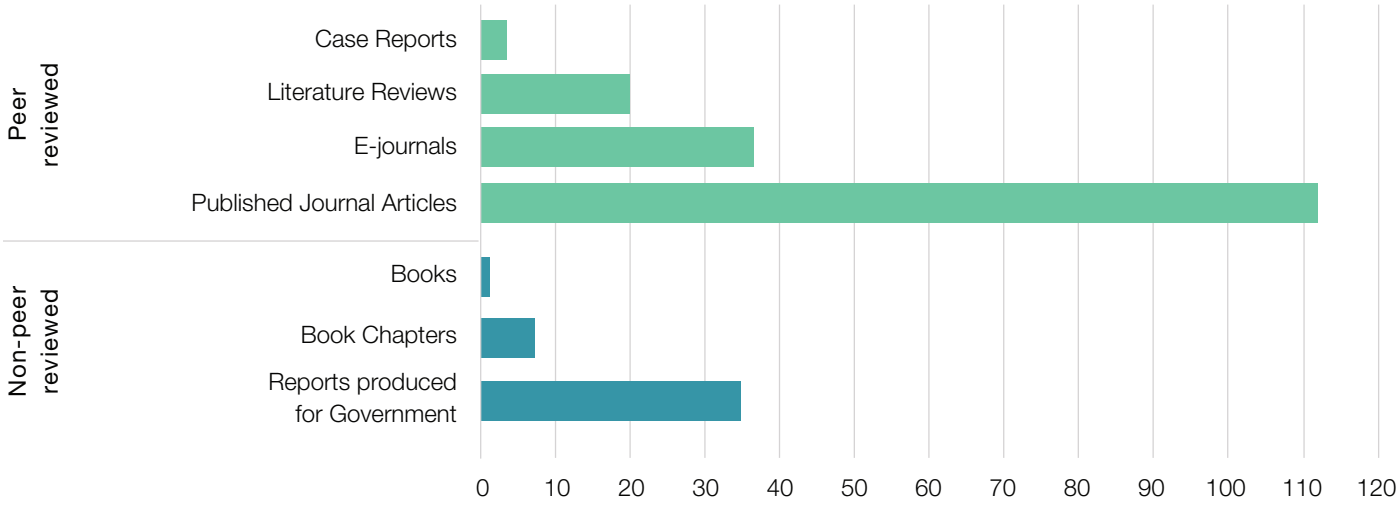
Reporting for CIHR Funding competitions includes one Foundation Grant and two Project Grant competitions during FY 2017-18. BCCDC did not participate in the Foundation Grant award competition, however, they were successful in both Project Grant competitions for a total of 3 awards, beating the national average in both competitions.

TABLE 14 BCCDC Annual Grant Application Success Rate

Grant Funding Opportunity	National Overall Results % (Approved/Submitted)	BCCDC Results % (Approved/Submitted)
2017-18 Foundation Grant (Open-Stage 3)	11.9% (36/303)	N/A
2017-10 Project Grant	15.9% (545/3,415)	16.6% (1/6)
2018-03 Project Grants	15.5% (408/2,633)	50% (2/4)

BCCDC had a total of 215 publications of which 80% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 45. The agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency.

FIGURE 45 Total Number of BCCDC/UBC Publications by Type and Category

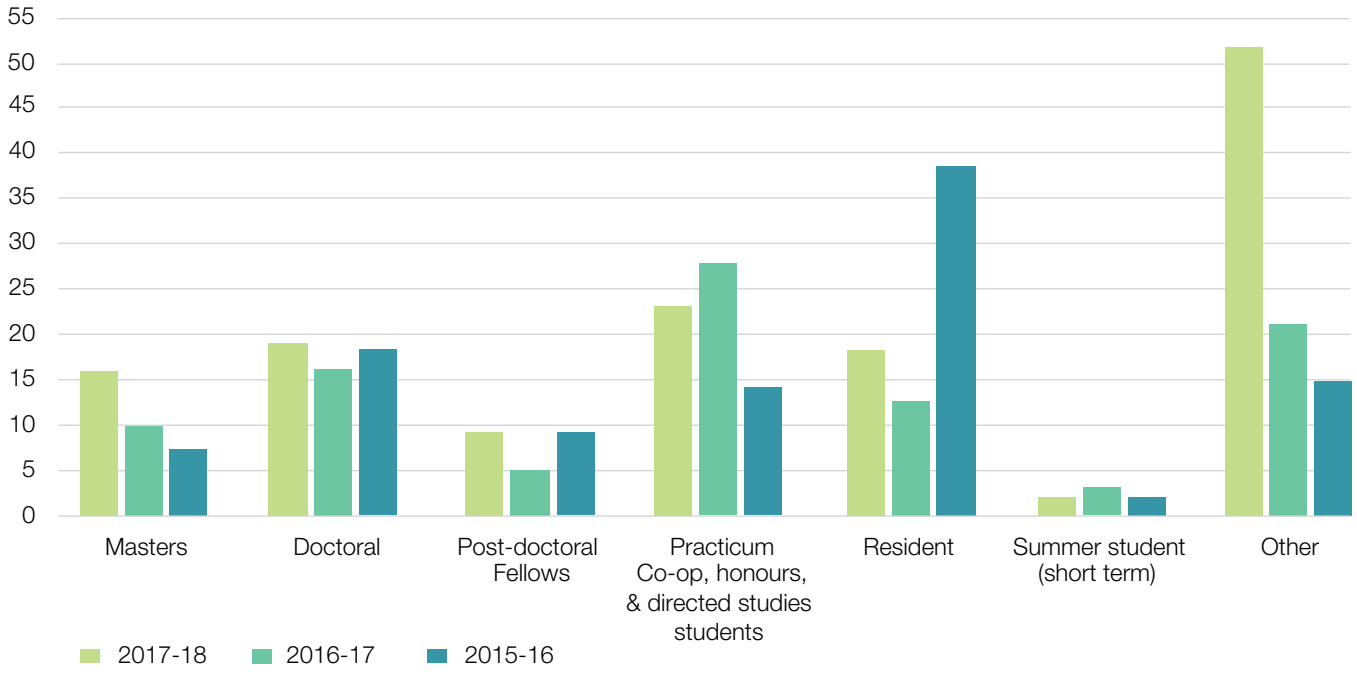


Building Research Capacity

BCCDC/UBC CDC defines a researcher as any principal investigator or co-investigator involved in BCCDC/UBC CDC research projects. BCCDC had a total of 34 researchers meeting this definition in FY 2017-18.

During FY 2017-18, BCCDC/UBC CDC researchers provided training and supervision to a total of 139 trainees (see Figure 46). The large number of other trainees includes medical students, research associates, undergraduates and clinical fellows.

FIGURE 46 Total Number of BCCDC/UBC CDC Trainees by Type and Fiscal Year



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 15 for a detailed breakdown of clinical trial activity by fiscal year.

TABLE 15 BCCDC/UBC CDC Clinical Trials

	12-13	13-14	14-15	15-16	16-17	17-18
Total Number of Clinical Trials active during the FY	2	2	3	4	5	5
Status of the Trial at the end of the FY:						
Total Number of Active Trials	2	2	3	4	5	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)	532	532	401	2,000	2,696	2,750
Total Cumulative Subject enrolment at the end of the FY	325	55	157	294	2,656	1,639

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 72 for a definition of funding types). Sixty percent (60%) of BCCDC's clinical trials are grant funded, 20% Industry funded, with the remaining 20% with no funding.

Table 16 reflects BCCDC's Top Three Achievements/Accomplishments/Highlights which include awards, citations, or clinical programs, either in progress or historical, that are relevant to the FY 17-18 timeframe.

TABLE 16 BCCDC/UBC CDC Top Three Achievements/Accomplishments/Highlights

OPIOID CRISIS INVOLVEMENT
In the past year, BCCDC has provided greater leadership in the response to the overdose emergency, as an active member of the Ministry of Mental Health and Addictions Overdose Emergency Response Centre (OERC). This includes leading the OERC's surveillance, monitoring and evaluation activities to provide regional and community teams with data needed to inform on-the-ground actions, and scaling up the provincial take-home naloxone program across BC including most recently the distribution through hundreds of community pharmacies. BCCDC also is leading the development of overdose-related innovations as well as conducting critical evaluations of the provincial response. For example, BCCDC has been funded by Health Canada to develop a pilot project for people who use drugs to access a safe, uncontaminated drug supply (through distribution of oral hydromorphone including through dispensing machines), and in partnership with UBC has developed a novel mathematical model for describing the impact of public health interventions including naloxone, overdose prevention services, and treatment. BCCDC has also demonstrated global leadership in challenging current drug policies that contribute to the increase in overdose deaths across North America, most notably through a TEDmed talk given by Dr. Mark Tyndall on the harm reduction model of drug addiction treatment (November 2017).
NATIONAL BLUEPRINT FOR HEPATITIS C ENGAGEMENT
BCCDC has been involved in developing a national blueprint for Hepatitis C engagement. BCCDC researchers along with researchers from McGill University were awarded a $1.2M CIHR grant for a national study on the impact of Hepatitis C treatment on liver disease outcomes. This project was informed by and built on research evidence from BCCDC researchers. The study will establish data platforms across BC, Ontario and Quebec and construct the Hepatitis C care cascade to measure progress across provinces and work towards HCV elimination targets. The study results will inform optimal screening/treatment strategies and policies for HCV care in different HCV risk groups and across diverse geographic and policy contexts in Canada.
GENOMICS
BCCDC continues its outstanding genomics work in tracking outbreaks in Salmonella, Carbapenemase Producing Organisms (CPO) and Tuberculosis (TB). Routine whole genome sequencing of all Salmonella in BC started in May 2017 as part of the national PulseNet Canada Program. Whole genome sequencing (WGS) data for public health surveillance of enteric disease has identified substantially more numbers of outbreaks, both provincially and nationally, that would have otherwise been undetected prior to WGS testing. 25% of retail frozen chicken nuggets contain Salmonella contamination. As a result CFIA is regulating that by 2019 all retail frozen chicken nuggets must be Salmonella free. WGS of microbes will be key to rapidly identifying outbreaks affecting humans, animals, food and the environment. BCCDC Public Health Laboratory has performed whole genome sequencing of all CPO isolates in BC from 2008 to present. This database has been used along with the PICNet surveillance program to track cases of CPO in BC, but more importantly has led to rapid detection of outbreaks in healthcare facilities across BC for infection prevention and control response. BCCDC TB researchers published the following: 1) a complete retrospective analysis of all TB isolates circulating in BC, 2005-2014 totalling over 2200 isolates, 2) a genomic analysis identifying the likely source of all pediatric TB cases in BC 2005-2014, and 3) a new method for inferring person-to-person TB transmission from genomic data alone. We also completed sequencing of ~250 TB genomes, representing all the TB cases diagnosed in 2015 and began sequencing all TB cases diagnosed in 2017-18. A report that we designed to better communicate TB genomic data was adopted by the ReSeqTB consortium.

WOMEN'S HEALTH RESEARCH INSTITUTE (WHRI)

WOMEN'S HEALTH RESEARCH INSTITUTE AT BC WOMEN'S

Producing and Advancing Knowledge

In FY 2017-18, researchers affiliated with WHRI were awarded a total of $2,967,120 in research funding, which represents a 15% increase over last year. The amount awarded as Operating Grants ($2,225,204) makes up 78% of total awards. A breakdown of funding types and subtypes can be found in Figure 47 and by funding source category in Figure 48. WHRI's portion of the Research Support Fund grant totaled $160,596 for FY 2017-18 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. At this time, those research dollars are only included if a formal transfer agreement is in place to allocate attribution of shared investigator grants. As a result, total research funding below is understated.

FIGURE 47 Total WHRI Research Funding by Funding Type and Sub-type by Fiscal Year

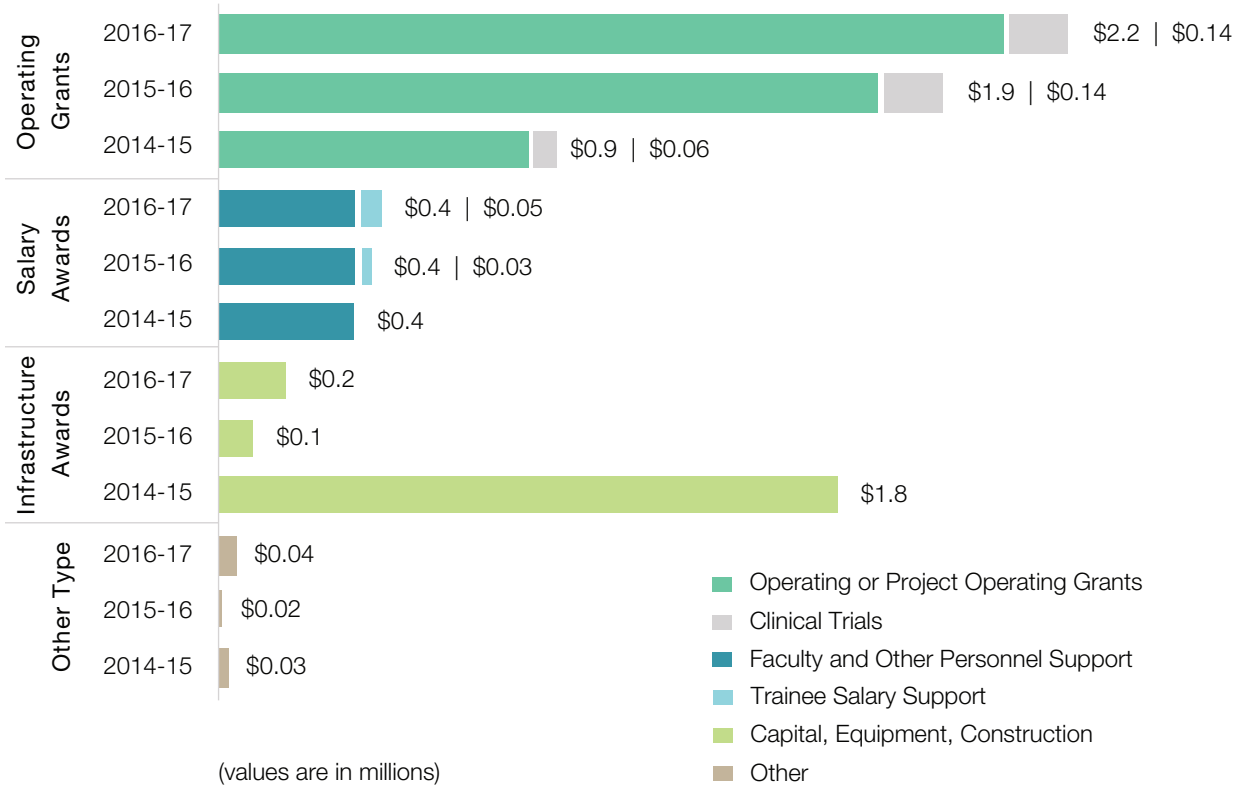
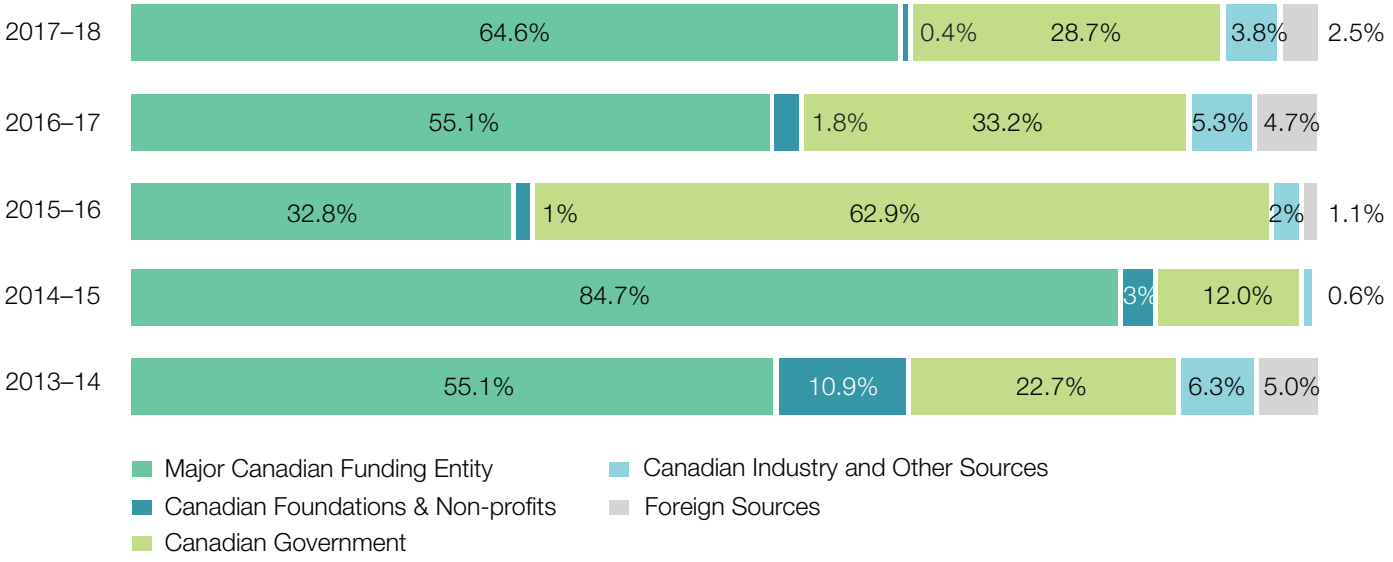
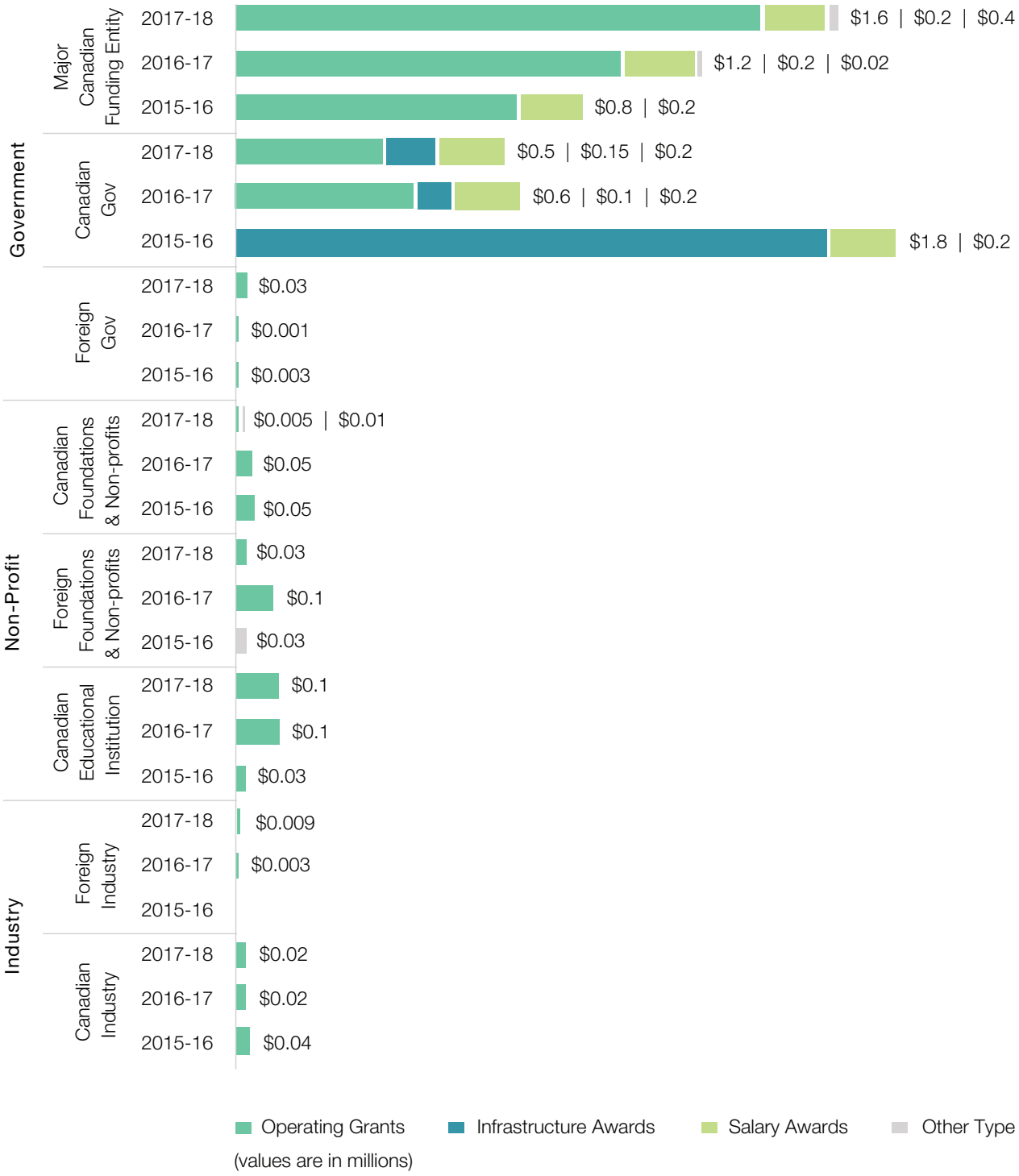


FIGURE 48 **Percentage of WHRI Research Funding by Funding Source Category by Fiscal Year**



In FY 2017-18, the top two funding categories are Major Canadian Funding Entity (65%) and Canadian Government (29%). Figure 49 details the major funding categories by funding type.

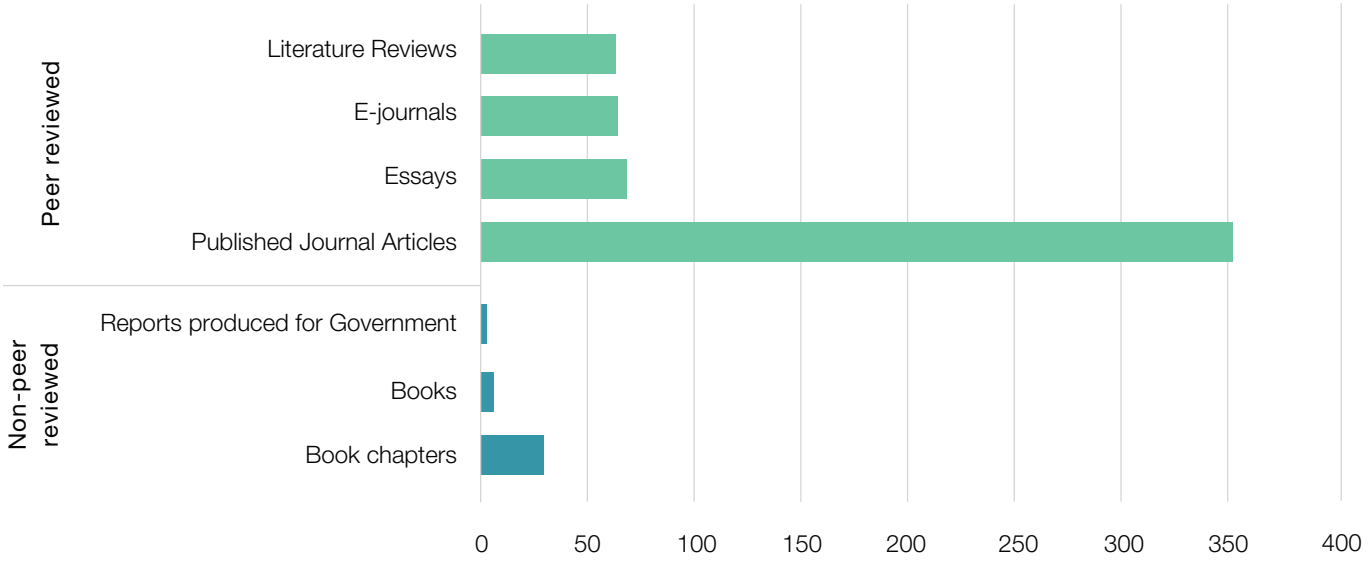
FIGURE 49 Total WHRI Research Funding by RISe Sector, Funding Source Category and Type by Fiscal Year



WHRI had three (3) grants approved in the CIHR October 2017 Project Grant competition and zero (0) for the March 2018 Project Grant competition. WHRI investigators apply for grant competitions that are offered by a variety of granting agencies.

WHRI had a total of 585 publications in calendar year 2017 of which 94% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is shown in Figure 50. Peer review represents the gold standard for scientific credibility. The agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency.

FIGURE 50 Total Number of WHRI Publications by Type and Category



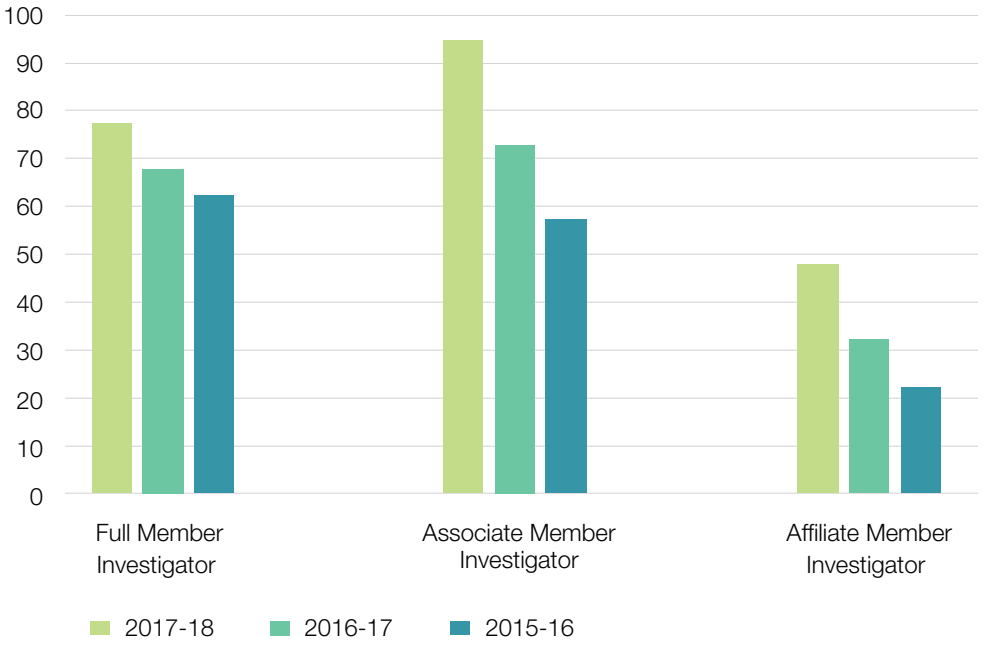
Building Research Capacity

In an effort to show WHRI's activities, their membership statistics are shown (see Figure 51). In FY 2017-18, membership increased by 46 for a total of 220 members, a 27% increase.

The membership categories are as follows:

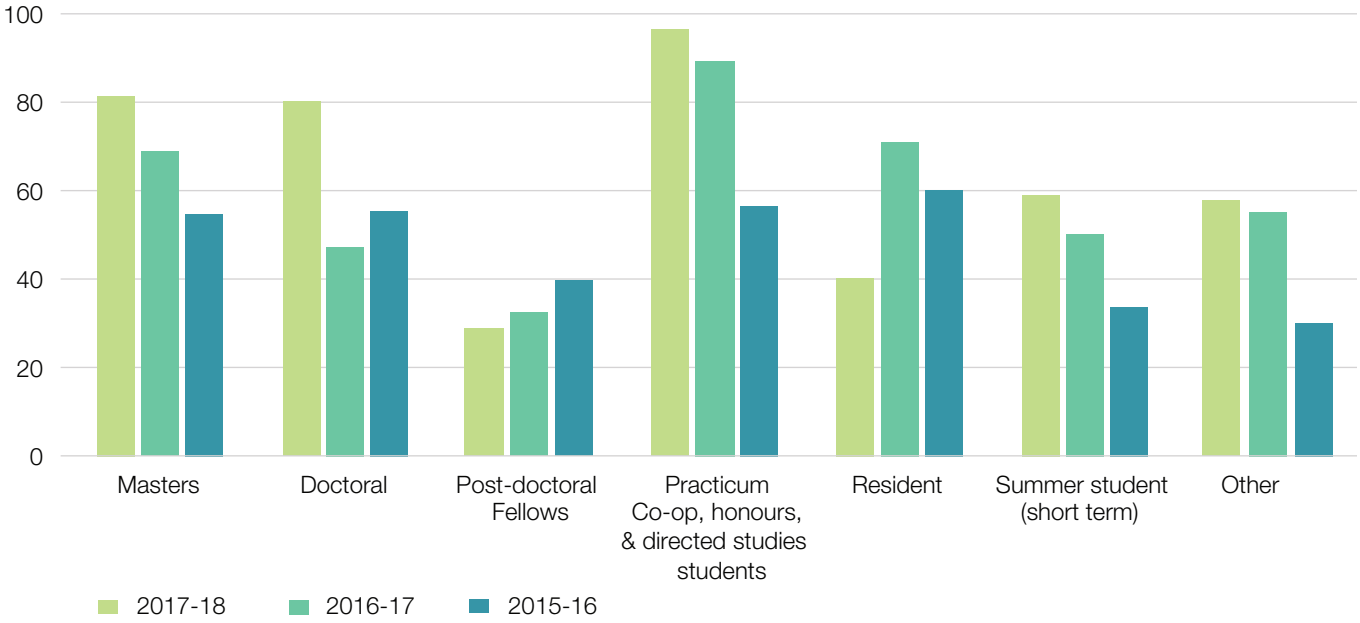
Full Member
Individuals involved in women's health research for which the WHRI would be the only research institute affiliation.
Associate Member
Individuals who are involved in women's health research, at least in part, but have a strong relationship with another research institute (e.g. BCCHR) that they wish to maintain; the result is a dual membership with the WHRI and their current affiliation.
Affiliate Member
Individuals who are extensively involved with another institute but may have projects that would overlap with WHRI.

FIGURE 51 Total WHRI Membership by Category and Fiscal Year



WHRI researchers provided training and supervision to a total of 448 trainees (see Figure 52). This increase is attributed to more accurate reporting of actual trainees plus the addition of new members who actively supervise trainees.

FIGURE 52 Total Number of WHRI Trainees by Type and Fiscal Year



Achieving Economic Benefits and Innovation

WHRI had one National Patent issued in FY 2017-18 for work related to Immunogenic T. pallidum protein fragments of Tp0751 and involved one WHRI member.

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 17 for a detailed breakdown of clinical trial activity by fiscal year.

TABLE 17 WHRI Clinical Trials

	12-13	13-14	14-15	15-16	16-17	17-18
Total Number of Clinical Trials active during the FY	26	26	27	28	11	31
Status of the Trial at the end of the FY:						
Total Number of Active Trials	26	26	20	24	7	23
Total Number of Trials that closed during the FY	7	6	7	4	4	8
Enrolment Numbers:						
Expected Local Subject Enrolment (for the term of the study)	3,694	3,709	3,433	4,058	1,162	6,653
Total Cumulative Subject enrolment at the end of the FY	2,223	1,811	1,940	2,360	545	3,092

Grant funding type is reported for Clinical Trials in figure 53. 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 72 for a definition of funding types). Thirty-two percent (32%) of WHRI's clinical trials are Grant funded, and 23% are Industry funded.

FIGURE 53 WHRI Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the Fiscal Year

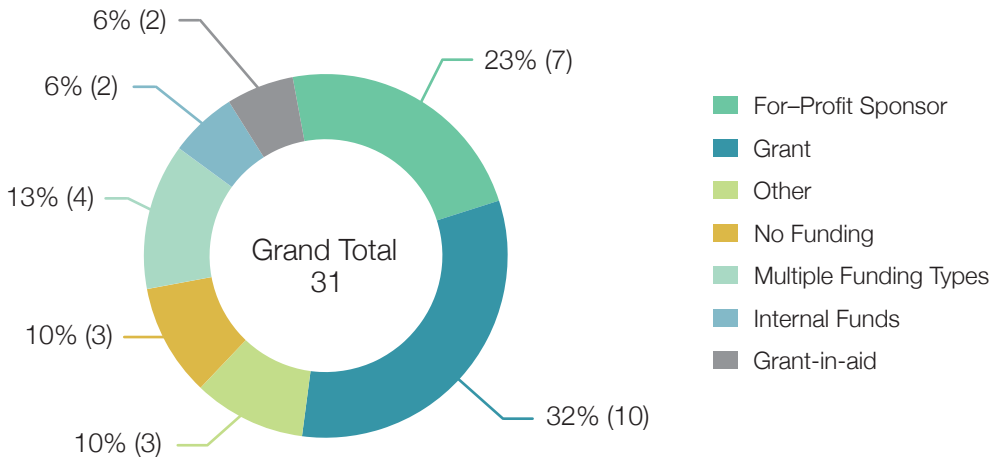


Table 18 reflects WHRI's Top Three Achievements/Accomplishments/Highlights which include awards, citations, or clinical programs, either in progress or historical, that are relevant to the FY 17-18 timeframe.

TABLE 18 WHRI Top Three Achievements/Accomplishments/Highlights

WHRI LEADS THE CREATION OF THE INAUGURAL BC WOMEN'S HEALTH RESEARCH AGENDA

At the request of the BC Ministry of Health, this past year, the WHRI lead the creation of BC's Women's Health Research Agenda. The Women's Health Research Agenda is meant to serve as a guiding document for those engaged in the women's health research enterprise. This document identifies key challenges, drivers, and enablers to women's health research and implementation efforts in BC and presents strategies for enabling, facilitating, and accelerating growth and excellence in women's health research and implementation. It is intended to direct the work of women's health researchers forward with strength and cohesion, focus and vision, to advance the field of women's health research in British Columbia.

The need for a Women's Health Research Agenda emerged alongside the development of a revitalized provincial Women's Health Strategy to improve the health and well-being of girls and women across British Columbia. Hand-in-hand with a women's health strategy is the need for a research agenda: a chance to review the landscape of women's health research in BC and chart the priorities, challenges, and opportunities for women's health research, knowledge translation and implementation across the province. This also presents an opportunity to consider women's health research at the population and public health level. Now the agenda has been released, the WHRI is working with women's research institutes in Edmonton and Toronto to improve federal coordination of women's health research.

WHRI TAKES ON RESPONSIBILITY FOR PROVIDING RESEARCHERS WITH ACCESS TO UNLINKED DATA FROM THE BC PERINATAL DATA REGISTRY

The WHRI has taken on the role of providing investigators in British Columbia with access to unlinked data from the Perinatal Data Registry for research purposes. This past year, the responsibility for managing and providing researcher access to unlinked data from the Perinatal Data Registry was transferred to a PHSA Data Analyst embedded within the WHRI. This change was initiated in order to ensure that researchers in the province will be able to have timely access to data from the Perinatal Registry via streamlined request processes and expedited data export procedures.

The Data Analyst is currently leading the development of standardized PHSA forms and tools to support data access/release from the Registry within PHSA for research purposes. To further facilitate use of Perinatal Data Registry data while minimizing the administrative burden of preparing data for release, the Data Analyst will work with PHSA Research and Academic Services to develop pre-approved datasets that can be made available within a secure research environment to researchers, trainees and clinician scientists..

WHRI ESTABLISHES TWO PATIENT ENGAGEMENT COMMITTEES TO PROMOTE PATIENT-ORIENTED RESEARCH

Research groups within the WHRI have established two separate patient engagement committees in order to inform the development and progress of research projects from two BC Women's Hospital clinical programs. These patient committees not only inform the development of research projects but serve as a vehicle to allow for end of project knowledge translation back to their respective patient groups.

This past year, the BC Women's Centre for Pelvic Pain and Endometriosis Research Program established their own Patient Research Advisory Board in order to help inform and guide the program's research mandate. The patients who serve on this board will be active partners in setting research priorities, writing grant applications, undertaking appropriate research tasks and translating research findings in way that is accessible for patients and their families. Similarly, BC Women's Complex Chronic Disease Program has an established community group of patients. The Program's research committee routinely seeks input from the patient community group regarding current and upcoming research projects.

REGISTRIES & DATASETS

For a fifth year, data was collected from PHSA's registries and datasets to capture information to allow identification of users, 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 17 out of the 18 registries/datasets were obtained. It was decided to roll the PREDICT dataset into the responses for the Tumor Tissue Repository. The Research Metrics working group drew a distinction between two types of datasets 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 datasets that are primarily grant funded and are not maintained for use beyond the term of a given research project.

Registry/Dataset Descriptions

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.
BC Generations Project	The BC Generations Project is British Columbia's largest-ever health study. The Project follows a cohort of nearly 30,000 BC participants who volunteer their health information and biological samples to help researchers learn more about how environment, lifestyle and genes contribute to cancer and other chronic diseases.
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.
Lung Cancer Screening Program	The BC Lung Screen Trial is an ongoing clinical trial at BC Cancer and Vancouver General Hospital focusing on early detection of lung and bronchial cancer.

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.
Cervical Cancer Screening Database	A population based clinical system for cervical cancer screening as well as a lab system for all gynaecological cytology performed by the Provincial lab.
Endometriosis and Pelvic Pain Interdisciplinary Cohort (EPPIC)	A prospective data collection to evaluate patient outcomes after interdisciplinary care for endometriosis and pelvic pain
PICNET	Provincial Infection Control Network of BC's aim is to to reduce healthcare-associated infections in BC healthcare facilities. Key areas of focus are surveillance, evidence-based guidelines, and education.
PROMIS-BC Renal Agency/ 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.
Screening Mammography Database (SMP)	Clinical system for scheduling, reporting and tracking of screening mammography exams.
BCEHS Resuscitation Outcomes Consortium (ROC)	The Resuscitation Outcomes Consortium (ROC) was created to conduct clinical research in the areas of cardiopulmonary resuscitation and traumatic injury. ROC consists of 10 Regional Clinical Centers (RCCs), one satellite site and a Data and Coordinating Center (DCC) that will provide the necessary infrastructure to conduct multiple collaborative trials to aid rapid translation of promising scientific and clinical advances to improve resuscitation outcomes.
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.

Registry/Dataset Use

For FY 2017-18, thirteen (13) out of the sixteen (16), or 81% of registries/datasets are used for the purpose of research as defined by UBC (see Glossary – Appendix 1, page 74). In addition, respondents were asked to identify other activities they provide in support of research. Table 19 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 19 Research Activities Supported by Registries and Datasets

Research Support Activity	Cancer	Cardiac	Cervical	Perinatal	PICNet	PREDICT	Renal	SMP	SPR	Transplant	Trauma	TTR	Biobank	BCEHS/ROC	Generations	Hereditary	EPPIC	Lung	GRAND TOTAL
Support in managing and linking data	3	3	3	3		2	3	3	1	1	2	3	3	1	2		1	1	**35**
Support in designing research studies	3	2	3	3		2	3	3		1	2	3	3	3	1		1	1	**34**
Assist in identifying knowledge gaps and improvement needs	1	3	3	3	1		3	3		1	3		1	2	1	1	1	1	**28**
Support in ensuring studies meet regulatory standards	2	3	1	1		2	3	1		1	2	3	2	2			1	1	**25**
Facilitate communication to identify pertinent research question		3	3	2	1		3	3	1	1	3			2	1			1	**24**
Support in conducting biostatistical analysis		3	1	2			3	1		1	2	1		3	1			1	**19**
Provide specialized and multidisciplinary methodological expertise	2	3		2		1	3				2	2		1				1	**17**
Teaching and hands on training for the above		1		2		2	2					3		1				1	**12**
Application of new technical capabilities to provide more timely access to wider range of data				2			3				3		1					1	**10**
Other	2												1		2				**5**
Not used to support research activities					1				2				1						**4**
Support in providing and teaching project management skills				1			1												**2**
GRAND TOTAL	**13**	**21**	**14**	**21**	**3**	**9**	**27**	**14**	**4**	**6**	**19**	**15**	**12**	**15**	**8**	**1**	**4**	**9**	**215**

Respondents were asked if they submit data to external organizations for the purposes of research. See Table 20 for the breakdown of data set type by registry/dataset for FY 2017-18. 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 20 Provision of Data to external Data Sets by Registry

Type of External Data Set	Cancer	Cardiac	Cervical	Perinatal	PICNet	PREDICT	Renal	SMP	SPR	Transplant	Trauma	TTR	Biobank	BCEHS/ROC	Generations	Hereditary	Lung	EPPIC	GRAND TOTAL
Pan Canadian dataset	3	1	1				4	3	2	1	1	3		2	1		1		23
Provincial data		3		2			2		2		1				2				12
Cross feeding within PHSA	1	3		2			3				1								10
Data Not Submitted to Any Organization			2		3	1							2			1		1	10
Other	2	2		1				1					1		1				8
International dataset	2						3			1				1					7
GRAND TOTAL	**8**	**9**	**3**	**5**	**3**	**1**	**12**	**4**	**4**	**2**	**3**	**3**	**3**	**3**	**4**	**1**	**1**	**1**	**70**

Names of the external datasets include:

Provincial:
Chronic Disease Registry Initiative
First Nations Health Authority
Renal Agency
Surgical Patient Registry (SPR) Completed Surgical Cases – Ministry of Health
Ministry of Health
Population Data BC
Statistics Canada

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 Society for Heart & Lung Transplant (ISHLT)
Resuscitation Outcomes Consortium (RoC)*
Chronic Kidney Disease Prognosis Consortium (CKD-PC)
Peritoneal Dialysis Outcome and Practice Patterns Study (PDOPPS)
Canadian Partnership for Tomorrow Project

**ROC include 4 distinct data sets; Cardiac Clinical Trials, Trauma Clinical Trials, Cardiac Arrest Registry and Trauma Registry.*

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 54. Access requests are summarized in Figure 55. For examples of the types of research questions posed by researchers, please see Table 21.

FIGURE 54 Ranking of Predominant Nature of Research Questions Using Data from the Registries/Datasets

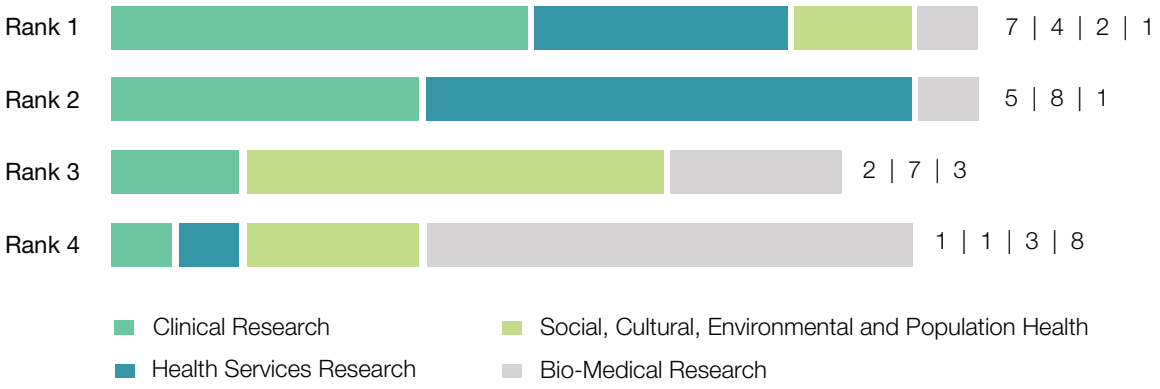
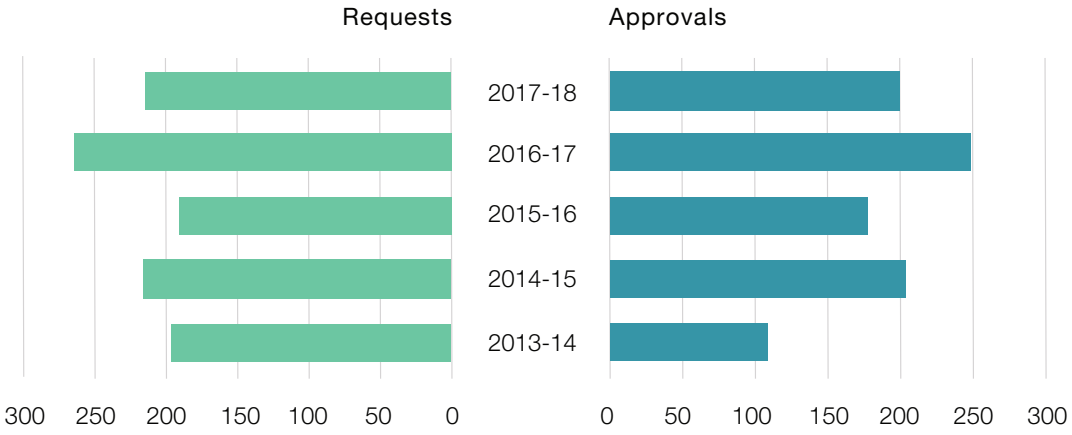


FIGURE 55 Research Access Requests and Approvals from Registry/Dataset by Fiscal Year



In addition, BCEHS manages a data set for ongoing research; the Red Blood Cell Products Pilot Project. BC Emergency Health Services is mainly a health service delivery agency whose mandate includes the production of knowledge in the patient populations they serve.

TABLE 21 Example Research Questions by Registry/Dataset

BC CHILDREN'S BIOBANK
Personalized treatments have a significant potential to improve therapy options for pediatric cancers. Mononuclear cells from bone marrow of 105 leukemia patients and 130 samples from solid tumour patients were provided to develop a research-grade platform for the rapid molecular characterization of pediatric cancers. Initially this platform will be applied to hematologic cancers. Once the platform is validated for hematologic cancers, consideration will be given to whether this platform is also amenable for rapid molecular characterization of pediatric solid tumors.
The BCCH biobank provided 48-60 plasma samples from “healthy” children or children who are not exhibiting a rheumatological disease in order to establish a “healthy” baseline levels of biomarkers for comparison with known biomarkers of children with vasculitis, a rare, life-threating disease. This will enable a more reliable interpretation of biomarker levels to inform clinical care.
Haemophilus influenzae type a (Hia), a bacterial infection that can result in pneumonia, meningitis, septic arthritis, and bloodstream infections, has recently been recognized as an important cause of severe invasive disease in Canadian First Nations and Inuit, as well as in Alaskan Native populations, with the highest rates reported in young children. The BCCH Biobank provided 116 plasma samples from “healthy” children in order to study plasma antibody concentrations in children of various ages in an effort to understand at what age children acquire protective antibodies. This data will be used to develop policy for prevention, including immunization with a new vaccine under development.
Requested samples will be used as normative measures of 'inflammasome' activation to which peripheral blood mononuclear cells collected from a child with a suspected inflammasome dysfunction will be compared. The patient has been followed for more than a decade in the Pediatric Rheumatology Clinic at BCCH. This child has a rare and unexplained autoinflammatory disease.
Blood and marrow transplantation (BMT) continue to be the only widely accepted immune therapy for hematopoietic malignancies, however, success is limited by the rejection of the donor immune system again host tissues. Recent research indicates that low levels of CD56bright NKreg cells are the reason for this, thus finding a propagation/culture system of this cell population is needed. This will be a building block toward NKreg therapy to minimize or prevent graft-versus-host disease. Tissues were provided to support this.
Bone marrow biopsy material was provided to support research aiming to define a validated algorithm for prognostic and diagnostic markers for pediatric graft-versus-host disease and build a much better understanding of the differences between adult and pediatric patients. Ultimately, with biomarkers to define a patient's risk profile and predict treatment responses, the research team aims to eliminate graft-versus-host disease, a condition in which the donor immune cells attach the recipient’s tissues as foreign.
As a secondary lymphoid organ, the tonsil will contain regulatory T cells (Tregs) with a phenotype that is distinct from cells in the blood. Specifically, we think there will be a higher proportion of follicular regulatory T cells. Experiments will be conducted, using 10 mononuclear cells from tonsil tissue from BCCH Biobnk, to understand more about the biology of these types of Tregs and explore potential therapeutic applications.
Acute lymphoblastic leukemia (ALL) is the most common malignancy in children and is characterized by excessive proliferation of immature lymphocytes in the bone marrow and their eventual dissemination to other organs. Understanding tumor formation and progression is an essential prerequisite to developing or selecting treatments for children with ALL. The aim of this study is to identify ataxia-telangiectasia mutated (ATM) mutations in B-cell ALL biopsies, using the granted specimens, to better understand the role these mutations play in initiating cancer.
Acute lymphoblastic leukemia (ALL) is caused by excessive proliferation of immature lymphocytes in the bone marrow and their eventual dissemination to other organs. Standard treatments for ALL such as chemotherapy and radiation often cause long-term side effects in children, therefore there is an urgent need for safer targeted therapies. Using specimens granted, the aims for this study are: Aim 1: Identify cancer-specific proteolytic protein termini and deregulated proteases in pre-B ALL Aim 2: Characterize underlying mechanisms and estimate risk of acquired resistance Aim 3: Validate absence from healthy tissues and presence across subpopulations of cancer cells.

Primary immunodeficiencies (PIDs) represent a group of genetic disorders that predispose to a range of complications including infection, autoimmunity and cancer. The fundamental cause of the immunodeficiency frequently remains elusive, delaying diagnosis and hindering treatment. Increasing use of high-throughput sequencing has rapidly expanded the number of identified genetic defects in previously uncharacterized PIDs. This project aims to characterize novel monogenic forms of PIDs.
BC PERINATAL DATABASE REGISTRY (PERINATAL HEALTH PROGRAM)
Is the Normal Uncomplicated Delivery (NUD) rate, in conjunction with the Adverse Delivery (AD) rate a reliable measure of the appropriateness of caesarean section use?
To determine the utilization of ondansetron and fluconazole during pregnancy in Canada, and whether the use of these drugs adversely affects pregnancy outcomes.
What are predictors or risk factors of maternal one-carbon metabolite and newborn B-12 status, as well as newborn outcomes?
To ascertain chemistry and hematology test ordering practices during the course of pregnancies in British Columbia; to determine which common perinatal factors influence laboratory test results during pregnancy using existing laboratory data.
Is anemia in pregnancy associated with an increase in maternal and perinatal morbidity and mortality?
Document the outcome of midwifery attended water births and determine if there are any differences in water birth outcomes versus a matched cohort of midwife-attended land births.
SCREENING MAMMOGRAPHY DATABASE
How does breast density affect the risk of breast cancer?
TUMOUR TISSUE REPOSITORY
Are there evolutionary mechanisms and key mutations for different metastasis paths of breast cancer?
Creating a 'normal' proteomic comparator map as a resource for proteomics data analysis for the Personalized Onco-Genomics Project.
Do expression patterns of ADAM17 (a predictor of immune cell exclusion) suggest its role in the establishment of an immunologically 'cold' phenotype in breast cancer?
Is the immune response to High Grade Serous Carcinoma consistent despite differences in molecular subtypes of each lesion within spatially distinct tumor sites?
Does the presence of lymph node hypoxia (oxygen deficiency) reflect the extent of immune activation against tumours of the breast?

BC CANCER REGISTRY
A population-based study on the outcomes and late effects of radiation therapy in long term survivors of carcinoma of the cervix treated with brachytherapy within BC.
Identification of factors associated with radium-223 therapy completion and to investigate the impact of sequencing relative to other drug options.
Efficacy and Prognostic Factors for Y-90 Radioembolization in Metastatic Neuroendocrine Tumors with Liver Metastases.
A retrospective review of primary cardiac sarcoma in the era of new systemic therapies.
Review of clinical outcomes (chemotherapy response and survival) in advanced FIGO Stage III & IV ovarian endometrioid carcinoma.
Outcomes of patients with traditional serrated adenomas of the colorectum.
Resource and health impact of personalized oncogenomics: a pilot project.
Case ascertainment and incidence of vestibular schwannoma in British Columbia 2006-2016.
Examining the epidemiology, treatment, and survival in young-onset colorectal cancer.
PRECISION: Preventing Complications from Inflammatory Skin, Joint, and Bowel Conditions.
PROMIS - TRANSPLANT REGISTRY
Expanded analysis: comparison of piggyback versus end-to-end and side-to-side technique in orthotopic liver transplantation.
Diabetes in Lung Transplant Study - studying all aspects of Diabetes in lung transplant recipients.
An Assessment of Medical Follow-up after Living Kidney Donation in BC.
ReGIFT. Prevention of Delayed Graft Function in Kidney Transplantation.
Does antiviral prophylaxis reduce the risk of EBV viremia in the first-year post-solid organ transplantation in high risk patients? A retrospective study.
Donor and recipient predictors of increased length of intensive care unit stay following bilateral lung transplantation: A single-centre retrospective cohort analysis.

Establishment of a database for Improved Quality Measures Analysis for Liver Transplantation Patients on Vancouver General Hospital.
Enhanced immune monitoring in pediatric kidney transplant recipients.
Identifying the differences in gene profile of intimal and medial smooth muscle cells isolated from human abdominal aorta.
Canada- DONATE- National observational study of the ICU management of deceased organ donors.
PROMIS - RENAL
What is the geographical distribution of rare forms of kidney disease (glomerulonephritis (GN)); and the costs of immunosuppressive agents used to treat GN in the province over time?
What are the outcomes of patients who choose Peritoneal Dialysis (PD) and then arrive to dialysis: do they start on PD?
How many patients in the province have autosomal dominant polycystic kidney disease (ADPKD) and what are the clinical trajectories of those registered at different levels of kidney function?
What is the impact on Peritoneal Dialysis (PD) retention of the PD Assist program implemented over the last 3 years?
ENDOMETRIOSIS AND PELVIC PAIN INTERDISCIPLINARY COHORT (EPPIC)
To determine whether deep dyspareunia is associated with sexual quality of life in women with endometriosis, independent of potential confounders.
What features in women with endometriosis are associated with severe back pain?
To investigate ethnic differences for moderate-to-severe endometriosis.
To evaluate the impact of a concomitant PVD diagnosis in women with pelvic pain on: a) clinical pain presentation (e.g. superficial dyspareunia, deep dyspareunia, other pain diagnoses, physical exam); b) psychological health outcomes (e.g. validated psychological measures,) and sexual quality-of-life); and c) sexual quality of life subscale of the Endometriosis Health Profile.
To evaluate point-of-care pre-operative transvaginal ultrasound (TVUS) sliding sign, in comparison to palpation of a nodule on digital pelvic examination, for the prediction of pouch of Douglas (POD) obliteration.
To determine whether bladder/pelvic floor tenderness and painful bladder syndrome were associated with severity of deep dyspareunia in women with Stage I/II and Stage III/IV endometriosis, while controlling for demographic characteristics and endometriosis-specific factors.

BC CARDIAC REGISTRY
Comparison of two methods of coronary revascularization – coronary artery bypass graft (CABG) and percutaneous coronary intervention (PCI) - across three groups defined by the timing of treatment.
Identification of care gaps for out-of-hospital-cardiac arrest (OHCA) in BC in order to implement and refine key care processes for OHCA that are important for improving long-term clinical outcomes.
Review of the following questions: (1) what are the changes in patient-reported outcomes between baseline, 1-month and 1-year after transcatheter aortic valve implantation (TAVI), (2) what are the predictors of clinically important improvement in patient-reported outcomes after TAVI (3) what is the relationship between patient-reported outcomes and 30-day and 1-year mortality after TAVI, and (4) what is the relationship between changes in patient-reported outcomes and changes in NYHA Classification.
Investigation of the following: (1) long-term clinical outcome/survival following mitral valve repair or replacement at different age groups (<50, 50-65, 65-75, >75), and in patients with dialysis vs non-dialysis, (2) freedom from re-do mitral valve (MV) surgery following mitral valve repair or replacement at different age groups, and dialysis vs non-dialysis patients, (3) the effect of valve types (mechanical valves, Edwards bovine tissue valve, Medtronic Morsac porcine tissue valve, SJM Epic porcine tissue valve) on long-term survival and freedom from re-do MV surgery following mitral valve replacement in propensity matched patients in dialysis and non-dialysis cohorts, (4) comparisons in 30-day mortality, hospital stay, long-term survival and freedom from re-do MV surgery following mitral valve repair versus mitral valve replacement in propensity matched patients, (5) determine risk factors for 30-day mortality and long-term survival following mitral valve repair or replacement, and (6) determine if there is a positive association between the duration of cardiopulmonary bypass or aortic cross-clamping and 30-day mortality & in-hospital morbidity following isolated mitral valve replacement or repair at different age groups.
Use of registry data to evaluate patient reported outcome measures (PROMs) in the management of atrial fibrillation. Based on the conceptual framework, the research questions are: (1) can trajectories of change in patient-reported outcome measures for outpatients with atrial fibrillation be explained by different biological functioning, or individual and environmental characteristics, and (2) what is the concordance between patient- and clinician-reported outcome measures for outpatients with atrial fibrillation?
Using the population-based data from the province of British Columbia (BC), examination of the effect of multiple arterial conduits on both short and long-term outcomes after CABG in the 'real world'.
The objectives are to assess: (1) the different clinical pathways of patients found to have an ejection fraction <35% (2) the proportion of patients who have an ejection fraction less than 35% who do not receive an implantable cardiac defibrillator (ICD) (3) the proportion of patients who have an indication for ICD insertion that do not receive an ICD, and (4)whether there is a change in the proportion of patients referred for ICDs following the distribution of an echocardiography report card.
The primary objective of the study is to use a population-based cohort of diabetes patients to evaluate the real-world costs and outcomes associated with diabetes between 1997 and 2015. Consideration will be given to the following:(1) Determine diabetes therapy treatment patterns over time, and evaluate factors associated with different treatment patterns (e.g. comorbidities, coverage policies, adherence, etc.), ; (2) Identify care gaps and determine what patient/policy/practice factors contribute to gaps in care, (3) Calculate the overall economic burden of diabetes in BC, and (4) Identify strategies to improve patient outcomes and reduce the economic burden of diabetes

BCAS/ROC - CARDIAC ARREST REGISTRY
Out-of-hospital cardiac arrest in British Columbia: Identifying care gaps and opportunities to improve long-term outcomes.
LUNG CANCER SCREENING PROGRAM
Develop method to predict malignancy potential of screening LDCT detected lung nodules.
Health economics implication of lung cancer screening.
Effect of lung cancer screening on quality of life.
CERVICAL CANCER SCREENING DATABASE
Human papillomavirus (HPV) Subtype Assessment in British Columbian Females: A Prevalence Study post-implementation of the Provincial School-Based HPV Vaccination program.
An Assessment of Adult Childhood cancer survivors' experiences.
BC GENERATIONS PROJECT
A pilot study launched at the BC Cancer aims to use state-of-art screening technology to determine whether it is possible to detect early signs of cancer in healthy volunteers with the use of a simple blood test.
A study to determine the influence of smoking on a person's immune status, including their ability to fight off bacterial and viral infections, and also the influence of smoking on the makeup of a person's gut bacteria (the microbiome), thus providing insights into the relationship between smoking and immune functions.
A study to examine the relationship between metabolomics and risk of developing cancer.
A study to evaluate the safety and effectiveness of a newer Hepatitis B vaccine (Sci-B-Vac) against the currently approved Hepatitis B vaccine (Engerix-B).

BC TRAMA REGISTRY
The goal of this study is to understand the practical utility of an on-line tool to capture patient reported outcomes after discharge from hospital for major trauma. Outcomes of interest relate to quality of life including daily function, pain control, satisfaction with care and employment status.
The purpose of this proposed study is to investigate the number, demographics, determinants, patterns, and associated costs of equestrian injuries in BC presenting to trauma centres in the past five years (1/4/2010 to 31/3/2015).
To examine the clinical impact of 24/7 on-site staff radiologist coverage in the Vancouver General Hospital Emergency Department, which was implemented on October 1, 2013.
The purpose of this study is to investigate the demographics, types, patterns, and associated costs of penetrating trauma in British Columbia from 31/3/2011 to 31/3/2016
This review is designed to evaluate the potential impact of a prehospital blood transfusion program in the aeromedical setting in British Columbia.
The purpose of this review is to evaluate the impact of the provincial burn clinical guidelines, which were previously implemented in 2011, on acute burn care management.
To describe and quantify screening cultures for methicillin-resistant Staphylococcus aureus (MRSA) in burn patients and to determine the incidence of MRSA infection rates in burn patients.
This study will complete a retrospective chart review of workplace related burns admitted to Vancouver General Hospital to identify factors influencing length of stay in hospital.

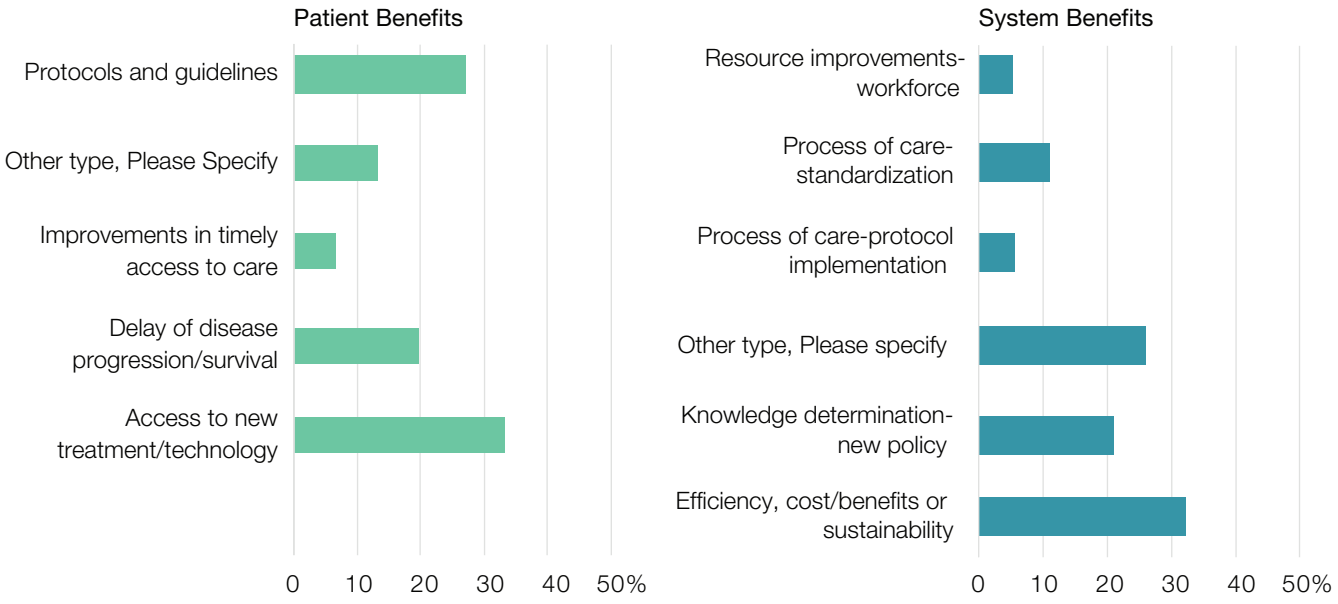
Research Benefits

Again, this year, data stewards were asked to classify the research benefits identified for FY 2017-18 into two distinct categories; Patient Benefits and System Benefits. See below for further detail on benefit types. Benefits resulting from research activities are 56% attributed towards System Benefits and 44% towards Patient Benefits.

Benefit Type	Benefit Sub-type
Patient Benefit:	Delay of disease progression/survival.
	Access to new treatment/technology
	Protocols and guidelines
	Improvements in timely access to care
	Other
System Benefits:	Process of care – standardization
	Process of care – protocol implementation
	Efficiency-cost/benefits or sustainability
	Knowledge dissemination – new policy
	Resource improvements – workforce
	Other

Figure 56 shows the percentages for each benefit category as a result of the registry and dataset usage for FY 2017-18.

FIGURE 56 Percentage of Benefit Sub-type by Type for FY 2017-18



APPENDIX 1 GLOSSARY

TERM	DESCRIPTION [DATA SOURCE]
Metric Definitions	
Metrics 1ab, 2b – Total annual grant awards, Total annual external grant awards by major funding categories by agency or research entity	Total Annual Award ($) for Grants, Awards and Contracts by Funding Source *[RISe annual file provided by UBC Office of Research Services]*
Metric 1c – Annual grant application success rate by agency/research entity. Added in FY 09-10	Success rates for two CIHR operating grant competitions (March and September of applicable year) for BC Cancer and BCCHR, BCMHSUS and WHRI. *[CIHR website for National results; Agency results self-reported on the excel data collection form]*
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. *[Agencies self-report utilizing SciVal to search Scopus utilizing researcher name; Agency inputs data on excel data collection form]*
Metric 2a – Total number of trainees by agency/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. *[Agencies manually request trainee statistics from individual investigators and input data on excel data collection form]*
Metric 2c – Total number of researchers by agency/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 agency. *[Previous year's researchers are provided to each agency from the researcher database in excel; Agencies provide additions, deletions, changes on excel data collection form]*

TERM	DESCRIPTION [DATA SOURCE]
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. *[RISe annual file provided by UBC Office of Research Services]*
Metric 2e – Research Support Fund grants (Added FY 12-13)	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 (RSF). *[RISe annual file provided by UBC Office of Research Services]*
Metric 3a - # of intellectual property disclosures, patents by agency/research entity	Total number of Invention Disclosure (internal documents), provisional patent and PCT applications by fiscal year. *[BCTDO (for BC Cancer) and UILO (all other agencies) complete the excel data collection form]*

TERM	DESCRIPTION [DATA SOURCE]
Metric 3b – Licenses, royalty income and # spin-off companies (Revised FY 10/11) *(Revised Net Licensing Rev definitions in FY 2013-14)*	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. IP related revenue shall follow the UILO (University-Industry Liaison Office) definitions from FY 2010-11 forward. **Definitions:** **Gross licensing revenue** = Royalties + Equity Liquidated + Option Fees + License Fees + License Management + Technology Assignment; Royalties - royalty payments including minimum annual royalty payments License Fees – upfront payments, milestone payments and other payments associated with the license License Management - legal fees incurred by TDO (Technology Development Office) or UILO relating to the licensed IP and reimbursed by licensees **Total TDO Expenses for patenting and legal costs** **Expenses for Licensed IP** – patenting, legal and related costs associated with licensed IP **Realized revenue per distribution agreements** – revenue accrued to PHSA agency after distribution to inventors, obligations due to affiliated academic institutions, granting agencies and inventor departments. The revenue distribution varies by entity and will be noted in the narrative. **Royalty, equity liquidated and licensee fees** 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. **Option Fees** 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. **Technology Assignment** This relates to the scenario when a company wishes to take ownership of the technology and in return pays an Assignment fee. *[BCTDO (for BC Cancer) and UILO (all other agencies) complete the excel data collection form]*
Metric 4a – Clinical Trials Source: Ethics Module for all REBs	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
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.

TERM	DESCRIPTION [DATA SOURCE]
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 Lab 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 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	Dollar amount for FY for Grant-in-aid awards (Broad topic but not directed). 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. Characteristics: • 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	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. 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.

TERM	DESCRIPTION [DATA SOURCE]
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	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: **Non-Profit** – funding provided mostly by private donations and endowments. **Industry** – funding provided by a for-profit business in the private or commercial sectors of business. **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]
Funding Sources/Granting Agency	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)	The Canadian Institutes of Health Research and its thirteen subsidiary institutes: * 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.

TERM	DESCRIPTION [DATA SOURCE]
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, BC Cancer 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.
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 agency department, agency 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.

TERM	DESCRIPTION [DATA SOURCE]
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 agency 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.
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	A number one through five (MUST have one selected). 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. Category 5 will be for those research entities/agencies who do not utilize the CFRI categories. If you utilize category 5, please indicate the definition that your research entity/agency uses to define Researchers. 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 agency members. Their primary affiliation will be with another academic and/or research institution. New categories for FY 16-17: http://bcchr.ca/research-support/membership
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 Agency Added in FY 11-12	An indication by number (1 or .5) of whether a researcher is attributable to applicable agency 100% (full) or 50% (shared).

TERM	DESCRIPTION [DATA SOURCE]
UBC's definition of Research Added in FY 13-14	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 foetuses." 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.'
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)