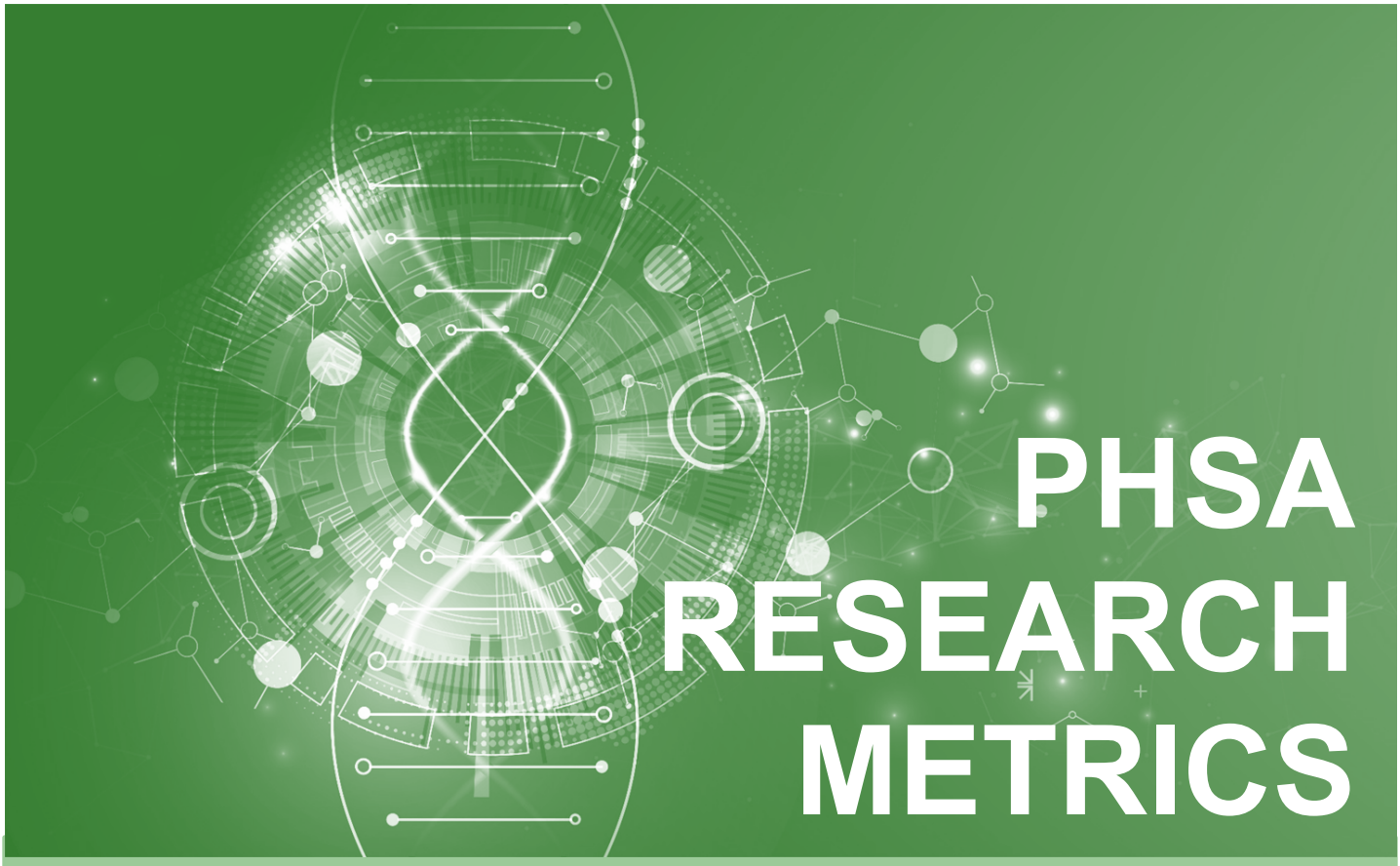

# PHSA RESEARCH METRICS

**FISCAL YEAR 2022-23**


Prepared for:
PHSA Research & Academic Development Committee
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PHSA Research Metrics Working Group
PHSA Data Analytics Reporting and Evaluation



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


**SUPPLEMENTARY REPORT**

# Table of Contents

# PHSA RESEARCH METRICS FISCAL YEAR SUMMARY – PHSA OVERALL

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

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

# PHSA AGGREGATE ANALYSIS

## Producing and Advancing Knowledge

In FY 2022-23, researchers affiliated with PHSA were awarded a total of $190,089,694, an increase of 7.3% from FY 2021-22.

Operating grants continue to make up the largest portion (86%) of total funding received. Operating grants support specific, time-limited research projects. While operating grants are the "bread and butter" of research grants, salary awards are important to provide researchers with the protected time to successfully compete for operating grants and represent 10% of total awards for the past five fiscal years. A breakdown of funding types and subtypes by fiscal year can be found in Figure 1. For FY 2022-23, the subtype of Operating or Project Operating Grants garnered the largest portion of research funding.

See Table 1 for breakdown of COVID-19 related research funding by program.

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

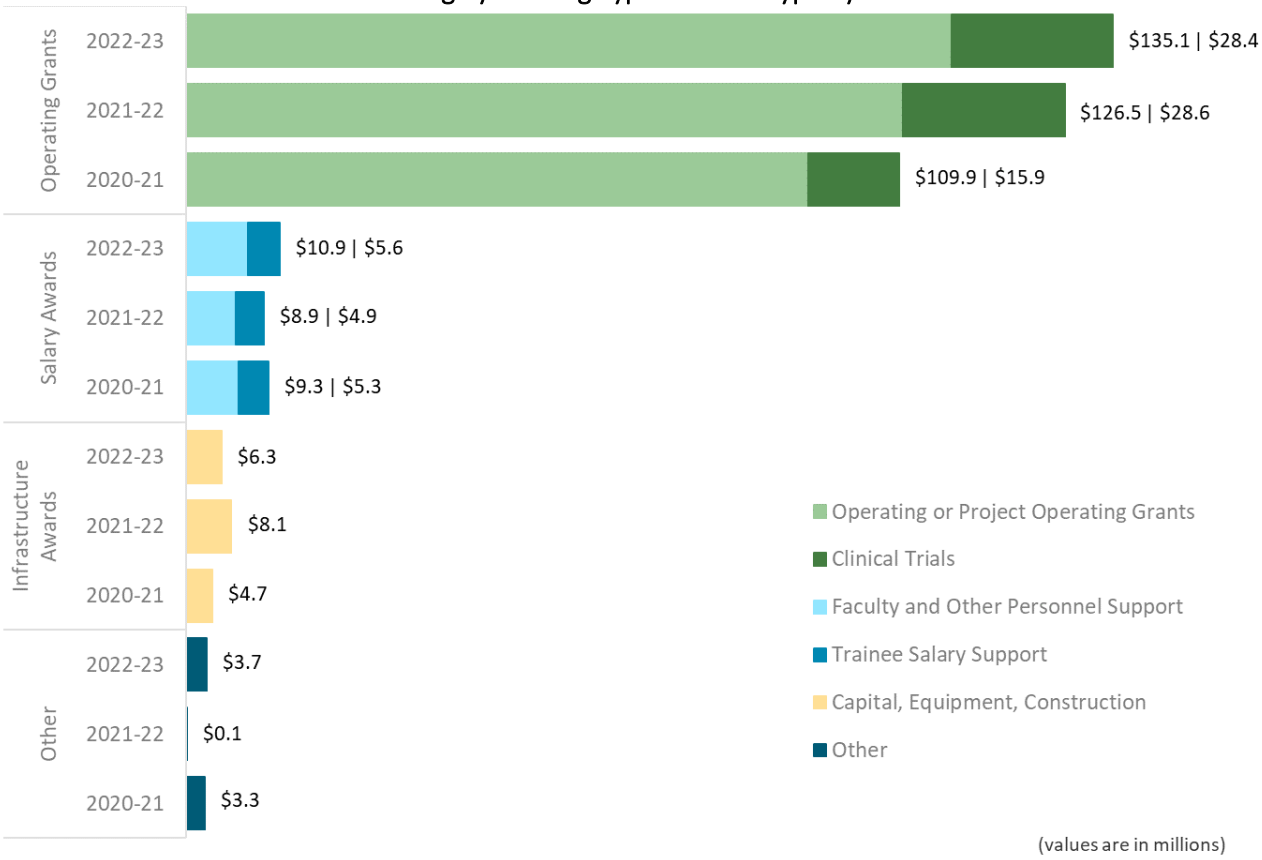
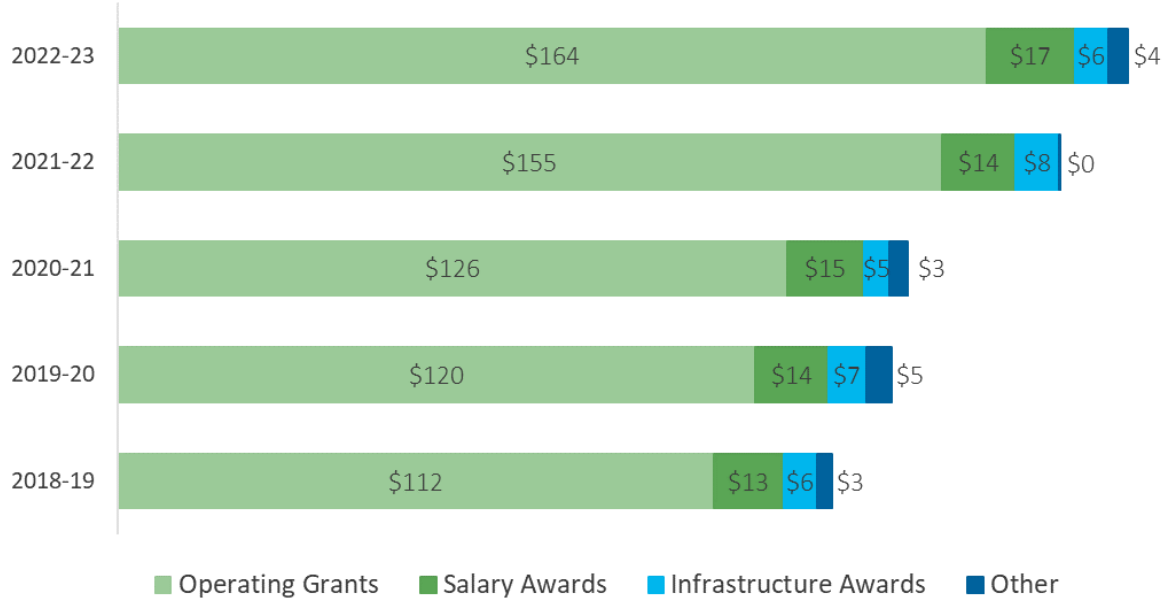



TABLE 1 COVID-19 Research – FY 2022-23

| Program | TOTAL |
|---|---|
| BCCRI | $994,054 |
| BCCHR | $5,338,157 |
| WHRI | $-46,270 |
| BCCDC | $748,010 |
| BCMHSUS | $24,045 |
| **TOTAL** | **$7,057,997** |

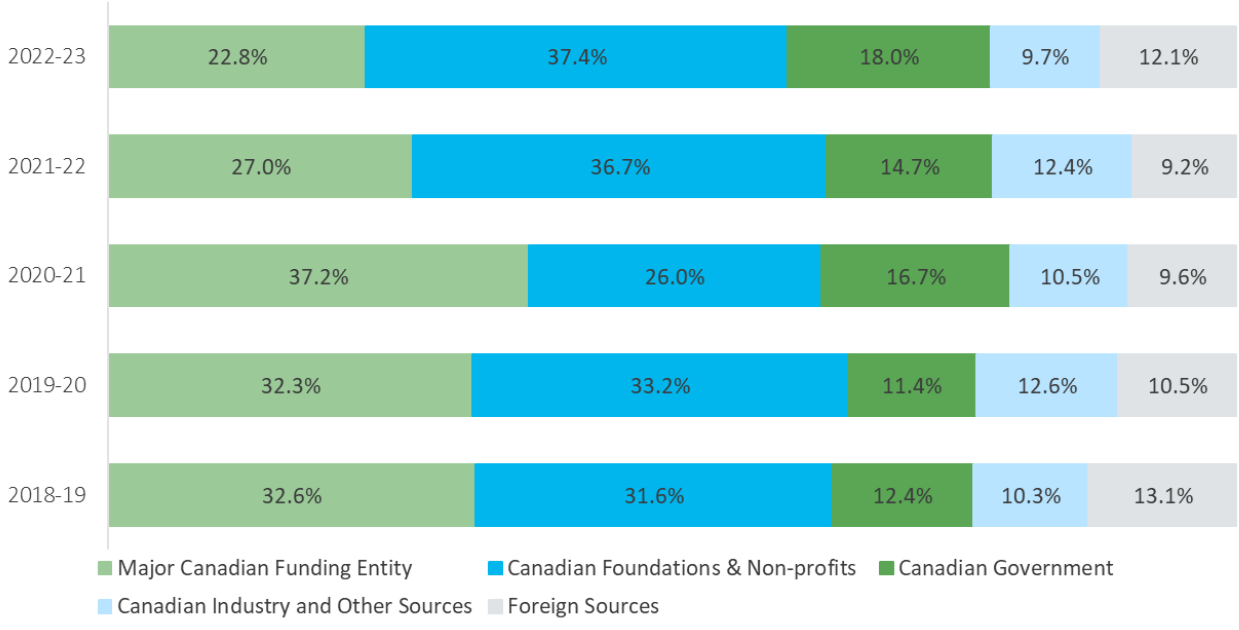
Research Support Fund grants total $4,134,441 and represent funding to support the indirect costs of research for tri-council awards but is not included in total research funding or the figures below. Because research support is a shared expense between UBC and PHSA research programs, PHSA has negotiated to receive 66% of the applicable UBC Research Support grant. Figure 2 shows Total Research Funding by Fiscal Year and Type for the past five fiscal years.

FIGURE 2 Total PHSA Research Funding by Fiscal Year and Type




A comparison of funding source by source category over five (5) fiscal years can be found in Figure 3. This figure, generated by compiling hundreds of potential sources into five categories, highlights the extent to which primary sources of funding vary from year to year. This year, Major Canadian Funding entities and Canadian Foundations & Non-profit sources represent 60.2% of the total funding. Canadian Foundations & Non-profits had the largest share of funding in 4 of the last the 5 years. Canadian Industry and Other sources and Foreign sources remain fairly stable while Canadian Government is at its highest level in 5 years.

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. 64, for sector definition) both by fiscal year and by program for five fiscal years.

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

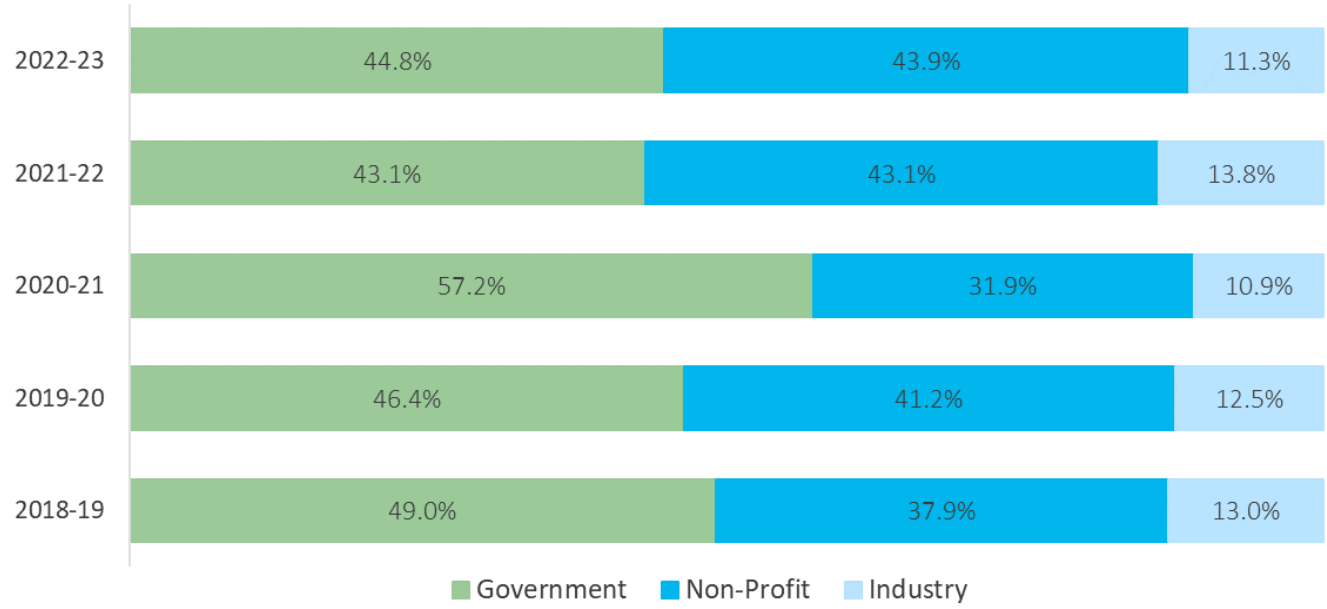
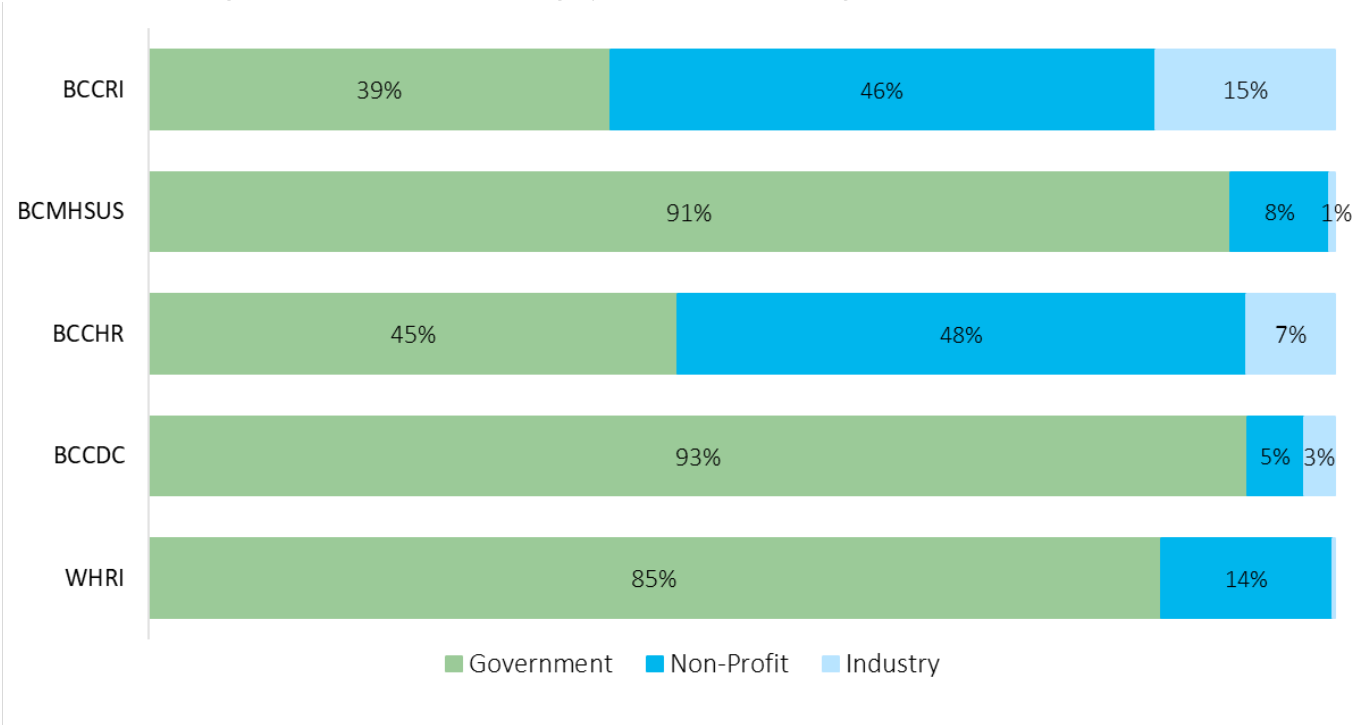



Figure 5 shows the percentage of funding by RISe sector and program for FY 2022-23. This graph reflects the variations in funding sources for all PHSA research entities, as BCMHSUS, BCCDC and WHRI rely heavily on government funding.

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



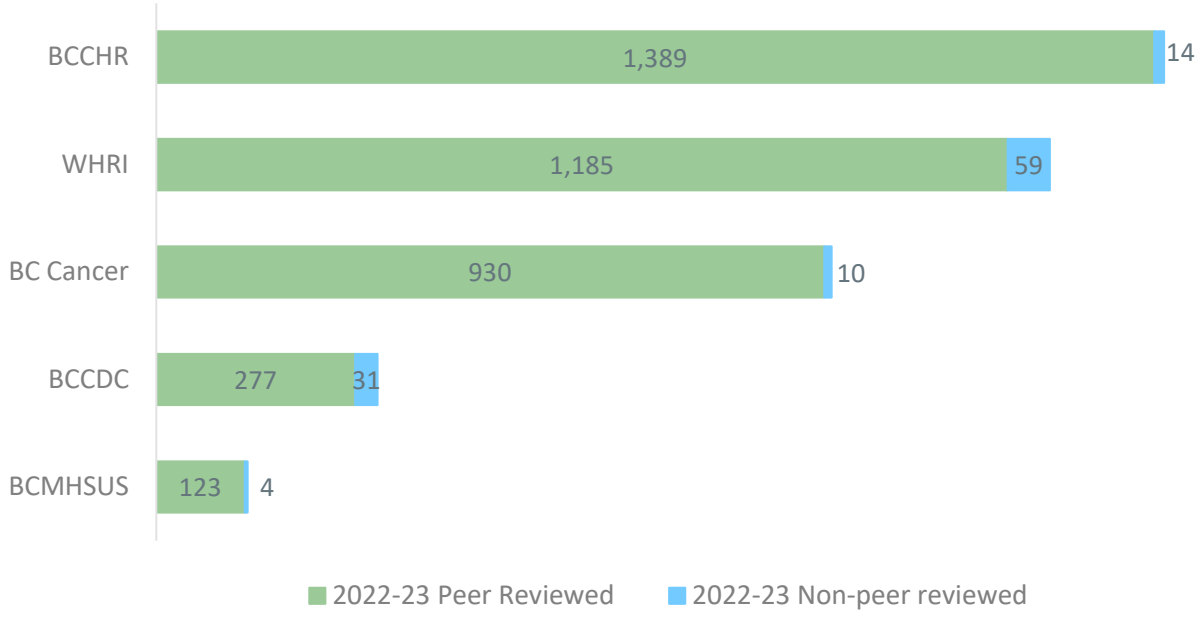
The application success rate is reported for the Fall 2022 and Spring 2023 CIHR project grant competitions. Results (see table 2) are shown for National and PHSA research entities combined. PHSA enjoyed success in both Project Grant programs and was above the national averages resulting in 43 awards.

TABLE 2 PHSA Annual Grant Application Success Rate

| Grant Funding Opportunity | National Overall Results % (Approved/Submitted) | PHSA Results % (Approved/Submitted) |
|---|---|---|
| **2022-09 Project Grant** | 25.0% (475/1,899) | 45.2% (28/62) |
| **2023-03 Project Grant** | 22.4% (474/2,113) | 25.0% (15/60) |

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

FIGURE 6 Total Number of Publications by Program and Category



## Building Research Capacity

PHSA research entities identified 963 researchers in categories 1, 2, and 5 in FY 2022-23, up 22.5 from FY 21-22 (see Figure 7). Increases were seen in all researcher categories. Category 3 researchers are defined as Affiliate Investigators and represent those researchers with a primary affiliation with a research or academic institution external to PHSA, but who wish to remain collaborators with PHSA researchers. PHSA does not track category 3 members funding, publications, or trainees. Details on affiliate members can be found in each program section. BCMHSUS, BCCHR and BCCRI can report their researchers utilizing BCCHR defined categories, which highlight the amount of time protected for research purposes. BCCDC and WHRI define researchers utilizing a methodology that best reflects the type of work and relationships they have with their researchers. Further information on these methods can be found in specific program sections. An attempt to count each researcher only once was made by attributing each researcher to the entity where the bulk of salary and/or support are received. Category 1 researchers are best positioned to compete for external grants.

FIGURE 7 Total Number of PHSA Researchers by Category and FY

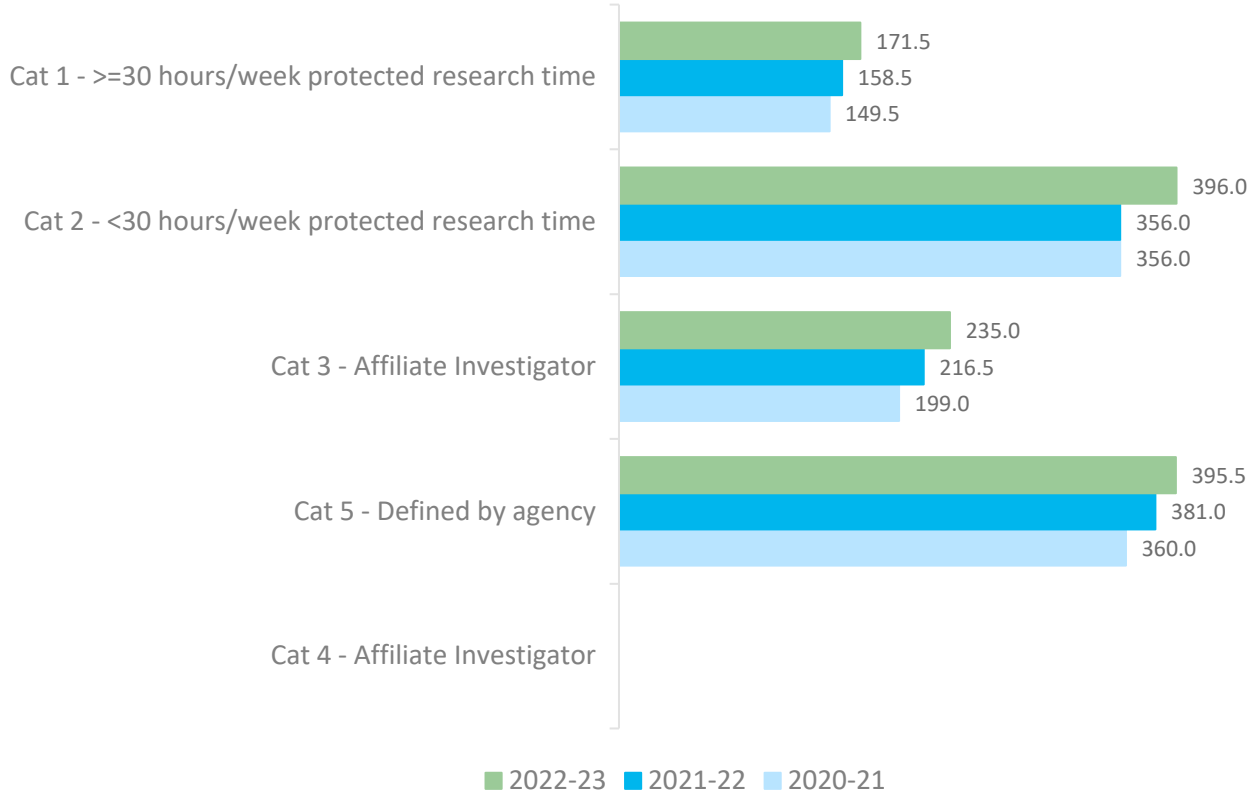


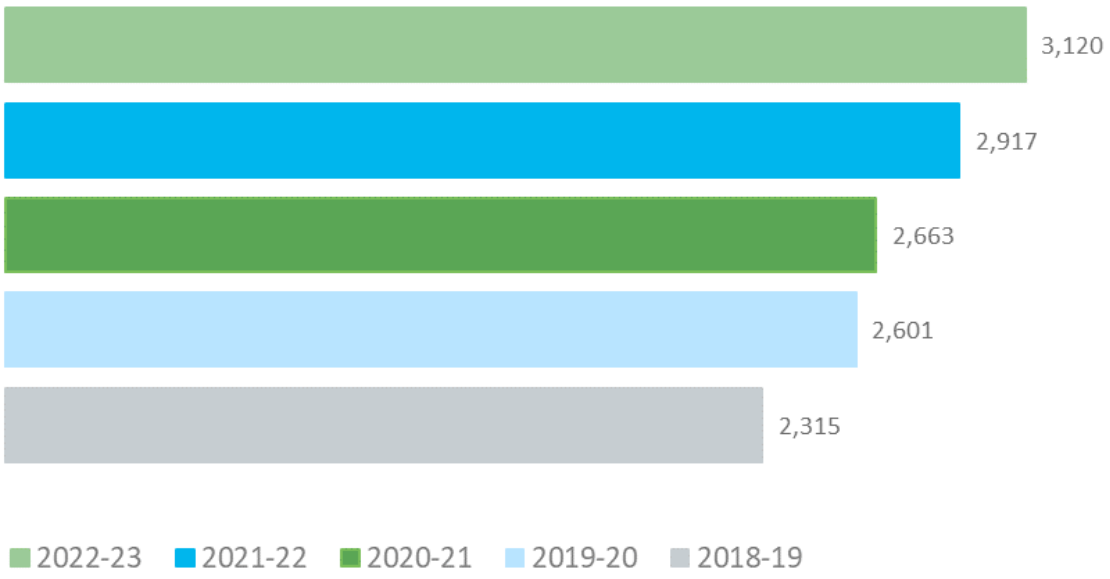

Table 3 provides summary statistics by program at the Principal Investigator (PI) level. PHSA received funding for 449 Principal Investigators collaborating with 1,337 UBC co-investigators for 1,483 unique studies in FY 2022-23. This excludes Salary and Other award types as these are not designated for specific studies and the number of co-investigators from other academic institutions.

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

| Program | # of Unique Studies | # of Unique PI's by Program | # of UBC Co-PIs by Program | Total Award Amount |
|---|---|---|---|---|
| BCCRI | 635 | 182 | 465 | $99,398,952 |
| BCCHR | 714 | 196 | 631 | $57,979,171 |
| WHRI | 66 | 37 | 134 | $6,370,083 |
| BCCDC | 54 | 25 | 85 | $5,196,838 |
| BCMHSUS | 14 | 9 | 22 | $885,984 |
| **Grand Total** | **1,483** | **449** | **1,337** | **$169,831,029** |

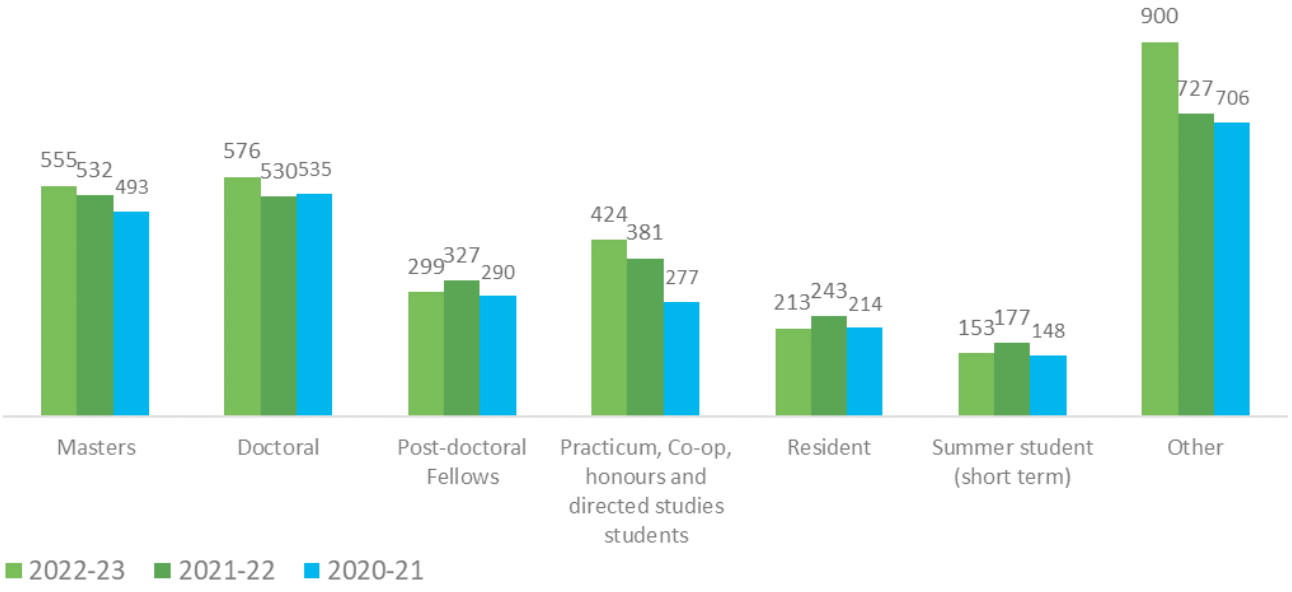
During FY 2022-23, PHSA researchers provided training and supervision to a total of 3,120 research trainees, an increase of 203 from FY 2021-22. This is a significant metric because the training of post-doctoral fellows (PDFs), Doctoral, and Masters Trainees in particular is a major indicator of the degree to which PHSA and its research entities are supporting their academic mandate and ensuring the next generation of highly qualified research personnel. In addition, post-doctoral fellows and doctorals contribute significantly to the conduct of research under the supervision of principal investigators. See Figure 8 and 9 for the number of trainees by type and fiscal year for PHSA overall.

FIGURE 8 Total Number of PHSA Trainees by Fiscal Year




The breakdown of trainees stayed relative the same for the past three years with the largest increase seen in the Other category in FY 2022-23.

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

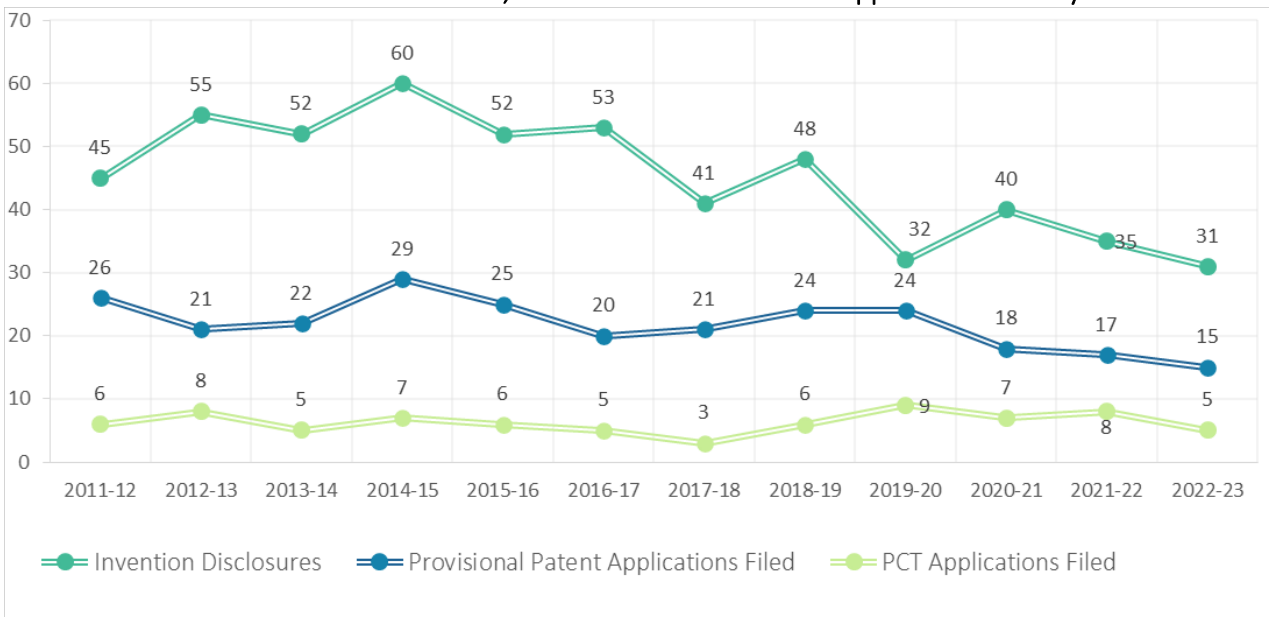


## Achieving Economic Benefits and Innovation

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

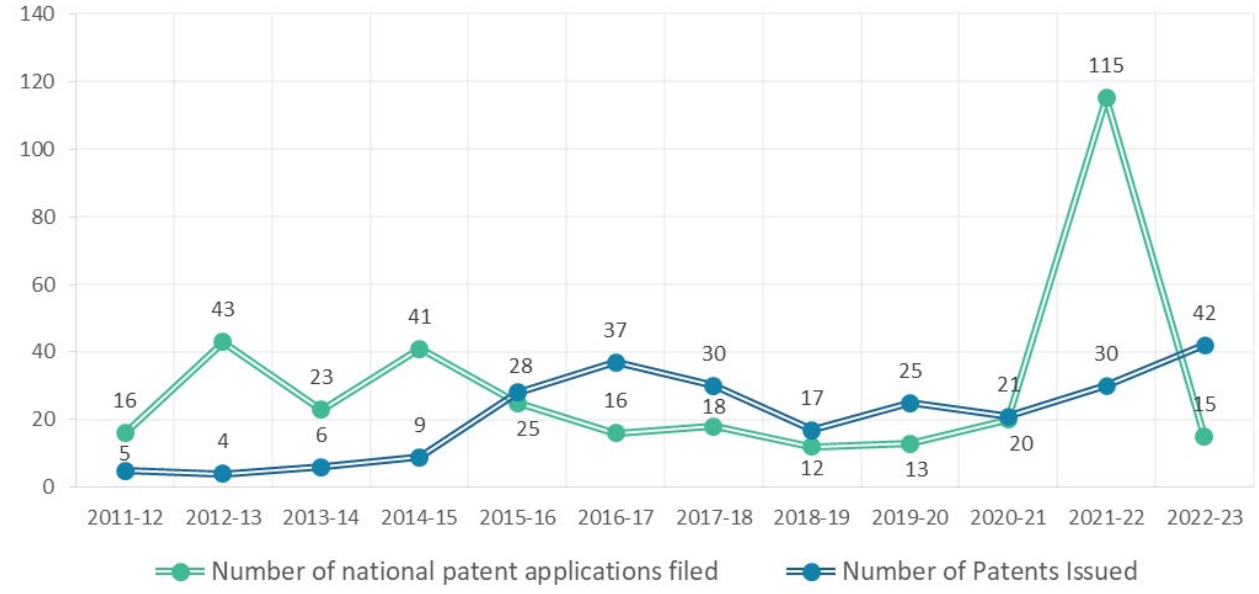
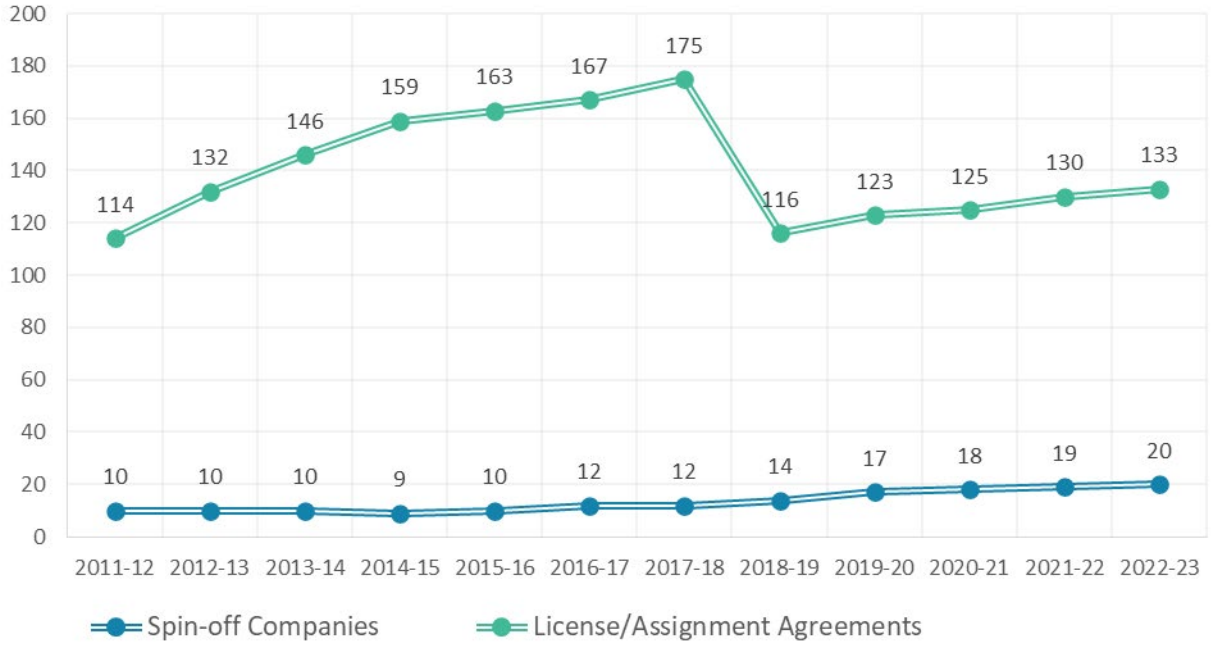


Figure 12 shows all licensing/assignment agreements and spin-off companies for PHSA Overall, combined for the past 12 years. Data is collected from PHSA's Technology Development Office (TDO) and through UBC's University-Industry Liaison Office (UILO) which includes activities from BCCHR and BCCRI researchers. Program specific numbers can be found in the BCCRI and BCCHR program sections. Two spin-off's were created: Overture Therapeutics and Linax Technologies (BCCRI). One BCCRI spin-off became inactive (Cuprous Pharma).

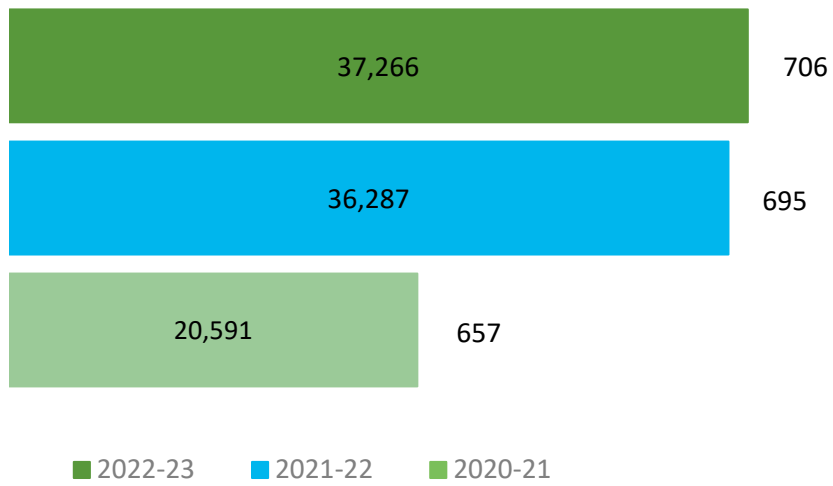
FIGURE 12 License/Assignment Agreements and Spin-Off Companies by Fiscal Year




For FY 2022-23, the number of clinical trials increased by 1.5% (11) over FY 2021-22. See Figure 13 for number of Clinical Trials and Total Cumulative Subject Enrollment by Fiscal Year.

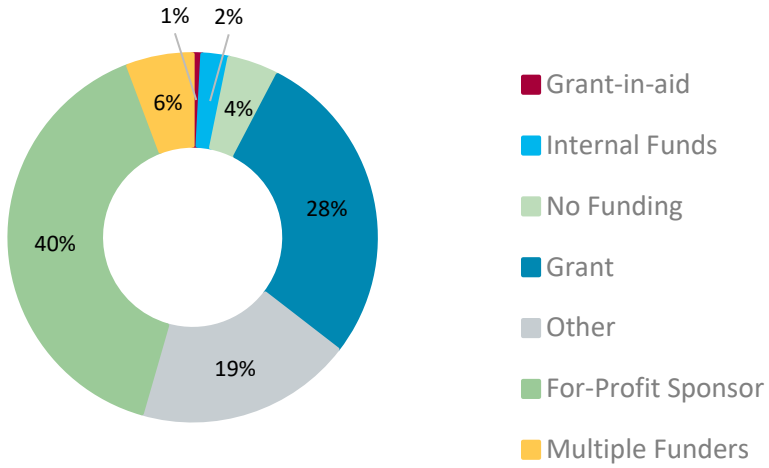
The opportunity to participate in clinical trials is an important metric because it offers patients the opportunity to participate in clinical evaluation of new drugs, many of which achieve therapeutic benefits beyond those offered by standard of care treatment. Clinical trials also represent the final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

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



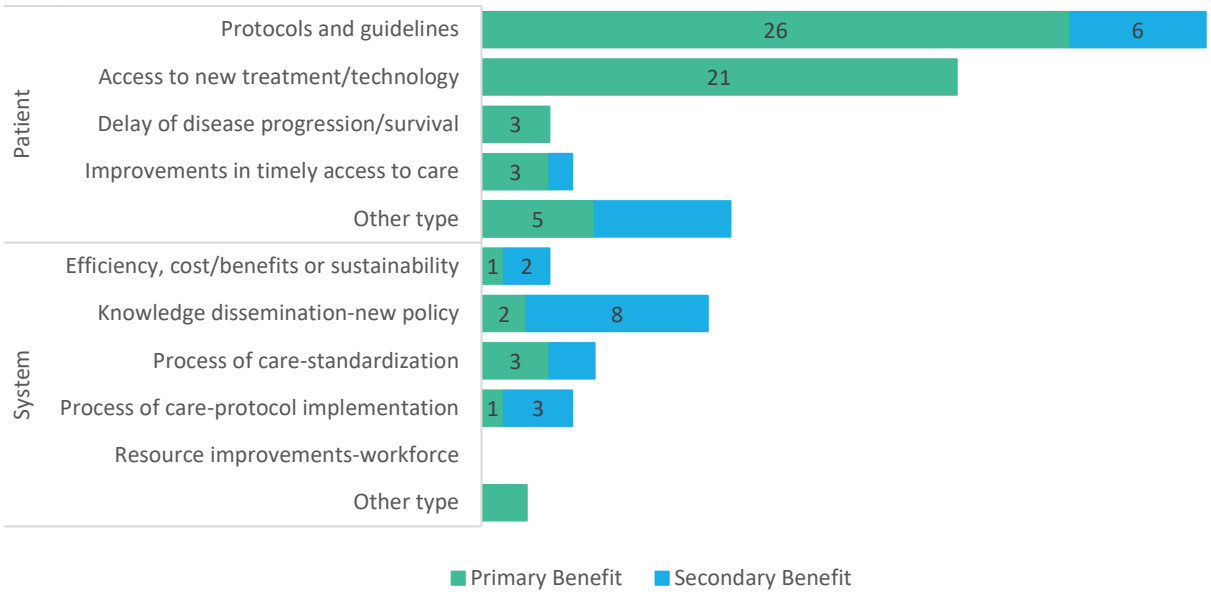
Grant funding type for Clinical Trials (CT) is sourced from the REB (Research Ethics Board) file and reflects the funding type entered as part of the ethics application (see Glossary – Appendix 1, page 66 for a definition of funding types). The percentage of trials that are industry sponsored (For-Profit Sponsor) was 40% in FY 2022-23, an increase of 1% from FY 2021-22. The Other category includes CTs with no funding type or with funding types that cannot be classified into one of the other categories. See Figure 14 for a breakout of trials by funding type percentage by category.

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




In FY 2022-23, the programs completed the survey that asked respondents to identify guidelines, drugs, diagnostic agents, or devices adopted or approved in FY 2022-23, and any new and adopted novel and transformational research designs or methodologies resulting from research driven by PHSA researchers or collaborative research in which PHSA researchers were key participants. Program specific outcomes can be found in the *PHSA Research and Student Education Metrics Consolidated Summary Report*. The survey was not intended to be exhaustive, but to capture the significant, top of mind advancements, and, further, asked respondents to identify the benefits to patients, population health, and/or health system sustainability of those advancements. Figure 15 is a summary of the classification of benefits realized through research. These represent both primary and secondary benefits. The Other Patient benefits included Real Word Evidence (2); Access to Care/Clinical Trial (2), Molecular classification for precision diagnostics and treatment (4), Change in surgical practice to prevent cancer (2), and new technology for use in clinical investigations (1). Given that many researchers participated in research related to COVID-19, we also asked them to identify if the outcome was related to COVID-19. Of the 67 outcomes reported, 8 (12%) were related to COVID-19.

FIGURE 15 Classification of Benefits Summary for All Programs



# BC CANCER RESEARCH INSTITUTE (BCCRI)

## Producing and Advancing Knowledge

In FY 2022-23, researchers affiliated with BCCRI were awarded a total of $106,826,093 in research funding which represents a 14% increase over FY 2021-22. Operating Grants ($94,854,968) represent 88.8% of total awards. A breakdown of funding types and subtypes can be found in Figures 16.

BCCRI's portion of the Research Support Fund grant for FY 2022-23 is $1,369,019 but is not included in total research funding or the figures below. Total Covid-19 research funding was $994,054 and is included in the figure 16.

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

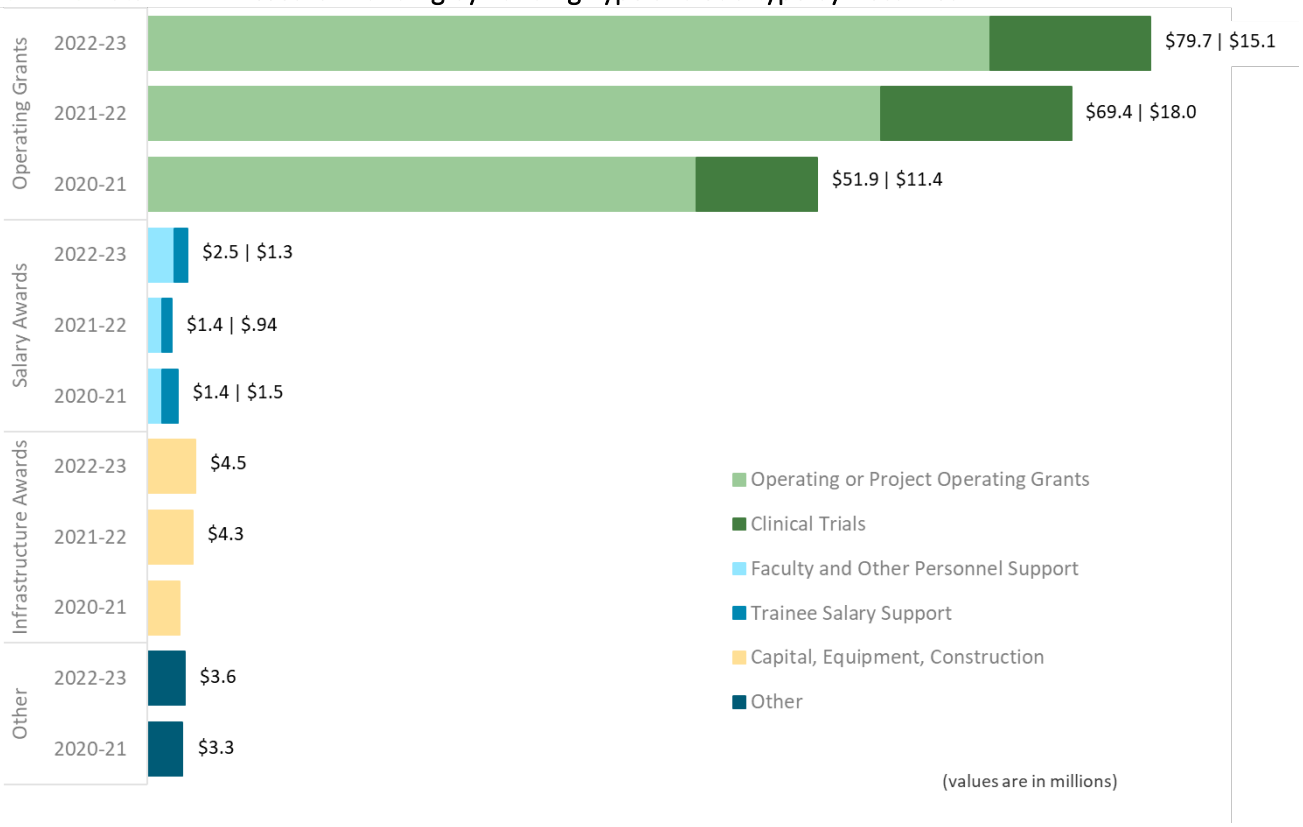
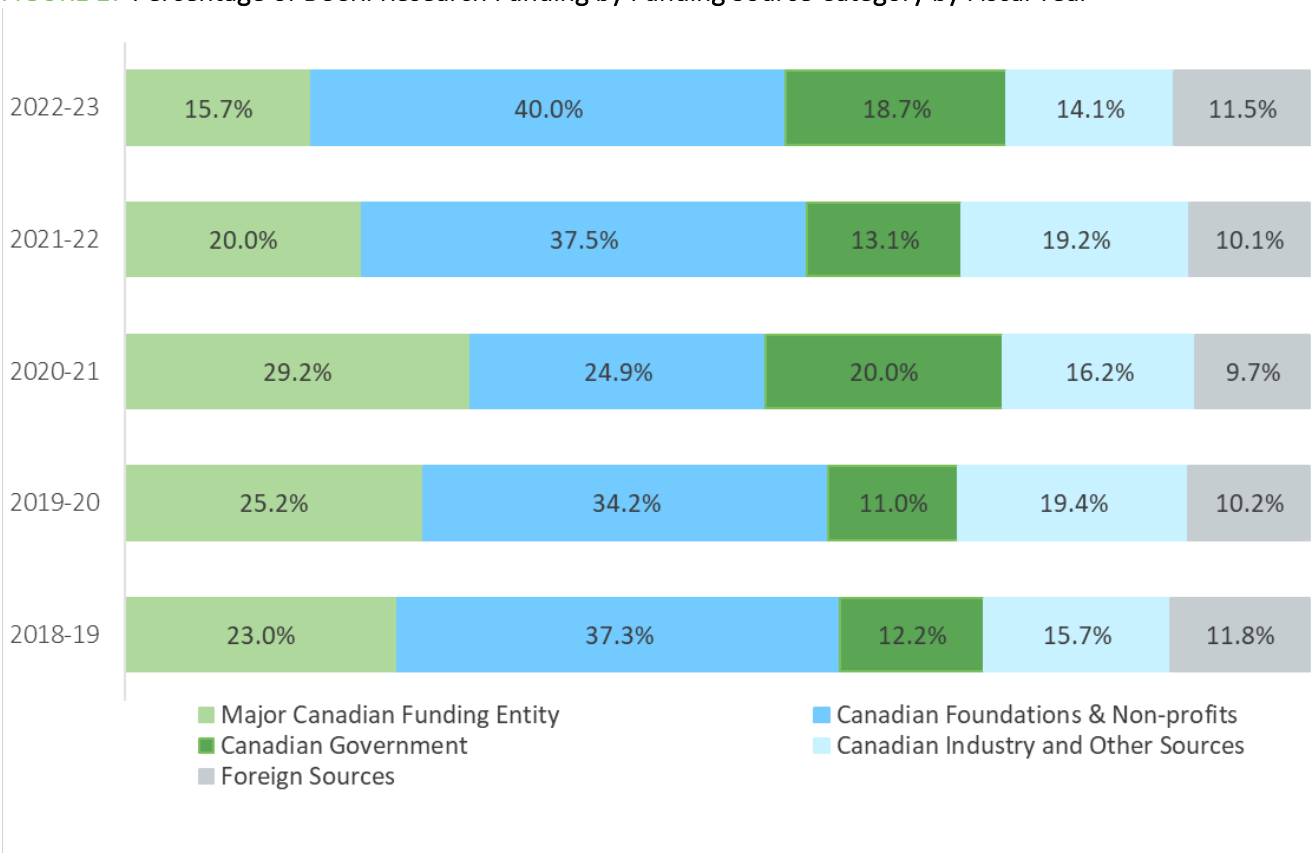


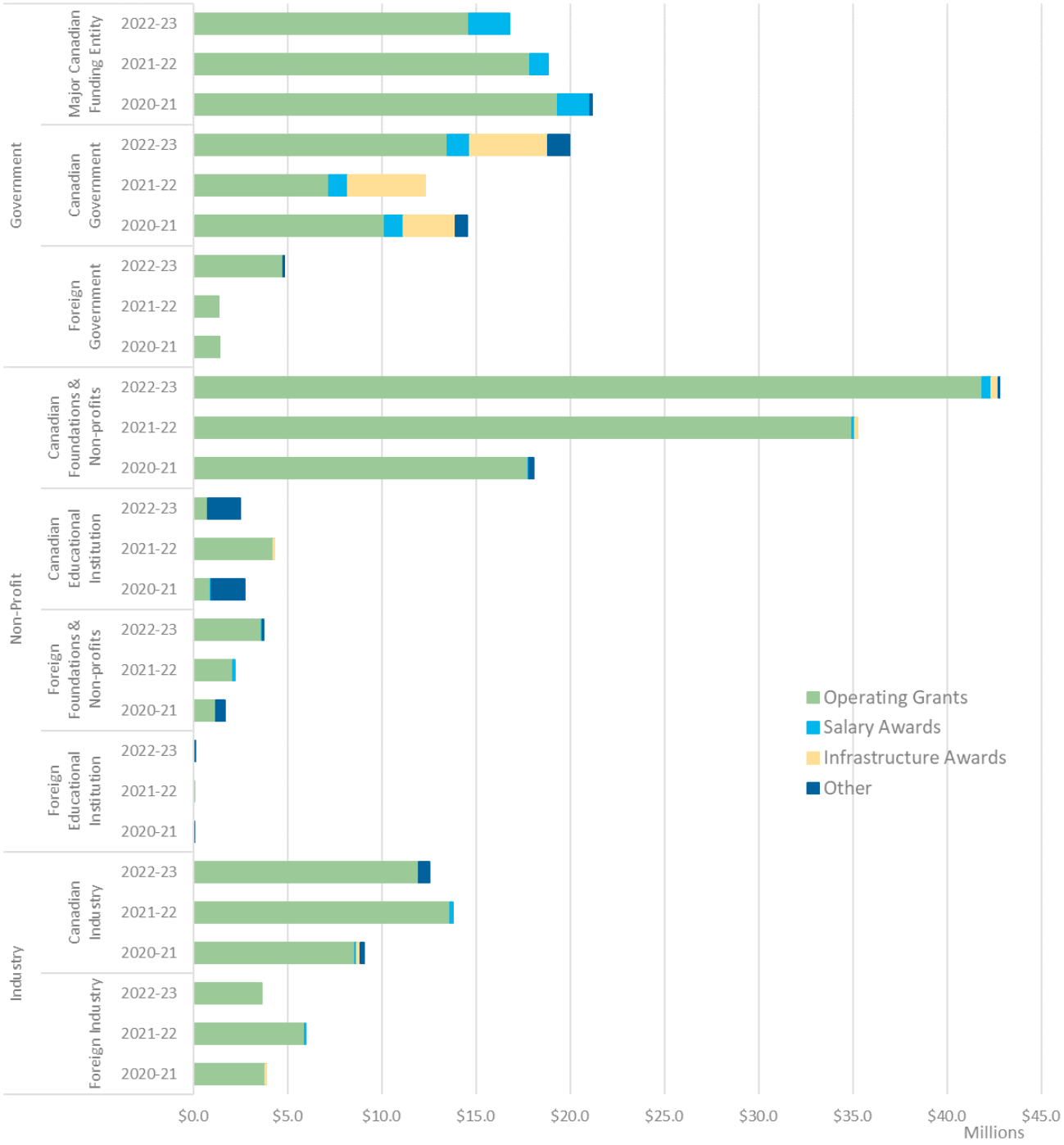
Figure 17 shows the percentage of funding by funding source category for the past 5 fiscal years. The Major Canadian Funding Entity category includes CIHR and its Institutes, Genome Canada and the Provincial Genome Agencies, Michael Smith Foundation for Health Research (MSFHR), Natural Sciences & Engineering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

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



BCCRI's Total Award Funding is shown by RISe sector, Funding Source Category and Funding Type. In FY 2022-23, the top funding sources are, Canadian Foundations & Non-profits (40%), Canadian Government (18.7%), and Major Canadian Funding Entities (15.7%). Figure 18 details the funding categories by RISe sector, funding source category and funding type.

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



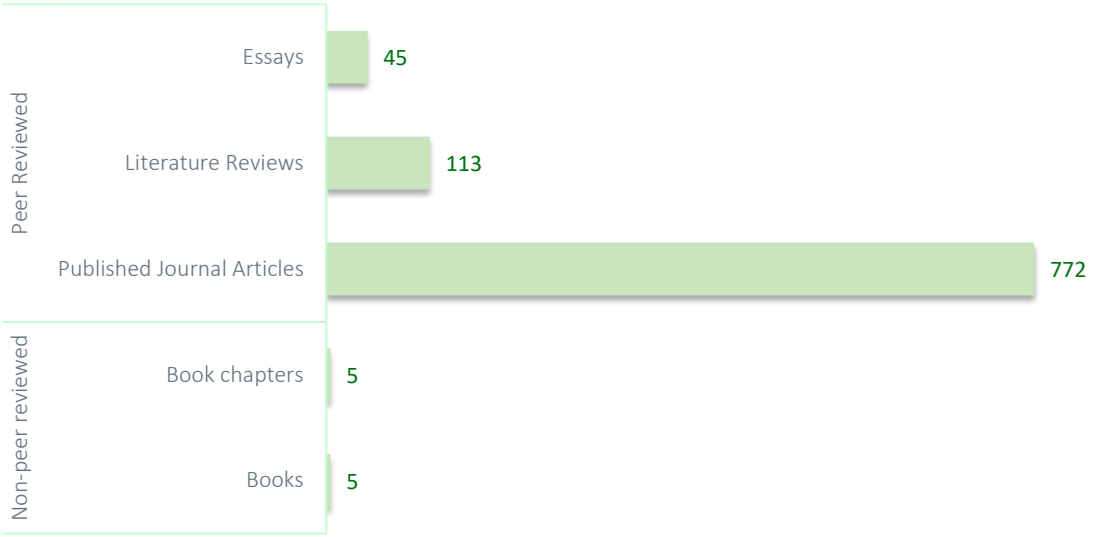
The application success rate is reported for the Fall 2022 and Spring 2023 CIHR grant competitions. Results (see table 4) are shown for National and BCCRI. BCCRI was successful in both competitions for a total of 17 awards from 56 applications and beat the national average in the Fall project grant competition.

TABLE 4 BCCRI Annual Grant Application Success Rate

| Grant Funding Opportunity | National Overall Results % (Approved/Submitted) | BCCRI Results % (Approved/Submitted) |
|---|---|---|
| 2022-09 Project Grant | 25.0% (475/1,899) | 42.3% (11/26) |
| 2023-03 Project Grant | 22.4% (474/2,113) | 20.0% (6/30) |

Total number of publications by type and category of peer vs. non-peer review is seen in Figure 19. BCCRI had a total of 940 publications, with a majority (772) of published journal articles.

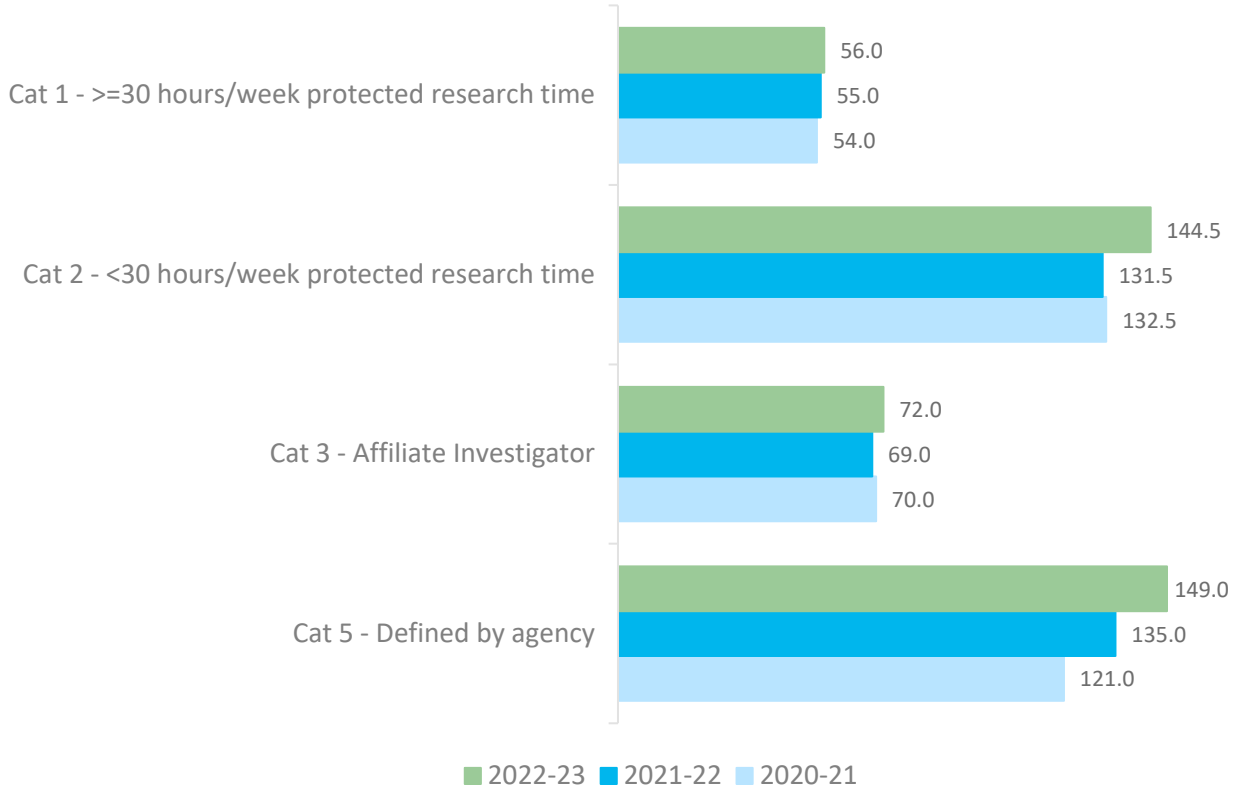
FIGURE 19 Total Number of BCCRI Publications by Type and Category




## Building Research Capacity

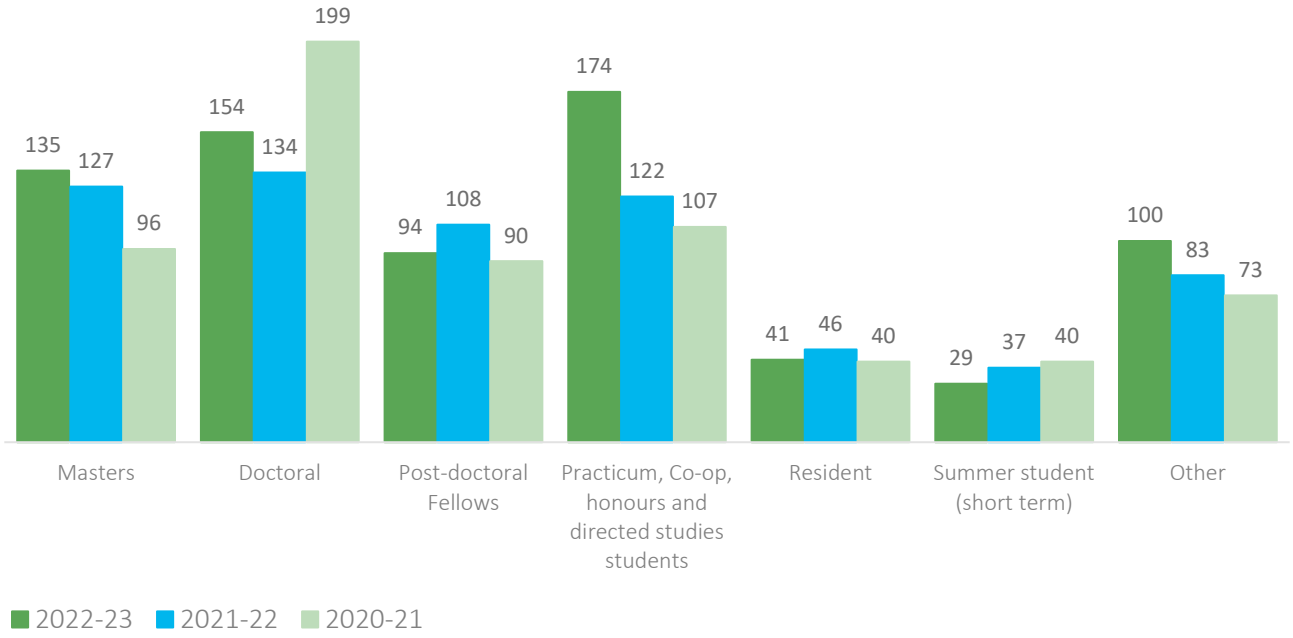
BCCRI has a total of 349.5 researchers in FY 2022-23 in categories 1, 2, and 5, an increase of 28 from FY 2021-22. While adoption of the BCCHR category classifications is in place, a significant amount (149) of the total researchers is in Category 5, which is a program specific category used to describe researchers that do not meet BCCHR category classifications. For BCCRI, the majority of Category 5 researchers are Medical or Radiation Oncologists, Program or Practice Leaders, and Nurses. As in past year's reports, researchers whose funding is officially split 50/50 between research entities are classified as 0.5. See Figure 20 for the number of researchers by category.

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




During FY 2022-23, BCCRI researchers provided training and supervision to a total of 727 trainees, an increase of 70 from FY 21-22. 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, how often trainee competitions are held and the envelope of funding.

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



## Achieving Economic Benefits and Innovation

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

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

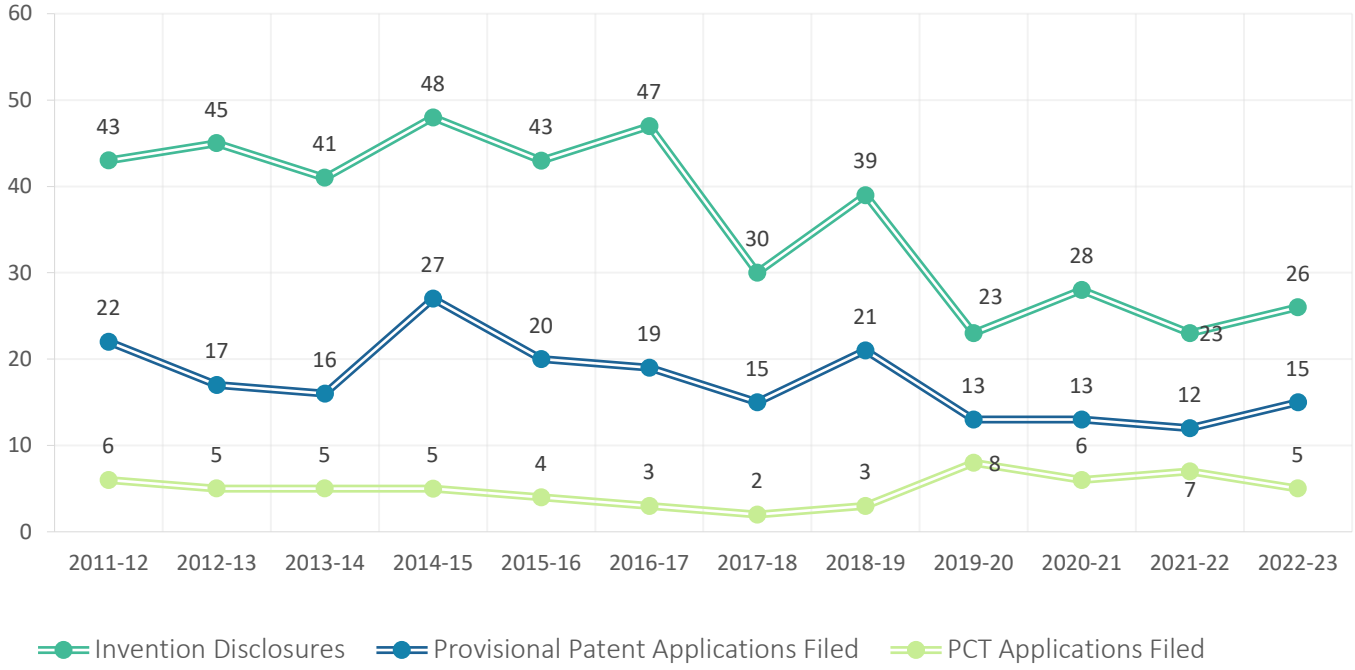
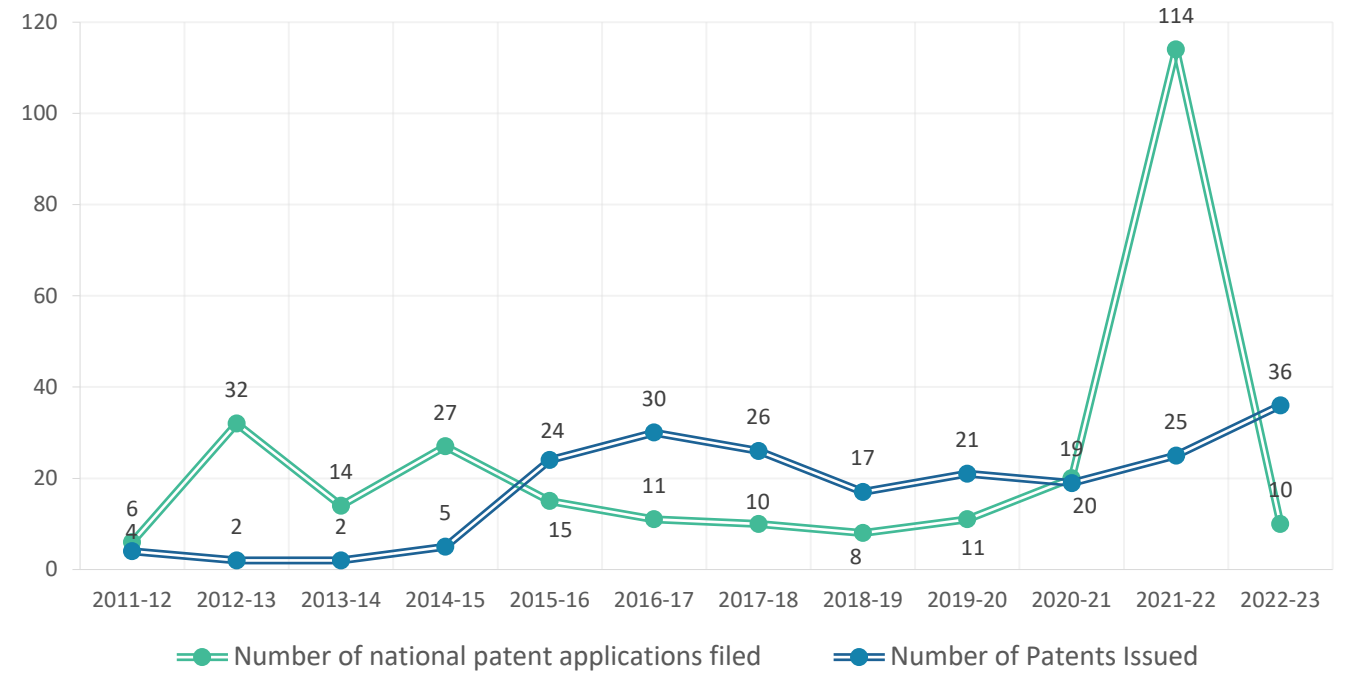
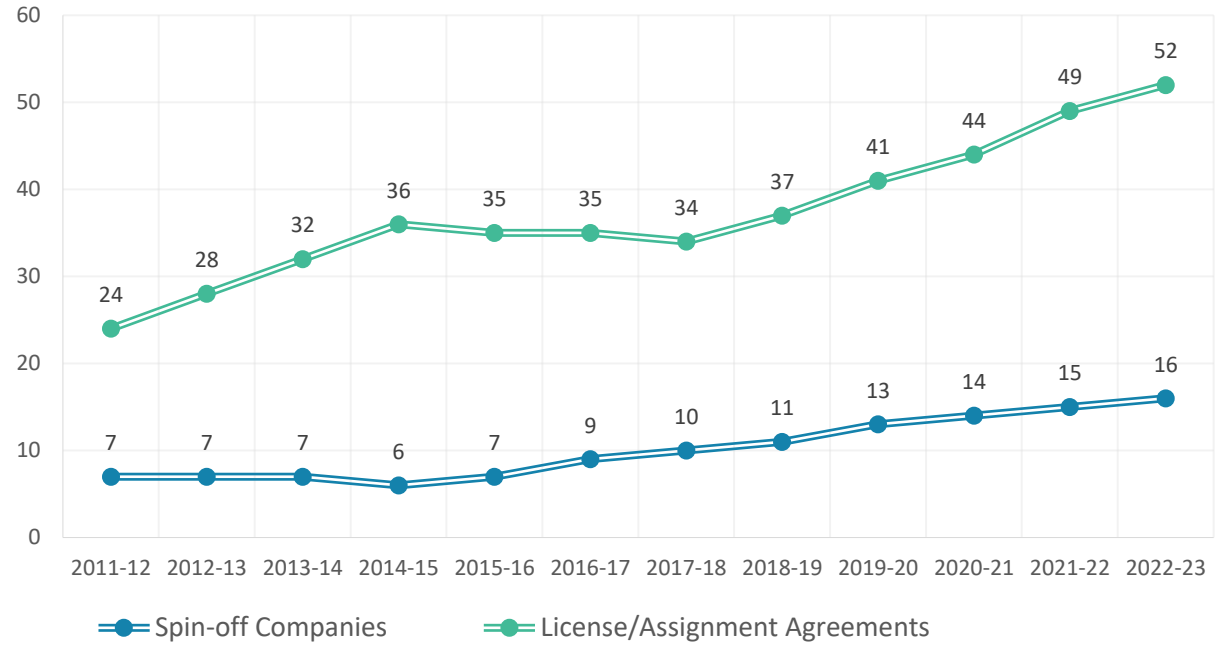



FIGURE 23 BCCRI National Patent Activity by Fiscal Year



In FY 2022-23, there were 52 active license agreements (see Figure 24), including three (3) new licenses/ assignment agreements. There were two (2) new spin-off companies created. Overture Therapeutics and Linax Technologies. Other active spin-off companies include Alpha9 Theranostics, Innovakine Therapeutics Inc., Aquinox Pharma, Essa Pharmaceuticals, Repeat Diagnostics, Coastal Genomics, Logipath Medical, Qing Bile Therapeutics, Metera Pharma, Curvafix, Fusion Genomics, ARTMS Products, and Vita.

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




IP related revenue, in accordance with UBC (University Industry Liaison Office UILO) definitions (see Glossary – Appendix 1, page 62) is reported in Table 5. Expenses related to patenting, license IP and legal costs totaled $388,969.93 in FY 2022-23. Realized licensing revenue per the distribution agreements totals $855,384.35 with $317,969,.93 to PHSA and $537,414.42 to BC Cancer departments. While distribution agreements vary, typically the inventor receives 50% of the net licensing revenue, with the remainder split between PHSA, BC Cancer departments, and UBC for those researchers with a UBC affiliation.

TABLE 5 TDO IP Related Revenue

| IP RELATED REVENUE | FY 18-19 | FY 19-20 | FY 20-21 | FY 21-22 | FY 22-23 |
|---|---|---|---|---|---|
| Royalties | $637,718.79 | $729,984.18 | $1,701,269.06 | $1,136,802.24 | $833,316.63 |
| Equity Liquidated | $122,861.33 | $31,375.94 | $123,470.15 | $1,722,742.51 | - |
| License Fees | $251,513.80 | $302,783.22 | $956,452.72 | $90,371.75 | $1,105,445.56 |
| License Management | $112,066.91 | $134,207.37 | $217,182.20 | $214,581.56 | $281,283.99 |
| Option Fees | 0 | 0 | 0 | 0 | 0 |
| **GROSS LICENSING REVENUE (TOTAL)** | **$1,127,160.83** | **$1,198,350.71** | **$2,998,374.13** | **$2,949,916.50** | **$2,220,046.18** |

## Advancing Health and Policy Benefits

See Table 6 for a detailed breakdown of clinical trial activity by fiscal year.

TABLE 6 BCCRI Clinical Trials

| Fiscal Year | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 |
|---|---|---|---|---|---|---|---|
| Total Number of Clinical Trials active during the FY | 321 | 309 | 337 | 370 | 362 | 388 | 378 |
| Status of the Trial at the end of the FY: | | | | | | | |
| Total Number of Active Trials | 265 | 257 | 277 | 290 | 290 | 319 | 288 |
| Total Number of Trials that closed during the FY | 56 | 52 | 60 | 90 | 72 | 69 | 90 |
| Enrolment Numbers: | | | | | | | |
| Expected Local Subject Enrolment (for the term of the study) | 44,305 | 43,064 | 47,366 | 48,768 | 22,566 | 28,556 | 27,062 |
| Total Cumulative Subject enrolment at the end of the FY | 30,084 | 34,573 | 34,341 | 8,344 | 6,982 | 7,369 | 8,821 |

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 66 for a definition of funding types). This information can be used to trend the percentage of trials that are industry sponsored. Fifty-two percent (52%) of BCCRI Clinical Trials are Industry funded.

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

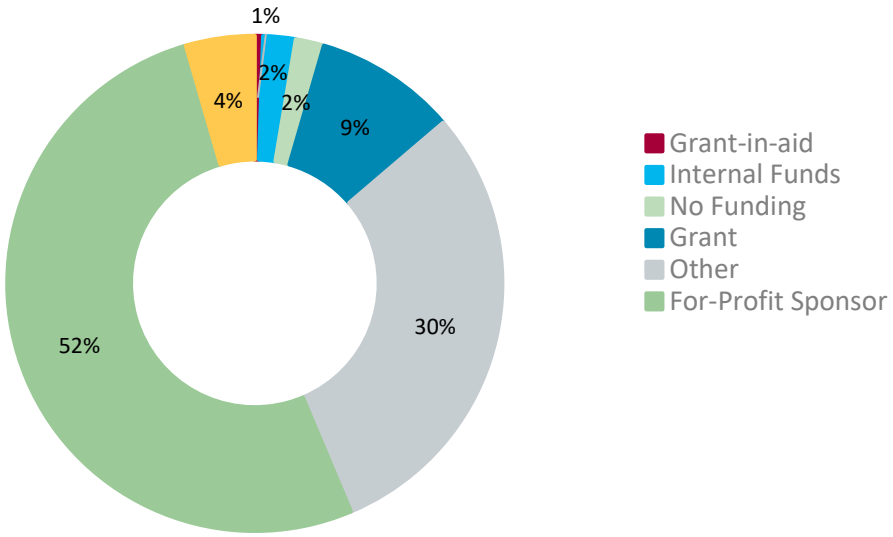


Table 7 reflects BCCRI's Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical, and be relevant to FY 2022-23 timeframe (April 1, 2022 - March 31, 2023).

TABLE 7 BCCRI Top Three Achievements/Accomplishments/Highlights

| **ESTABLISHMENT OF THE RISING STARS AWARDS** |
|---|
| Rising Stars Award: To celebrate Dr. Connie Eaves' Gairdner Wightman Award, her election into the Royal Society in the UK, and her appointment to the Order of Canada, the BC Cancer Research Institute, has established the BC Cancer Rising Stars Award. This is made possible by the generous support of the BC Cancer Foundation.<br><br>Each year, the BC Cancer Foundation will support "Rising Stars" in cancer research. These first of their kind awards specifically support trainees at BC Cancer are in the amount of $25,000 for 2-year terms. These scholarships will be available on a competitive basis to outstanding BC Cancer trainees, as well as Indigenous trainees engaged in cancer research at partner institutions in collaboration with BC Cancer, including the University of British Columbia Okanagan campuses (UBCO) and the University of Northern British Columbia (UNBC).<br><br>To help foster equity, diversity, and inclusion, a portion of the awards granted will be allocated for academically outstanding women, applicants who identify as Indigenous, applicants who are Black and applicants who are from underrepresented communities. Applicants with disabilities will also be given special consideration. In the inaugural year of the "Rising Stars" we received over 40 applications and were able to fund 10 awards. |
| **RECEIVED A $150M BC GOVERNMENT GRANT TO ENHANCE CLINICAL RESEARCH AND TRIALS CAPABILITIES** |
| In March of 2023 the BC Government announced $440 Million in investments in BC Cancer. $150 Million of this is a 3-year grant to the BC Cancer Foundation to enhance clinical research and clinical trial capabilities across the province. The funding grant agreement between the province and the BC Cancer Foundation includes $30M for research chair endowments, $14.3M in training scholarships, $25M in recruitment initiatives, $25M in startup and seed grants and $55.7M for clinical and multidisciplinary research programs.<br><br>The funding will allow BC Cancer to Secure the recruitment of academic clinicians who will bridge the gap between research and practice, provide opportunities to grow translational and clinical research as well as provide protected time to grow clinical research. |
| **TIER 1 CANADA RESEARCH CHAIR AWARDED TO BC CANCER RESEARCHER** |
| Dr. Aly Karsan was awarded a Tier 1 Canada Research Chair in Myeloid Cancers. Acute myeloid leukemia is an aggressive blood cancer that is extremely difficult to treat because it is spread by rare leukemic stem cells that can evade most current therapies. As a result, this cancer has a high fatality rate.<br><br>As Canada Research Chair in Myeloid Cancers, Dr. Aly Karsan is trying to understand how these cells resist therapy and figure out how to target them using new treatments. He and his research team are using cutting-edge genomic, epigenomic and functional techniques to examine single blood cancer cells. Because each patient's acute myeloid leukemia harbours multiple different leukemic stem cells, Karsan and his team are looking for common pathways in different types of leukemic stem cells that could be used to target the disease. Ultimately, they hope to provide the knowledge needed to develop new therapies for patients who do not respond to standard treatments. |

# BC CHILDREN'S HOSPITAL RESEARCH INSTITUTE (BCCHR)

## Producing and Advancing Knowledge

In FY 2022-23, researchers affiliated with BCCHR were awarded a total of $68,751,722 in research funding, an increase of $1,909,713 (3%) from last FY. The amounts awarded as Operating Grants ($56,395,543) make up approximately 82% of total funding received. A breakdown of funding types and subtypes can be found in Figure 26.

BCCHR's portion of the Research Support Fund Program grant totaled $2,121,300 for FY 2022-23 but is not included in total research funding or the figures below. Total Covid-19 related research funding was $5,338,157 and is included in the figure 26.

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

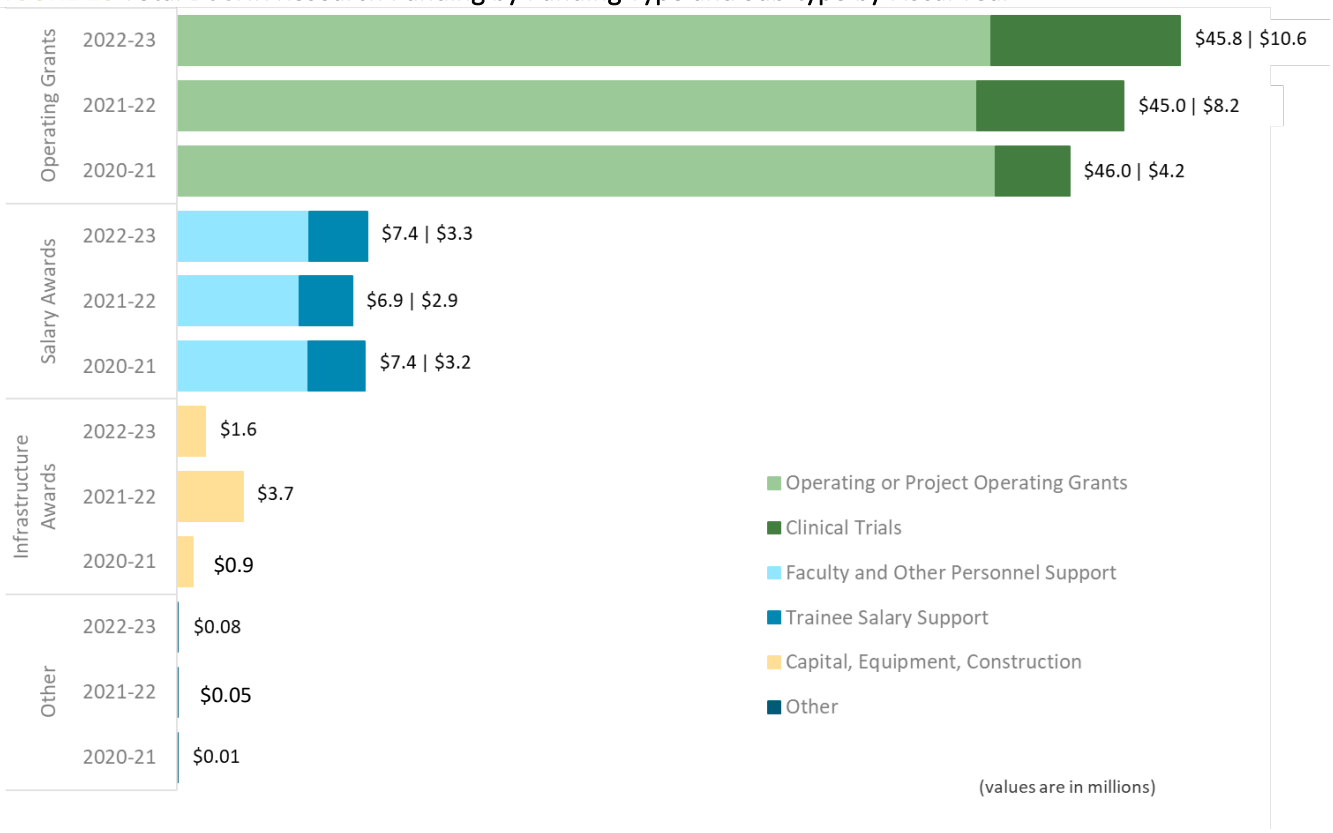
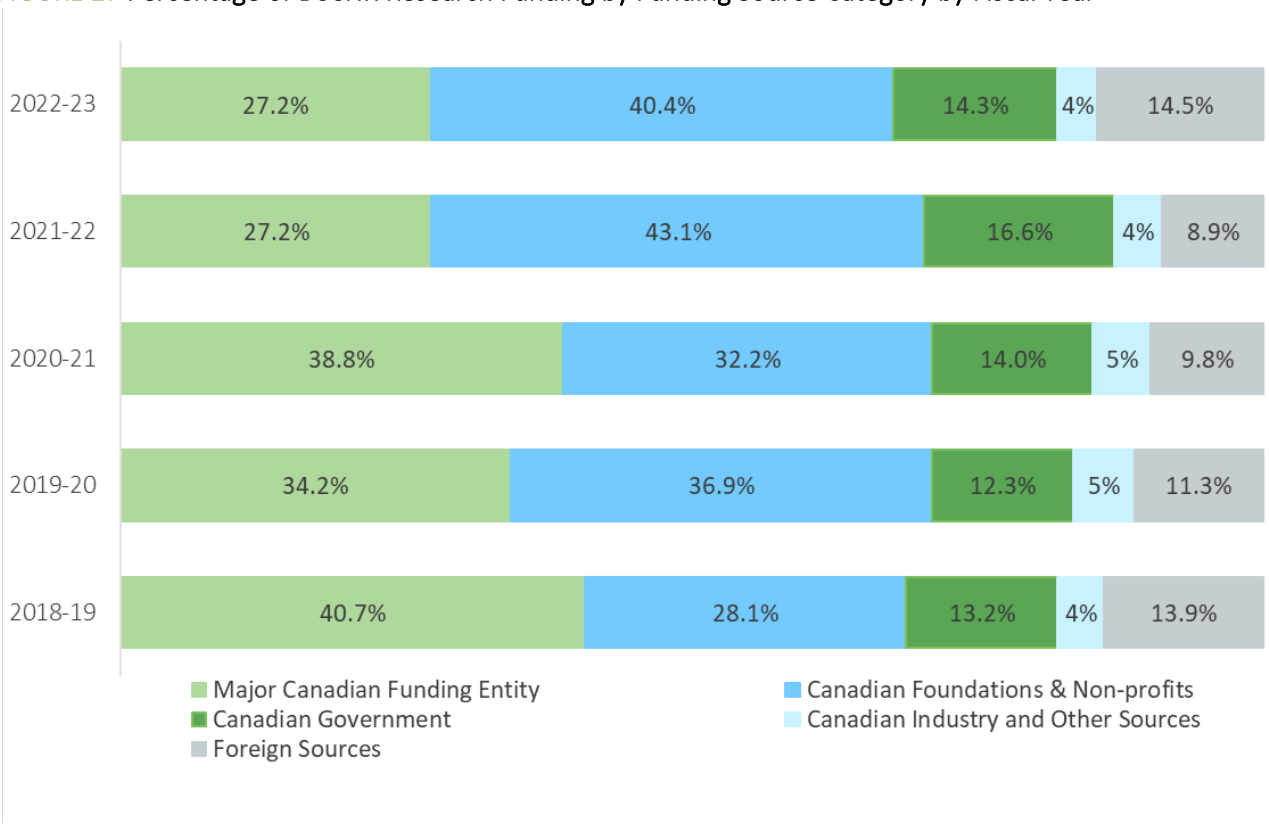


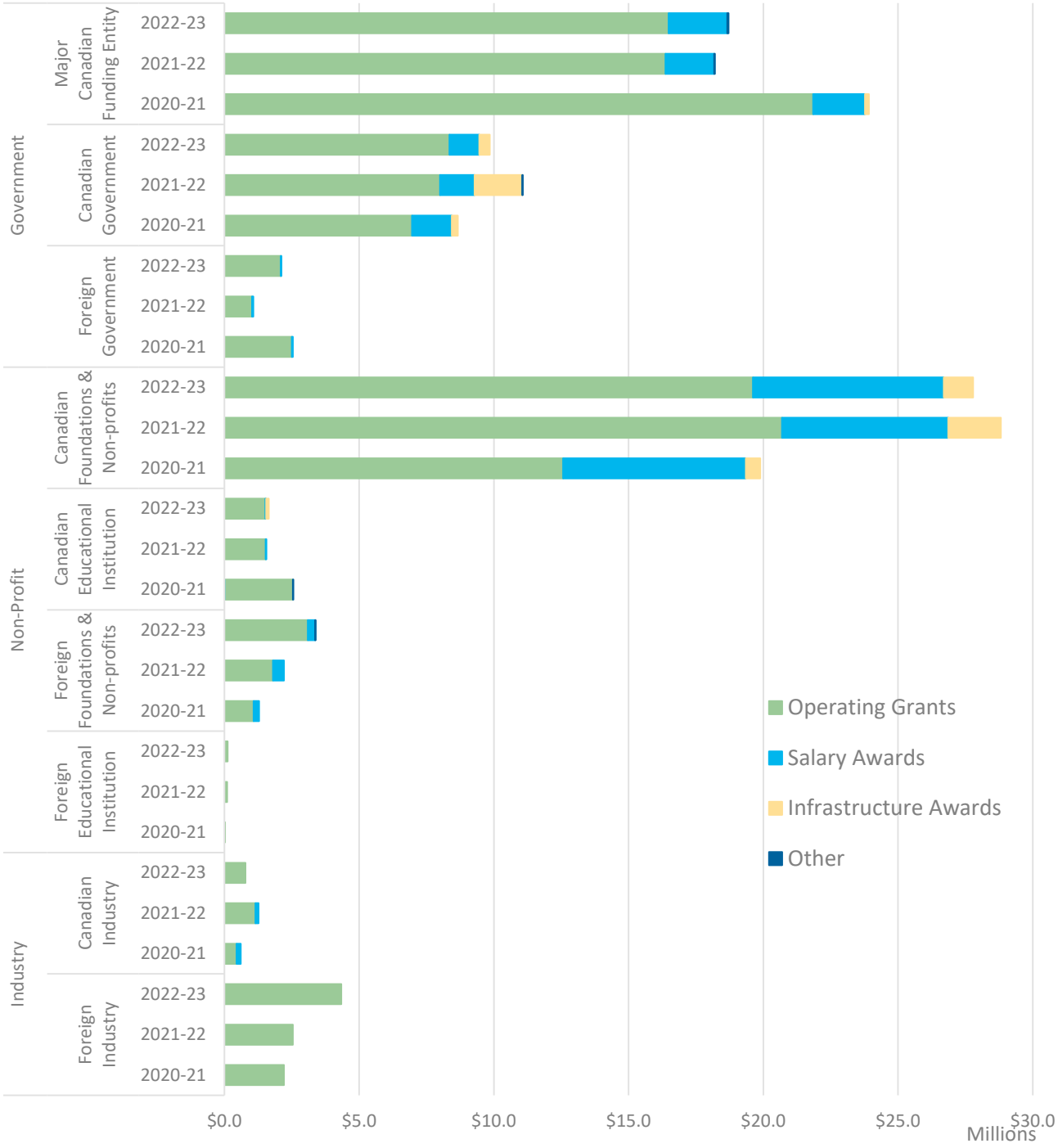
Figure 27 shows funding by funding source category. For FY 2022-23, all categories remained relatively unchanged from the previous fiscal year with the exception of Foreign Sources, which increased 5.6%

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



The top three funding categories are Canadian Foundations & Non-Profits (40.4%), Major Canadian Funding Entity (27.2%), and Canadian Government (14.3%). Figure 28 details the funding categories by RISe sector, funding source category and funding type.

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



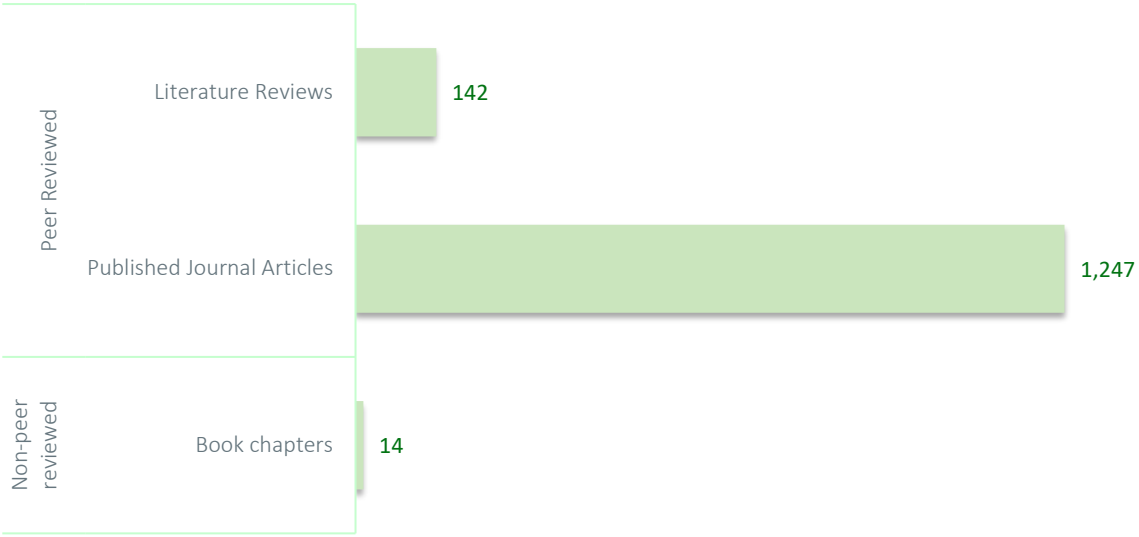
The application success rate is reported for the Fall 2022 and Spring 2023 CIHR grant competitions. Results (see table 8) are shown for National and BCCHR. BCCHR was successful in both Project Grant competitions for a total of 20 awards out of 50 applications, beating the national average in both Project competitions.

TABLE 8 BCCHR Annual Grant Application Success Rate

| Grant Funding Opportunity | National Overall Results % (Approved/Submitted) | BCCHR Results % (Approved/Submitted) |
|---|---|---|
| 2022-09 Project Grant | 25.0% (475/1,899) | 51.9% (14/27) |
| 2023-03 Project Grant | 22.4% (474/2,113) | 26.1% (6/23) |

BCCHR had 1,403 publications in calendar year 2022, with 99% of them being peer reviewed. Total number of publications by type and category of peer vs. non-peer reviewed, is seen in Figure 29. Peer review represents the gold standard for scientific credibility. The program total represents the number of publications where at least one program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program.

FIGURE 29 Total Number of BCCHR Publications by Type and Category

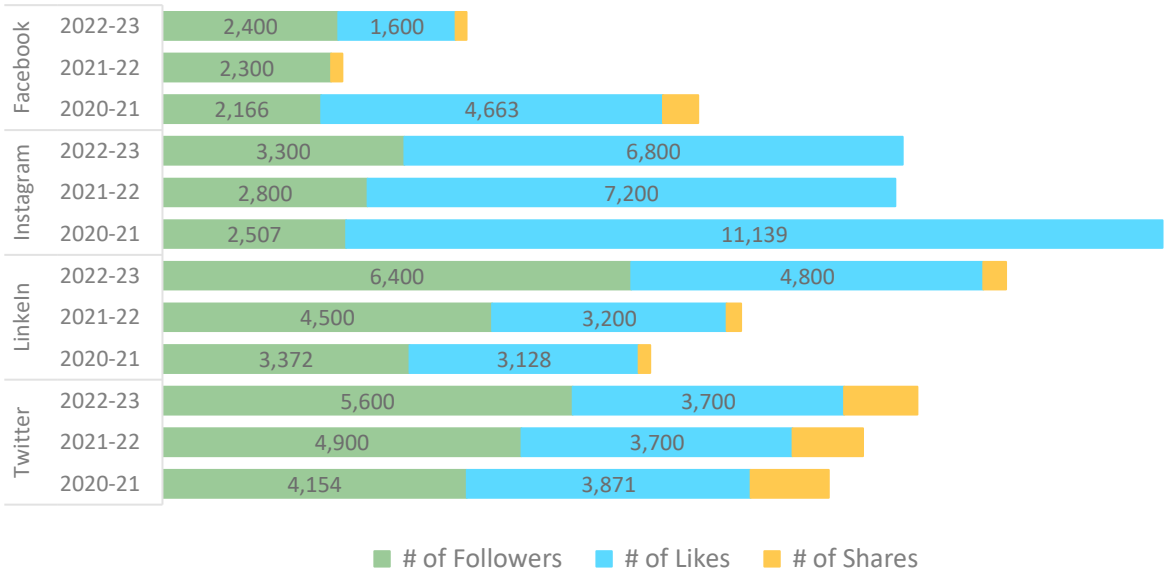



Three full fiscal years' worth of data is provided for the BCCHR four research specific social media channels in Figure 30; Facebook (member since July 2011); Twitter (member since March 2009); Instagram (member since January 2018); and LinkedIn (member since 2015). Tracking and reporting of this data is a measure of knowledge translation in addition to meeting the following goals with regard to BCCHR research activities:

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

These metrics are a measure of reach and engagement and provide an indication of the volume of activity. In addition to the below activity, many BCCHR researchers maintain their own professional accounts to engage peers, funders, and patients, but this information is not tracked.

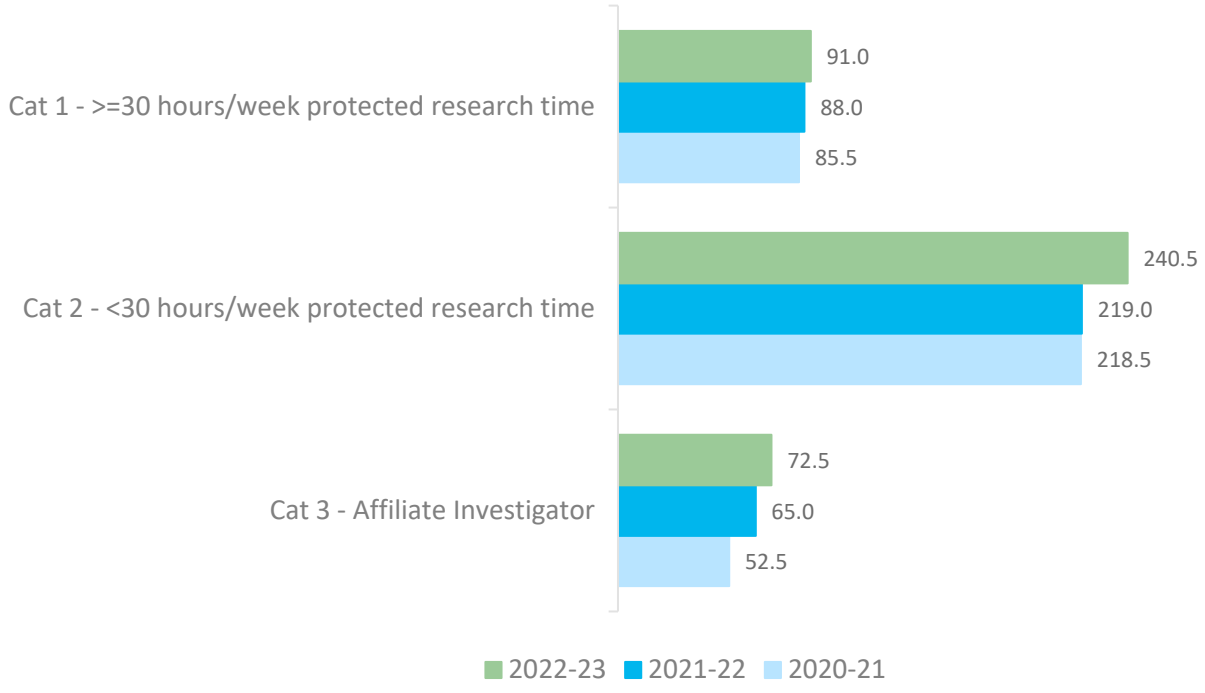
FIGURE 30 BCCHR Social Media Statistics




## Building Research Capacity

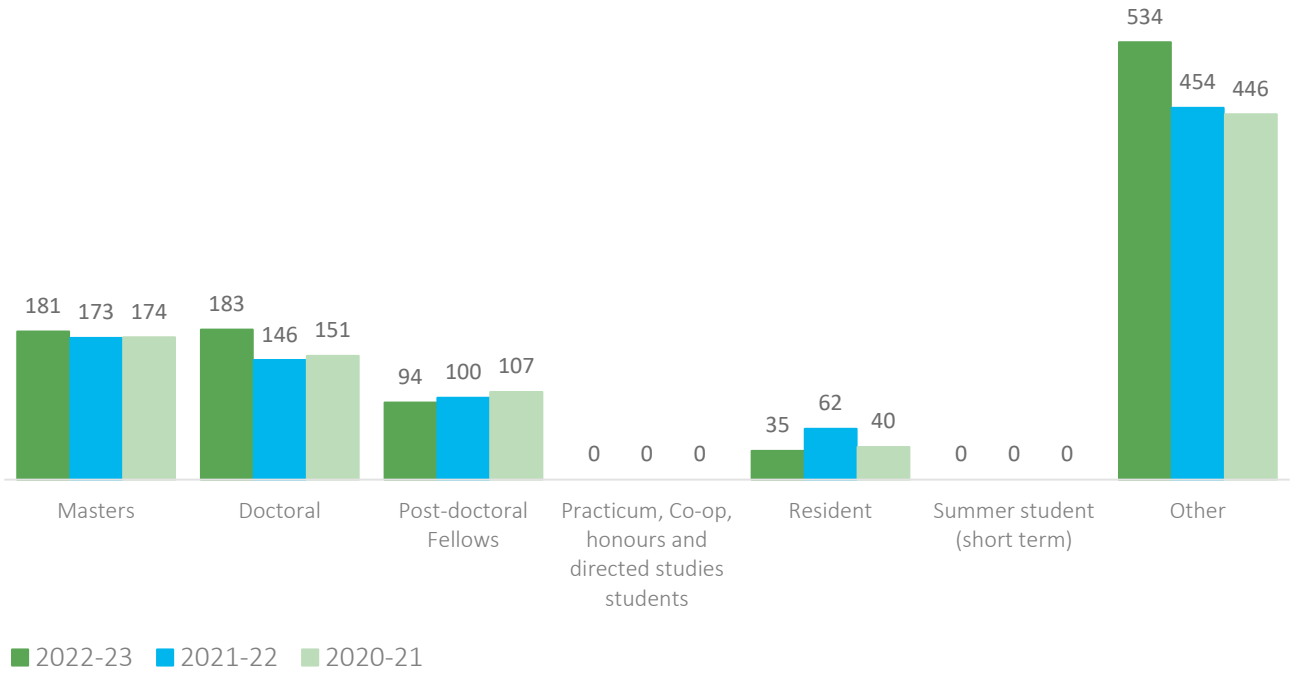
BCCHR has a total of 331.5 researchers in categories 1 and 2, an increase of 24.5 from FY 2021-22. The distribution of these researchers is represented in Figure 31. Researchers in categories 1 and 2 are primarily based on the Children's & Women's Health Centre of BC campus with the largest proportion of the members being split between Category 1 – those that have greater than 30 hours per week of their time protected for research and Category 2 – those that have less than 30 hours per week of protected research time. Category 3 members are affiliate investigators that are not based on site but who collaborate with BCCHR members and are affiliated with a research theme. Their primary affiliation will be with another academic and/or research institution. The purpose of this category is to provide official recognition for these individuals who collaborate with BCCHR members on a regular basis. The BCCHR does not track category 3 members funding, publications, or trainees. These numbers exclude Emeritus/Emerita Investigators who have prior status as investigators with BCCHR.

FIGURE 31 Total Number of BCCHR Researchers by Category



During FY 2022-23, BCCHR researchers provided training and supervision to a total of 1,027 (up 92 from FY 2021-22) trainees. BCCHR categorizes Practicum, Co-op, honours and directed studies and summer students in one combined category, without the ability to differentiate type. See Figure 32 for number of trainees by type. BCCHR currently tracks full-time research trainees (masters, doctoral and postdoctoral fellows) and undergraduate students undertaking their training at BCCHR.

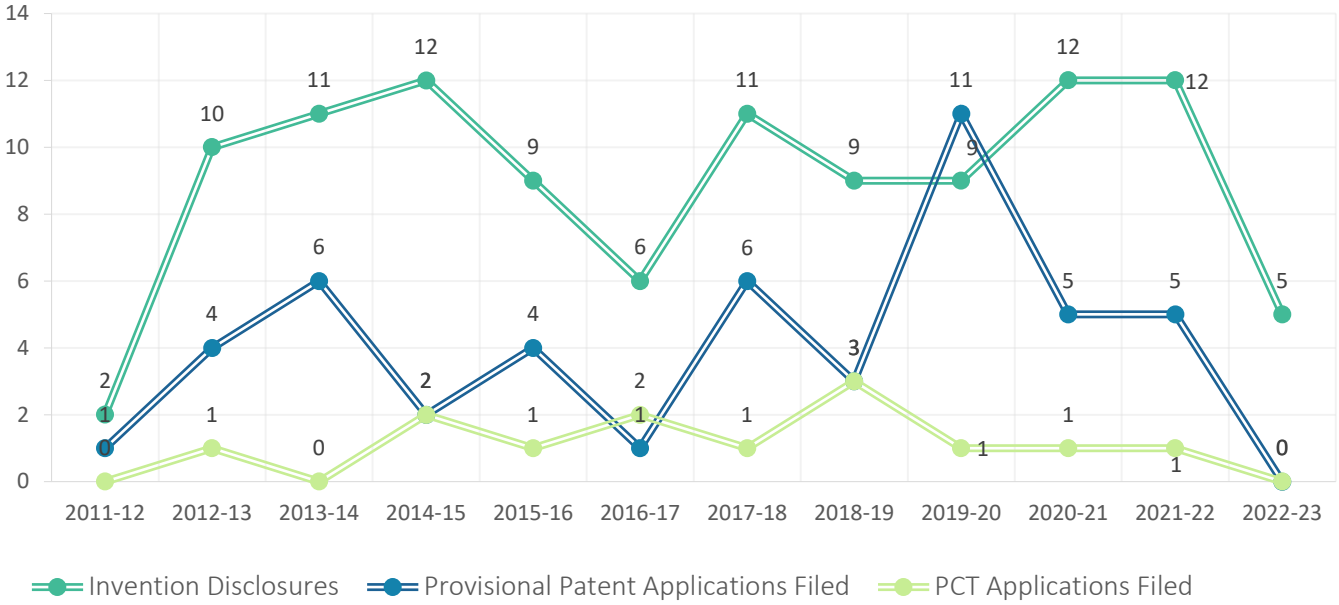
FIGURE 32 Total Number of BCCHR Trainees by Type




## Achieving Economic Benefits of Innovation

The number of invention disclosures, provisional patent and PCT applications filed by fiscal year are shown in Figure 33

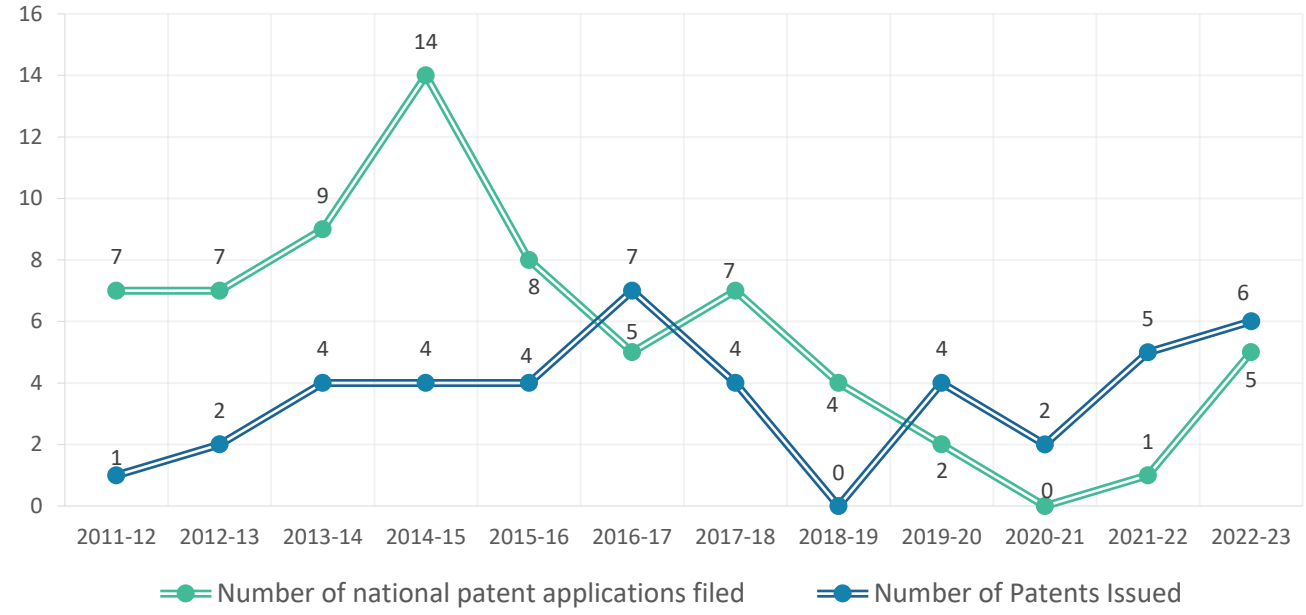
FIGURE 33 BCCHR Invention Disclosures, Provisional Patent and PCT Applications Filed by Fiscal Year



Patents are reported in Figure 34 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).

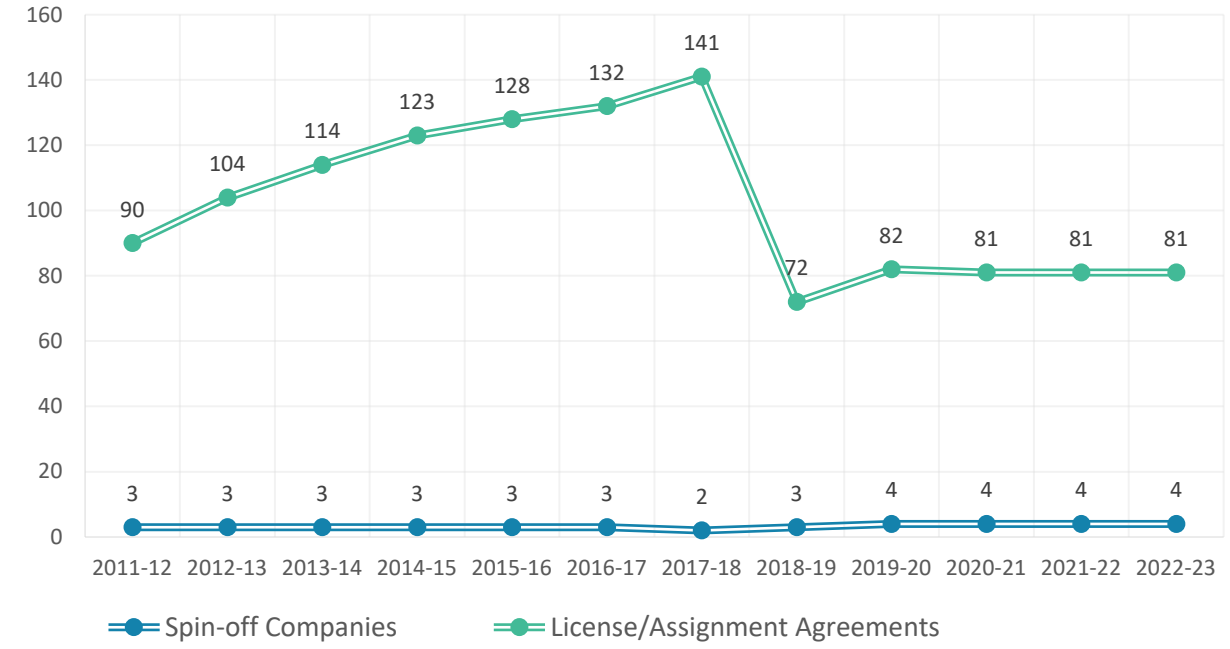
Data is collected and reported by the University of British Columbia University-Industry Liaison Office (UILO).

FIGURE 34 BCCHR National Patent Activity by Fiscal Year




Again, in FY 2022-23, there were 81 active license/assignment agreements in place (See Figure 35). No new spin-off companies were created in FY 2022-23. BCCHR holds shares in: Incisive Genetics, Lions Gate Technologies, ME Therapeutics, and Xenon Pharmaceuticals (private) which is held in trust by UBC.

FIGURE 35 BCCHR License/Assignment Agreements and Spin-off Companies by Fiscal Year



IP related line-item revenue data for FY 2022-23 is shown below. Expenses related to patenting, license IP and legal costs totaled $1,969 in FY 2022-23.

TABLE 9 BCCHR IP Related Revenue

| IP RELATED REVENUE | FY 18-19 | FY 19-20 | FY 20-21 | FY 21-22 | FY 22-23 |
|---|---|---|---|---|---|
| Royalties | $313,462.10 | $635,065.03 | $727,424.30 | $837,237.00 | $283,716.00 |
| Equity Liquidated | | | | $331,104.00 | - |
| License Fees | $50,000.00 | | | $101,705.00 | $630,466 |
| License Management | | | | | |
| Option Fees | | | | | |
| GROSS LICENSING REVENUE (TOTAL) | $363,452.79 | $635,065.03 | $727,424.30 | $1,270,046.00 | $914,181 |

## Advancing Health and Policy Benefits

See Table 10 for a detailed breakdown of clinical trial activity by fiscal year.

TABLE 10 BCCHR Clinical Trials

| Fiscal Year | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 |
|---|---|---|---|---|---|---|---|
| Total Number of Clinical Trials active during the FY | 198 | 195 | 212 | 200 | 228 | 240 | 248 |
| Status of the Trial at the end of the FY: | | | | | | | |
| Total Number of Active Trials | 154 | 153 | 175 | 153 | 188 | 189 | 186 |
| Total Number of Trials that closed during the FY | 44 | 42 | 37 | 47 | 40 | 51 | 62 |
| Enrolment Numbers: | | | | | | | |
| Expected Local Subject Enrolment (for the term of the study) | 106,212 | 102,916 | 108,147 | 104,957 | 110,337 | 21,373 | 21,814 |
| Total Cumulative Subject enrolment at the end of the FY | 57,789 | 108,720 | 6,564 | 5,632 | 8,855 | 22,016 | 17,667 |

Grant funding type is reported for Clinical Trials in Figure 65. 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 66 for a definition of funding types). Twenty-nine percent (29%) of BCCHR's Clinical Trials are Industry funded.

FIGURE 36 BCCHR Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY

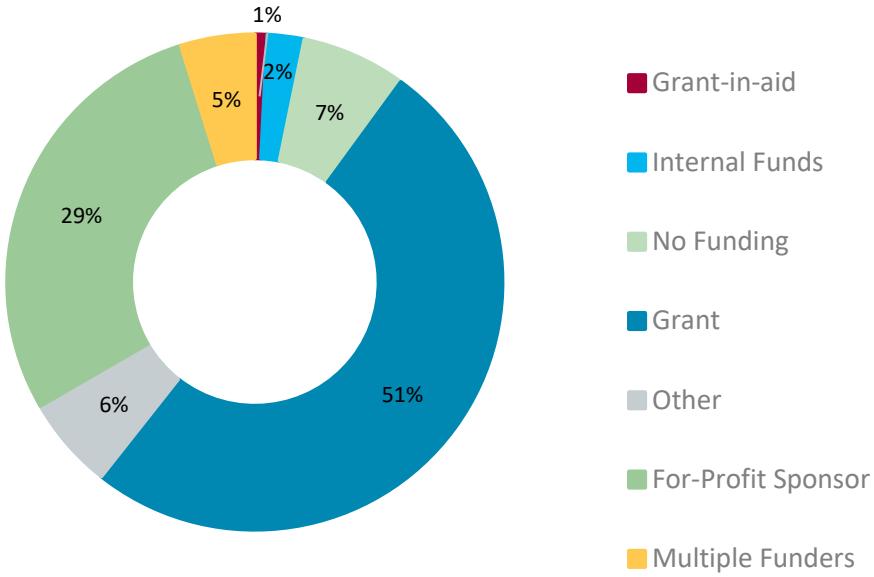


Table 11 reflects BCCHR's Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical and be relevant to FY 2022-23 timeframe (April 1, 2022 - March 31, 2023).

TABLE 11 BCCHR Top Three Achievements/Accomplishments/Highlights

## NEW PRECISION ONCOLOGY PLATFORM STANDS TO SAVE YOUNG LIVES ACROSS CANADA

More than 700 Canadians from birth to age 29 die from difficult-to-treat, relapsed, or metastatic cancer each year. To save more lives of kids with relapsed cancer, researchers with the Michael Cuccione Childhood Cancer Research Program — Dr. Philipp Lange, Dr. James Lim, Dr. Christopher Maxwell, and Dr. Gregor Reid — launched the BRAvE Initiative. Using cutting-edge technologies, the team will find the individual vulnerabilities of each child's cancer and then grow an avatar model of the tumour in the lab. Right from the child's initial diagnosis, researchers can use the avatar to understand how the tumour might grow and respond to medications and prepare the best way to treat a child's cancer should it return or prove difficult to treat with conventional therapies.

The BRAvE Initiative also has the first-in-Canada facility to grow patient tumours as chicken egg-based avatars which can shorten the preparation time and may open the door to a future where every difficult-to-treat cancer can be enrolled in innovative targeted therapies.

## EXAMINING YOUTH MENTAL HEALTH & WELL-BEING DURING THE COVID-19 RECOVERY PHASE IN BC

The COVID-19 pandemic has had unprecedented impacts on mental health and access to supports, particularly for those in late adolescence and early adulthood. Dr. Evelyn Stewart, Dr. Hasina Samji and their teams have been focused on identifying strategies to support youth mental health and well-being during the pandemic recovery period.

Their report "Improving Youth Mental Health and Well-Being During the COVID-19 Recovery Phase in B.C." identified which groups of youth have been disproportionately impacted and what modifiable factors and coping strategies have helped to buffer the effects of the pandemic.

Their findings highlight that, on average, youth broadly reported poorer mental health during the pandemic compared to before the pandemic. Moreover, specific groups of youth – girls, sexual and gender minority youth, and those with poorer pre-COVID mental health – reported worse outcomes during the pandemic compared to their peers.

The team presented three priority recommendations:

1. Address mental health disparities among underserved populations by minimizing barriers to mental health services and improving access.
2. Improve integration and collaboration of youth mental health partners in B.C. and increase youth representation to inform projects and the allocation of resources.
3. Enhance social and emotional learning (SEL) strategies within schools. These programs and strategies should be standardized and enhanced for all students in B.C. and implemented in other community organizations that work with youth.

## EQUITY, DIVERSITY, AND INCLUSION IN RESEARCH HIGHLIGHTS

BCCHR has been focused on developing infrastructure to support EDI in all aspects of the organization, including the research that is conducted here.

There are several projects underway to provide constructive change in training opportunities and recruitment, and to promote inclusion in research. Here are a few examples:

- The Integrated Student Program In Research Education (INSPIRE) provides research training and practical experiences in child health research to university students during the academic year. For students who need to work to support their financial obligations and cannot engage in volunteering, BCCHR will set up a fund to alleviate the financial burden of seeking the necessary training and experiences to pursue a career in health sciences.
- UBC and PHSA are developing training and resources on incorporating EDI principles into our hiring process. This will provide us with the tools to be more just, equitable and inclusive in our recruitment practices.
- The Gender Clinic at BC Children's Hospital has been working to ensure high-quality accessible care for trans youth during the pandemic and beyond.

## EQUITY, DIVERSITY, AND INCLUSION IN RESEARCH HIGHLIGHTS (CONTINUED)

  - Dr. Brenden Hursh and his team conducted research during the pandemic that showed trans youth and their families want to continue virtual care after the COVID-19 pandemic has ended. Most would prefer to have two-thirds of their future gender clinic visits conducted virtually.
  - The study findings have helped to establish the need for ongoing virtual care in the gender clinic.
- Researchers are including families with limited English proficiency in studies.
  - Dr. Quynh Doan and her team are investigating language as a barrier to participation in research with the goal of increasing the number of pediatric clinical studies that provide opportunities for individuals of diverse language backgrounds to participate.
  - The team has reviewed Research Ethics Board (REB) submissions to gauge the current level of inclusion of participants with limited English proficiency to identify best practices that can be supported and incorporated into other studies.
- Working under the supervision of Dr. Patricia Janssen, Jennifer Murray is collaborating on a study initiated and co-led by Cowichan tribes looking at the high rates of preterm births in the Cowichan Tribes communities to better understand why this is happening and how to ensure healthy pregnancies, births and children in Cowichan.

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

BC MENTAL HEALTH & SUBSTANCE USE SERVICES
*Provincial Health Services Authority*

## Producing and Advancing Knowledge

In FY 2022-23, researchers associated with BCMHSUS, were awarded a total of $1,097,540. Operating grants make up the majority (80.7%) of awards. A breakdown of funding types and subtypes can be found in Figure 37. BCMHSUS's portion of the Research Support Fund Program grant totaled $85,518 for FY 2022-23 but is not included in total research funding or the figures below. Total Covid-19 related research funding was $24,045 of Operating Grants and is included in the Figure 37.

FIGURE 37 BCMHSUS Research Funding by Funding Type and Sub-type by Fiscal Year

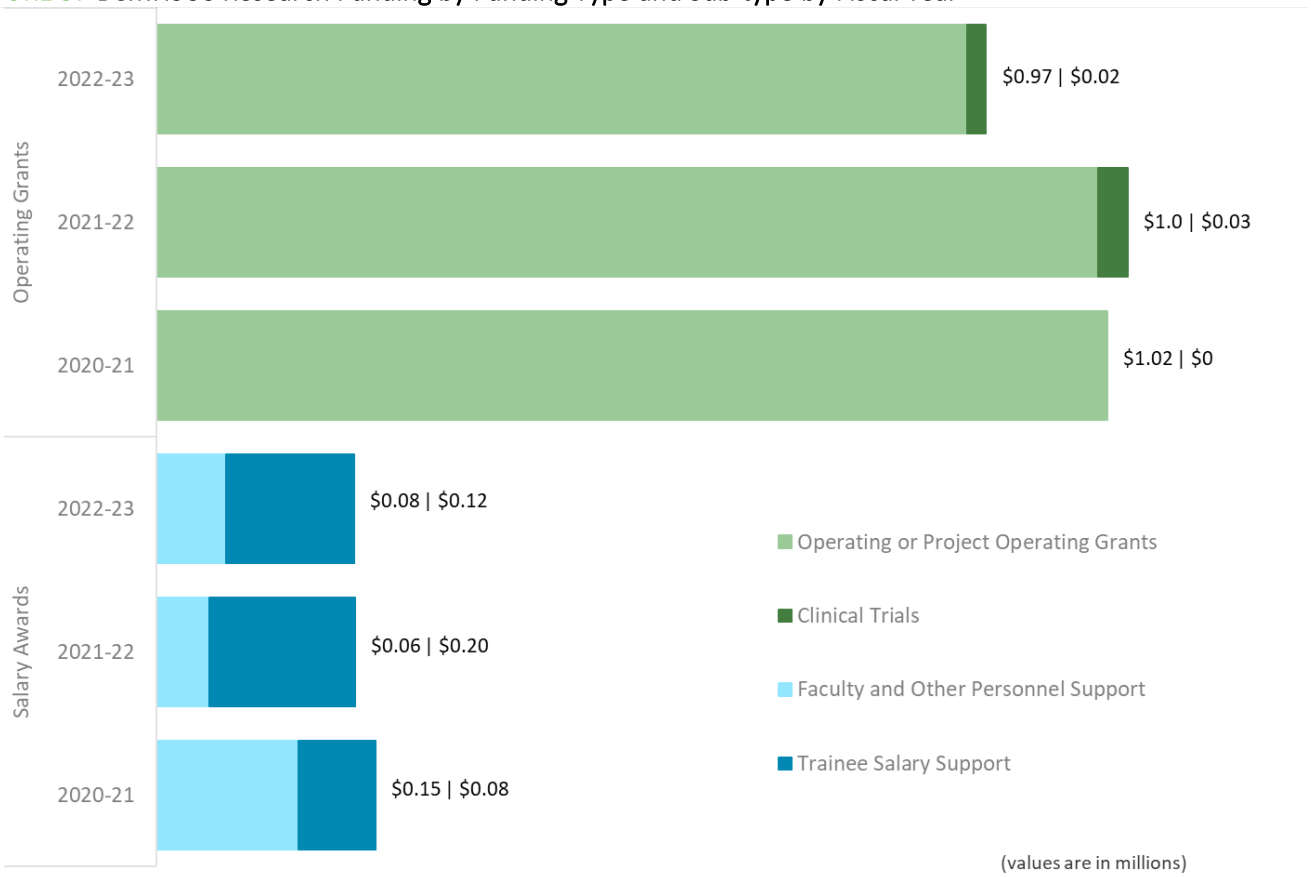
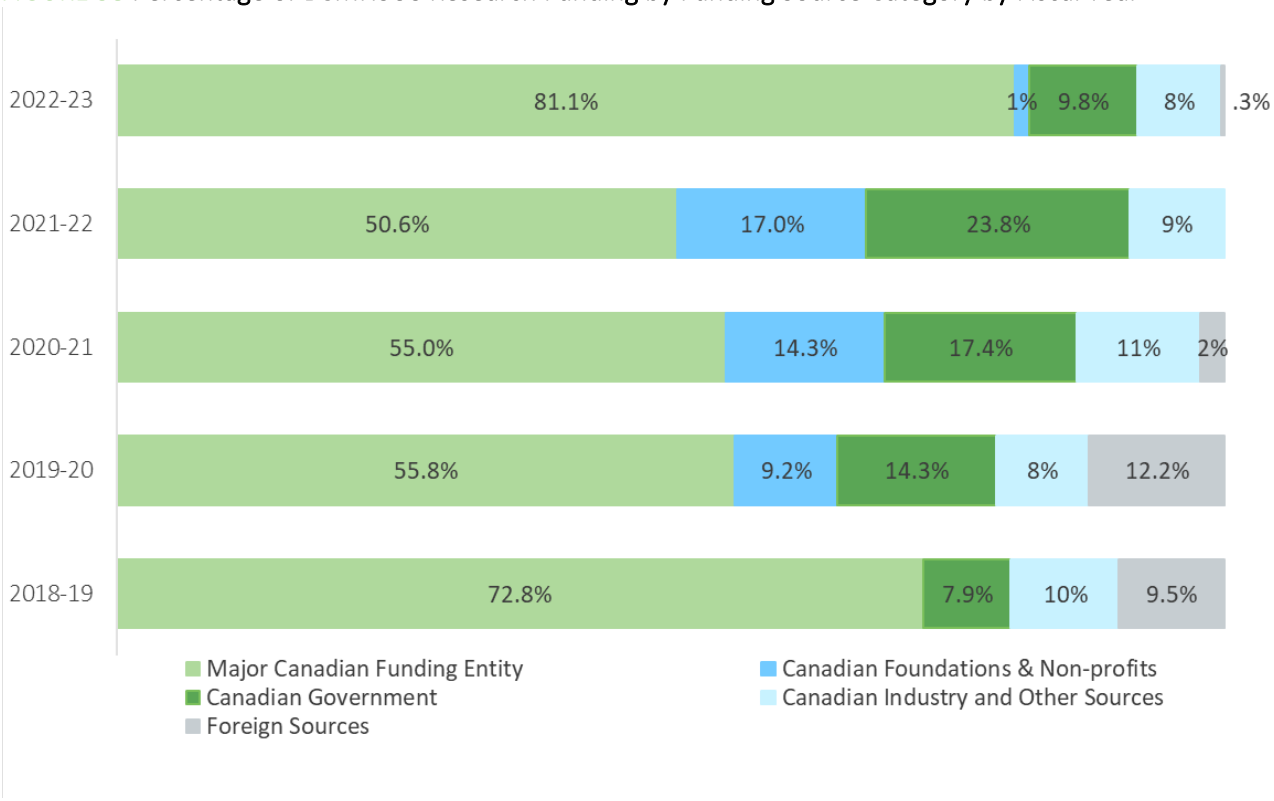


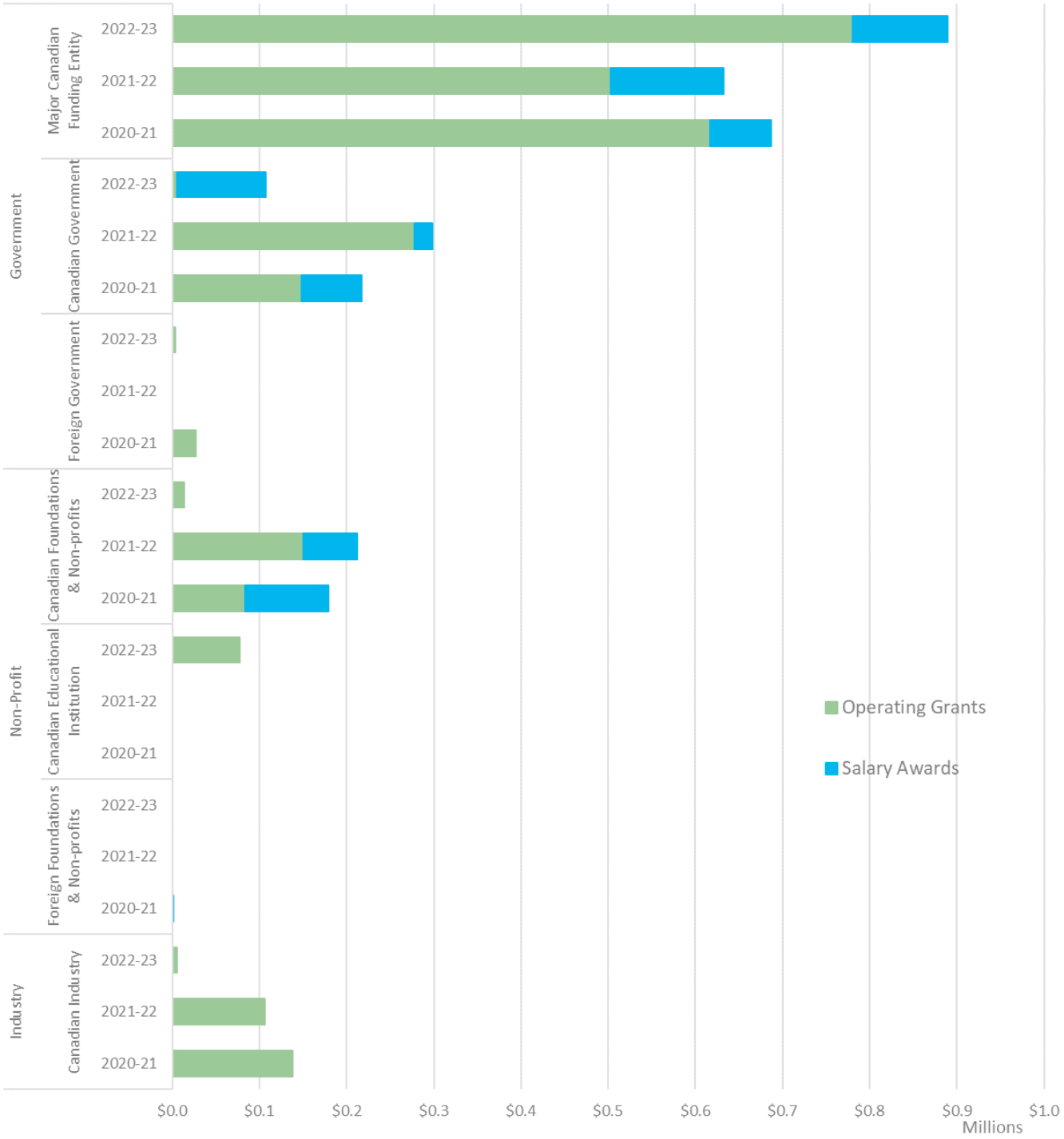
Figure 38 shows funding by funding source category. The Major Canadian Funding Entity increased substantially over the previous fiscal year with the second largest being the Canadian Government category. Due to the small number of awards, the category percentages fluctuate year over year.

FIGURE 38 Percentage of BCMHSUS Research Funding by Funding Source Category by Fiscal Year



The top 2 funding categories are Major Canadian Funding Entities (71.2%), and Canadian Government (9%). Figure 39 details the funding categories by RISe sector, funding source category and funding type.

FIGURE 39 Total BCMHSUS Research Funding by RISe Sector, Funding Source Category and Type by Fiscal Year



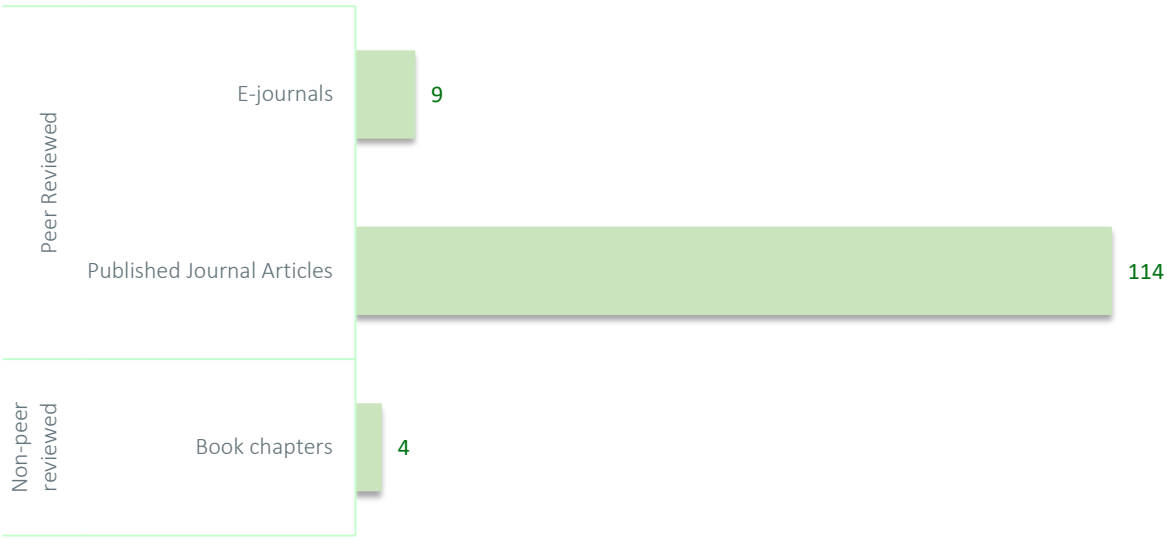
The application success rate is reported for the Fall 2022 and Spring 2023 CIHR grant competitions. BCMHSUS was not successful in either Project Grant competitions for a total of 0 awards out of 3 applications.

TABLE 12 BCMHSUS Annual Grant Application Success Rate

| Grant Funding Opportunity | National Overall Results % (Approved/Submitted) | BCMHSUS Results % (Approved/Submitted) |
|---|---|---|
| 2022-09 Project Grant | 25.0% (475/1,899) | 0.0% (2/0) |
| 2023-03 Project Grant | 22.4% (474/2,113) | 0.0% (1/0) |

BCMHSUS had a total of 127 publications of which 97% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 40. The program total represents the number of publications where at least one program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program.

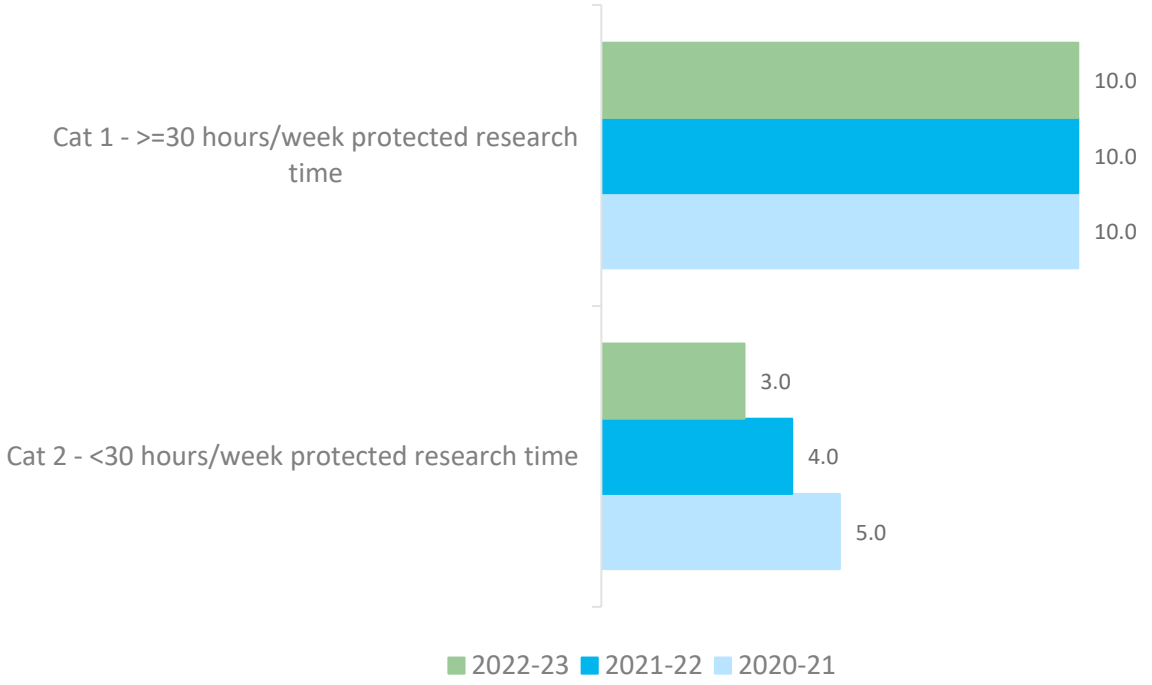
FIGURE 40 Total Number of BCMHSUS Publications by Type and Category



## Building Research Capacity

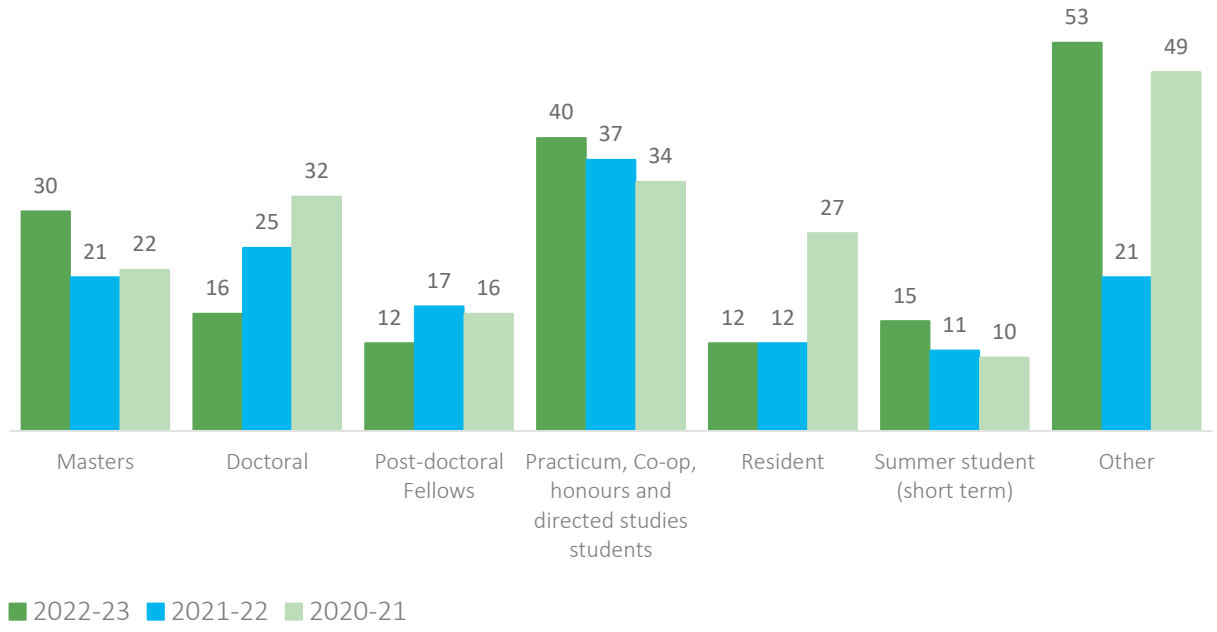
BCMHSUS had a total of 13 researchers in FY 2022-23, with 10 having greater than 30 hours of protected research time per week (Figure 41). While this is a decrease from previous years, a number of BCMHSUS clinicians engaged in research are now counted in the BCCHR totals following the operational transfer of Child & Youth Mental Health back to BC Children's Hospital.

FIGURE 41 Total Number of BCMHSUS Researchers by Category




During FY 2022-23, BCMHSUS researchers provided training and supervision to a total of 178 trainees, an increase of 34 over last FY (see Figure 42).

FIGURE 42 Total Number of BCMHSUS Trainees by Category



## Advancing Health and Policy Benefits

See Table 13 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 13 BCMHSUS Clinical Trials

| Fiscal Year | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 |
|---|---|---|---|---|---|---|---|
| Total Number of Clinical Trials active during the FY | 2 | 5 | 7 | 7 | 5 | 8 | 8 |
| Status of the Trial at the end of the FY: | | | | | | | |
| Total Number of Active Trials | 2 | 5 | 7 | 7 | 4 | 7 | 7 |
| Total Number of Trials that closed during the FY | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Enrolment Numbers: | | | | | | | |
| Expected Local Subject Enrolment (for the term of the study) | 450 | 902 | 1,217 | 1,320 | 1,115 | 1,400 | 882 |
| Total Cumulative Subject enrolment at the end of the FY | 244 | 423 | 465 | 565 | 551 | 596 | 523 |

Grant funding type is reported for Clinical Trials in Figure 43. 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 66 for a definition of funding types). The majority, sixty-three percent (63%) of BCMHSUS' Clinical Trials are grant funded.

Figure 42

FIGURE 43 BCMHSUS Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY

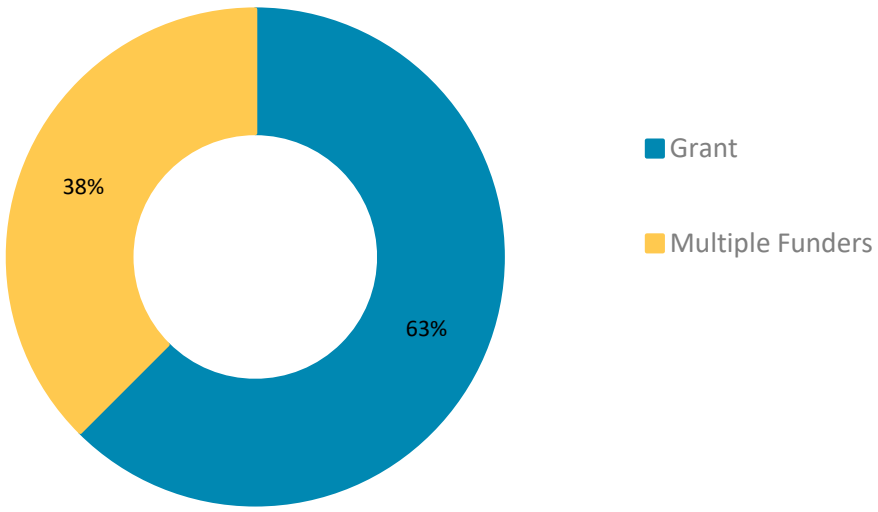


Table 14 reflects BCMHSUS' Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical and be relevant to FY 2022-23 timeframe (April 1, 2022 - March 31, 2023).

TABLE 14 BCMHSUS Top Three Achievements/Accomplishments/Highlights

| BCMHSUS RESEARCHER ADVANCES INTERNATIONAL CLINICAL PRACTICE IN GENETIC COUNSELLING |
|---|
| Dr. Jehannine Austin has made significant contributions to international clinical practice guidelines through two published papers. The first paper, titled "Clinical genetic counseling and translation considerations for polygenic scores (PGS) in personalized risk assessments: a Practice Resource from the National Society of Genetic Counselors," was co-authored by Wand H, Kalia S, Helm BM, Sukiel S, Brockman D, Vriesen N, Goudar RJ, Austin J*, and Yanes T*. This paper, published in the Journal of Genetic Counseling in August 2022, highlights important insights into genetic counseling and translation considerations for polygenic scores. The second paper, titled "Standardized human pedigree nomenclature: update and assessment of the recommendations of the National Society of Genetic Counselors," was authored by Bennet R, French K, Resta R, and Austin J. This paper, published online in the Early Journal of Genetic Counseling in September 2022, provides an updated and evaluated assessment of the recommendations made by the National Society of Genetic Counselors regarding standardized human pedigree nomenclature. Dr. Austin's pioneering work at the Adapt Clinic led to the establishment of two additional clinical services, one in Cardiff, UK, and the other in Tennessee, USA. These clinics were inspired by Dr. Austin's groundbreaking research and have been shaped by their expertise in the field. |
| BCMHSUS RESEARCHER ACHIEVES TOP RANK IN APRIL 2022 CIHR PROJECT GRANT |
| In April 2022, Dr. Clare Beasley was awarded a CIHR Project Grant, achieving the top rank in the Behavioural Sciences B Committee. The grant serves as recognition of her exceptional research proposal focusing on investigating the role of the complement system in schizophrenia. Dr. Beasley's team is dedicated to unraveling the intricate cellular and molecular pathology underlying schizophrenia and other psychiatric disorders. Its research encompasses a comprehensive approach, involving the examination of brain tissue, blood, and saliva samples. By looking at these biological specimens, the team aims to identify and understand the alterations in immune system functioning within individuals affected by mental illness. The team's ultimate goal is to shed light on the connection between the immune system and psychiatric disorders, particularly schizophrenia, contributing to the advancement of knowledge and potential therapeutic interventions in this field. |
| ANTIPSYCHOTICS EXPERT RANKED IN TOP 0.1% OF PUBLISHED AUTHORS WORLDWIDE |
| Dr. Alasdair Barr's expertise in psychosis and antipsychotic medications has earned him a remarkable ranking in the top 0.1% of published authors worldwide on antipsychotic agents from 2013 through 2023. This notable recognition, as documented on Expertscape (https://expertscape.com/au/antipsychotic+agents/Barr%2C+A), distinguishes him among a community of more than 55,000 scientists worldwide. His research efforts have encompassed the publication of influential manuscripts, including systematic reviews and meta-analyses, which explore the utilization of antipsychotic drugs in early psychosis intervention. One notable achievement was the publication of a manuscript, which received the designation of being a "top-cited" article. This publication, accessible at (https://pubmed.ncbi.nlm.nih.gov/34263540), has gained substantial readership in clinical literature. These types of review and meta-analytical studies hold significance for clinicians striving to implement evidence-based research into their clinical practice. Such contributions align with the objectives of the BCPP (British Columbia Psychosis Program) and BCMHSUS (British Columbia Mental Health and Substance Use Services), facilitating the integration of research findings into practical healthcare approaches. |

# BC CENTER FOR DISEASE CONTROL/UBC CDC (BCCDC)

BC Centre for Disease Control
Provincial Health Services Authority

## Producing and Advancing Knowledge

In FY 2022-23, researchers affiliated with BCCDC were awarded a total of $6,180,311 in research funding, which represents a 6% increase over last fiscal year. The amount awarded as Operating Grants ($5,196,838) makes up 84.1% of total awards. A breakdown of funding types and subtypes can be found in Figure 44 and by funding source category in Figure 45.

BCCDC's portion of the Research Support Fund Program grant totaled $225,103 for FY 2022-23 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. Total Covid-19 related research funding was $748,010 and is included in Figure 44.

FIGURE 44 Total BCCDC Research Funding by Funding Type and Sub-type by Fiscal Year

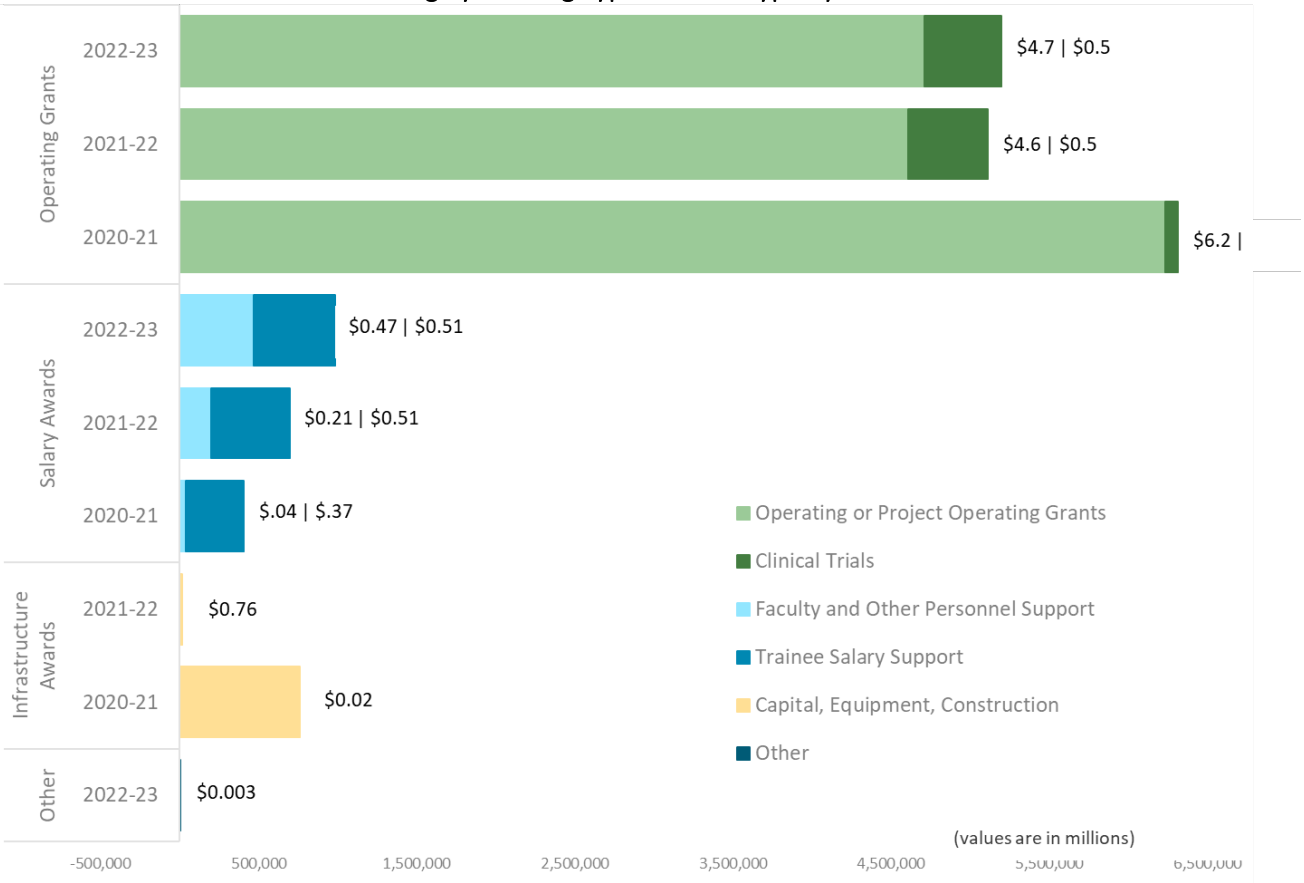
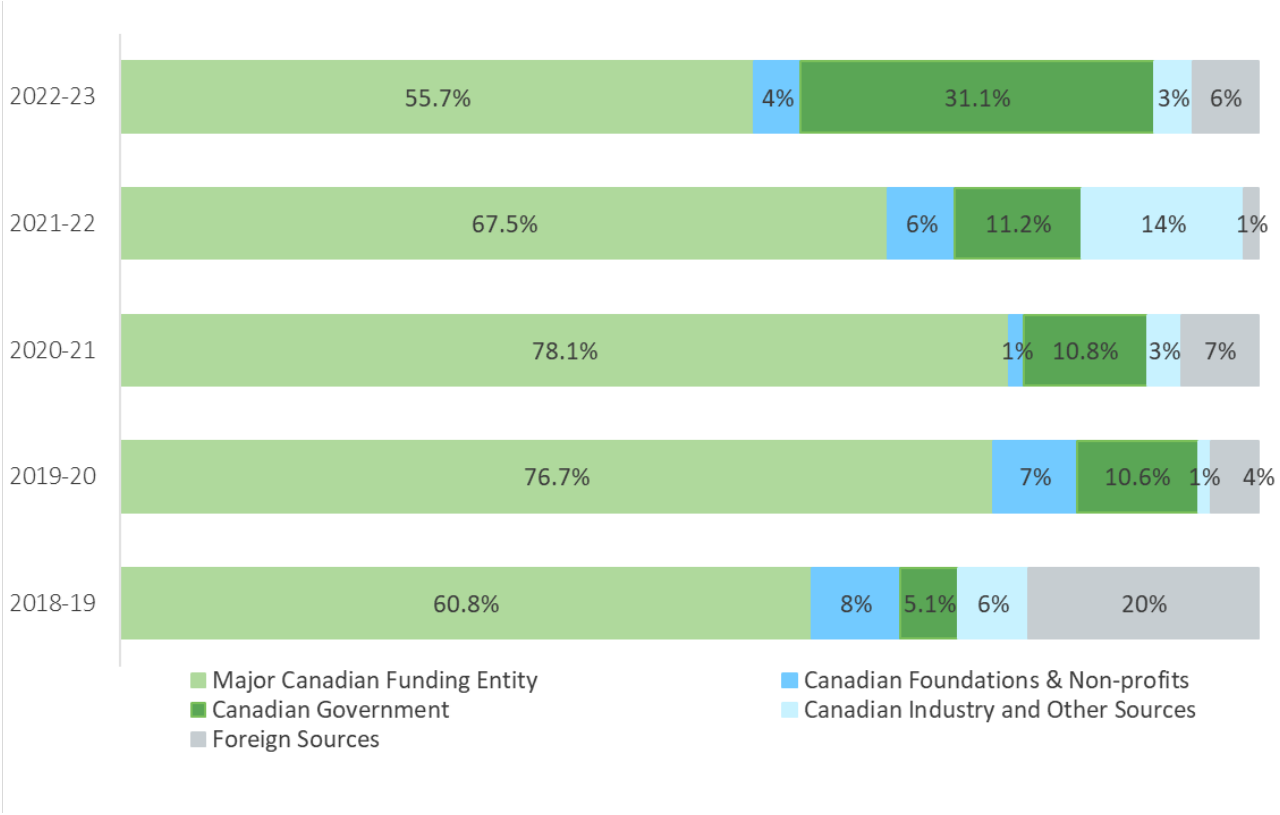


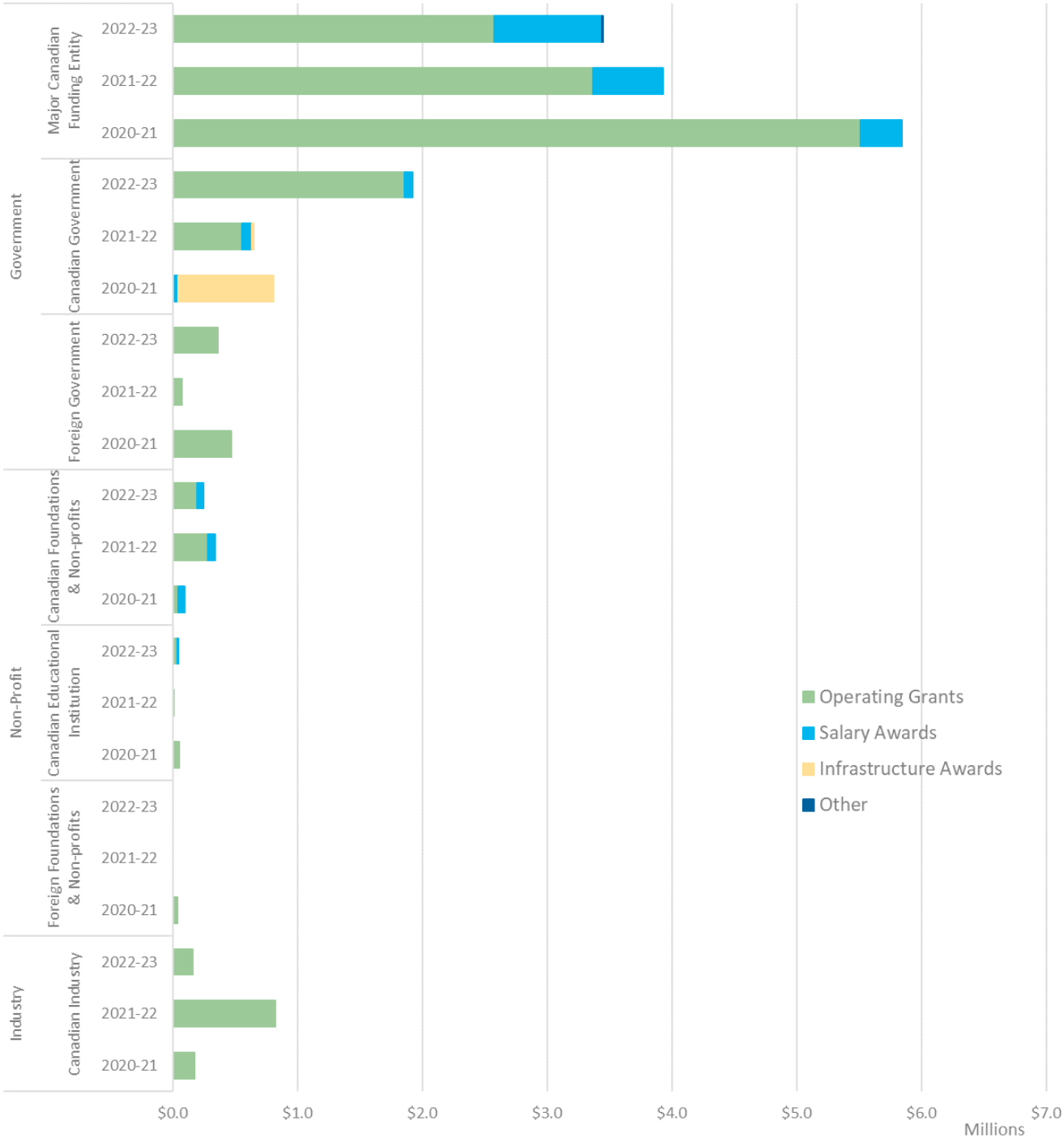
Figure 45 shows funding by funding source category.

FIGURE 45 Percentage of BCCDC Research Funding by Funding Source Category by Fiscal Year



The top two funding categories in FY 2022-23 are Major Canadian Funding Entity (55.7%) and Canadian Government (31%). Figure 46 details the funding categories by RISe sector, funding source category and funding type.

FIGURE 46 Total BCCDC Research Funding by RISe Sector, Funding Source Category and Type by FY



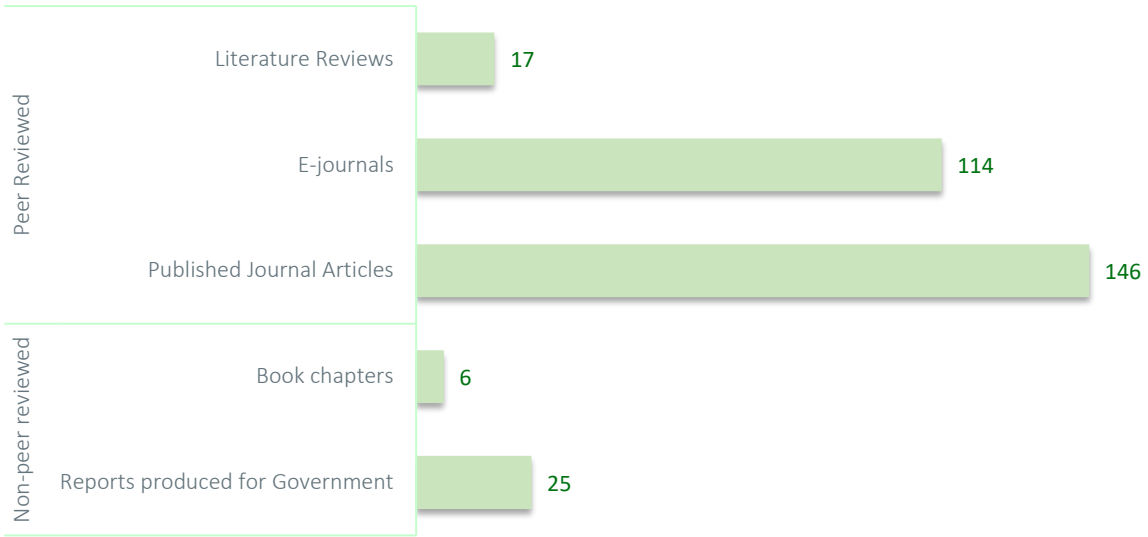
The application success rate is reported for the Fall 2022 and Spring 2023 CIHR grant competitions in Table 15. BCCDC was successful in the Project Grant competitions for a total of 2 awards, beating the national average in the Spring Project competition.

TABLE 15 BCCDC Annual Grant Application Success Rate

| Grant Funding Opportunity | National Overall Results % (Approved/Submitted) | BCCDC Results % (Approved/Submitted) |
|---|---|---|
| **2022-09 Project Grant** | 25.0% (475/1,899) | 0% (0/2) |
| **2023-03 Project Grant** | 22.4% (474/2,113) | 28.6% (2/7) |

BCCDC had a total of 308 publications of which 90% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 47. The program total represents the number of publications where at least one program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program.

FIGURE 47 Total Number of BCCDC Publications by Type and Category

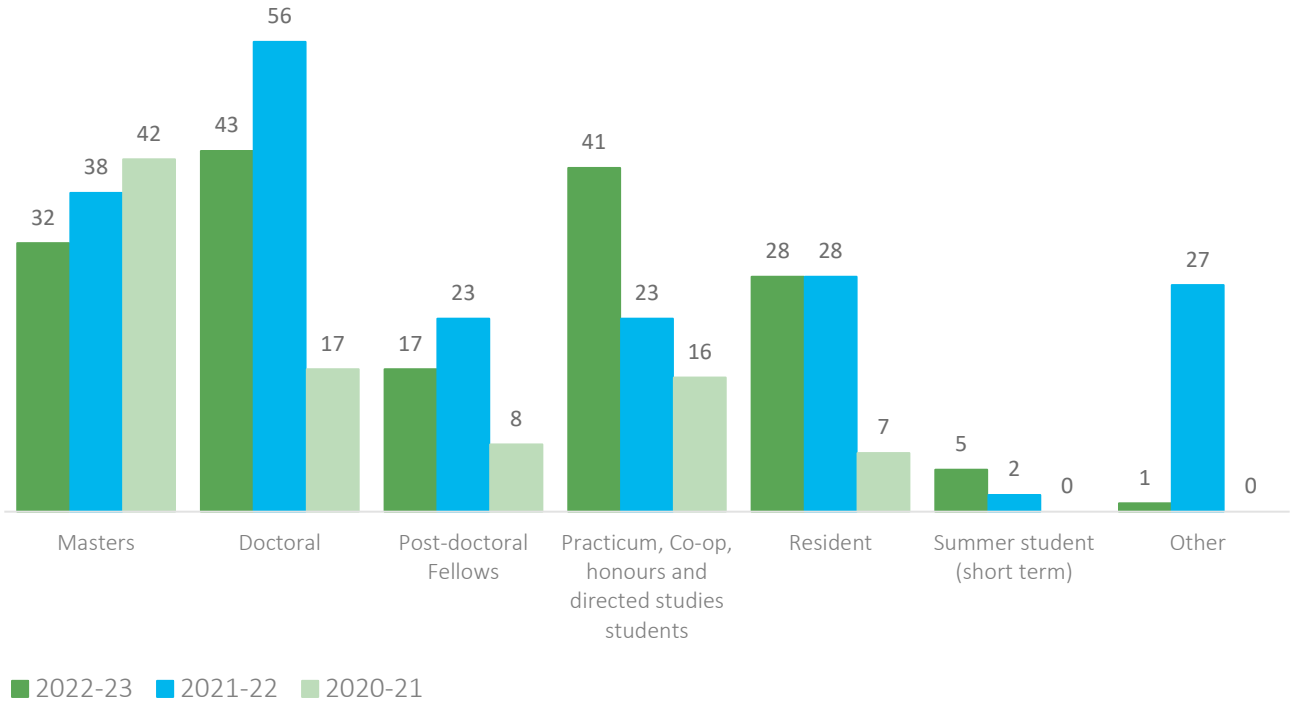


## Building Research Capacity

BCCDC defines a researcher as any principal investigator or co-investigator involved in BCCDC research projects. BCCDC had a total of 48.5 researchers meeting this definition in FY 2022-23, an increase of 1 from FY 2021-22.

During FY 2022-23, BCCDC researchers provided training and supervision to a total of 167 trainees (see Figure 48) a decrease of 30.

### Figure 48 Total Number of BCCDC Trainees by Type




## Advancing Health and Policy Benefits

See Table 16 for a detailed breakdown of clinical trial activity by fiscal year.

### TABLE 16 BCCDC Clinical Trials

| Fiscal Year | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 |
|---|---|---|---|---|---|---|---|
| Total Number of Clinical Trials active during the FY | 5 | 5 | 9 | 11 | 12 | 14 | 15 |
| Status of the Trial at the end of the FY: | | | | | | | |
| Total Number of Active Trials | 5 | 4 | 8 | 10 | 11 | 14 | 14 |
| Total Number of Trials that closed during the FY | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| Enrolment Numbers: | | | | | | | |
| Expected Local Subject Enrolment (for the term of the study) | 2,696 | 2,750 | 6,699 | 10,579 | 12,625 | 12,814 | 13,729 |
| Total Cumulative Subject enrolment at the end of the FY | 2,656 | 1,639 | 2,707 | 2,961 | 1,663 | 3,613 | 5,233 |

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 66 for a definition of funding types). Sixty-seven percent (67%) of BCCDC's clinical trials are grant funded, 13% have multiple funders, and 13% with no funding.

Table 17 reflects BCCDC's Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical, and be relevant to FY 2022-23 timeframe (April 1, 2022 - March 31, 2023).

TABLE 17 BCCDC Top Three Achievements/Accomplishments/Highlights

| WASTEWATER ANALYSIS INITIATED AS RESEARCH ESTABLISHED AS KEY PUBLIC HEALTH TOOL |
| --- |
| During the pandemic, wastewater became an important tool for monitoring SARS-CoV-2 in the community and UBC/BCCDC were at the forefront of this work. This work started as an externally funded research project by a UBC laboratory embedded at BCCDC Public Health Laboratory. Since then, the work has expanded to include additional viruses (influenza A, influenza B, RSV and norovirus) and sequencing of SARS-CoV-2 to detect emerging variants. Furthermore, routine testing has transitioned to the Public Health Laboratory, while research and development for new targets continues in the UBC research laboratory. This is a fantastic example of the impact of cutting-edge translational research and the benefit of research and service laboratories being co-located at the BCCDC. |
| EMPHASIS ON COMMUNITY ENGAGEMENT AND INDIGENOUS PARNERSHIPS BY THE OVERDOSE RESEARCH PROGRAM |
| BCCDC researchers launched several new projects focused on partnering with people with lived experience of incarceration and substance use. These projects included a Health Canada funded initiative known as PREVAIL that provided 120 men and women leaving correctional centres who are at high risk of overdose cellular phones, care and medicine bundles designed by a formerly incarcerated person through a partnership with Chee Mamuk, peer support through Unlocking the Gates Non-Profit Society, and harm reduction supplies including take home naloxone. |
| UBCCDC PROJECT MANAGEMENT TEAM HELPS BCCDC RESEARCHERS SUCCESSFULLY COMPETE FOR MORE THAN $26M IN GRANTS |
| The UBCCDC Project Management Team helped coordinate, support, and enhance COVID-19 research projects resulting in 42 successful applications for a total value of over $26M. This included eight from CIHR, nine for Genome BC, seven from the Michael Smith Foundation for Health Research (MSFHR is now Health Research BC), six from the Public Health Agency of Canada, three joint Genome BC, MSFHR and BCCDC Foundation projects, and nine other funders. |

# WOMEN'S HEALTH RESEARCH INSTITUTE (WHRI)

WOMEN'S HEALTH RESEARCH INSTITUTE AT BC WOMEN'S

## Producing and Advancing Knowledge

In FY 2022-23, researchers affiliated with WHRI were awarded a total of $7,234,027 in research funding, which represents a 21.5% decrease over last year. The amount awarded as Operating Grants ($6,181,522) makes up 85.5% of total awards. A breakdown of funding types and subtypes can be found in Figure 49 and by funding source category in Figure 50.

WHRI's portion of the Research Support Fund Program grant totaled $333,501 for FY 2022-23 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.

Total Covid-19 related research funding was $-46,270 and is included in the figure 49.

FIGURE 49 Total WHRI Research Funding by Funding Type and Sub-type by Fiscal Year

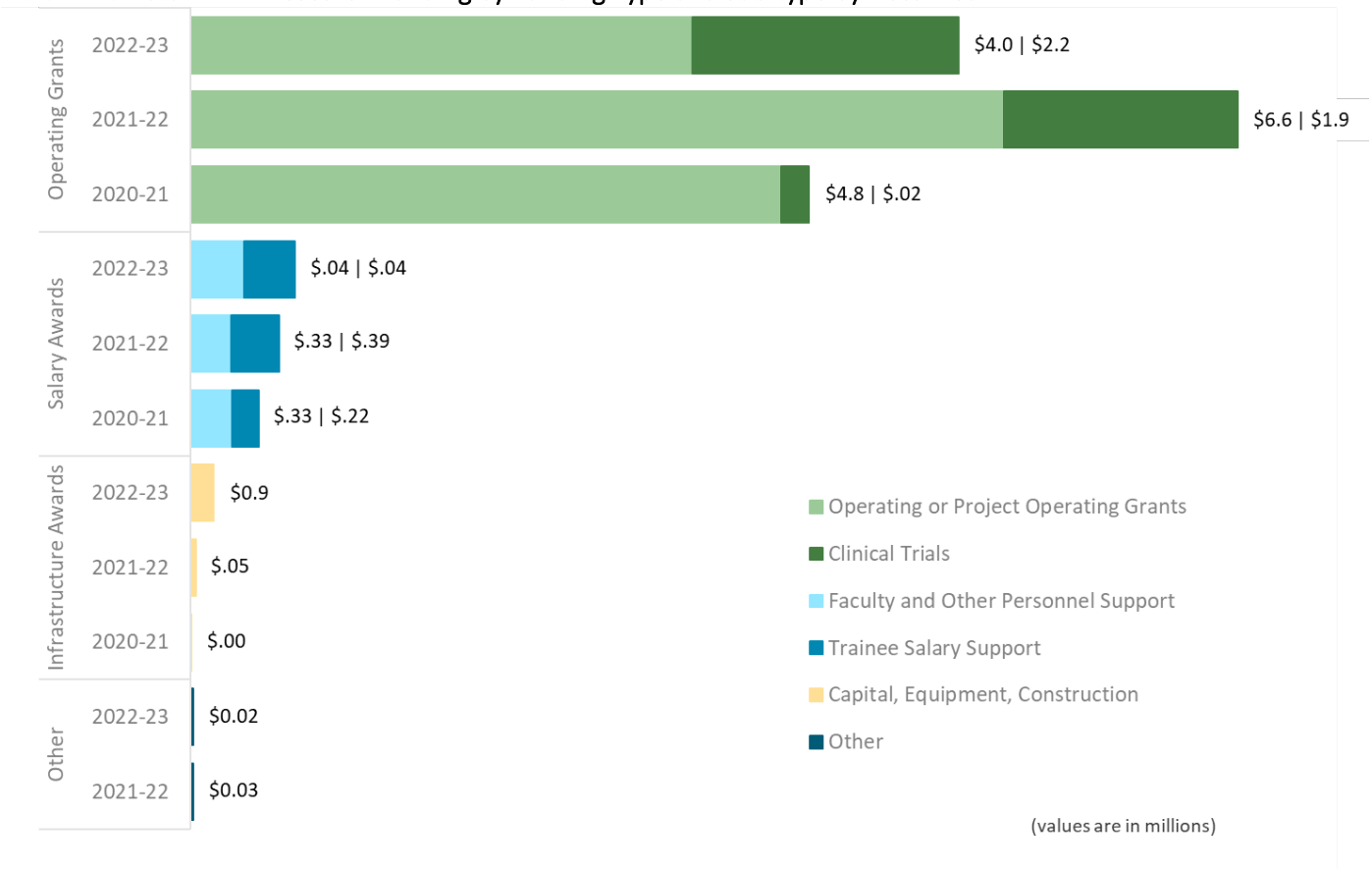
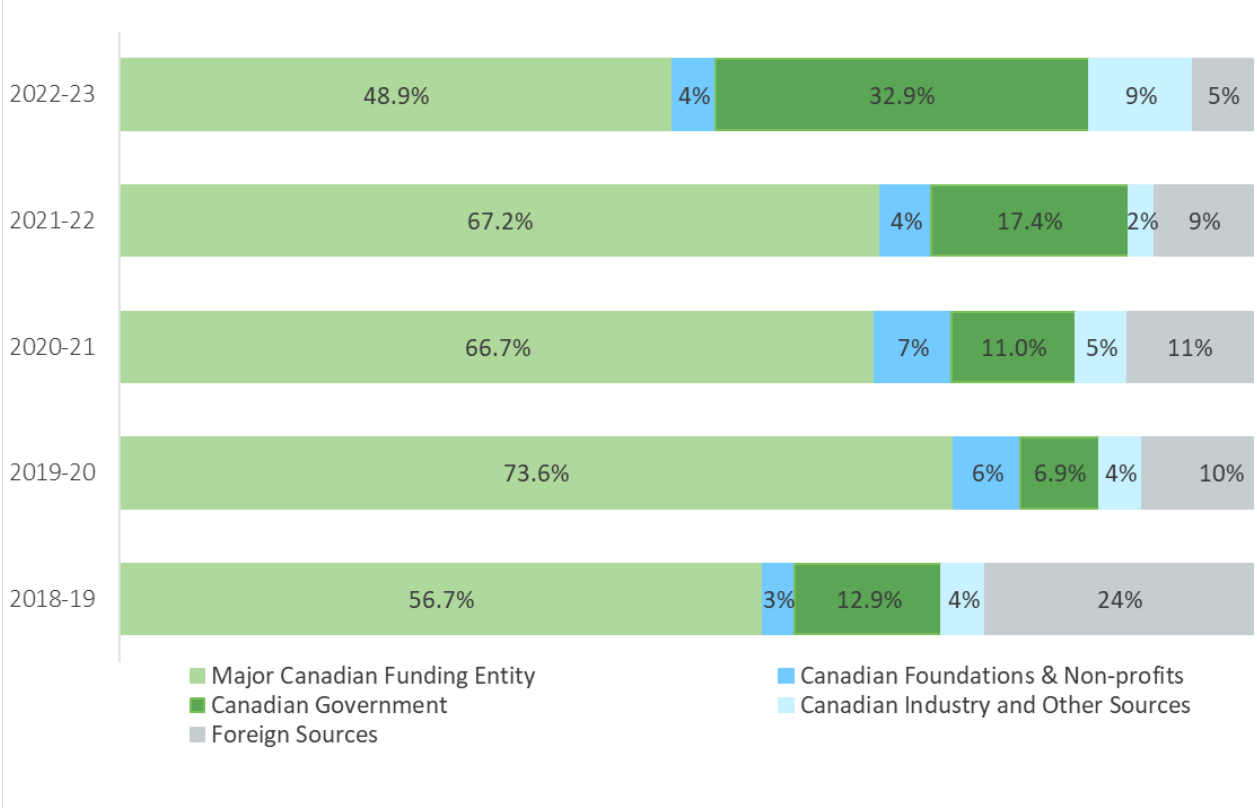


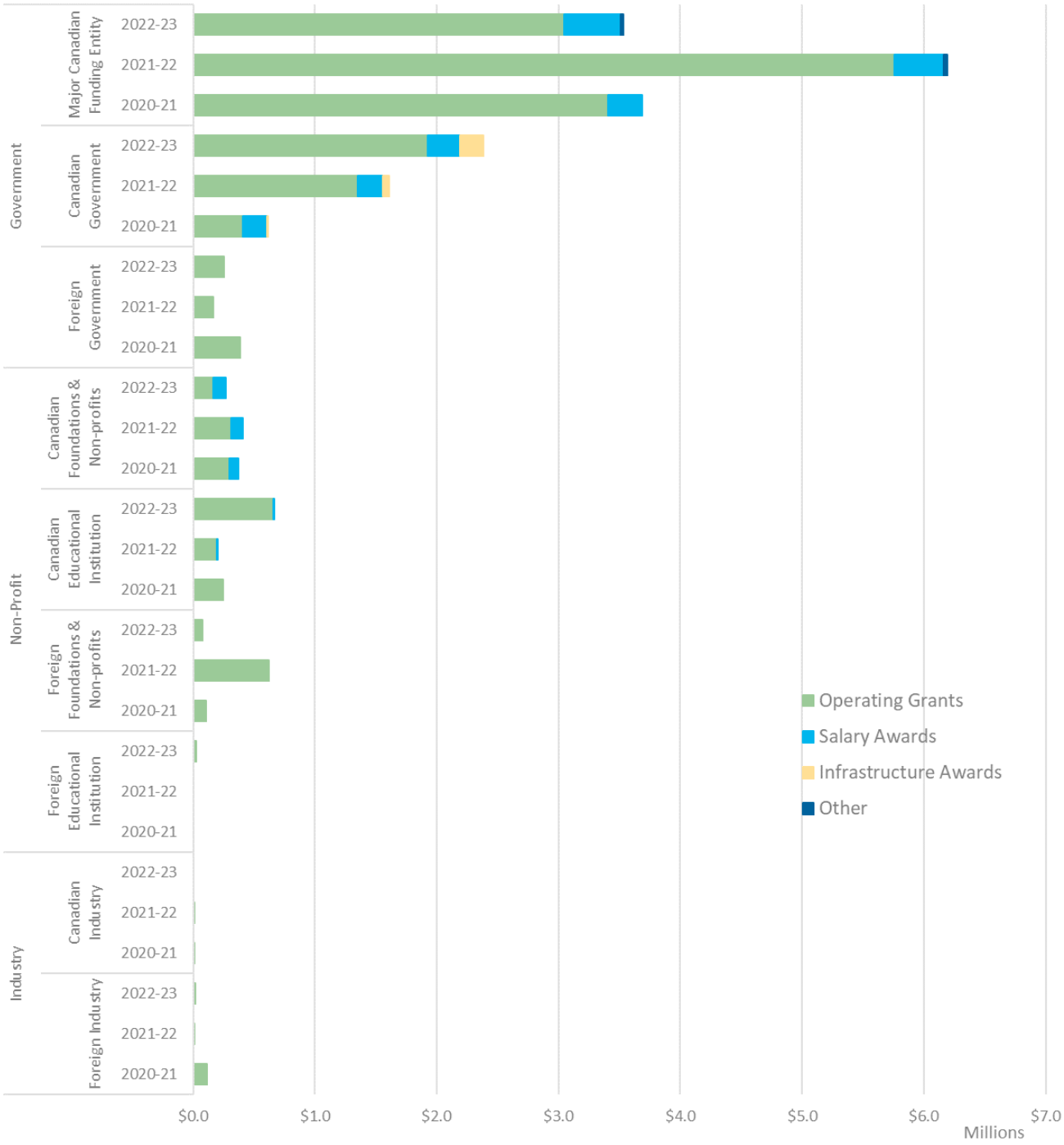
Figure 50 shows funding by funding source category.

FIGURE 50 Percentage of WHRI Research Funding by Funding Source Category by FY



In FY 2022-23, the top two funding categories are Major Canadian Funding Entities (48.8%) and Canadian Government (32.9%). Figure 51 details the major funding categories by RISe sector, funding source category and funding type.

FIGURE 51 Total WHRI Research Funding by RISe Sector, Funding Source Category and Type by Fiscal Year



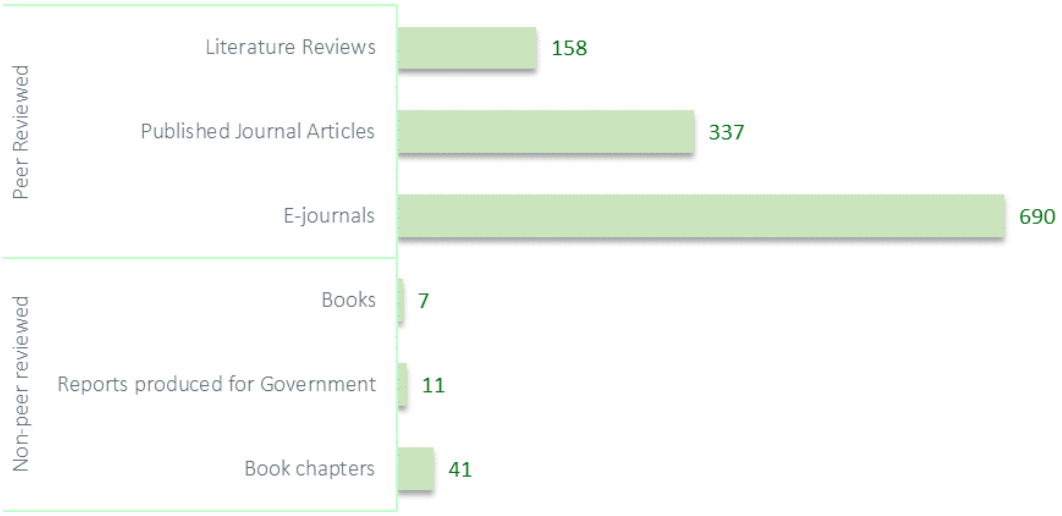
The application success rate is reported for the Fall 2022 and Spring 2023 CIHR grant competitions. WHRI was successful in both Project Grant competitions with a total of 5 awards. In both Project Grant competitions, WHRI was above the national average success rate. WHRI investigators apply for grant competitions that are offered by a variety of granting agencies.

TABLE 18 WHRI Annual Grant Application Success Rate

| Grant Funding Opportunity | National Overall Results % (Approved/Submitted) | WHRI Results % (Approved/Submitted) |
|---|---|---|
| 2022-09 Project Grant | 25.0% (475/1,899) | 60.0% (3/5) |
| 2023-03 Project Grant | 22.4% (474/2,113) | 66.7% (2/3) |

WHRI had a total of 1,244 publications in calendar year 2021 of which 95% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is shown in Figure 52. Peer review represents the gold standard for scientific credibility. The program total represents the number of publications where at least one program researcher was an author of the publication. When researchers from more than one research entity/program collaborate on the same publication, it is counted once for each program.

FIGURE 52 Total Number of WHRI Publications by Type and Category




Three full fiscal years' worth of data is provided for WHRI 's four research specific social media channels; Facebook (member since Aug 2010); Twitter (member since August 2010); Instagram (member since May 2018; and LinkedIn (member since June 2017). Strategic use of social media, combined with tracking and reporting of this data directly supports our strategic aim to Increase and Promote Research Translation, Implementation, and Communication. Social media use also aligns with several domains within the WHRI Strategic Framework for Knowledge Translation (KT) including:

- Building KT Capacity: Promoting and hosting events to accelerate the dissemination of evidence to knowledge users.
- Advocating for a Culture of KT: Promoting KT activities and KT products.
- Manage KT Projects: Facilitating KT events and activities, including dissemination of research evidence to targeted knowledge users (e.g. patients, providers, prescribers, decision makers); and track the impact of dissemination campaigns that increase the use of KT products.

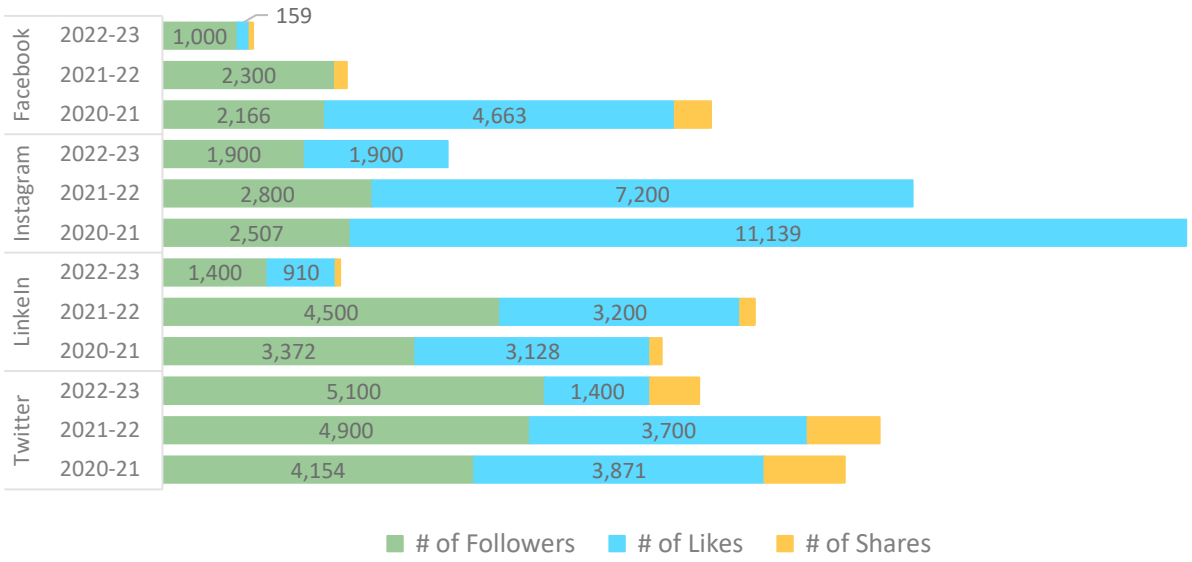
In addition to our strategic alignment, social media is practically used to:

- Drive traffic to the WHRI website, which allows users to engage with our services and supports.
- Enhance the profile of the WHRI as one of only 3 women's research institutes in Canada.
- Amplifying the successes and opportunities of the women's health research community, including investigators, trainees, and those across PHSA programs.
- Strengthen and track the impact of WHRI events and KT opportunities (e.g., WHRI Symposia, @WomensResearch Wellness Exchange (public event), @WomensResearch Podcast, BC Women's Research Rounds)

Figure 53 shows annual results of three fiscal years. These metrics are a measure of reach and engagement and provide an indication of the volume of activity.

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

FIGURE 53 WHRI Social Media Statistics



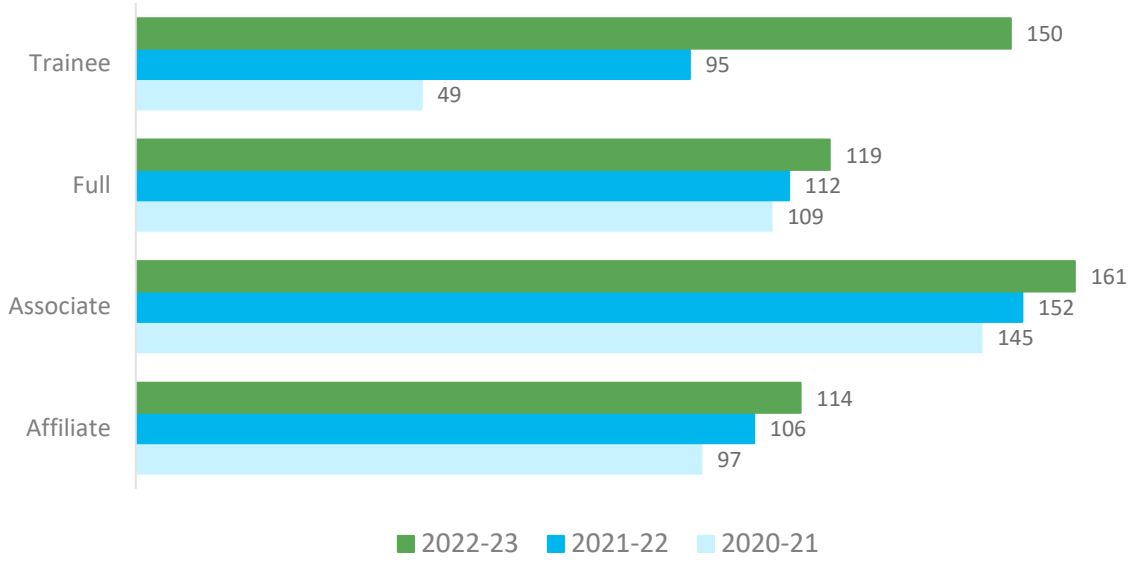

## Building Research Capacity

In an effort to show WHRI's activities, their membership statistics are shown (see Figure 54). In FY 2022-23, membership increased by 79 for a total of 544 members.

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

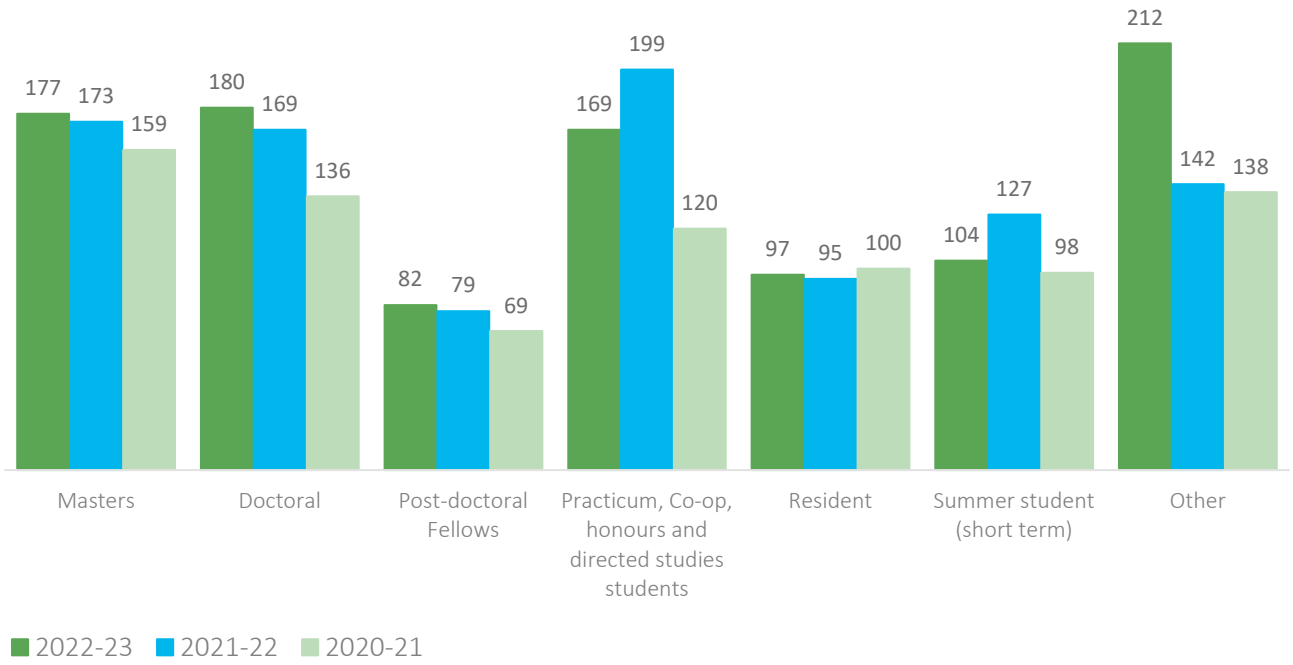
| | |
|---|---|
| *Full Member* | Individuals involved in women's health research for which the WHRI would be the only research institute affiliation. |
| *Associate Member* | Individuals who are involved in women's health research, at least in part, but have a strong relationship with another research 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. |
| *Trainee Member (new 2020-21)* | Individuals who are undergrads, grad students, medical students, research and clinical fellows, international students, and any person in a degree-granting program who is engaged in research. |

Figure 54 Total WHRI Membership by Category



WHRI researchers provided training and supervision to a total of 1,021 trainees (see Figure 55) an increase of 37 over last fiscal year.

Figure 55 Total Number of WHRI Trainees by Type




## Advancing Health and Policy Benefits

Clinical trial data from the REB (Research Ethics Board) is provided utilizing the same methodology as last year. See Table 19 for a detailed breakdown of clinical trial activity by fiscal year.

TABLE 19 WHRI Clinical Trials

| Fiscal Year | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 |
|---|---|---|---|---|---|---|---|
| Total Number of Clinical Trials active during the FY | 11 | 31 | 38 | 20 | 23 | 22 | 45 |
| Status of the Trial at the end of the FY: | | | | | | | |
| Total Number of Active Trials | 7 | 23 | 30 | 16 | 17 | 16 | 35 |
| Total Number of Trials that closed during the FY | 4 | 8 | 8 | 4 | 6 | 6 | 10 |
| Enrolment Numbers: | | | | | | | |
| Expected Local Subject Enrolment (for the term of the study) | 1,162 | 6,653 | 10,928 | 8,838 | 8,864 | 8,868 | 11,120 |
| Total Cumulative Subject enrolment at the end of the FY | 545 | 3,092 | 3,160 | 1,507 | 1,938 | 1,941 | 4,309 |

Grant funding type is reported for Clinical Trials in Figure 56. 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 66 for a definition of funding types). Thirty-one percent (31%) of WHRI's clinical trials are Industry funded, and 31% are Grant funded.

FIGURE 56 WHRI Percentage of Clinical Trial Grant Funding Type – Active and Terminated Trials within the FY

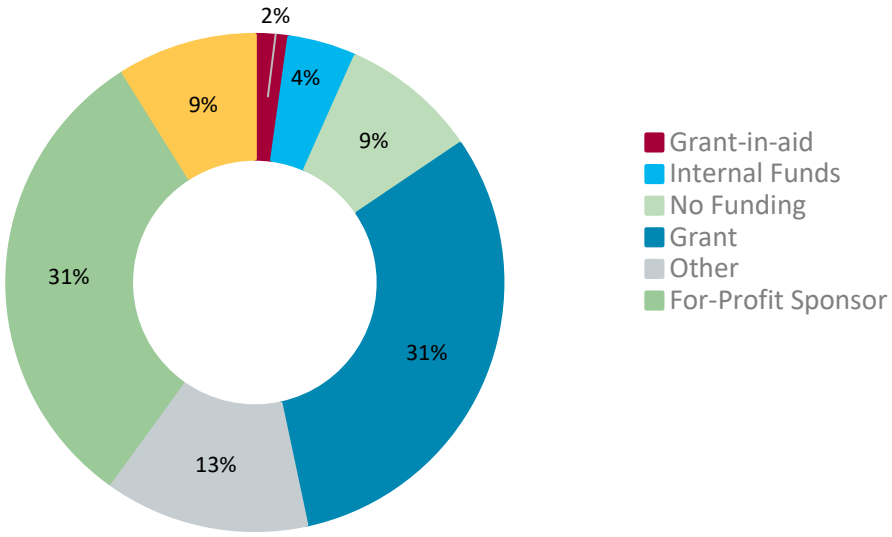


Table 20 reflects WHRI's Top Three Achievements/Accomplishments/Highlights, and can include awards, citations, clinical programs, either in progress or historical, and be relevant to FY 2022-23 timeframe (April 1, 2022 - March 31, 2023).

TABLE 20 WHRI Top Three Achievements/Accomplishments/Highlights

| RESEARCH AND KNOWLEDGE MOBILIZATION BY WHRI INVESTIGATOR RESULTED IN BC BEING THE FIRST PROVINCE IN CANADA TO OFFER FREE PRESCRIPTION CONTRACEPTION |
|---|
| Based on research evidence and advocacy lead by WHRI researcher Dr. Wendy Norman and her Contraception and Abortion Research Team (https://cart-grac.ubc.ca/), in partnership with BC Women's Hospital + Health Centre, British Columbia is now the first province in Canada to offer free prescription contraception for residents (as of April 1, 2023). This policy change is intended to ensure equitable access to contraception and to reduce the rate of unintended pregnancies, ultimately saving money for the province's healthcare system. Dr. Norman's research has been working toward this goal since 2011, including conducting a BC-wide door-to-door sexual health survey and regularly hosting stakeholder engagement events, to gather data to support evidence-informed policy development. In partnership with BC Women's Hospital + Health Centre, Dr. Norman and her research team were influential in bringing about this policy change through research, advocacy and implementation planning with the provincial government and other partners. |
| THE WHRI AND BCCHR PARTNER TO LAUNCH A JOINT DIGITAL HEALTH RESEARCH OFFICE TO SUPPORT DIGITAL INNOVATION IN WOMEN'S, NEWBORN'S AND CHILDREN'S HEALTH |
| Recognizing the rapid advances within the technology and digital health sector, and the influence of these advances on health delivery and research, the WHRI and BCCHR have partnered to create a joint Digital Health Research Office for both their research communities. This office is currently staffed by a Digital Health Research Manager and Digital Health Research Coordinator who will work to build the digital health research program for the Oak Street Campus by creating opportunities to learn and share knowledge related to digital innovations in women's, newborn's and children's health. The Digital Health Research Manager will actively engage with decision makers in government, health authorities and other partners to accelerate the implementation of evidence-based, locally produced digital health research interventions. This office will continue to build on established WHRI and BCCHR joint digital health initiatives, including a monthly digital health research seminar series, digital health week programing and a Michael Smith Health Research BC funded project (https://whri.org/our-initiatives/rapid/) to develop a shared research agenda in perinatal digital innovation. |
| A WHRI INVESTIGATOR'S PUBLICATION DEMONSTRATES THAT A NOVEL COMMUNITY BASED METHOD OF CERVICAL CANCER SCREENING CAN BE INTEGRATED INTO THE HEALTH SYSTEM IN LOW-RESOURCE SETTING |
| A publication in Nature Medicine (https://www.nature.com/articles/s41591-023-02288-6) by WHRI researcher Dr. Gina Ogilvie and her research team demonstrated the feasibility of integrating a community-based self-collected HPV-based cervix screening into an existing health system in a low-resource rural setting with a high burden of cervical cancer. In partnership with the Uganda Cancer Institute, Dr. Ogilvie's team conducted a two-armed pragmatic cluster randomized trial in the rural Mayuge region of Uganda (the ASPIRE-Mayuge trial). The goal of the trial was to compare the effectiveness of two community-based cervical cancer screening models using self-collected HPV testing: 1) community health worker recruitment (door-to-door); and 2) community health meetings. The ASPIRE-Mayuge trial showed that implementation of door-to-door HPV screening led to better attendance of follow-up treatment services but required more personnel when compared to community health days. The results from this study will inform the national scale-up of cervical cancer screening in Uganda, aligning with the World Health Organization's target of achieving cervical cancer elimination through the pillar of increased HPV screening coverage. |

# REGISTRIES & DATASETS

## Advancing Health and Policy Benefits

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

Data stewards for a total of 16 PHSA registries or datasets, were invited to participate in a survey designed to assess the research activities of the registry/dataset. Completed surveys from 14 out of the 16 registries/datasets were obtained. The Research Metrics working group drew a distinction between two types of databases that might be counted. The first are those that serve as registries. These are the result of significant infrastructure investment in the collection of longitudinal data that are regional, provincial, or national in scope regarding provision of services to specific population(s), maintained for the purposes of undertaking analysis, surveillance and/or research. They represent a significant resource for and investment in research. The second (not collected) are short-term, project-related databases that are primarily grant funded and are not maintained for use beyond the term of a given research project.

### Registry/data set Definition/Purpose

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

| REGISTRY/DATASET | PURPOSE |
|---|---|
| BC CANCER REGISTRY | The BC Cancer Registry is a population-based registry of all cancers diagnosed in British Columbia residents. It collects data and generates cancer statistics on the BC Population for the purpose of monitoring the burden of cancer in the province. It also serves as a source of information for research. |
| BC CARDIAC REGISTRY (HEARTIS) | Heart Information System (HEARTis) tracks a patient journey for all current and future cardiac procedures, throughout British Columbia, from registry on the waitlist to procedure completion and follow up. Its purpose is to support clinical care, quality assurance and improvement, and outcome-based research. |
| BCCDC COVID-19 DATASET | This is an integrated dataset utilized for the management of the COVID-19 pandemic and includes data from the Ministry of Health, Regional Health Authorities, and PHSA. |
| BC PERINATAL DATABASE REGISTRY (BCPDR) | The (BCPDR) contains data abstracted from obstetrical and neonatal medical records on nearly 100% of births in the province of British Columbia from over 60 hospitals as well as births occurring at home attended by BC registered midwives. The BCPDR also collects data on maternal postpartum readmissions up to 42 days post-delivery and baby transfers and readmissions up to 28 days after birth. Data access is provided for public-interest research purposes, surveillance, program delivery, and evaluation. |
| BC TRAUMA REGISTRY | Provides data collection, reporting and support of research and quality initiatives related to trauma care. |
| CENTRAL TRANSUFSION REGISTRY | The Central Transfusion Registry (CTR) is a database operated by the BC Provincial Blood Coordinating Office (PBCO) and contains records of recipients who have received blood and blood products in British Columbia and the Yukon. The CTR was the first population-based transfusion registry in Canada and remains one of the largest such registries in North America since its inception in 1999. |
| ENDOMETRIOSIS AND PELVIC PAIN INTERDISCIPLINARY COHORT (EPPIC) | A prospective data collection to evaluate patient outcomes after interdisciplinary care for endometriosis and pelvic pain |
| BREAST CANCER SCREENING DATABASE (PREVIOUS NAME - SCREENING MAMMOGRAPHY DATABASE) | Clinical system for scheduling, reporting and tracking of screening mammography exams. |

| 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. |
| PROMIS-BC RENAL/TRANSPLANT | Patient Records and Outcome Management Information System – is the renal care community's clinical information system. With data collected from the 39 renal units in British Columbia, PROMIS supports: Individual patient care management; Renal unit management; Continuous quality improvement and research; Outcomes-based planning. PROMIS database is used as a source of important epidemiological data in support of clinical trials and for assessing new therapies. |
| 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. |
| LUNG CANCER SCREENING PROGRAM | The BC Lung Screen Trial provides the only access to organized lung cancer screening to eligible B.C. residents. |
| TUMOUR TISSUE REPOSITORY (TTR) | TTR is a provincial resource to support translational cancer research at BC Cancer, across Canada and internationally. The TTR is a state-of-the-art tumour bank that collects tissues, blood, and clinical information and processes these to create anonymous cases that can be studied by cancer researchers to understand how cancer develops, how it grows, how it spreads, and how it responds to treatment. |

## Supporting Research Activities

For FY 2022-23, thirteen (13) of registries/datasets are used for the purpose of research as defined by UBC (see Glossary – Appendix 1, page 67). In addition, respondents were asked to identify other activities they provide in support of research. Table 21 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 21 Research Activities Supported by Registries and Datasets

| Research Support Activity | Cancer | Cardiac | Cervical | Perinatal | Renal | Breast Cancer | Transplant | Trauma | TTR | Biobank | EPPIC | Lung | BCCDC | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Assist in identifying knowledge gaps and improvement needs | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 33 |
| Support in managing and linking data | 3 | 3 | 2 | 3 | 3 | 3 | | 3 | 2 | 3 | 3 | 2 | 1 | 31 |
| Support in ensuring studies meet regulatory standards | 3 | 3 | 1 | 3 | 3 | 3 | 3 | | 2 | 2 | 3 | 2 | | 28 |
| Support in designing research studies | | 3 | | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 1 | 27 |
| Support in conducting biostatistical analysis | | 3 | 1 | 3 | 3 | 3 | 3 | 3 | | | 3 | 2 | 3 | 27 |
| Facilitate communication to identify pertinent research question | | 3 | 2 | 3 | 3 | 3 | 3 | 2 | | 1 | 1 | 2 | 3 | 26 |
| Provide specialized and multidisciplinary methodological expertise | 3 | 3 | 1 | 3 | 3 | | 3 | 3 | | | 1 | 2 | 2 | 24 |
| Application of new technical capabilities to provide more timely access to wider range of data | 3 | 2 | | 2 | 1 | | | 4 | | 1 | | 2 | | 15 |
| Teaching and hands on training for the above | | | | 3 | 2 | | | 2 | 1 | 1 | 1 | | | 10 |
| Support in providing and teaching project management skills | | | | | 3 | | | | | 1 | 1 | | | 5 |
| Grand Total | 15 | 23 | 9 | 26 | 27 | 18 | 18 | 23 | 8 | 12 | 18 | 16 | 13 | 226 |

Respondents were asked if they submit data to external organizations for the purposes of research. See Table 22 for the breakdown of data set type by registry/dataset for FY 2022-23. 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 22 Provision of Data to external Data Sets by Registry

| Type of External Data Set | Cancer | Cardiac | Perinatal | Renal | Breast | Transplant | Trauma | TTR | Biobank | Lung | EPPIC | BCEHS-Paramedic | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pan Canadian dataset** | 3 | 1 | | 2 | 2 | 2 | 1 | 2 | 2 | 1 | | | **16** |
| **Provincial data** | | 3 | 3 | 3 | | 2 | | | 2 | | | 1 | **14** |
| **International dataset** | 3 | | | 2 | | 3 | | | | 2 | | | **10** |
| **Cross feeding within PHSA** | | | 2 | 1 | | | 1 | | | | | 1 | **5** |
| **Other** | | 1 | 3 | | | | | | | | 1 | | **5** |
| **Grand Total** | **6** | **5** | **8** | **8** | **2** | **7** | **2** | **2** | **4** | **3** | **1** | **2** | **50** |

Names of the external datasets include:

Provincial:
Chronic Disease Registry Initiative
CanROC
First Nations Health Authority
Ministry of Health, Health Ideas, HDP
Data Innovation Program
Population Data BC
BC COVID Biobank Network (BCCBN)
The Centre for Health Evaluation and Outcome Sciences (CHÉOS)
BC Cardiac Registry, BCCDC

Pan Canadian:
Canadian Cancer Registry – Statistics Canada
Canadian Joint Replacement Registry
Canadian Organ Replacement Registry (CORR)
Canadian Ovarian Experimental Unified Resource (COEUR) – Terry Fox Research Institute
Canadian Tissue Repository Network (CTRNet)
Covid-19 Immunity Task Force (CITF)
HOPE Research Centre at Sunnybrook Health Sciences Centre
Pan-Canadian Early Detection of Lung Cancer Study
Public Health Agency of Canada (Canadian Breast Cancer Screening Database)
PRecision Oncology For Young people (PROFYLE)
The Canadian Donation and Transplantation Research Program (CDTRP)

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

## 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 57. Access requests are summarized in Figure 58. For examples of the types of research questions posed by researchers, please see Table 6 in the PHSA Research and Student Education Metrics Consolidated Summary Report.

FIGURE 57 Ranking of Predominant Nature of Research Questions Using Data from the Registries/Datasets

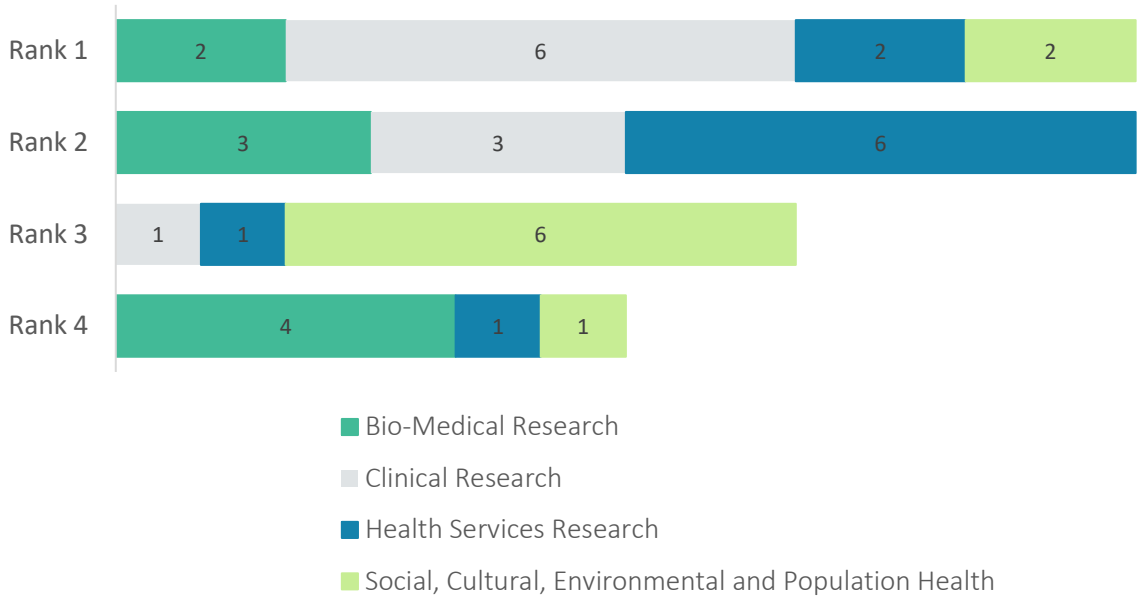
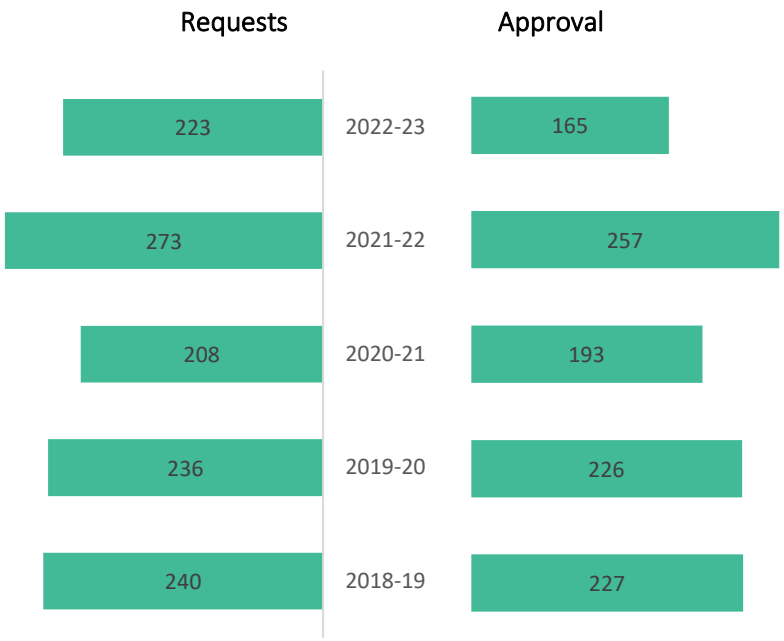



FIGURE 58 Research Access Requests and Approvals from Registry/Dataset by Fiscal Year



# APPENDIX 1 - GLOSSARY

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

| TERM | DESCRIPTION *[DATA SOURCE]* |
|---|---|
| | *[RISe annual file provided by UBC Office of Research Services]* |
| **Metric 2e –** Research Support Fund Program 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 program.<br><br>*[RISe annual file provided by UBC Office of Research Services]* |
| **Metric 3a -** # of intellectual property disclosures, patents by program/research entity | Total number of Invention Disclosure (internal documents), provisional patent and PCT applications by fiscal year.<br><br>*[BCTDO (for BC Cancer) and UILO (all other programs) complete the excel data collection form]* |
| **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.<br><br>IP related revenue shall follow the UILO (University-Industry Liaison Office) definitions from FY 2010-11 forward.<br>**Definitions:**<br>**Gross licensing revenue** = Royalties + Equity Liquidated + Option Fees + License Fees + License Management + Technology Assignment.<br>Royalties - royalty payments including minimum annual royalty payments<br>License Fees – upfront payments, milestone payments and other payments associated with the license<br>License Management - legal fees incurred by TDO (Technology Development Office) or UILO relating to the licensed IP and reimbursed by licensees<br>**Total TDO Expenses for patenting and legal costs**<br>**Expenses for Licensed IP** – patenting, legal and related costs associated with licensed IP<br>**Realized revenue per distribution agreements** – revenue accrued to PHSA program after distribution to inventors, obligations due to affiliated academic institutions, granting agencies and inventor departments.<br><br>The revenue distribution varies by entity and will be noted in the narrative.<br>**Royalty, equity liquidated and licensee fees**<br>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.<br>**Option Fees**<br>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. |

| TERM | DESCRIPTION *[DATA SOURCE]* |
|---|---|
| | <u>Technology Assignment</u><br>This relates to the scenario when a company wishes to take ownership of the technology and in return pays an Assignment fee.<br><br>*[BCTDO (for BC Cancer) and UILO (all other programs) complete the excel data collection form]* |
| **Metric 4a –** Clinical Trials<br>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. |
| 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)<br>(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. |

| TERM | DESCRIPTION *[DATA SOURCE]* |
|---|---|
| Clinical Trials (4a)<br>(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).<br><br>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.<br><br>Characteristics:<br>• Sponsor supports research activities of an individual researcher or group of researchers. Sponsor does not restrict use of funds<br>• Funds are paid in advance<br>• No invoicing or financial statements are required by Sponsor<br>• University/Host Institution retains all rights to inventions and other intellectual property<br>• University/Host Institution is free to publish results<br>• University/Host Institution provides the Sponsor with a final report only<br>• Parties to the Agreement: University/Host Institution and Sponsor (may include University/Host Institution Affiliated Hospitals) |
| Other Funding Type – Service Contracts<br>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<br>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.<br><br>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. |
| Other Funding Type<br>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:<br><br>**Non-Profit** – funding provided mostly by private donations and endowments.<br>**Industry** – funding provided by a for-profit business in the private or commercial sectors of business.<br>**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] |

| TERM | DESCRIPTION *[DATA SOURCE]* |
|---|---|
| Funding Sources/Granting Program | The rows on worksheet 1ab, 2b that correspond to the funding sources agreed to by the Research Metrics Working Group on July 22, 2009 and modified in subsequent fiscal years. |
| CIHR and its institutes<br>(included in Major Canadian Funding Category) | The Canadian Institutes of Health Research and its thirteen subsidiary institutes:<br>* Aboriginal Peoples' Health<br>* Aging<br>* Cancer Research<br>* Circulatory and Respiratory Health<br>* Gender and Health<br>* Genetics<br>* Health Services and Policy Research<br>* Human Development, Child and Youth Health<br>* Infection and Immunity<br>* Musculoskeletal Health and Arthritis<br>* Neurosciences, Mental Health and Addiction<br>* Nutrition, Metabolism and Diabetes<br>* 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<br>(included in Major Canadian Funding Category) | Natural Sciences and Engineering Research Council |
| SSHRC<br>(included in Major Canadian Funding Category) | Social Sciences and Humanities Research Council |
| Genome Canada and provincial Genome agencies<br>(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<br>(included in Major Canadian Funding Category) | Michael Smith Foundation for Health Research (BC) |
| Canadian Industry | Canadian-based for-profit corporations. Decisions on whether a funding source is Canadian or Foreign are driven by award payment or contract address. |
| Canadian Foundations & Non-Profits<br>(name modified in FY 12-13 to align with UBC categories – all historical data was recoded) | Canadian not for profit organizations including foundations and charities. These include grants that are “internally” sourced (i.e., that are from BCCHR, BCCRI or their affiliated Foundations such as BCWF, BCCHF, and BCCF etc.) |
| Canadian Educational Institution | This was added in FY 09-10 as a separate Funding Source Category and includes all educational and/or academic institutions in Canada. Foreign Educational Institutions are categorized under Foreign Other Source. |
| Canadian Government | Provincial, municipal, territorial, or federal governments and crown corporations in Canada |
| Foreign Industry | For-profit corporations outside Canada. Decisions on whether a funding source is Canadian or Foreign are driven by award payment or contract address. |

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

| TERM | DESCRIPTION *[DATA SOURCE]* |
|---|---|
| Total Head Count | Total number of research trainees of that type, not an FTE (Full Time Equivalent number). |
| **LIST OF RESEARCHER NAME (COLUMNS AND ROW)** | |
| Category<br>(modified to add Shared Membership sub-category under BCCHR categories 1-3 in FY 2010-11)<br>Membership categories revised FY 16-17 | A number one through five (MUST have one selected).<br>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.<br><br>Category 5 will be for those research entities/programs who do not utilize the CFRI categories. If you utilize category 5, please indicate the definition that your research entity/program uses to define Researchers.<br><br>A shared membership sub-category available in CFRI Categories 1-3 was added in FY 2010-11. This new category allows individuals to formally declare their alignments (including percentage affiliation) with more than one organization. Category 4 was clarified to include only affiliate investigators that are not based on site but who collaborate with program members. Their primary affiliation will be with another academic and/or research institution.<br>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 Program<br>Added in FY 11-12 | An indication by number (1 or .5) of whether a researcher is attributable to applicable program 100% (full) or 50% (shared). |
| UBC's definition of Research<br>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) |