PHSA Research Metrics

6th Annual Report

Fiscal Year 2013-14

Prepared For: PHSA Research Committee
Prepared by: Ellen Chesney, Chief Administrative Officer - Research
PHSA Research Metrics Working Group
PHSA Performance Measurement & Reporting

Acknowledgement

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

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

PHSA Research Metrics Fiscal Year Summary – PHSA Overall

Indicator		Key Measure Description	FY 2011-12 Value	FY 2012-13 Value	FY 2013-14 Value
Producing & Advancing Knowledge	1a	**Total Annual Grant Awards by Type (excluding Major* CFI Infrastructure grants)**	**$126,361,562**	**$126,703,056**	**141,001,291**
		Salary Awards	13,139,360	12,652,088	10,887,936
		Infrastructure Awards – HR & Minor CFI	7,611,165	4,689,873	2,755,351
		Operating Grants	98,270,202	100,064,997	121,878,768
		Other	7,340,835	9,296,098	5,479,236
		Total Annual Grant Awards including Major CFI Infrastructure grants (see 2d below)	**128,218,285**	**128,100,775**	**142,381,426**
	1b	**Total Annual Grant Awards by RISe Sector (excluding Major* CFI infrastructure grants)**			
		Government	71,158,285	64,617,326	66,101,747
		Non-Profit	43,495,243	50,226,591	62,575,175
		Industry	11,708,033	11,859,140	12,324,370
	1c	Annual Grant Application Success Rate – CIHR March Competition – PHSA Overall/Nat'l Rate	16.7%/20.1%	27.3%/20.1%	31.3/20.1%
	1c	Annual Grant Application Success Rate – CIHR Sept Competition – PHSA Overall/Nat'l Rate	32.3%/22.1%	24.5%/20.8%	22.2%/19.0%
	1d	Total # of Publications with Agency Author			
		CFRI	620	631	694
		BCCA	352	429	826
		WHRI	196	324	300
		BCCDC	102	146	190
		BCMHARI	68	68	70
,.m Building Research Capacity	2a	Total # of Research Trainees	903	1,178	1,279
	2c	Total # of Researchers (excluding Category 4 – Affiliate Investigator Category)	638.5	650.5	696.5
		Category 4 – Affiliate Investigator	37	44.5	39
	2d	Infrastructure Investment – Major CFI Infrastructure Grants	$1,856,724	$1,397,719	$1,380,135
	2e	Indirect Costs Program Grants (Tri-Council only)	N/A	$3,445,518	$3,793,358
Achieving Economic Benefits & Innovation (BCCA, CFRI & BCCDC only)	3a	# of Invention disclosures	45	55	52
		# of Provisional Patent applications filed	26	21	22
		# of PCT applications filed	6	8	5
		# of Patents Filed/Issued	16/5	43/4	23/6
	3b	# Active License Agreements	114	132	146
		# of Spin-off Companies	10	10	10
		IP related revenue – Realized Revenue			
		BCCA	$70,334.84	$89,089.14	$93,506.53
		CFRI	$5,617.00	$71,896.00	$55,375.00
Advancing Health & Policy Benefits	4a	**Clinical Trials** (including Non-PHSA PIs utilizing PHSA facilities and resources)			
		# active trials at the end of the FY	465	499	529
		Cumulative Subject Enrollment at end of FY	29,155	30,069	32,511
	4b,c,d	**Registries as Research Resources**			
		# of Research Requests/Approvals	193/186	142/132	196/110

*see definition of Major CFI grants in Glossary – Appendix 4

Executive Summary

This is the sixth annual Research Metrics Report, based on the Framework for PHSA Research Metrics previously approved by the PHSA Research Committee (see Appendix 2, pg. 64). All previously reported qualitative and quantitative metrics have been updated to include data for FY 2013-14 in the Framework's four categories; **Producing & Advancing Knowledge**, **Building Research Capacity**, **Achieving Economic Benefits & Innovation**, and **Advancing Health & Policy Benefits**.

For a second year, UBC is reporting revenue related to the Indirect Costs Program (ICP), 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, SSHRC) and are paid to the research institutes based on a formal agreement. Due to the fact that research support is a shared expense between UBC and PHSA research agencies, PHSA has negotiated to receive 66% of the applicable UBC ICP grant. The total amount of the ICP grant for FY 13-14 for all PHSA agencies combined was $3,793,358. This amount is not reported as part of total research funding in this report but is included here as UBC reports this figure to align with the CAUBO (Canadian Association of University Business Officers) policies.

The results for each metric are provided in a one page snapshot utilizing combined information from each participating PHSA research entity. These include Child & Family Research Institute (CFRI), British Columbia Cancer Agency (BCCA), Women's Health Research Institute (WHRI), BC Mental Health & Addictions Research Institute (BCMHARI), British Columbia Centre for Disease Control/UBC Centre for Disease Control (BCCDC/UBC CDC) and, BC Emergency Health Services (BCEHS). Given its relatively low level of research activity attributable to PHSA investigators, BCEHS is not reported in a separate agency section. While there are a number of researchers associated with the BC Renal Agency, Cardiac Services BC, and BC Transplant, they conduct their research under the auspices of the academic affiliation they hold. As such, research activities are not attributed directly to these PHSA agencies and they are accordingly not captured in this report with the exception of information related to their associated data registries.

As seen on the PHSA Overall Summary Page, total annual grant awards, numbers of researchers, researcher trainees, and publications have all increased from FY 2012-13 levels. Total annual grant awards ($141,001,291), without Major CFI (Canada Foundation for Innovation) grants, increased by $14,298,235. This increase, in part, can be attributed to awards being collected on a budgeted versus a cash received basis. This change in data collection is the result of utilizing the UBC RISe data for all agencies across PHSA as the source for award data. In addition, a BC Cancer agency PI received two large grants totaling more than $8M. From FY 2008-09 until FY 2013-14, total annual grant awards have increased by 32% and total close to $780 million dollars. Major CFI Infrastructure grants are reported separately under research capacity, indicator 2d, and have shown a continued downward trend. These represent large-scale infrastructure grants that are not offered every year, and are multi-year in duration. Full grant amounts for Major CFI Infrastructure grants are recorded in the year budgets are established.

PHSA research entities continue to perform well in comparison with national peers. PHSA's success rates for both the March and September CIHR competitions have well surpassed the national averages. The total number of CIHR applications for the March and September operating competitions increased from 104 to 111, which resulted in an increase in approved applications over last FY (29 vs. 27). These competitions represent only a small portion of grant applications but are reported as a good measure that is consistent across agencies and can be compared to a national rate.

Again this fiscal year, the total number of publications is reported by agency and shows an increase in most instances. Peer reviewed represents the gold standard for scientific credibility and again this year, over 95% of publications are peer reviewed. The total number represents the agency total for publications where agency researchers were authors of the study. When researchers from more than one research entity/agency collaborate on one publication, it is counted once for each agency. Hence, an aggregate total PHSA number is not accurately available.

For a fifth year, reporting related to Indicator 3: Achieving Economic Benefits and Innovation captured numbers of intellectual property (IP) disclosures and patents at the BC Cancer Agency, CFRI and BCCDC. Data across PHSA agencies remained relatively stable. Further refinement in how IP revenue is reported included replacement of the Net Licensing revenue line item with specific expenses related to patent activity and licensed IP and more accurately reflects the process of expense recovery.

For Indicator 4: Advancing Health and Policy Benefits, a survey was issued asking respondents to identify any guideline, drug, diagnostic agent or device adopted or approved in FY 2013-14 as a result of research driven by PHSA researchers, or collaborative research in which PHSA researchers were key participants, as well as the benefits resulting from those initiatives. A key finding for each agency is now presented in summary form in the PHSA overall section, with detailed submissions included in the respective agency sections. While not intended to be an exhaustive listing, this year's submissions highlight some of the key products resulting from PHSA research that are improving outcomes and system sustainability.

In FY 2013-14, a redesigned survey was developed, with input from the registries, to more clearly describe (report) activities undertaken by the registries to participate in and support research activities. Information provided this year reveals how the registries contribute data to national, pan-Canadian and international datasets to support large scale research studies. The benefits of research undertaken from data in the registries have also been classified this year into two broad category types of patient and system benefits.

A major change in the way clinical trial information is collected was also implemented this year. Since the inception of reporting this data, PHSA has received a listing of active clinical trials from the respective PHSA research ethics boards (BCCA and C&W). These systems also collect enrollment data on both the initial ethics application and on subsequent post approval activity applications (renewals, study amendments, closures and acknowledgements). Instead of relying on self-reported numbers by individual PIs, additional fields containing enrollment figures (expected total subject enrollment & cumulative enrollment to date) were included. While data quality issues remain, this process provides the best opportunity to automate the process and improve on the completeness of the data going forward. In addition, we were able to capture clinical trial data from PIs who utilize PHSA facilities and resources but are not formally affiliated with a PHSA research institute and PHSA PIs who utilize a non-PHSA ethics board (UBC's Clinical Research Ethics Board and Behavioral Research Ethics Board). This has resulted in the restatement of clinical trial data for the past three fiscal years.

Although the data presented in this report provide trending and, in some instances, comparative information, efforts have been made to portray each reporting entity uniquely, to accurately reflect their very different and unique natures. Presented together, they portray the range and depth of research activity associated with PHSA. The unique natures of the research entities result in some variability in the availability and detail of some metrics.

To better understand the metrics reported, it is helpful to refer to the glossary and definitions document (see Appendix 4) that guided data collection.

The following report was prepared with the assistance of the Research Metrics working group comprising representatives of each of the PHSA research entities and PHSA Performance Measurement and Reporting (see Appendix 3). The individuals within this group worked extremely hard to develop consistent definitions and approaches to collecting data which has further strengthened the consistency and clarity of the collected metrics and their efforts are greatly appreciated. The ability to report on all metrics included in the PHSA's research metrics framework is an iterative process and metrics will continue to be refined further in future reports.

PHSA Aggregate Analysis

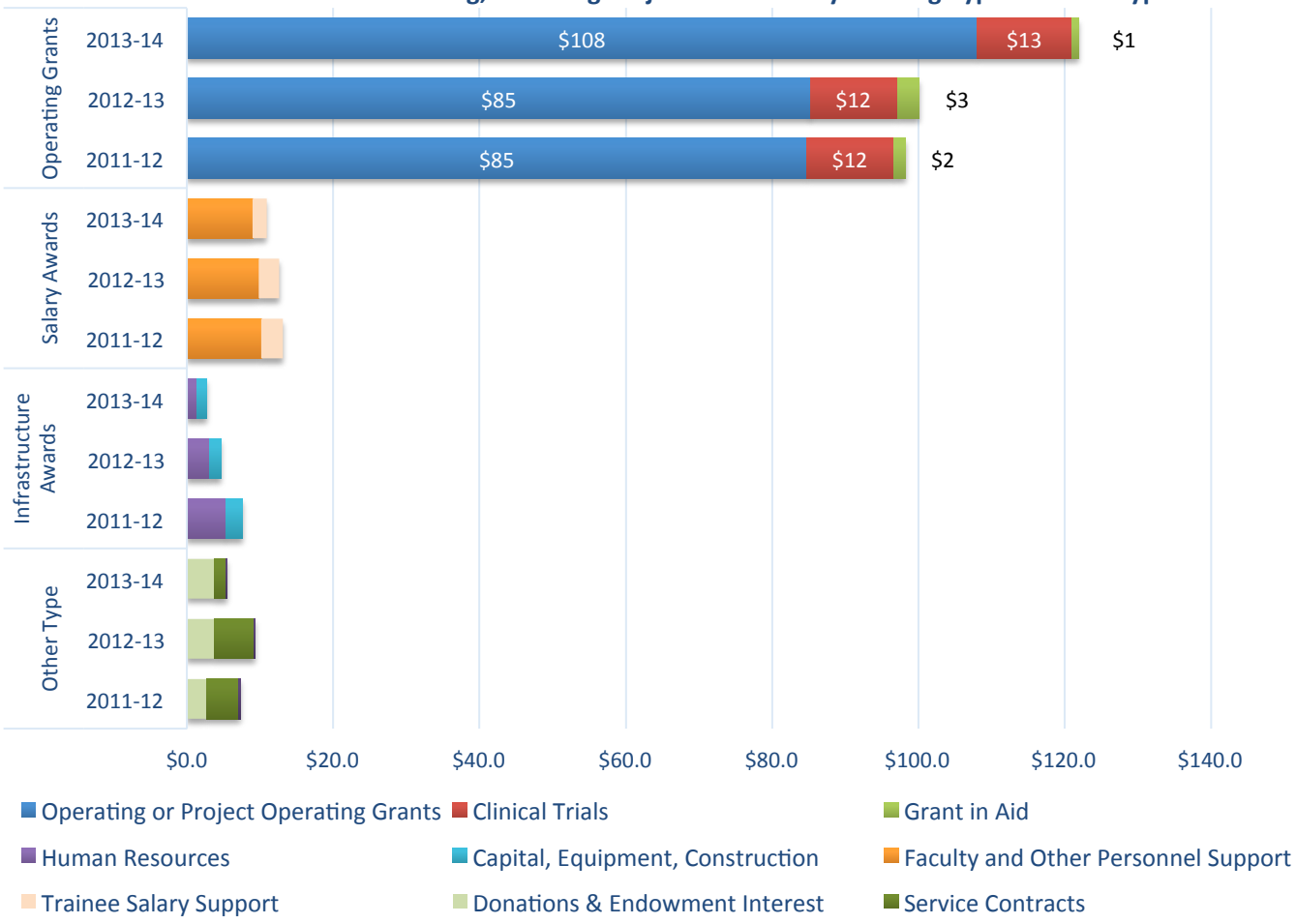
Producing and Advancing Knowledge

In FY 2013 -14, researchers affiliated with PHSA were awarded a total of $142,381,426 including major CFI infrastructure grants. Operating Grants ($121,878,768) continued to make up the largest portion (85.6%) of total funding received. This 7.5% increase in the portion of total awards over last year can mostly be attributed to awards being collected on a budgeted versus a cash received basis. This change in data collection is the result of utilizing the UBC RISe data for all agencies across PHSA as the source for award data. 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.

A breakdown of funding types and subtypes by fiscal year can be found in Figure 1. For FY 2013-14, the subtypes of Operating or Project Operating Grants, and Faculty and Other Personnel Support garnered the largest portion of research funding in their respective type categories. Clinical Trials funding, from FY 2011-12 – FY 2013-14 remained relatively stable. Infrastructure awards (HR and Capital, Equipment and Construction) has seen a steady decline over the past five years from a high of 29.2% of funding in FY 2009-10 to a low of 2.9% in FY 2013-14. Declines in this category have been in all three sub-types [HR, Capital, Equipment, Construction and Capital, Equipment, Construction – Major CFI) and reflect fewer competitions available in these areas.

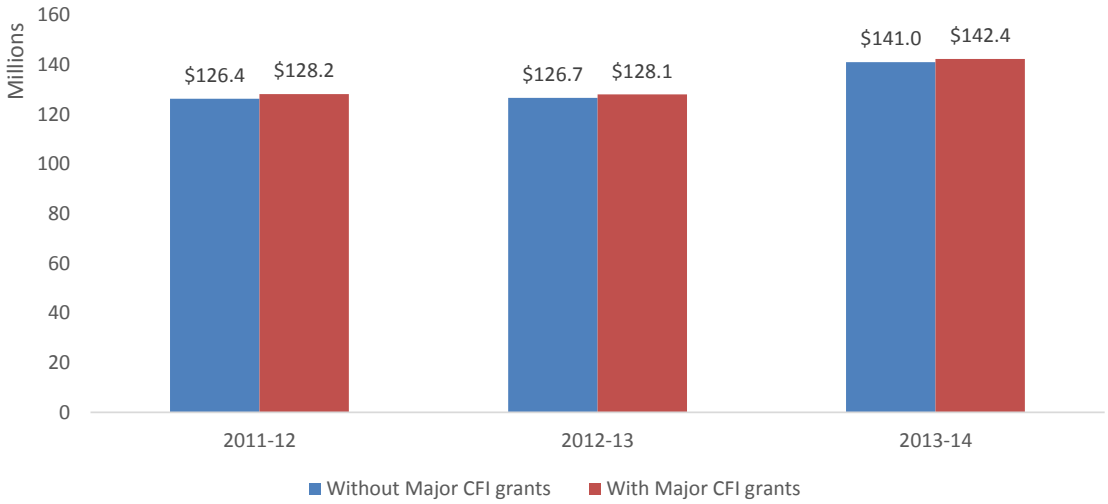
Figure 1

Total PHSA Research Funding, including Major CFI Grants by Funding Type and Sub-Type



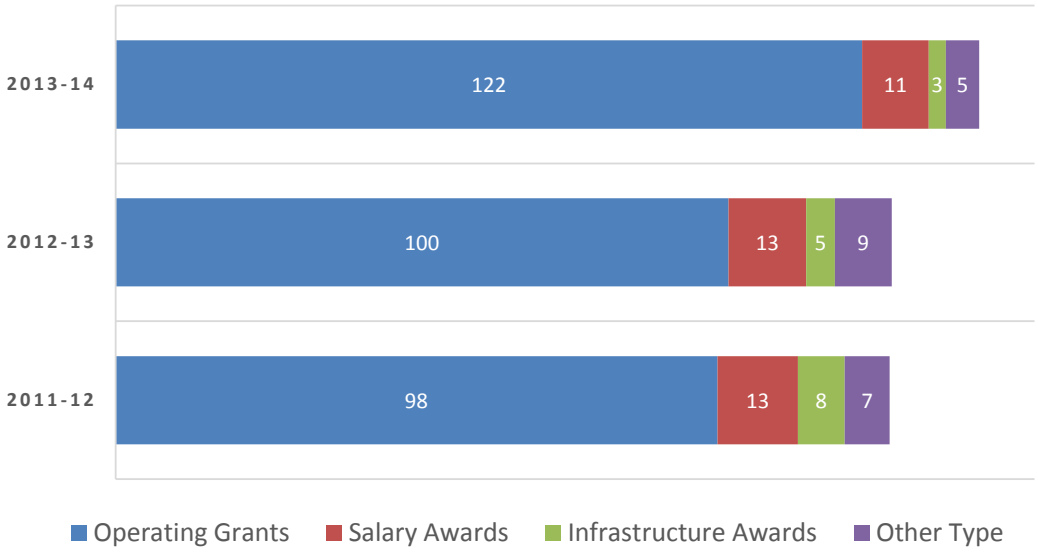
Total Funding, excluding major CFI infrastructure grants ($141,001,291), increased by $14,298,235. This increase, in part, can be attributed to changes in data collection resulting in amounts for operating grants being on a budgeted basis as opposed to cash received. The BC Cancer Foundation (BCCF) also modified their financial system which impacted how awards were recorded and managed. In the last year BCCF has supported BCCA with more targeted outcomes funding, translational and program research awards. Total infrastructure grants totaled $1,380,135, which is due to the fact that large-scale CFI infrastructure grants are not offered every year, are multi-year in duration, and full grant amounts are recorded in the year budgets are established. Indirect Costs Program grants total $3,793,358, up $347,840 over FY 12-13 and represents funding to support the indirect costs of research for tri-council awards, but is not included in total research funding or the figures below. Total PHSA Research Funding showing Major CFI award impact, year over year, is provided in Figure 2.

Figure 2
Total PHSA Research Funding With/Without Major CFI Grants



Additionally, Total Research Funding, without Major CFI grants, by Fiscal Year and Type is shown in Figure 3. This shows a relatively stable blend of Funding Types over the three-year period, noting that infrastructure awards have decreased, as they are not offered every year. The other type category includes donations and endowment interest and service contracts.

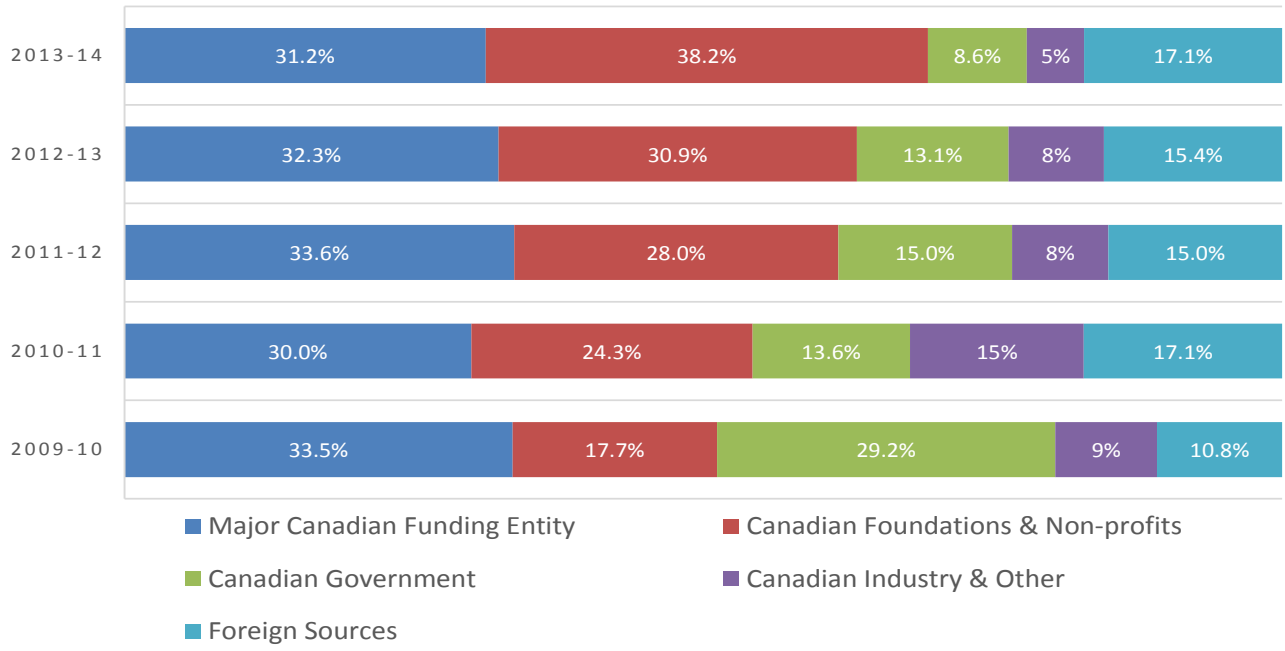
Figure 3
Total PHSA Research Funding without Major CFI Grants by Fiscal Year and Type



A comparison of funding source by source category over five (5) fiscal years can be found in Figure 4. 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. These data include Major CFI grants. Of note is the decline in Canadian Government funding (green) and the corresponding increase in Canadian Foundations & Non-profits (red). Major Canadian Funding entities include CIHR, NSERC, SSHRC, and Genome Canada & Agencies.

Figure 4

Percentage of PHSA Research Funding, including Major CFI grants by Funding Source Category by FY

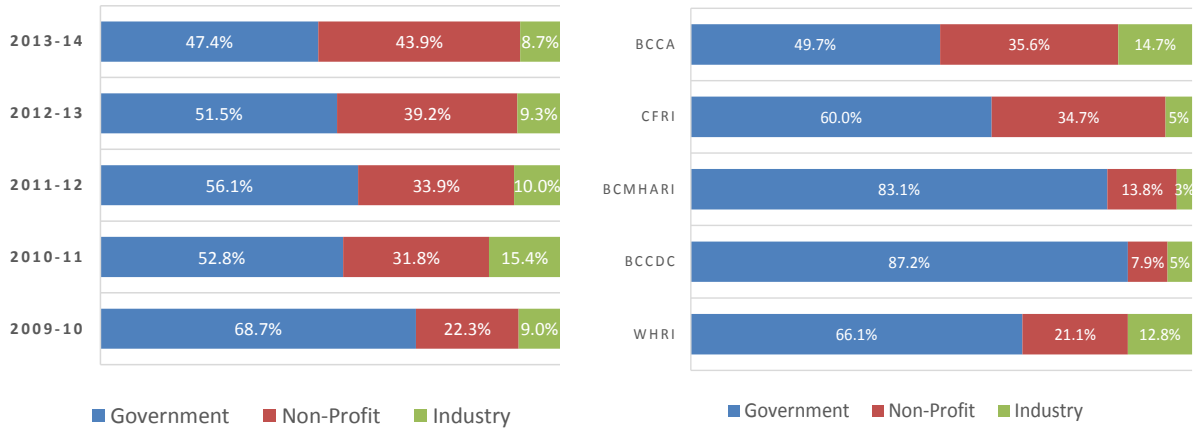


In addition to the above, Figure 5 shows the same award data by RISe sector (see glossary, pg. 69, for sector definition) both by fiscal year and by agency for five fiscal years. Of note on the FY chart, is the increase in funding from the non-profit sector from a low of 22.3% in FY 09-10 to a high of 43.9% in FY 13-14. Also of note is the corresponding decrease in government funding, the largest funding sector for all PHSA agencies, from a high of 68.7% in FY 09-10 to a low of 47.4% in FY 13-14. Industry funding has remained relatively consistent across fiscal years.

Figure 5

Percentage of PHSA Research Funding, including Major CFI grants by RISe Sector

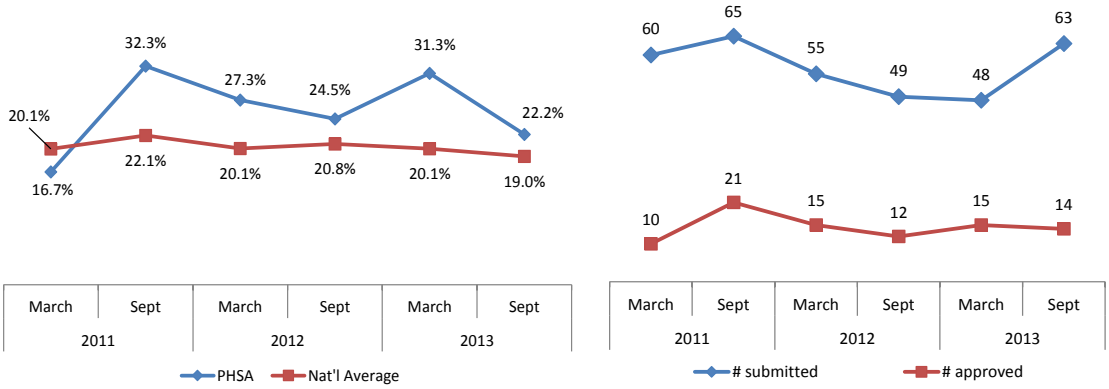
By Fiscal Year **By Agency**



Again this year, PHSA researchers have achieved positive success rates in the two most recent CIHR operating grant competitions (March and September of 2013). PHSA researchers' success rates were well above than the national average for both the March and September 2013 competitions. Figure 6 below shows the overall success rates based on revised competition results for the last three calendar years (which occur in instances when, after the initial funding announcement, one of the CIHR Institutes decides to support highly ranked applications that have just missed the cut-off by providing a bridging award) for research entities across the PHSA. National success rates are presented for comparison. Also shown is the total number of applications submitted and approved by PHSA agencies.

Figure 6

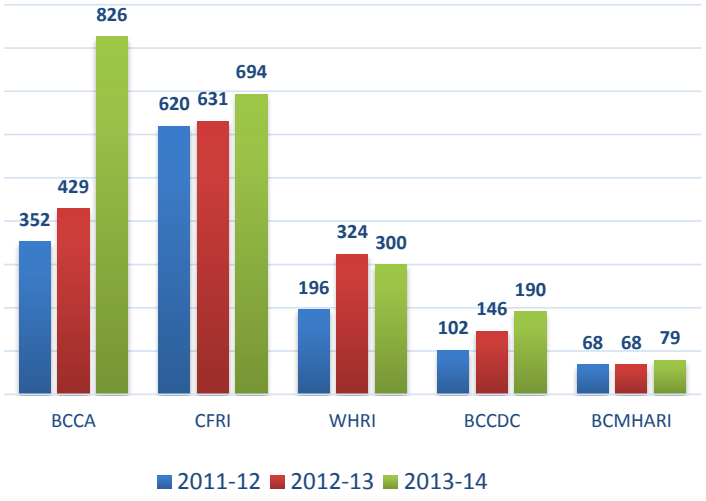
PHSA CIHR Application Success Rate and Number of Applications Submitted/Approved

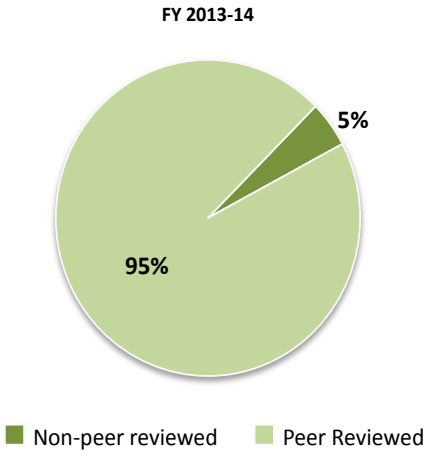


Total # of publications is presented for the last three fiscal years. Publications were collected by research entities for the applicable fiscal year and meet the following criteria: Books, book chapters, peer-reviewed publications inclusive of published journal articles, case reports, essays, literature reviews, e-journals, monographs and reports produced for government. See Figure 7 for a breakdown of total publications by agency and category of peer-reviewed vs. non-peer reviewed. Peer review represents the gold standard for scientific credibility. A breakdown by types is shown in the agency specific sections due to low sample size.

Figure 7

Total Number of Publications by Agency and Percentage Peer vs. Non-peer Reviewed



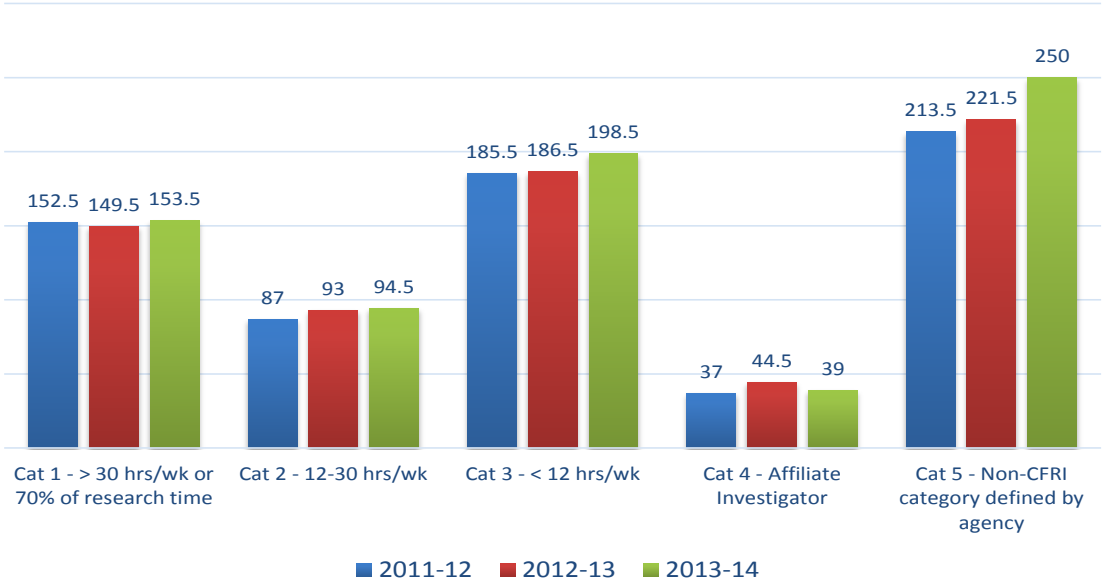


Building Research Capacity

PHSA research entities identified 696.5 researchers in categories 1 – 3 and 5 in FY 2013-14, up 46 from FY 2012-13 (see Figure 8). Category 4 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. Category 4 researchers totaled 39, down 5.5 from FY 2012-13. PHSA does not track category 4 members funding, publications or trainees. BCCA, BCMHARI and CFRI are able to report their researchers utilizing CFRI definitional categories, which highlight the amount of time protected for research purposes. BCCDC and WHRI define researchers utilizing a methodology that best reflects the type of work and relationships they have with their researchers. Further information on these methods can be found in specific agency sections. An attempt to count each researcher only once was made by attributing each researcher to the entity where the bulk of salary and/or support are received. Category 1 researchers are best positioned to compete for external grants.

Figure 8

Total Number of PHSA Researchers by Category and FY



During FY 2013-14, PHSA researchers provided training and supervision to a total of 1,279 research trainees, an increase of 101 from FY 2012-13. 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 9 and 10 for the number of trainees by type and fiscal year for PHSA overall.

Figure 9

Total Number of PHSA Trainees by Fiscal Year

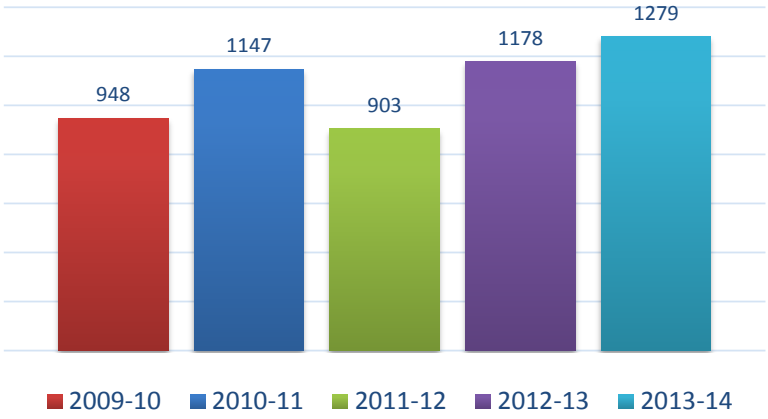
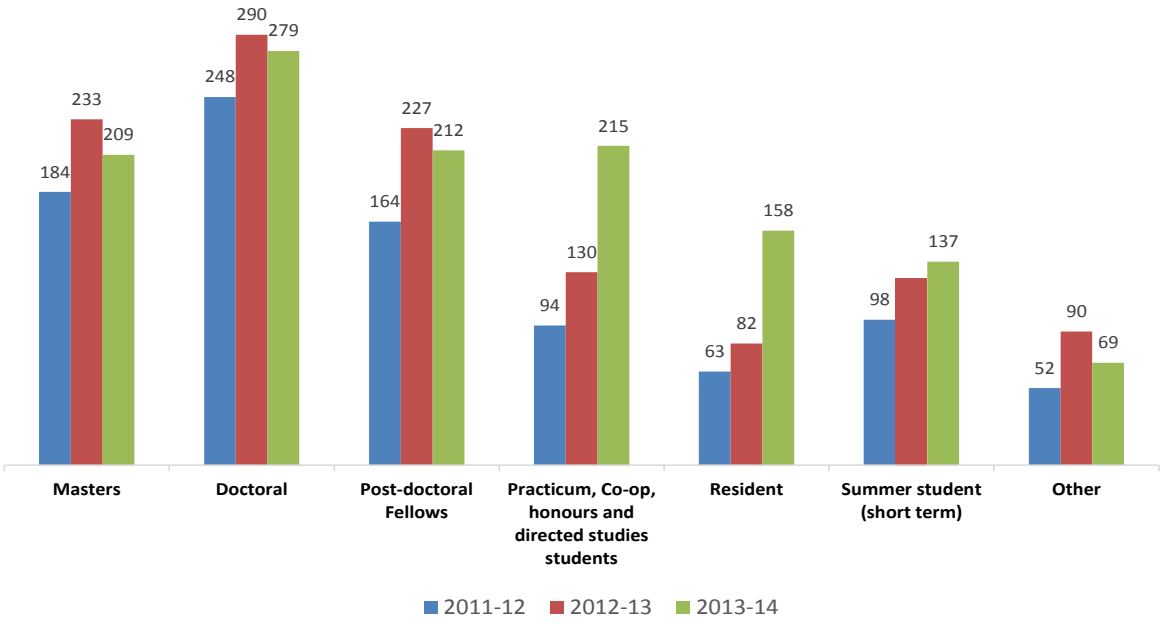


Figure 10
Total Number of PHSA Trainees by Type by Fiscal Year

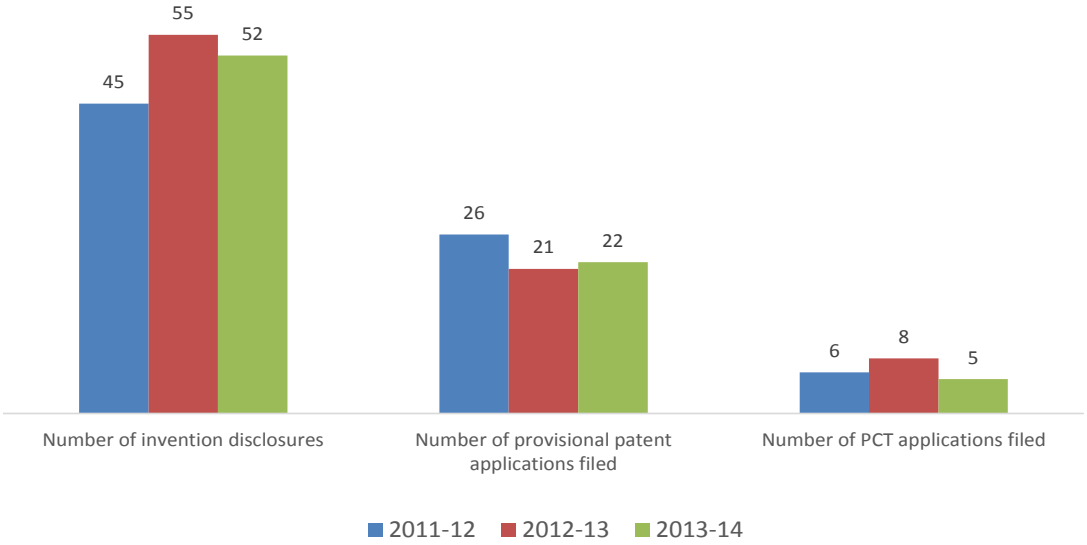


Achieving Economic Benefits and Innovation

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

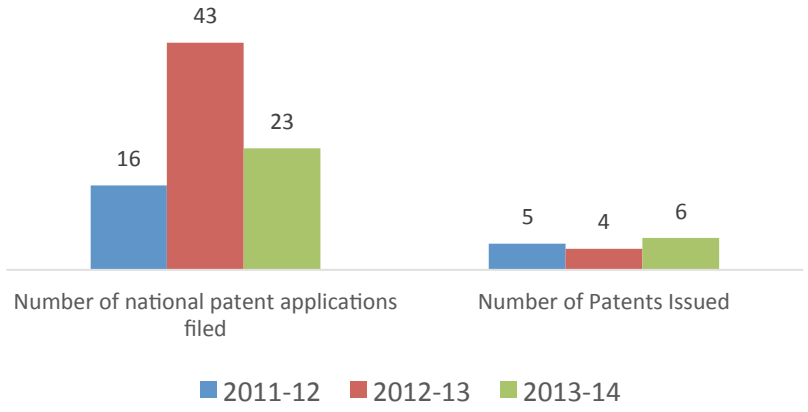
See Figure 11 for total number of invention disclosure, provisional patent and PCT applications filed by fiscal year. Invention disclosures are primarily internal BCCA documents, filed with TDO to inform the decision of whether or not to proceed with the patent process. The next stage in the patent process is to file provisional patent applications followed by patent cooperative treaties, or PCTs, which act as gateway world-wide patents, each step involving greater specificity.

Figure 11
Total # of Invention Disclosures, Provisional Patent and PCT Applications Filed by Fiscal Year



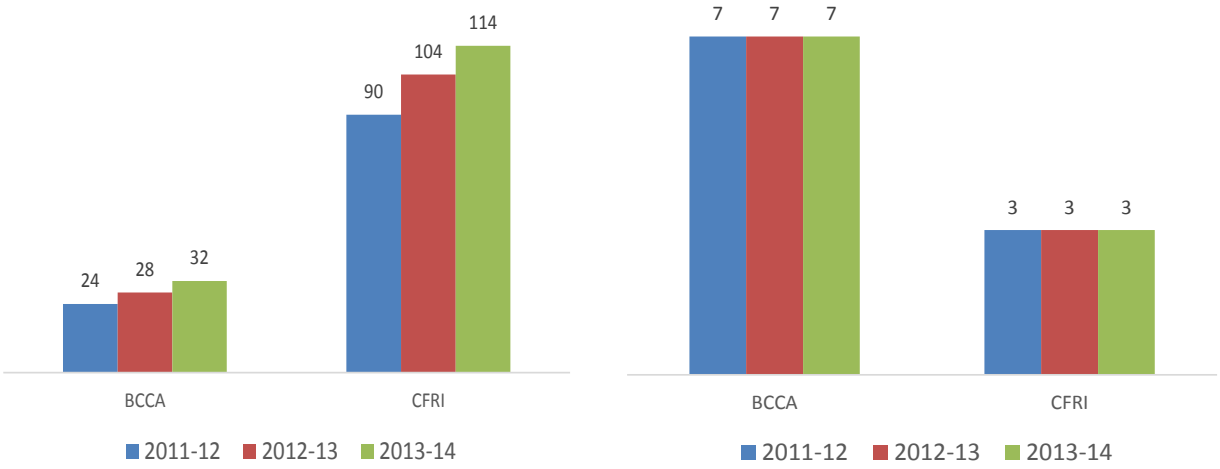
Patents are reported in Figure 12 below. Applications filed in a given year represent different applications than those which are approved in that same year (which typically are the result of applications in previous years).

Figure 12
Total # of National Provisional Patent Applications Filed by Fiscal Year



Licensing agreements have increased and the number of spin-off companies was unchanged for FY 2013-14, although there was one new spin-off and one that became inactive (see Figure 13). Both License Agreements and Spin-off companies can expire during the fiscal year.

Figure 13
License/Assignment Agreements (left) and Spin-Off Companies (right) by Fiscal Year



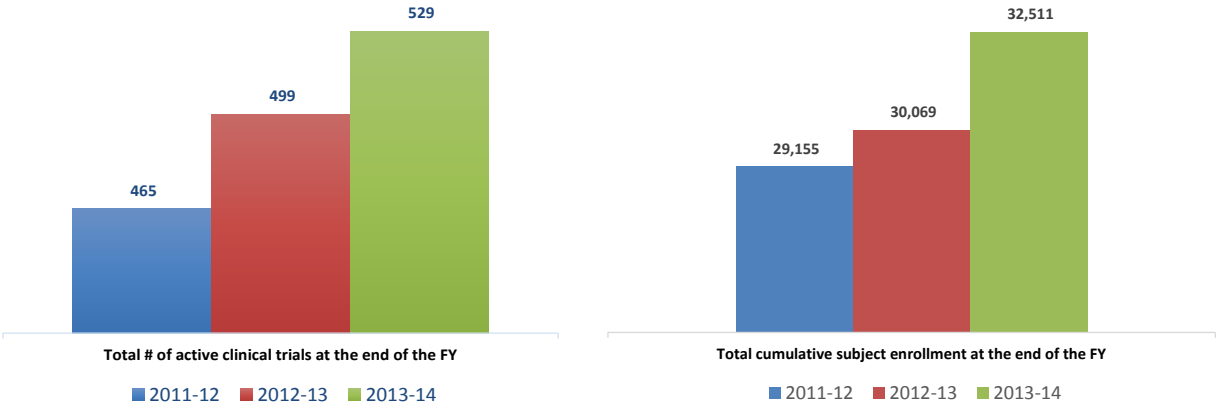
Advancing Health and Policy Benefits

To measure advancement of health and policy benefits, PHSA is providing clinical trial data for three fiscal years. Efforts continued this year to refine the data collection process to provide the most accurate and complete data. In addition to receiving the list of clinical trials for PIs associated with PHSA from the BCCA and C&W research ethics boards (REB), this year additional fields containing enrollment figures (expected total subject enrollment & cumulative enrollment to date) reported as part of the annual renewal process are included instead of relying on self-reported numbers by individual PIs. While data quality issues remain, this process provides the best opportunity to automate the process and improve on the completeness of the data going forward. In addition, we were able to capture clinical trial data from PIs who utilize PHSA facilities and resources but are not formally affiliated with a PHSA research institute and PHSA PIs who utilize a non-PHSA

ethics board. These changes have resulted in the restatement of data for the past three fiscal years and the removal of enrollment activity during the FY data as this is not captured as part of post approval ethics board activities.

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

Figure 14
Total # of Clinical Trials and Total Cumulative Subject Enrollment by Fiscal Year



Advancing Health and Policy Benefits

Achievements in advancing health and policy benefits were collected, for a fifth year, through a survey issued to all reporting entities. The survey asked respondents to identify guidelines, drugs, diagnostic agents or devices adopted or approved in FY 2013-14 as a result of research driven by PHSA researchers or collaborative research in which PHSA researchers were key participants. The survey was not intended to be exhaustive, but to capture the significant, top of mind advancements, and, further, asked respondents to identify the benefits to patients, population health, and/or health system sustainability of those advancements. A key achievement for each agency is reported below in Table 1 with full details provided in each agency/reporting entity section and document important achievements in translational research.

Table 1

Guideline, drug, diagnostic agent, or device adopted or approved in 2013-14 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
A BCCA interdisciplinary team research study resulted in a new breath tracking system which, when employed, allows a deep inspiration breath hold maneuver that minimizes radiation doses to the heart during left sided breast cancer radiotherapy treatment.	The newly developed breath tracking system will reduce cardiac toxicity from left sided breast cancer treatment.
BMHARI investigator led the launch of the Drug Cocktails website (www.drugcocktails.ca) as a resource for youth to "get the facts" about the effects and risks of mixing medications consumed with substances like cigarettes, marijuana, alcohol and street drugs.	The Drug Cocktails website will be an important new resource for youth and staff within Children's & Women's Health Centre of BC for PHSA and its agencies, by providing best practice knowledge on the effects of mixing medications with other consumed substances. Uptake of this information can assist young people in avoiding risk of harm.
At BCCDC a randomized clinical trial assessing the immunogenicity of 2 doses of HPV vaccine in younger adolescent's versus 3 doses in young women was conducted.	The trial resulted in changes to the World Health Organization (WHO) guidelines and the European Medicine Association guidelines. Over 10 jurisdictions globally are moving to 2 doses of the HPV vaccine as well. A reduction in doses makes the vaccine cheaper, easier to use, and could increase the number of adolescents that receive the vaccine in countries where finance is a consideration.
Research developed and supported by CFRI/WHRI has resulted in the dissemination of knowledge translation materials on www.optimalbc.ca, a website that informs and educates women and maternity care providers on normal childbirth.	The website aims to improve patient outcomes due to facilitation of evidence-based care and informed choice around vaginal birth after Caesarian section, with downstream impact of decreasing rates of Caesarian section in BC.
Launched in April 2013, the Concussion Awareness Training Toolkit (CATT) hosts a free, 40-minute online course about concussion, targeted to physicians and nurses. It includes the SCAT3, a concussion assessment tool designed to be used on the playing field or in a clinical setting; links to clinical information and journal articles; case studies and videos; and printable patient handouts. [CFRI]	The Concussion Awareness Training Toolkit provides information for health care providers based on the latest, verified standards of care. The aim is to standardize concussion care across BC and Canada. In its first five weeks online, the site received 1,500 hits.

BC Cancer Agency (BCCA)

Producing and Advancing Knowledge

In FY 2013-14, researchers affiliated with BCCA were awarded a total of $79,039,423 in research funding. The amount awarded as Operating Grants ($76,748,556) makes up 97.1% of total funding received. A breakdown of funding types and subtypes, including major CFI grants, can be found in Figures 15 and by funding source category in Figure 16.

The large increase in operating grant amounts is due, in part, from changes in the financial system of the BC Cancer Foundation. Awards are now managed by directly accounting for the dollars allocated based on the total amount awarded for the time period as opposed to charging these amounts directly to the Foundation as in previous years. In addition, a BCCA researcher received two large awards; a $10M grant ($5M in year 1 of 3) from BC Cancer Foundation to study the *Utilization of genomic information to augment chemotherapy decision-making for people with incurable malignancies (Personalized OncoGenomics*). This project is connected to the Personalized Genomics program that is being developed in BCCA- Vancouver Clinic Campus; and a $3M National Institutes of Health (NIH) grant to study *Molecular characterization and validation for pediatric cancers*

BCCA's portion of the Indirect Costs Program grant for FY 2013-14 is $1,347,407, but is not included in total research funding or the figures below.

Figure 15

Total BCCA Research Funding including Major CFI grants by Funding Type and Sub-type

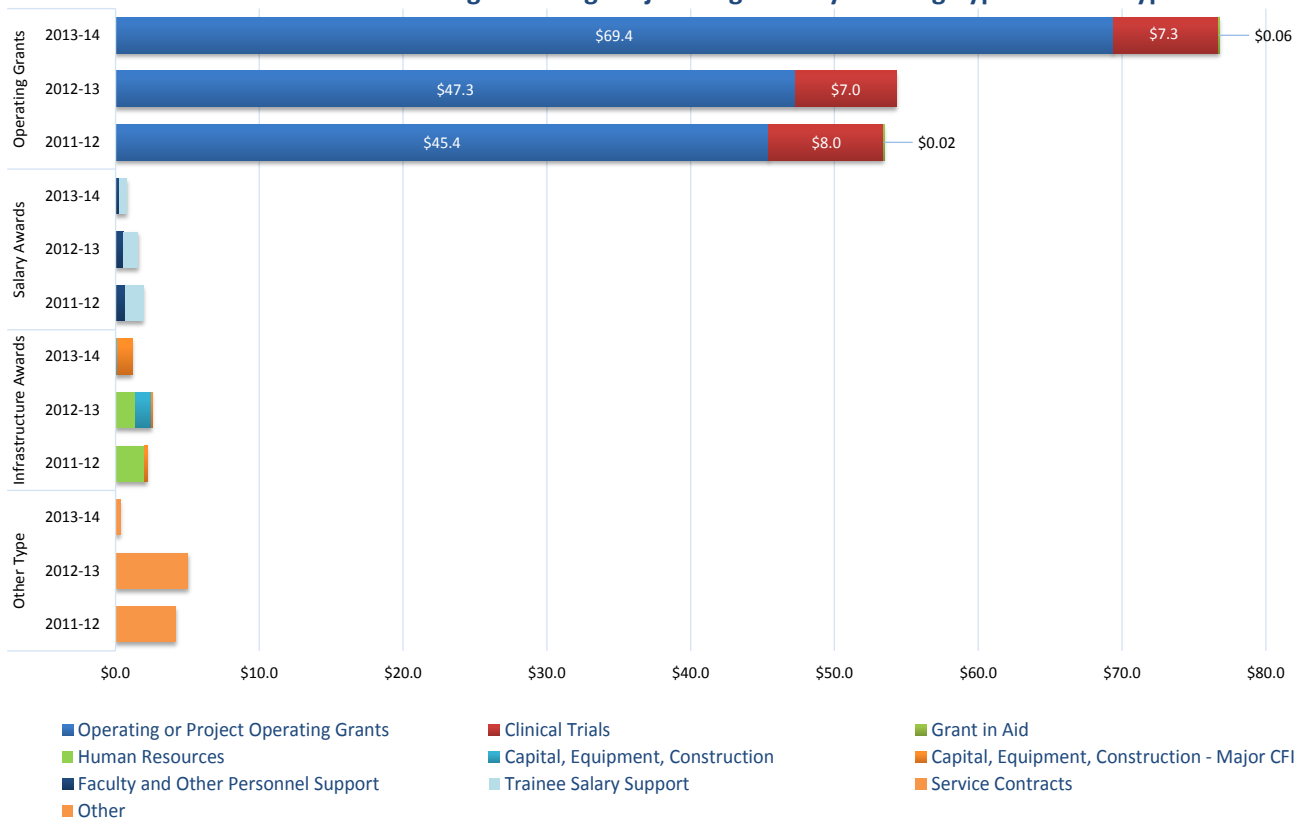
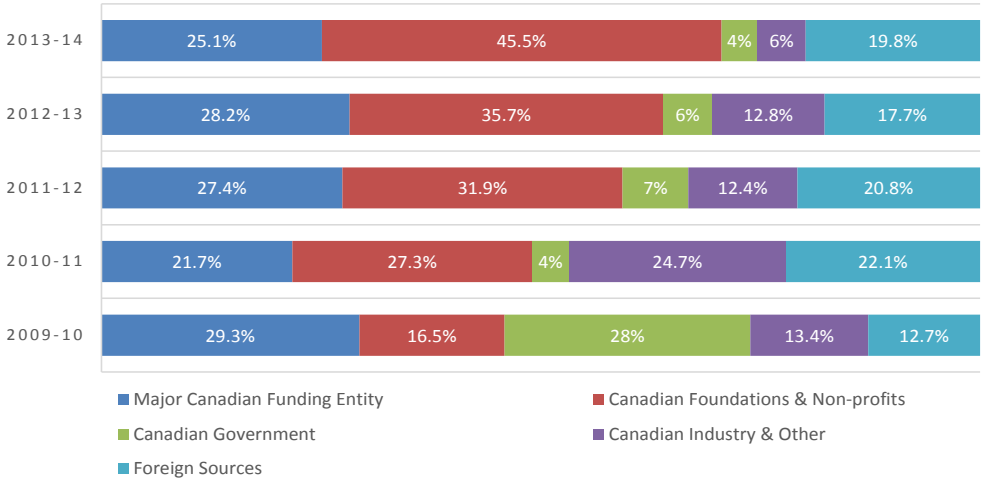
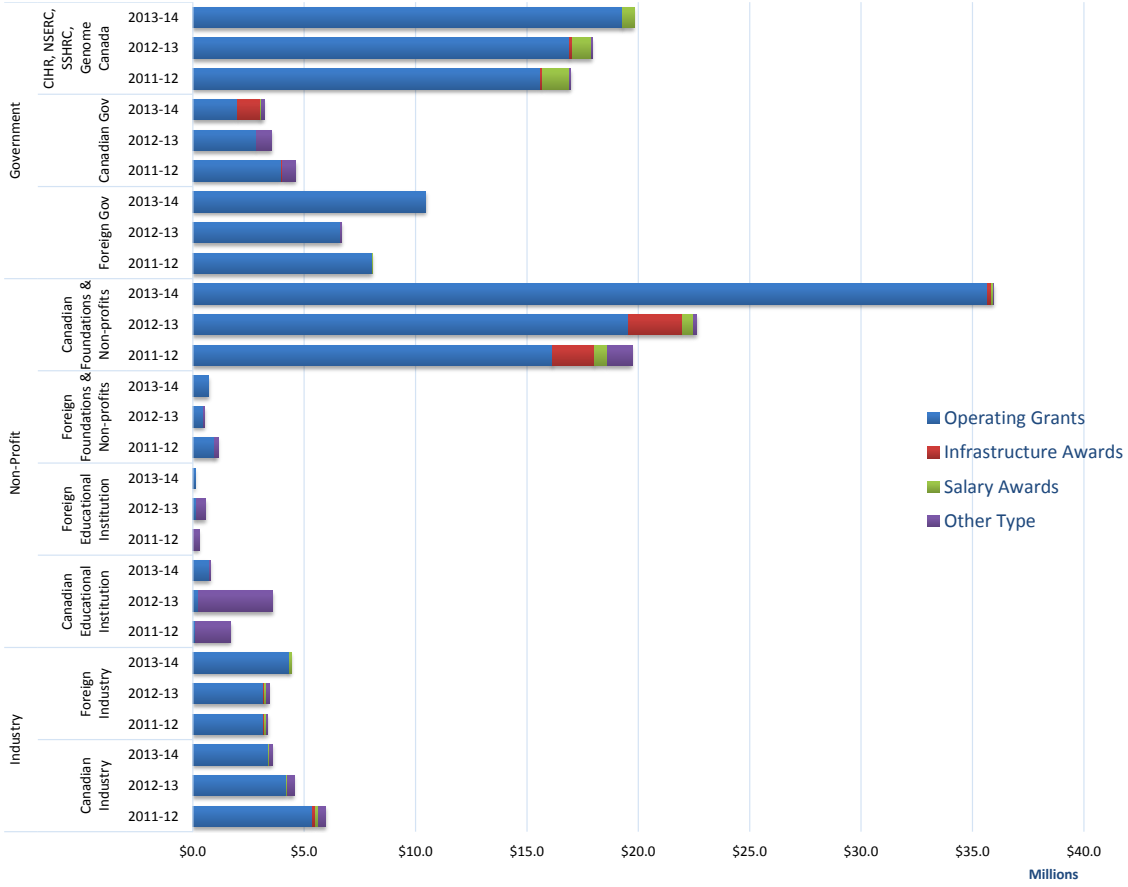


Figure 16
Percentage of BCCA Research Funding, including Major CFI grants by Funding Source Category by FY



As in the PHSA overall section, BCCA's Total Award Funding is shown by RISe sector, Funding Source Category and Funding Type. As in all previous years, the top funding sources continue to be Canadian Foundations & Non-profits and the Major Canadian Funding Sources (CIHR, NSERC, SSHRC and Genome Canada). Of note is the steady decrease in both Canadian Government and Canadian Industry funding types over the three-year period. Figure 17 details the major funding categories by funding type.

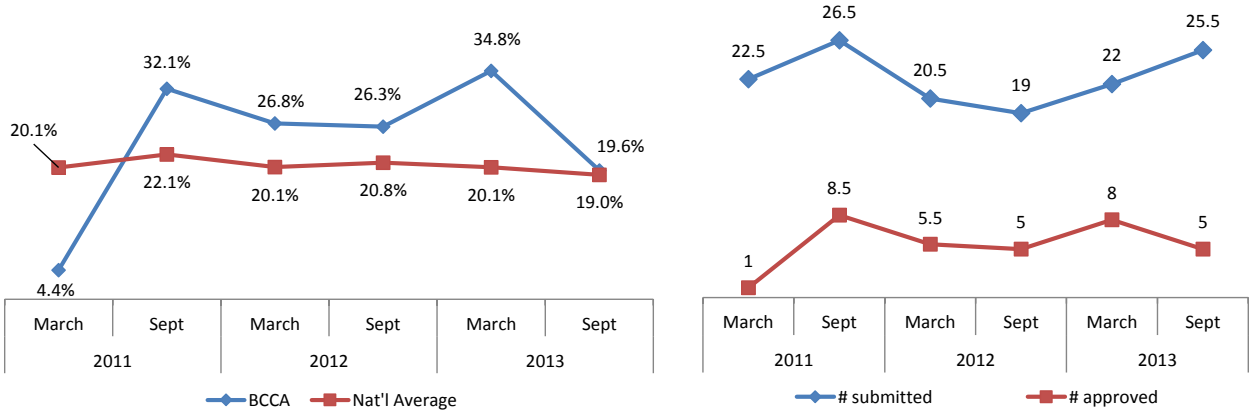
Figure 17
BCCA Research Funding, including Major CFI grants by RISe Sector and Funding Source Category by Type



BCCA has demonstrated success in recent CIHR operating grant competitions, exceeding the national average for both the March and September 2013 competitions. Figure 18 below shows CIHR grant application success rates for BCCA compared to the national average as well as number of applications submitted and approved.

Figure 18

BCCA's CIHR Operating Grant Application Success Rate & Number of Applications Submitted/Approved



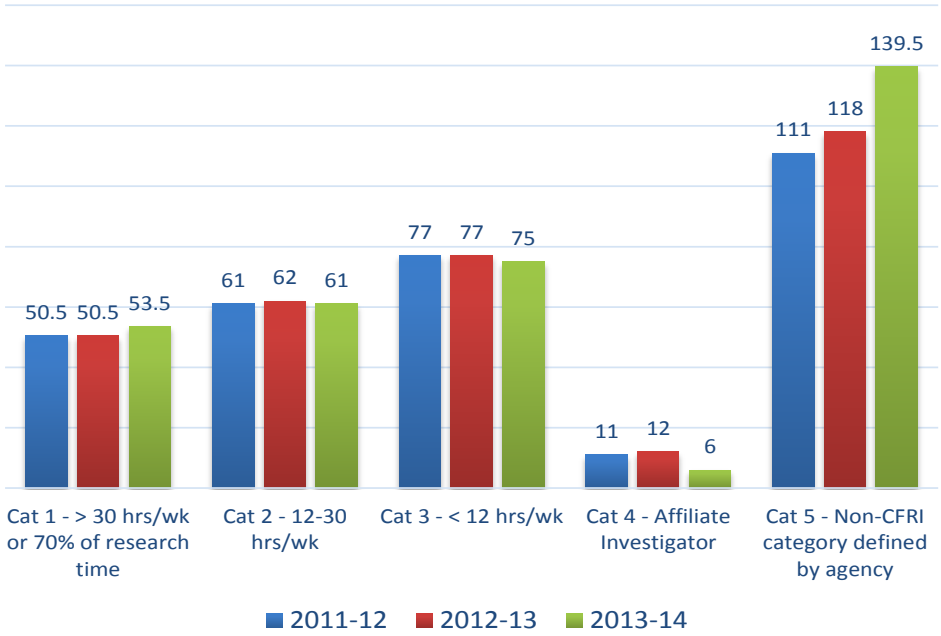
Total number of publications by type and category, is reported for a third year in FY 2013-14. BCCA reported a total of 826 published journal articles, all of which are peer reviewed. This year BCCA expanded its process to include the expertise of the UBC librarians and search engines available at the UBC Library. This enabled more varied parameters and a larger scope thus returning a larger # of publications.

Building Research Capacity

BCCA has a total of 329 researchers in FY 2013-14 in categories 1-3 and category 5, and 6 in category 4. While adoption of the CFRI category classifications is in place, a significant amount (139.5) of the total researchers are in Category 5, which is an agency specific category used to describe researchers that do not meet CFRI category classifications. For BCCA, the majority of Category 5 researchers are Medical or Radiation Oncologists, Program or Practice Leaders, Research Scientists and Nurses. As in past year's reports, researchers whose funding is officially split 50/50 between research entities are classified as 0.5. See Figure 19 for the number of researchers by category.

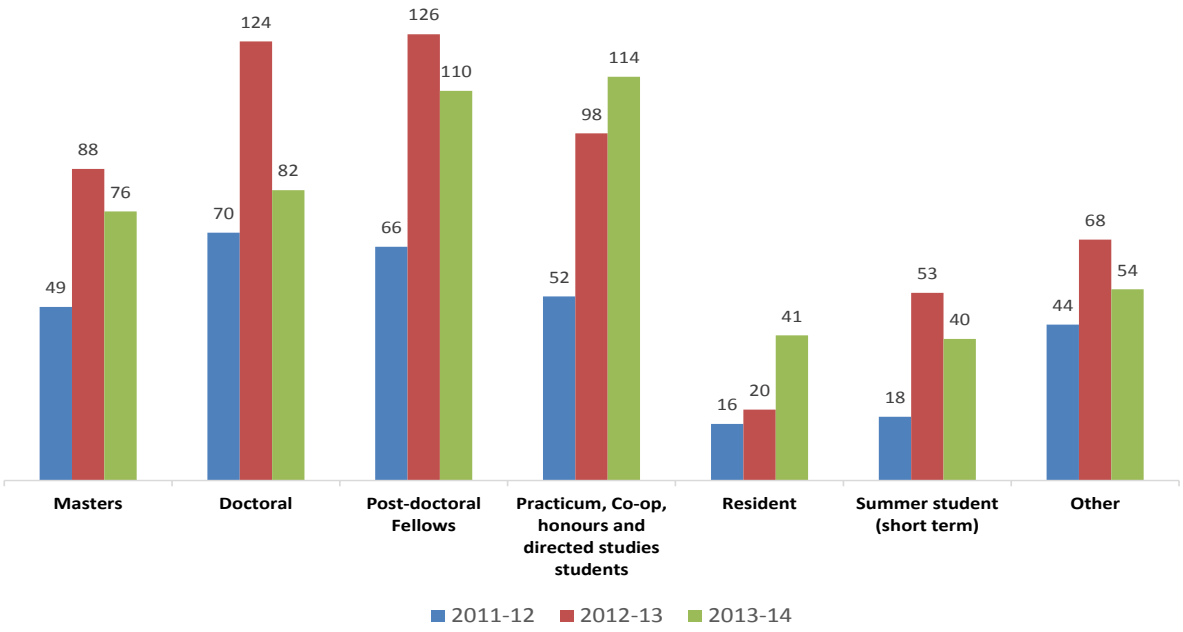
Figure 19

Total Number of BCCA Researchers by Category and Fiscal Year



During FY 2013-14, BCCA researchers provided training and supervision to a total of 517 trainees (down 60 from FY 2012-13). See Figure 20 for the number of trainees by type. Factors influencing the number of trainees include but are not limited to, operating grant success rates; whether trainees can obtain fellowships to secure their own funding, and how often trainee competitions are held and the envelope of funding.

Figure 20
Total Number of BCCA Trainees by Type and Fiscal Year

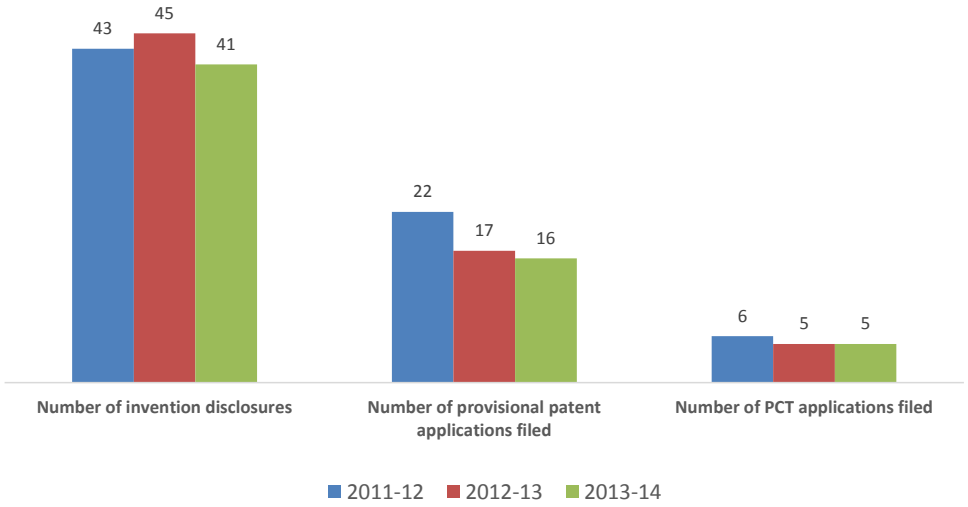


Achieving Economic Benefits and Innovation

BCCA Technology Development Office (TDO) Activities

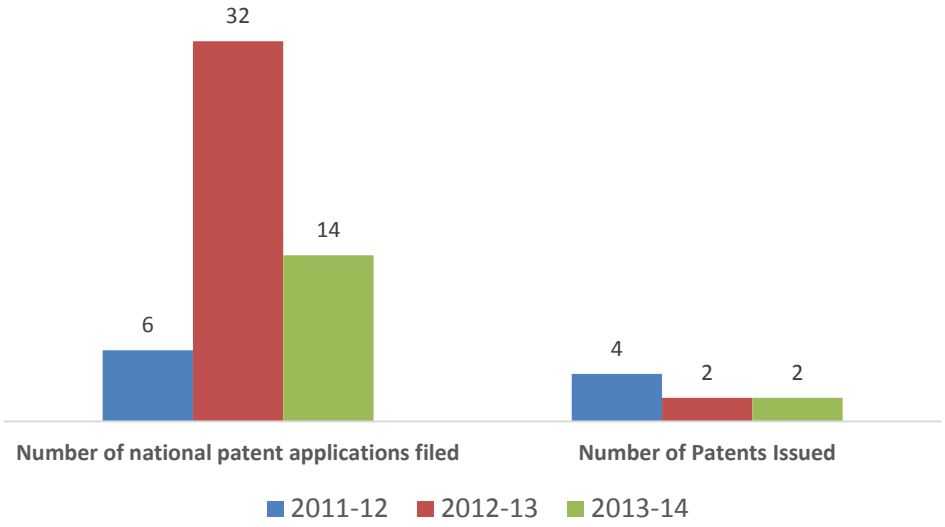
Patent Activity has remained relatively stable over the last three fiscal years. Invention disclosures are primarily internal BCCA documents, filed with TDO to inform the decision of whether or not to proceed with the patent process. The next stage in the patent process is to file provisional patent applications followed by patent cooperative treaties, or PCTs, which act as gateway world-wide patents. See Figure 21 for patent activity statistics.

Figure 21
BCCA TDO Invention Disclosures, Provisional Patent and PCT Applications by Fiscal Year



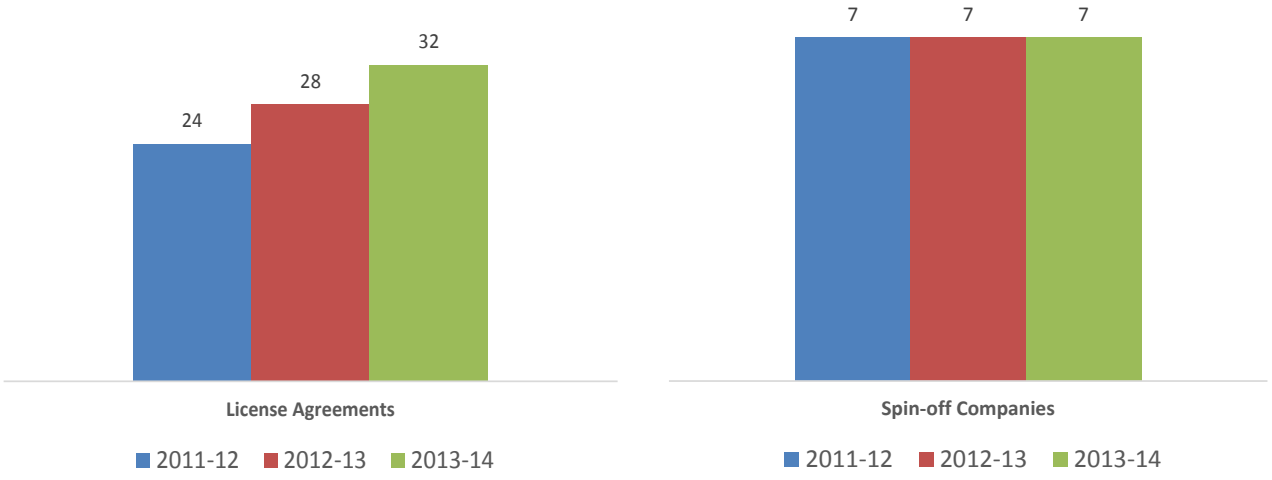
National patent applications are then filed with each step involving greater specificity. Patent applications filed in a given year represent different applications than those which are approved in that same year (which typically are the result of applications in previous years). The number of national patent applications filed last year included a number of new national phase applications relating to an earlier license for a skin cancer detection device (15 applications) and a new license for a HPV vaccine to a French company (15 applications). See Figure 22 for a breakdown by fiscal year.

Figure 22
BCCA TDO National Patent Activity by Fiscal Year



In FY 2013-14, there were 32 (up 4 from last year) active license agreements (see Figure 23). There were 8 new licenses and 4 terminations. There was one new spin-off company created; Fusion Genomics. Other active Spin-off companies include Aquinox Pharmaceuticals, Essa Pharmaceuticals, Repeat Diagnostics, and Verisante. Upstream Biosciences became inactive during FY 2013-14.

Figure 23
BCCA License Agreements (left) and Spin-Off Companies (right) by Fiscal Year



Further clarifications on the reporting of IP related revenue, in accordance with UBC (University Industry Liaison Office UILO) definitions (see Glossary – Appendix 4, page 67) were done in FY 2013-14. See Table 2 for a restatement of the past two fiscal years of IP related revenue. Expenses related to patenting, license IP and legal costs totaled $556,217.77 in FY 2013-14. Realized licensing revenue per the distribution agreements totals $93,506.53, up $4,417.39 over last FY. While distribution agreements vary, typically the inventor receives 50% of the net licensing revenue, with the remainder split between PHSA, BCCA departments, and UBC for those researchers with a UBC affiliation.

Table 2
TDO IP Related Revenue

IP Related Revenue	FY 2012-13	FY 2013-14
Royalties	343,954.18	387,894.13
Equity Liquidated	36,177.85	
License Fees	10,000.00	54,725.00
License Management	272,601.94	314,161.97
Option Fees	9,350.00	
Technology Assignment	56,100.00	
Gross Licensing Revenue (total)	**728,183.97**	**756,781.10**

Advancing Health and Policy Benefits

As described in the PHSA overall section, efforts continued this year to refine the data collection process to provide the most accurate and complete data. The process now entails capturing total subject enrollment and cumulative enrollment to date from the annual renewal applications at the UBC ethics boards (BCCA, C&W and CREB REBs). Previous years have utilized a manual process of requesting data from individual PIs and was subject to poor response. In addition, we were able to capture clinical trial data from PIs who utilize PHSA facilities and resources but are not formally affiliated with one of the PHSA research institutes and PHSA PIs who utilize a non-PHSA ethics board. These changes have resulted in the restatement of data for the past three fiscal years for all agencies and the removal of the enrollment within the FY data as it's not captured as part of REB post approval activities. Of note is that approximately 30% of BCCA trials had no enrollment figures. Once these fields are made mandatory as opposed to optional, as they now are, enrollment figures should increase.

Table 3
BCCA Clinical Trials

	11-12	12-13	13-14
Total Number of Clinical Trials active during the FY	272	300	321
Status of the Trial at the end of the FY:			
Total Number of Active Trials	151	212	274
Total Number of Trials that closed during the FY	121	88	47
Enrolment Numbers:			
Expected Local Subject Enrolment (for the term of the study)	36,022	35,899	36,653
Total Cumulative Subject enrolment at the end of the FY	24,439	25,515	27,299

Following are key guidelines, drugs, diagnostic agents or devices adopted or approved in FY 2013-14 as a result of research driven by BCCA researchers, and their corresponding benefits. These outcomes represent important achievements in translational research that are improving patient outcomes and system sustainability.

Table 4
BCCA Outcome Survey Responses

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
A lung nodule malignancy risk calculator for screening low-dose computed tomography was developed by the BC Cancer Agency Lung Health Study research team in collaboration with 7 other centers across Canada who participated in the Pan-Canadian Early Detection of Lung Cancer Study sponsored by the Terry Fox Research Institute, the Canadian Partnership Against Cancer, as well as local cancer foundations such as the BC Cancer Foundation.	The Lung Nodule Malignancy Risk Calculator provides an evidence based approach to decrease the frequency of repeat imaging studies or biopsy for management of lung nodules detected by CT scan.
On February 4, 2014, new breast screening guidelines were released that had been developed by a Screening Guidelines Committee, chaired by the leader of the Breast Tumour Group (BTG) and with multiple members of the BTG and other staff members from PHSA/BCCA. These guidelines change the interval for screening women in their 40s to every other year. It also introduced the concept of informed decision making to this process, encouraging women in the 40s and over age 74 to have discussions with their primary health care provider on the various harms and benefits of breast mammographic screening. The Screening Mammography Program (SMP) has also developed promotional and informational material to be provided to all women to educate them of both the harms and benefits of screening. In addition, an online decision aid was developed, with the help of BCCA researchers, which will help women and physicians predict the likelihood of a woman with her particular age, family history and past medical history to have breast cancer, a false positive or recall, and a false positive biopsy. The new guidelines introduce the concept of women with above average risk (women with a first degree relative with breast cancer) and offer screening to these women on an annual basis, regardless of age.	These new guidelines provide women the tools to be involved in the process of decision making with regards to breast cancer screening, while keeping with their own preferences. By allowing women of higher than average risk to attend breast screening annually these guidelines attempt to personalize screening (our first step) and hope to detect more cancers earlier in the more susceptible population hence enhancing the sustainability of the program. These guidelines are still within a population based screening program with a target population of women aged 50 to 69.
A physicist led project resulted in the development of a Monte Carlo dose calculations platform for clinical and research use. The software for fast Monte Carlo calculations of the dose in patient treatment plans has been developed and made available for general use. The software provides accurate 3-dimentional dose distributions for verification of the dose produced by the planning computer. This software is especially beneficial in complex geometries such as mono-isocentric breast plans, lung plans and plans with multiple planning target volumes (PTVs).	This software now provides better quality radiotherapy treatments where complex geometries and tissue inhomogenieities challenge commercial treatment planning algorithms' and where no accurate independent dose calculations would otherwise be available. With access to this software, a physicist's plan checking practice has been significantly influenced. Beginning in 2014, routine clinical plan quality assurance (QA) for Stereotactic Radiosurgery (SRS) and Stereotactic Ablative Radiotherapy (SABR) will commence. This will be the first time that Monte Carlo based methods will be our main process for QA.
A BCCA research team working on the project, "Optimization of CT-scan protocol and images for treatment planning of head & neck cases for radiation therapy", discovered that through CT-Scan optimization and image reconstruction they have been able to identify the best image quality for visualization of patient anatomy without compromising the	This new discovery has resulted in a new CT-scan protocol that benefits patients as oncologists are able to contour the organs or the target for their cancer treatment resulting in more effective treatment. This new protocol has been implemented clinically for Head and Neck patients with Radiation Oncologists consensus and satisfaction, without

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
patient dose. This project also identified two separate image series: the image series with large field of view (FOV) is used for dose calculation and treatment verification, the image series with a 25 cm small FOV, which benefits from a higher spatial resolution, is used by oncologist to contour regions of interest (ROIs).	increasing dose to patient or addition of significant resources.
The Genome Sciences Centre lab participated in several international Genome-Wide Association Studies (GWAS), particularly for subtypes of non-Hodgkin lymphoma and for ovarian cancer. These studies resulted in the identification of loci that affect susceptibility to these cancers. These loci may be used in the development of future diagnostic tests.	Future benefits of these studies would be the ability to better identify the cancer risk of specific individuals.
BCCA was involved in 2 randomized trials and an expanded access trial using enzalutamide leading up to Health Canada's approval of enzalutamide in the treatment of castration-resistant prostate cancer.	The Health Canada approval of enzalutamide in the treatment of castration-resistant prostate cancer gives patients another treatment option when castrate-resistant prostate cancer treatments have failed. This provides for an increased survival in these patients.
BCCA CTAG laboratory played a critical role in the approval of the Pan 50 breast cancer prognosticator by the US Food and Drug Administration (FDA), Health Canada and the European Medicines Agency (EMA). BCCA CTAG research initiatives has resulted in: Validation of the use of FOXL2 as a diagnostic marker for ovarian cancer Identification of alpha catenine as a novel marker for diffuse gastric cancer Discovery of BRG1 loss as a key defining feature of small cell hypercalcemic ovarian cancer, a poorly understood cancer that occurs in girls and young women and is the most lethal of all ovarian cancers.	The OVCARE team has developed the Comprehensive Ovarian Cancer Prevention Program, a population based strategy for decreasing ovarian cancer which could reduce the incidence of this cancer more than 30%. This program has been embraced by multiple jurisdictions, including areas of England and Italy. A health economist has been hired to work with our team to determine the impact and cost effectiveness of this approach. In 2014, the safety of the approach was proven by a study done by the OVCARE team. This work published in 2014 and has led to a change in the way this cancer is diagnosed and provides the first rational avenues towards developing new treatments for this disease.
As a result of research conducted by a BCCA researcher from the Vancouver Cancer Centre, and colleagues in Vancouver Coastal, Vancouver Island Health Authority and Fraser Health, a process of bowel performance assessment, integrated with a bowel protocol for patients receiving palliative care, was implemented at the new Vancouver Hospice.	The implementation of this clinical tool has resulted in better assessment of bowel function and management of bowel problems.
Led by BCCA, and in collaboration with Vancouver General and BCCA's Genome Science Centre, BrainCare Part II: World-Class Expertise and Technology has developed a brain tumour diagnosis/surgery/treatment paradigm that is viewed as a world first. This new paradigm seeks to provide true personalized cancer care by tailoring brain cancer treatment based on specific tumour abnormalities. The team has identified a method of 'tumour banking' which preserves many crucial receptors, molecules and chromosomes for further analysis, and hopes to extend this 'tumour banking' to all other neurosurgical centres in the province. Further, researchers are creating a standardized process by which all	This new world first paradigm provides for a coordinated diagnosis, surgical, post-surgery treatment for patients with brain tumours, with the ultimate objective of providing true personalized cancer care.

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
tumour samples will undergo genetic sequencing, allowing brain cancer patients to have their individual tumour analyzed for specific abnormalities which make it unique from all other tumours, despite being in the same class of malignancy. This allows for specific treatment for a specific tumour, as opposed to a cookbook of treatments based on "what works for most people."	
BC Cancer Agency's Cancer Genetics Laboratory has, for the last 18 months, been working on the BC Cancer Agency Oncopanel, a test to detect mutations in patients with colorectal, lung and other cancers. Once available BC Cancer Agency will be the first cancer centre in Canada to have a test like this. It will be available to over 1,200 cancer patients a year and will be a routine test that is accurate and available quickly.	Patient access to a routine test that is accurate and quickly available that detects cancer mutations that can be targeted with existing or new treatments.
BC scientists say they have reached a milestone in the development of a new source of medical isotopes that does not rely on Canada's aging nuclear reactors. Radioisotopes are vital diagnostic tools used on 30,000 Canadians each week to detect medical conditions such as cancer or heart disease. A team from TRIUMF, Canada's national laboratory for particle and nuclear physics, at the BC Cancer Agency says it has used a cyclotron particle accelerator that was designed and built in Richmond, B.C. for large-scale production of TC-99m, the isotope needed for medical imaging such as CT scans.	A new, reliable source of isotopes, a vital cancer diagnostic tool, enough for the Vancouver area, in now locally available using a cyclotron particle accelerator that was designed and built in Richmond, BC. The BC Cancer Agency team's production breakthrough with its medical cyclotron demonstrates a possible route to stabilizing the global supply of isotopes.

Child & Family Research Institute (CFRI)

Producing and Advancing Knowledge

In FY 2013-14, researchers affiliated with CFRI were awarded a total of $53,909,958 in research funding, an increase of $370,015 over last FY. The amounts awarded as Operating Grants ($37,182,998) and Salary Awards ($8,940,446) make up approximately 85.5% of total funding received. A breakdown of funding types and subtypes can be found in Figure 24. Figure 25 shows funding by funding source category. CFRI's portion of the Indirect Costs Program grant totaled $2,005,643, up $181,129 for FY 2013-14 but is not included in total research funding or the figures below.

Figure 24

Total CFRI Research Funding including Major CFI grants by Funding Type and Sub-type

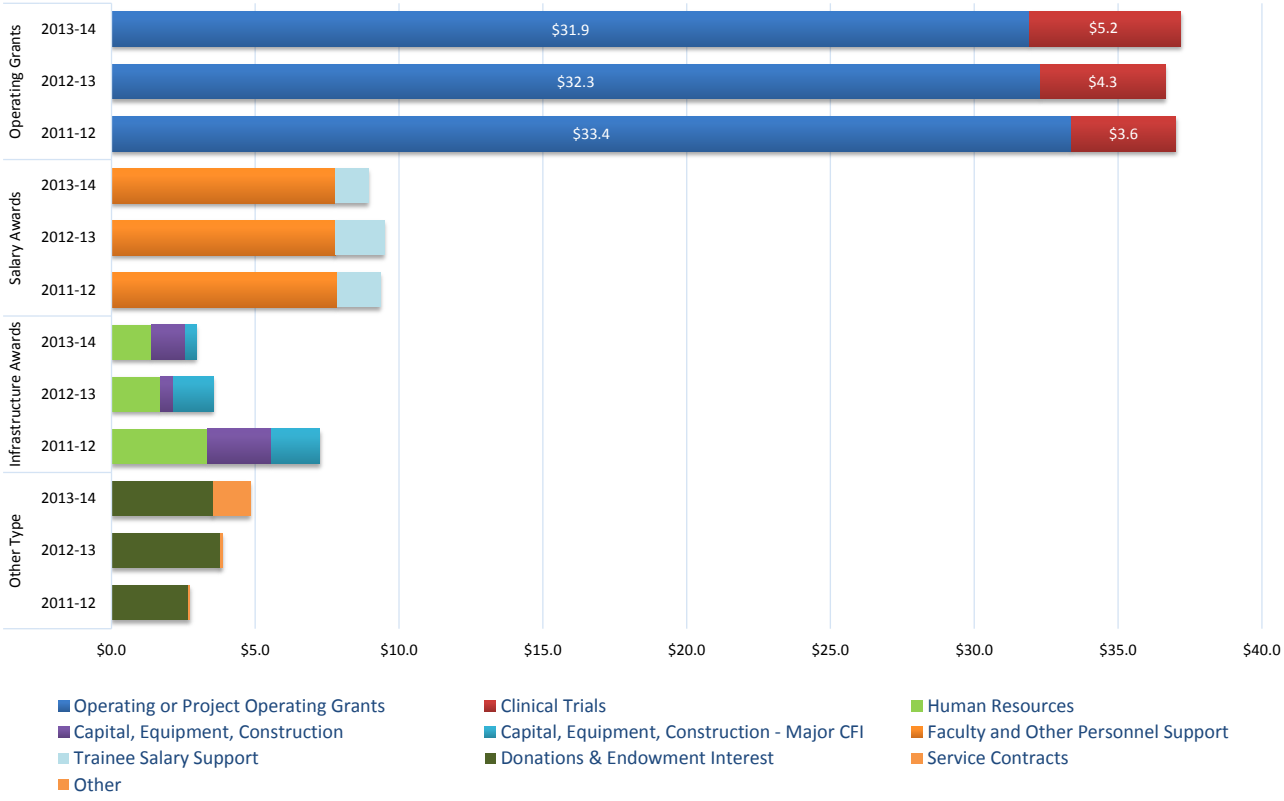
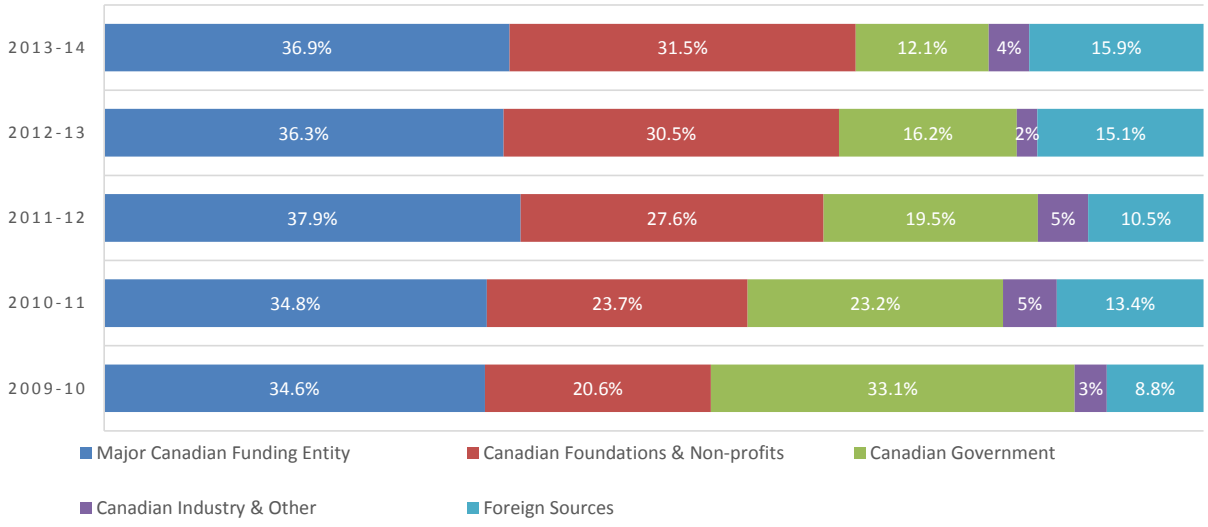


Figure 25

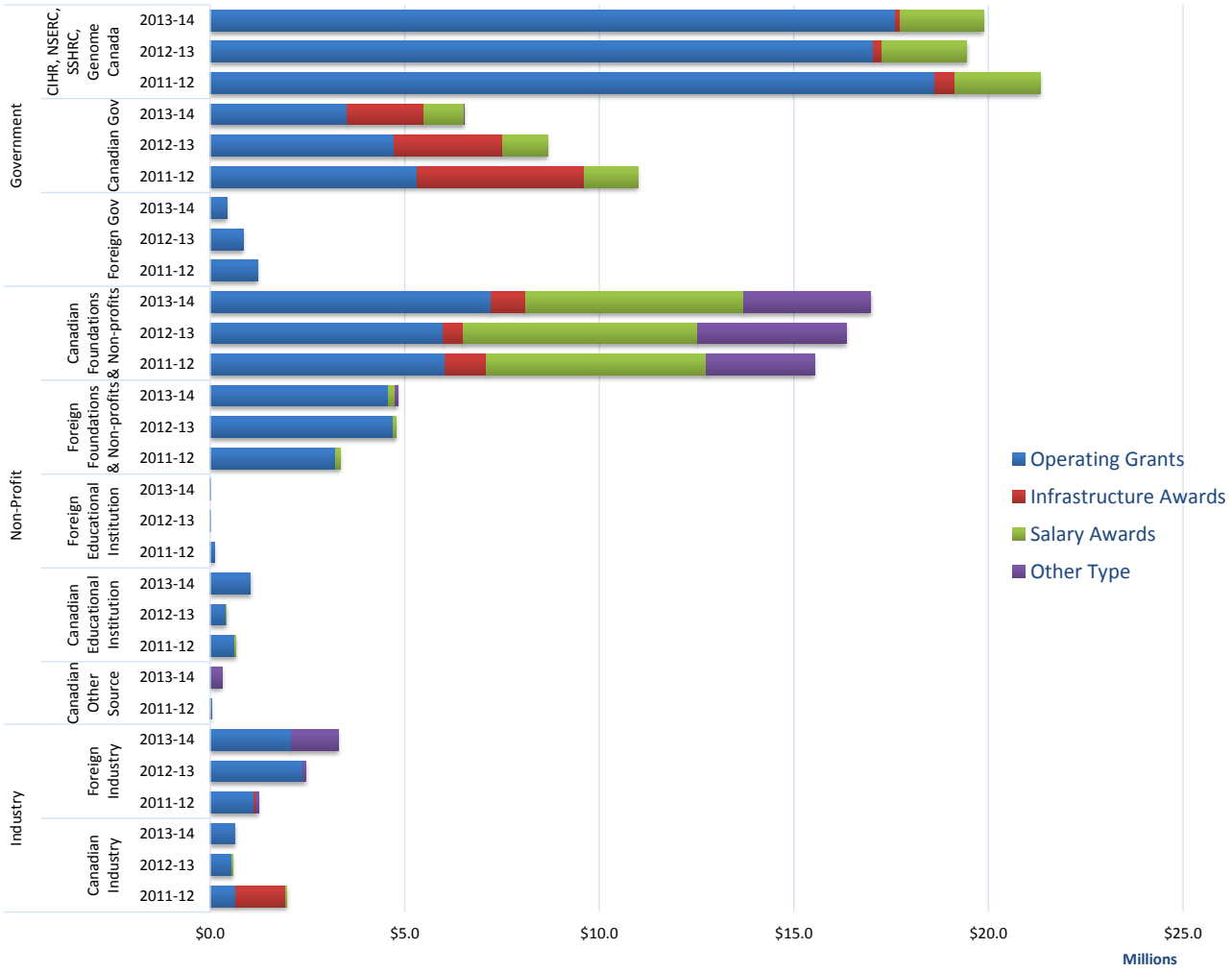
Percentage of CFRI Research Funding, including Major CFI grants by Funding Source Category by FY



The top three funding categories are Major Canadian Funding Entity (36.9%), Canadian Foundations & Non-Profits (31.5%) and Canadian Government (12.1%). Figure 26 details the RISe sector and funding categories by funding type.

Figure 26

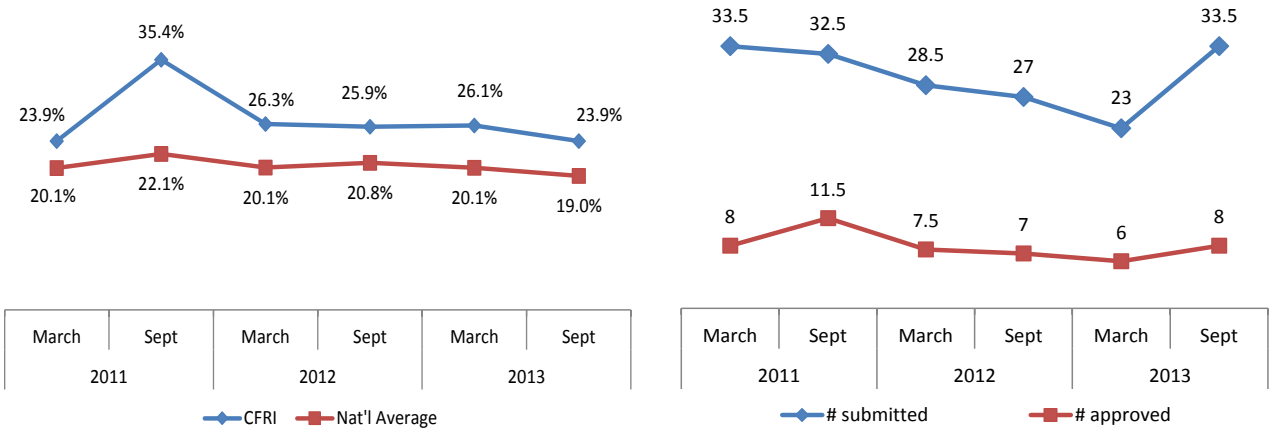
CFRI Research Funding, including Major CFI grants by RISe Sector and Funding Source Category by Type



CFRI has demonstrated success in recent CIHR operating grant competitions, exceeding the national average in both competitions in 2013. Figure 27 below shows the revised competition results (which occur in instances when, after the initial funding announcement, one of the CIHR Institutes decides to support highly ranked applications that have just missed the cut-off by providing a bridging award) and number of applications submitted and approved.

Figure 27

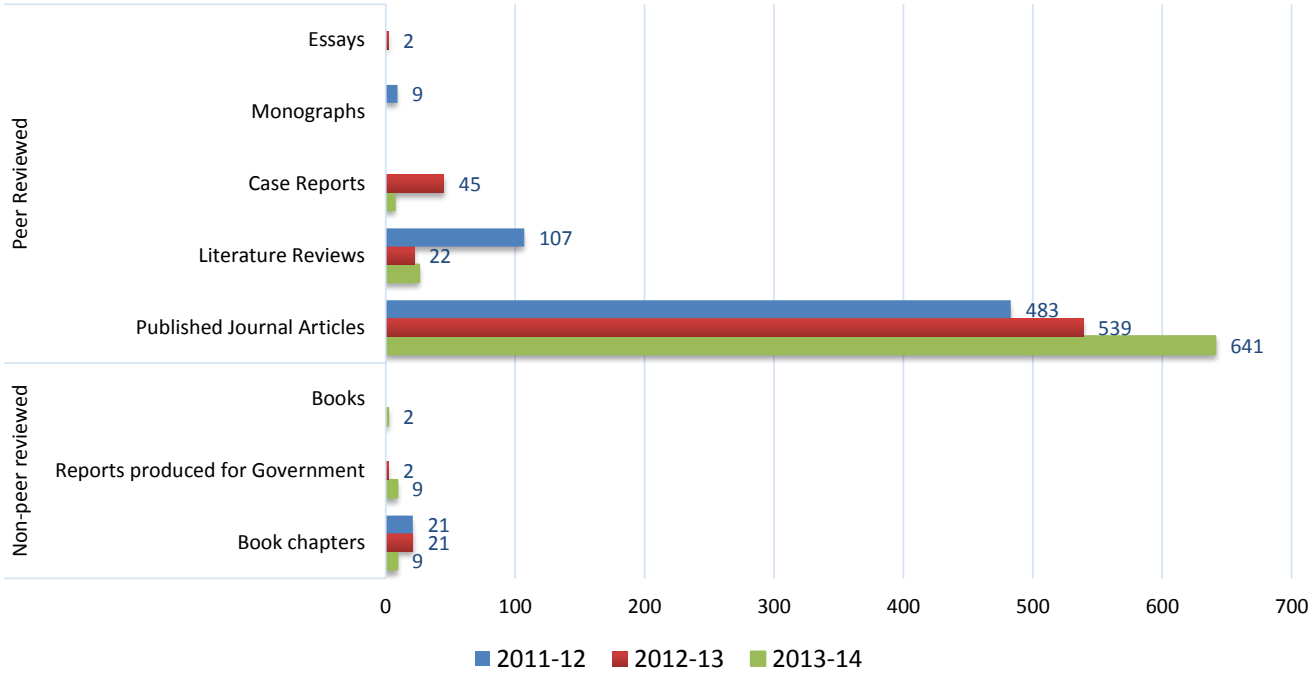
CFRI's CIHR Operating Grant Application Success Rate & Number of Applications Submitted/Approved



CFRI had 694 publications with 97% of them being peer reviewed. Total number of publications by type and category of peer vs. non-peer reviewed, is seen in Figure 28 for. Peer review represents the gold standard for scientific credibility. The agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency. CFRI accepts case reports, essays, e-journals and government proceedings but they do not categorize them into these subcategories.

Figure 28

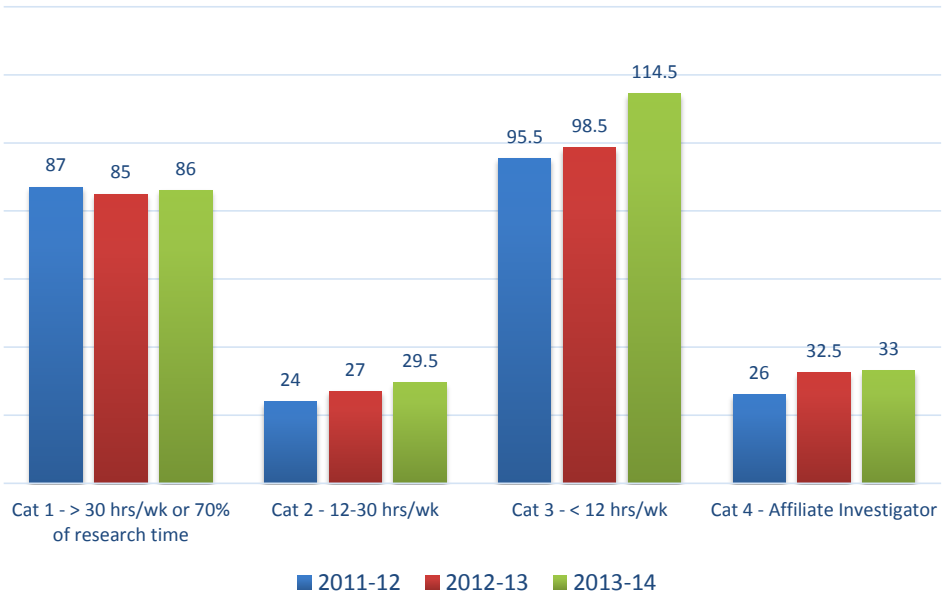
Total Number of CFRI Publications by Type and Category



Building Research Capacity

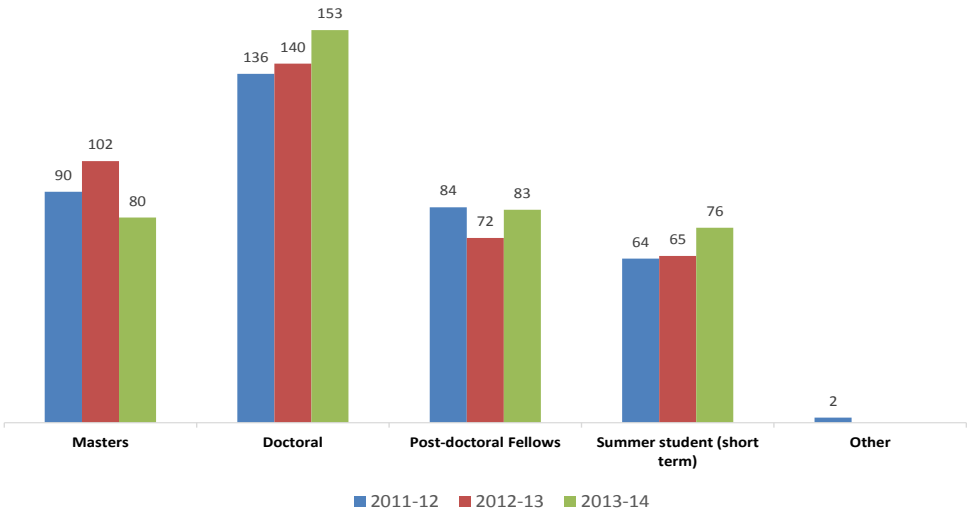
CFRI has a total of 230 researchers in categories 1-3. The distribution of these researchers is represented in Figure 29. Researchers in categories 1-3 are primarily based on the Children's & Women's Health Centre of BC campus with the largest proportion of the members being split between Category 1 – those that have greater than 30 hours per week / or 70% of their time protected for research and Category 3 – those that have less than 12 hours per week of protected research time. Category 4 members are affiliate investigators that are not based on site but who collaborate with CFRI members. 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 CFRI members on a regular basis. The CFRI does not track category 4 members funding, publications or trainees.

Figure 29
Total Number of CFRI Researchers by Category



During FY 2013-14, CFRI researchers provided training and supervision to a total of 392 (up 13 from FY 2012-13) trainees. See Figure 30 for number of trainees by type. The CFRI currently tracks full-time research trainees (masters, doctoral and postdoctoral fellows) and summer students undertaking their training at the CFRI. There are numerous co-op or directed studies students attached to the Institute, but due to their brief tenure on site, information on this group is not tracked.

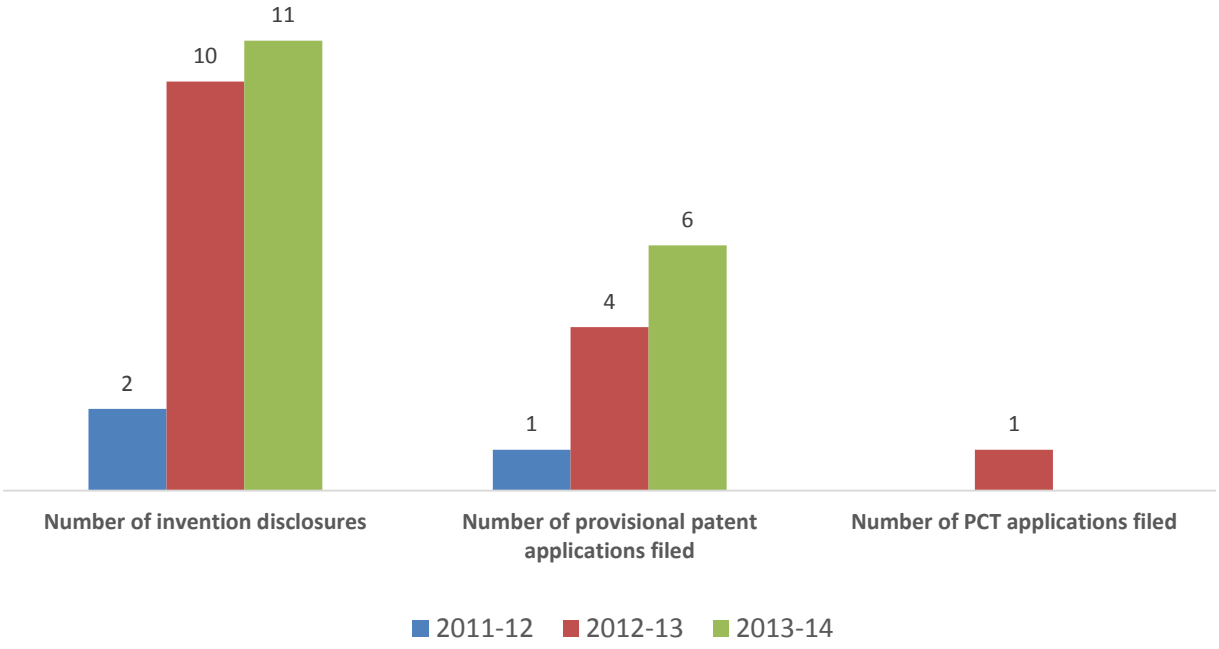
Figure 30
Total Number of CFRI Trainees by Type



Achieving Economic Benefits and Innovation

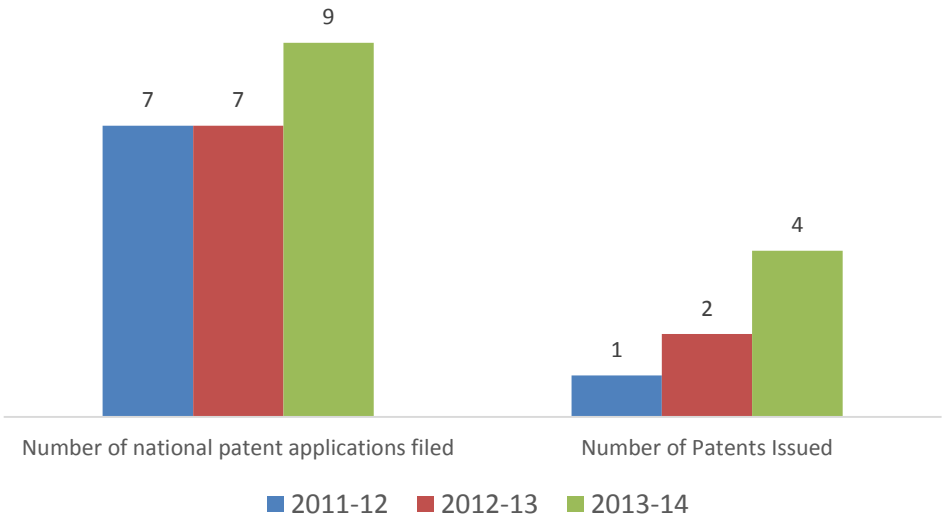
The number of invention disclosures, provisional patent and PCT applications filed by fiscal year are in Figure 31.

Figure 31
CFRI Invention Disclosures, Provisional Patent and PCT Applications Filed by Fiscal Year



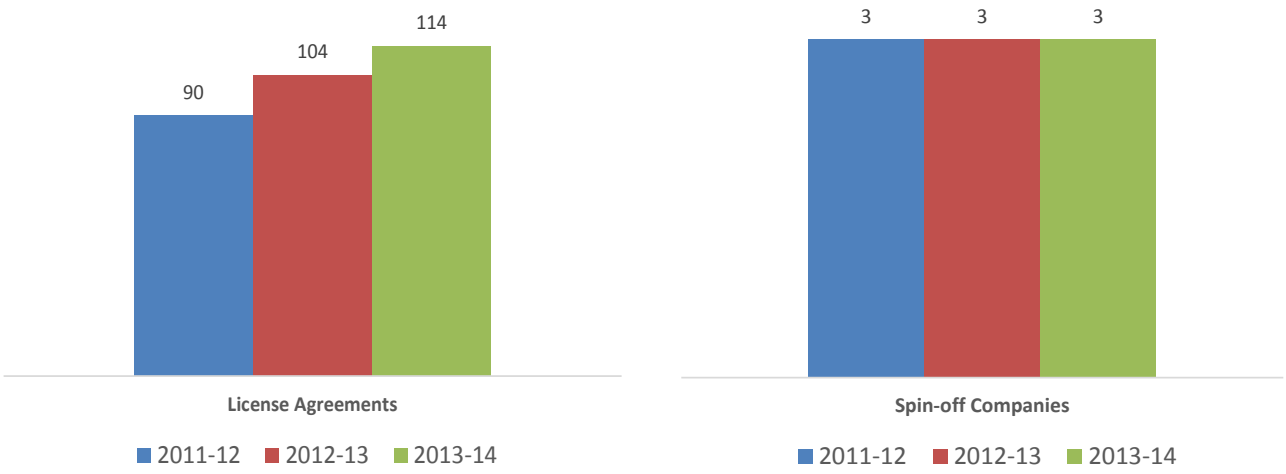
Patents are reported in Figure 32 below. Applications filed in a given year represent different applications than those which are approved in that same year (which typically are the result of applications in previous years). Data is collected and reported by the University of British Columbia University-Industry Liaison Office (UILO).

Figure 32
CFRI National Patent Activity by Fiscal Year



In FY 2013-14 there were 114 (up by 10) active license/assignment agreements in place (See Figure 33). No new spin-off companies have been created. CFRI holds shares in three active companies – Urodynamix Technologies (publicly traded), Lions Gate Technologies, and BCY Lifesciences (publicly traded). Xenon Pharmaceuticals (private) is held in trust by UBC so is not included in the totals below.

Figure 33
CFRI License/Assignment Agreements (left) and Spin-off Companies (right) by Fiscal Year



Further clarifications on the reporting of IP related revenue, in accordance with UBC (University Industry Liaison Office UILO) definitions (see Glossary – Appendix 4) were done in FY 2013-14. See Table 5 for CFRI data by fiscal year. For CFRI, UILO covers all patent, legal and related costs prior to distribution of any revenue amounts. As a result, CFRI is only able to report net licensing revenue, per the distribution agreement, not gross. Until UBC has recovered all of their Patent and Legal costs on a file by file basis, there is no distribution of revenues to C & W. Realized revenue per the distribution agreements for FY 2013-14 was $55, 375.30.

Table 5
CFRI IP Related Revenue

IP Related Revenue	FY 2011-12	FY 2012-13	FY 2013-14
Royalties	5,617.00	71,896.00	55,375.30
Equity Liquidated			
License Fees			
License Management			
Option Fees			
Technology Assignment			
Net Licensing Revenue (total)	**5,617.00**	**71,896.00**	**55,375.30**

Advancing Health and Policy Benefits

As described in the PHSA overall section, efforts continued this year to refine the data collection process to provide the most accurate and complete data. The process now entails capturing total subject enrollment and cumulative enrollment to date from the annual renewal applications at the UBC ethics boards (BCCA, C&W and CREB REBs). Previous years have utilized a manual process of requesting data from individual PIs and was subject to poor response. In addition, we were able to capture clinical trial data from PIs who utilize PHSA facilities and resources but are not formally affiliated with one of the PHSA research institutes and PHSA PIs who utilize a non-PHSA ethics board. These changes have resulted in the restatement of data for the past three fiscal years for all agencies and the removal of the enrollment within the FY data as it's not captured as part of REB post approval activities. Of note is that approximately 48% of CFRI trials had no enrollment figures. Once these fields are made mandatory as opposed to optional, as they now are, enrollment figures should increase.

Table 6
CFRI Clinical Trials

	11-12	12-13	13-14
Total Number of Clinical Trials active during the FY	146	154	166
Status of the Trial at the end of the FY:			
Total Number of Active Trials	80	101	133
Total Number of Trials that closed during the FY	66	53	33
Enrolment Numbers:			
Expected Local Subject Enrolment (for the term of the study)	9,285	10,037	120,491
Total Cumulative Subject enrolment at the end of the FY	2,191	1,851	7,023

The following table 7 reflects a sample of key guidelines, drugs, diagnostic agents or devices adopted or approved in FY 2013-14 as a result of research driven by CFRI researchers, and their corresponding benefits. These outcomes represent important achievements in translational research that are improving patient outcomes and system sustainability.

Table 7

CFRI Outcomes Survey Responses

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
Researchers published the discovery of a new genetic cause of excess ammonia (hyperammonemia) in the blood of newborns. Hyperammonemia is a medical emergency affecting between 1/8,000 to 1/44,000 infants. The treatment varies according to the cause, and determining the origin of each case is often a challenge – it could be a rare genetic condition, an infection, or an adverse reaction to other medication, each with its own particular remedy. Carglumic acid, already used to treat other genetically-caused forms of hyperammonemia, is costly and difficult to obtain. So the standard response – until now – was to use it only when cheaper treatments failed or lab tests confirmed the cause through a genetic analysis or detection of a particular biomarker pattern in the infant's blood. This process can take days, even weeks, during which irreversible brain damage can occur. With this discovery, newborns can be screened for hyperammonemia and treated sooner. The findings were published February 13th, 2014 in the American Journal of Human Genetics, and online January 24th in the journal Molecular Genetics and Metabolism: :A new genetic cause of excess ammonia (hyperammonemia) in the blood of newborns, increasing the chances that children can be treated before suffering permanent brain damage."	With this discovery, newborns can now be screened for hyperammonemia, increasing the chances that children can be treated before they suffer permanent brain damage. The researchers also demonstrated that carglumic acid is an effective treatment for this form of hyperammonemia. Since making this discovery, the team at BC Children's Hospital was able to arrange funding and shipment of carglumic acid to a small hospital in ruralBC for a family with children affected by this condition.
TIDE BC app, a free, downloadable software for iPhones and iPad, is the result of the Treatable Intellectual Disability Enfeavor in BC (TIDE BC) project at BC Children's Hospital. The Treatable-ID app focuses on diagnosing 81 treatable rare diseases that cause intellectual disability. The app features a tool for both clinicians and scientists that is designed to facilitate the diagnostic approach to treatable ID and stimulate an evidence-based approach to rare diseases. The tool provides an overview of biochemical categories, signs and symptoms, diagnostic tests, therapies and evidence.	Released in May, 2013, the TIDE BC app is helping improve awareness of treatable intellectual disability. TIDE BC app is used by more than 1,200 clinicians and scientists every month. There are approximately 200 people who download the free IOS version of the TIDE BC app and 1,000 monthly visitors to treatable-id.org. Of the 1,000 people who visit Treatable-id.org every month, roughly 30%are returning visitors and most are from the USA, Canada and Australia. Most of the healthcare providers and researchers who have downloaded the app are from the USA, Canada and Brazil.
International Pyridoxine Dependent Epilepsy (PDE) Consortium guidelines published on new treatment of a metabolic epilepsy.	The new guidelines show benefit to patients with better seizure control and potential improvements of neurodevelopment.
In 2013, 5 experts translated data from a systematic literature review regarding intellectual developmental disorders (IDD) into a two tiered algorithm. IDDs are characterized by significant impairment of cognitive functions, with limitations of learning, adaptive behaviour and skills and present with significant co-morbidity. This algorithm, targeted at clinical and biochemical geneticists, child neurologists and developmental pediatricians,	This is a TIDE BC initiative and BCCH is the first ever to change clinical paradigms by prioritizing the identification of treatable disorders in IDD patients. So far the focus has been more on genetic disorders which are more frequent yet not amenable to treatment. This TIDE practice change has the potential to prevent brain damage in many patients; preliminary results of the

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
comprises metabolic "screening" tests in urine and blood, which are relatively accessible, affordable, less invasive, and have the potential to identify 60% of all treatable inborn errors of metabolism (IEMs). The second tier investigations for the remaining disorders are ordered based on individual clinical signs and symptom. The algorithm is supported by an app at http://www.treatable-id.org/ which comprises up-to-date information on all 89 IEMs, relevant diagnostic tests, therapies and a search function based on signs and symptoms. These recommendations support the clinician in early identification of treatable IEMs in the child with IDD, allowing for timely initiation of therapy with the potential to improve neurodevelopmental outcomes.	protocol implementation at BCCH shows that as many as 5% of all IDD patients are affected by a metabolic disease which is treatable. Significant emotional suffering and medical costs can be saved as a result of this practice change.
Babies at risk of developing a food allergy can be exposed to potential allergens as early as 6 months of age, according to a new position statement co-authored by a CFRI researcher. The statement is based on a review of current research into food allergies and guidelines from around the world. This new statement, released by the Canadian Pediatric Society (CPS) and the Canadian Society of Allergy and Clinical Immunology in December 2013, lifts previous restrictions where women were advised to avoid eating allergy-provoking foods such as peanuts, fish or eggs, while pregnant or breastfeeding and that new moms delay the introduction of these foods, in some cases until three years of age.	With this new position paper, parents no longer need to delay introducing allergy-provoking foods to babies.
Researchers have reported the first clinical trial of an automated anesthesia drug delivery system for children, a major step towards more personalized anesthesia. Last year, there were approximately 8,750 pediatric surgeries with anesthesia at BC Children's Hospital. Presently, anesthesiologists make a few anesthetic dosing adjustments per hour in response to a patient's physiological conditions such as heart rate and blood pressure. The new CFRI-developed automated anesthesia system continuously monitors a patient's brain activity and adjusts dosing second-by-second to induce or maintain an anesthetized state. By conducting continual measurement of the effect of these drugs on the brain, the researchers were able to automate these adjustments based on experience with the actual patient rather than on experience from previous patients. The automated system is thus ideal for delivering only as	This new CFRI-developed automated anesthesia system will provide improved operating room safety and efficiency as well as improved drug safety for patients.

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
much anesthetic as a child needs, which the study found varied by as much as ten times between similar children. The study evaluated 108 pediatric patients, ages six to 17, who underwent gastrointestinal endoscopy procedures at BC Children's Hospital between August 2011 and September 2012. In 85% of the procedures, the automated system worked seamlessly with no need for manual intervention. This pioneering research, with CFRI researcher and UBC Engineering professor and as the engineering lead, paves the way for trials to evaluate the autopilot system's clinical benefits.	
Researchers at CFRI have released a platform for new and novel mobile health applications as open source software. Their work was published in September 2013. LambdaNative was initially created in 2009 by the Pediatric Anesthesia Research Team (PART) and the Electrical & Computer Engineering in Medicine (ECEM) research group to support the development of mobile phone applications to improve diagnosis, monitoring, and patient care everywhere from hospital operating rooms to remote areas of developing countries. The research team released the software as open source earlier this year to enable other research teams to build their own tools using this platform.	Researchers hope that sharing the software will lead to new functionality and new opportunities for collaboration. To date, the software has been used to develop over 45 applications. Highlights include: The Phone Oximeter, which uses inexpensive and widely-available mobile phone technology to measure blood oxygen levels to improve diagnosis and care for patients in areas with limited health care resources. The telePORT monitoring and message device, which improves communication between anaesthesia team members through real-time display of patient data, person-to-person chat, reminders, and quick access to key contacts. The iControl anesthesia controller, an automated drug delivery system that uses data from monitoring equipment in the operating room to provide patients with the optimal amount of anesthetic drugs during surgery. If not enough medication is administered, the patient could wake up or move during surgery, and if too much is given, the patient could experience complications such as very low blood pressure or prolonged recovery. These mobile health apps have been used in more than 10 clinical studies and clinical trials involving over 10,000 participants in Canada, France, India, Uganda, Bangladesh, and South Africa.
telePORT, the remote Portable Operating Room Tracker, is a free app released in June 2013 that was developed by the Pediatric Anesthesia Research Team at BC Children's Hospital in collaboration with the UBC Electrical and Computer Engineering in Medicine research group.	telePORT's purpose is to improve information exchange and simplify communication between anesthesia team members.

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
telePORT has five main screens: Overview, which provides the user with basic information about their subscribed anesthesia locations, such as the anesthetic phase and three vital sign values. If additional detail is required access to waveforms and trends is available from here as well. Messaging, a combination of person-to-person chat system, and a system to receive pages from an operating room or reminders. Phonebook, a list of commonly used phone extension and pager numbers; as well as an editor for these entries. Room Subscription, the place where room information is subscribed to and where subscriptions can be delegated to other users. Reminders, which allow the user to set up time- and anesthetic phase-based reminders	
Dontchoke.ubc.ca is an evidence-based educational website, focused on providing information about choking hazards and prevention to children in schools, as well as to the adults who care for them. This website has been translated into Mandarin and Cantonese; plus 8 other translations are pending.	Dontchoke.ubc.ca is part of a global choking prevention strategy. With the slogan "a minute of care can save a life", the team is educating the parents of tomorrow, today.
The Pediatric Tracheostomy app is a project of the Office of Pediatric Surgical Evaluation and Innovation (OPSEI) of the iACT cluster, and the Otolaryngology Division at BC Children's Hospital. The app serves to inform parents, older patients and family about tracheostomies, living with a trach, and trach care.	This app is meant to increase understanding and decrease apprehension about tracheostomies; and is available free of charge from the iTunes store.
A new study, recently published online in November 2013 by the American Journal of Obstetrics and Gynecology, shows ethnicity-specific birth weight charts are better at identifying newborns who are small for gestational age (SGA), a classification associated with hypothermia, hypoglycemia, infection and admission to the neonatal intensive care unit. In the study, data from more than 100,000 newborns in Washington state was examined against two birth-weight standards: a population-based birth weight chart used by most hospitals and one that accounted for the ethnicity of the newborns. The researchers found a considerable number of babies classified as small for gestational age by the conventional birth weight chart were actually healthy babies.	Ethnicity-based birth-weight standards can help better direct attention to those babies who need it the most. They also lead to reduced parental anxiety, unnecessary testing and health care costs.
A recent CFRI-led study with over 800 Canadian girls found that two doses of human papillomavirus (HPV) vaccine was associated with an immune response similar to that with three doses. This important finding arose from an ongoing national research project to determine the best dosing schedule for the HPV vaccine. Led by Dr. Simon Dobson of CFRI's Vaccine Evaluation Centre (VEC), the national research team	If researchers find that two doses are effective, then it would mean fewer needles for girls receiving the vaccine, as well as cost savings for the health care system. This research will demonstrate whether over the longer term, two doses remain as effective as three doses.

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
is recruiting over 8500 teenage girls across Canada to participate in the 10-year study, with the VEC seeking more than 3500 participants in British Columbia. Girls joining the study will have already received the vaccines from the provincial public immunization programs. HPV infections cause nearly all cases of cervical cancer, which is the second most commonly diagnosed cancer in women worldwide. The HPV vaccine is very effective at providing immunity against the disease.	
A CFRI investigator participated as a member of Health Canada's Infant Feeding Expert Advisory Group. The group developed national recommendations on "Nutrition for Healthy Term Infants: Recommendations from Six to 24 Months". The recommendations were produced as a joint statement of Health Canada, Canadian Paediatric Society, Dietitians of Canada, and Breastfeeding Committee for Canada.	The statement provides health professionals with evidence-informed principles and recommendations. Provinces, territories, and health organizations can use it as a basis for developing practical feeding guidelines for parents and caregivers in Canada.
Virtual reality (VR) is an important emerging technology that is increasingly being introduced in health centers as a rehabilitation intervention. A research study identifying factors influencing therapists' adoption of VR technology for brain injury rehabilitation was conducted. A measure based on the Decomposed Theory of Planned Behavior (DTPB) was developed and administered to 42 therapists. Overall, therapists had positive attitudes toward VR, perceived it as being useful, and had positive intentions to use it more in the future. The self-efficacy composite yielded the lowest scores. The most significant barrier to adoption was time, while social influences and knowledge were the primary facilitators. Future research will explore the impact of knowledge translation interventions on these mediators of VR adoption. This research, on the factors influencing therapists' adoption of VR technology for brain injury rehabilitation, was presented at the Canadian Network for Child and Youth Rehabilitation (CN-CYR) Annual Symposium (part of the Canadian Association of Paediatric Health Centres (CAPHC)'s annual conference. The audience was primarily management and administration, along with some clinicians and other stakeholders.	Collaboration initiatives have led to dedicated treatment space and changes to scheduling and other protocols to better enable VR use, as well as the provision of support staff assistance to therapists. The VR equipment continues to be used clinically; as the result of CFRI research findings Therapists are supported in a peer mentoring model and have access to ongoing technical support.
Dr. Bill Gibson published his results of uncovering a rare mutation in Pik3Ca that can teach us about common diseases including diabetes. This discovery identified that overactive PIK3CA makes belly fat more sensitive to insulin, and protects against metabolic syndrome. This suggests the PIK3CA pathway is a good pathway to target when we develop new drugs to treat or prevent diabetes.	This discovery of a rare mutation in Pik3Ca provides a new pathway in developing new drugs to treat or prevent diabetes. It also illustrates the importance of studying rare diseases, not only to solve them but also because rare diseases teach us important lessons about common diseases.

BC Mental Health and Addictions Research Institute (BCMHARI)

Producing and Advancing Knowledge

In FY 2013-14, researchers associated with BCMHARI were awarded a total of $3,158,580 a decrease from FY 2012-13 but consistent with previous years. The variation is attributed to significant increases in grants in aid in the 2 previous years. Tri-council funding, which contributes to federal IP grant awards in future years, was approximately 7% higher in FY 2013-14. A breakdown of funding types and subtypes can be found in Figure 34. BCMHARI's portion of the Indirect Costs Program grant totaled $182,861.76 for FY 2013-14 but is not included in total research funding or the figures below.

Figure 34

BCMHARI Research Funding by Funding Type and Sub-type

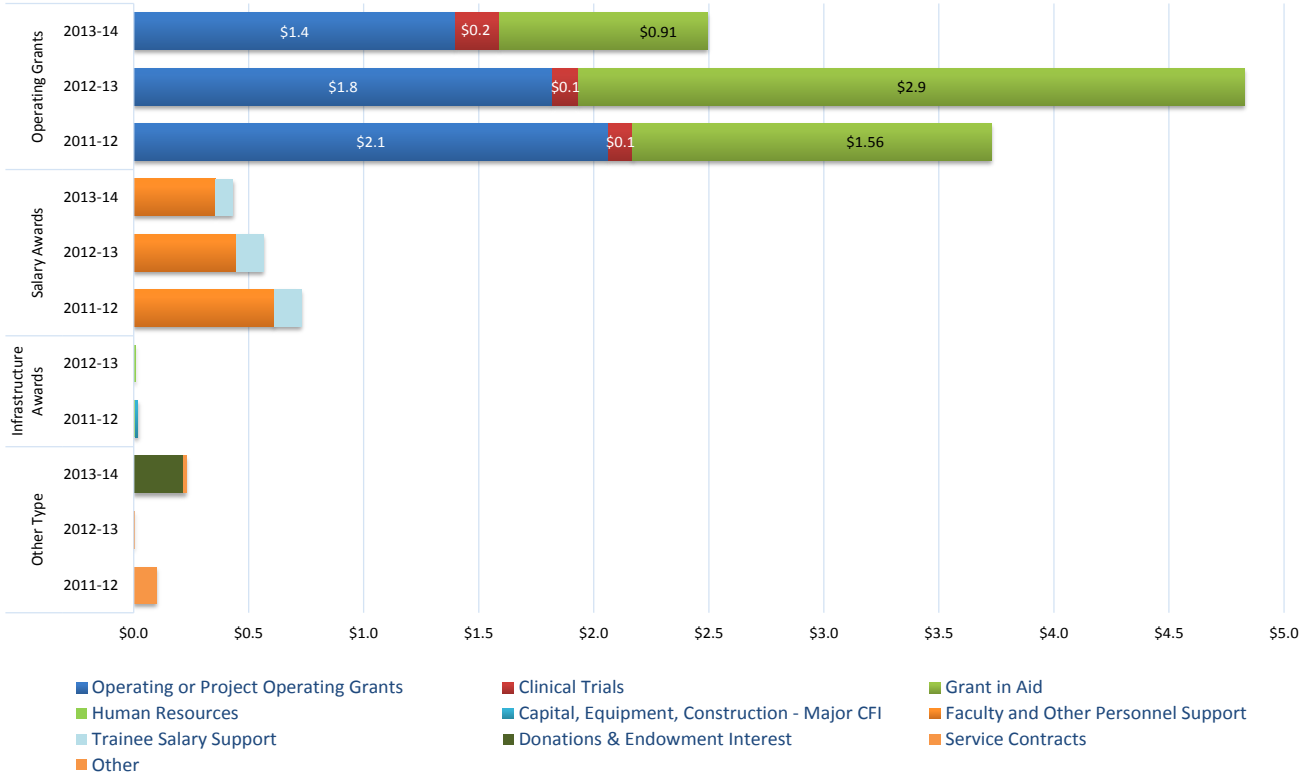
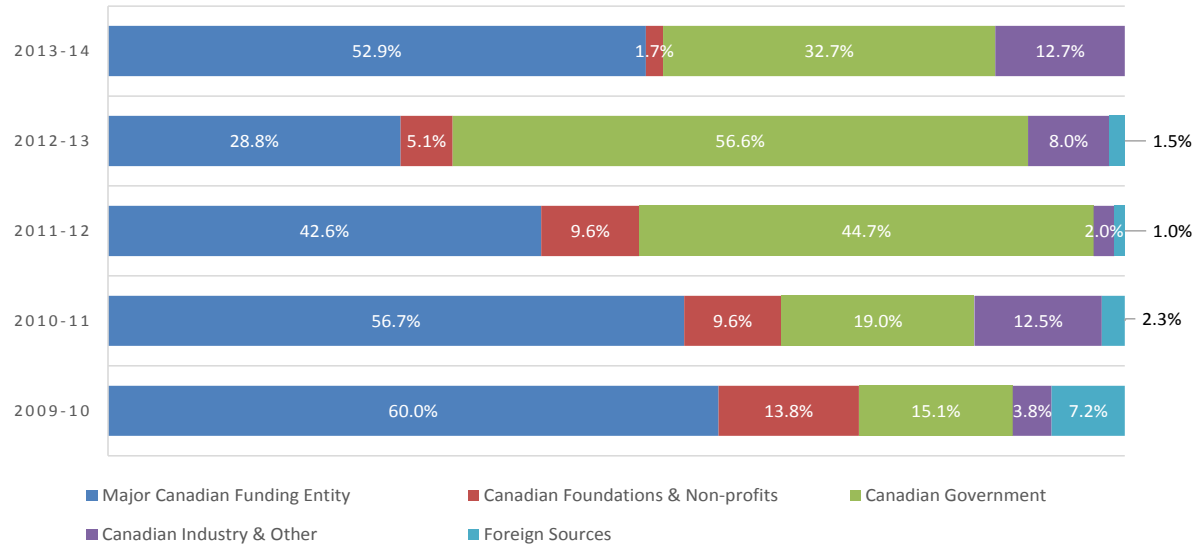


Figure 35

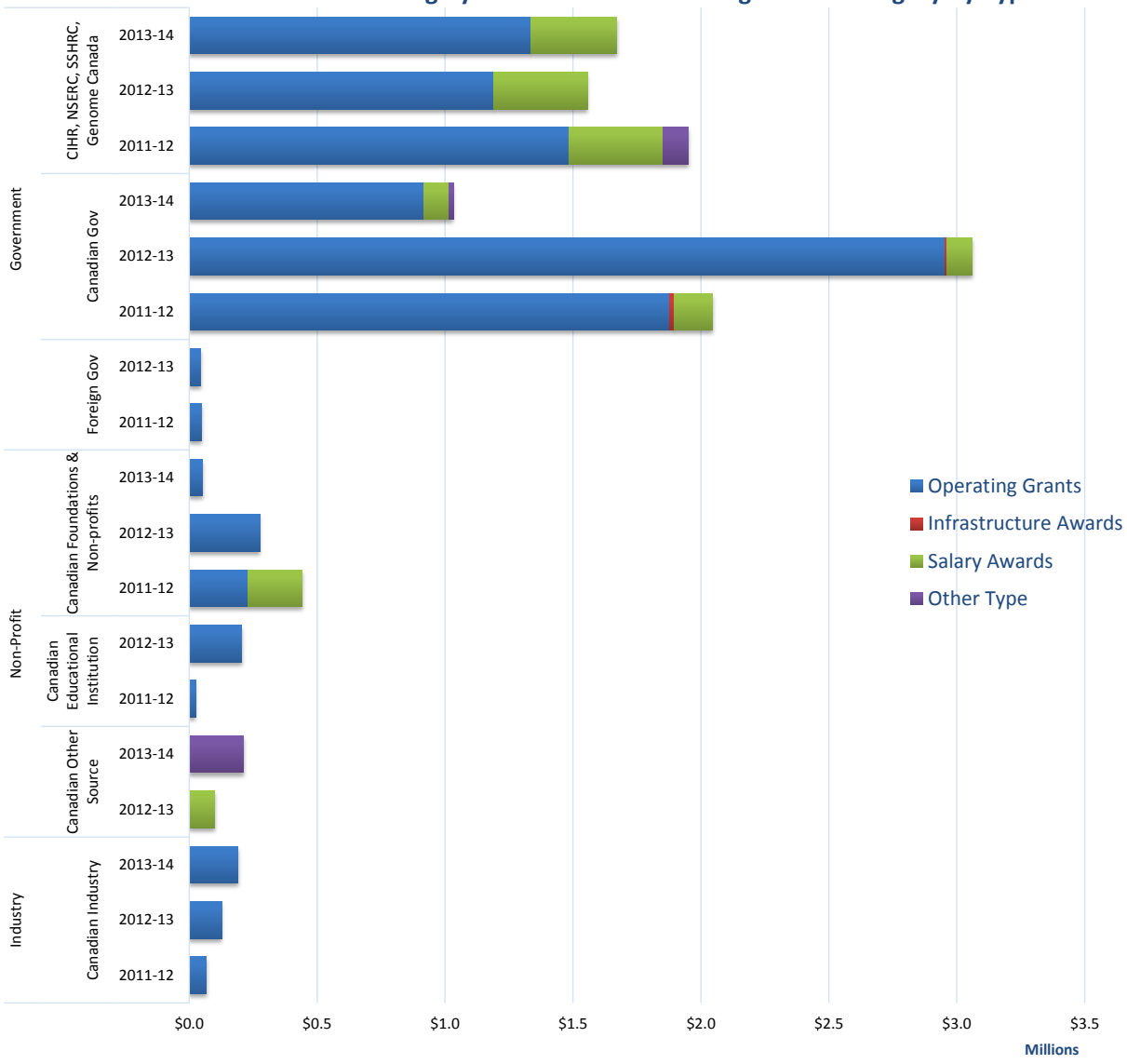
Percentage of BCMHARI Research Funding, including Major CFI grants by Funding Source Category by FY



The top two funding categories are Major Canadian Funding Entity (52.9%) and Canadian Government (32.7%) and Figure 36 details the major funding categories by RISe sector, funding source and funding type.

Figure 36

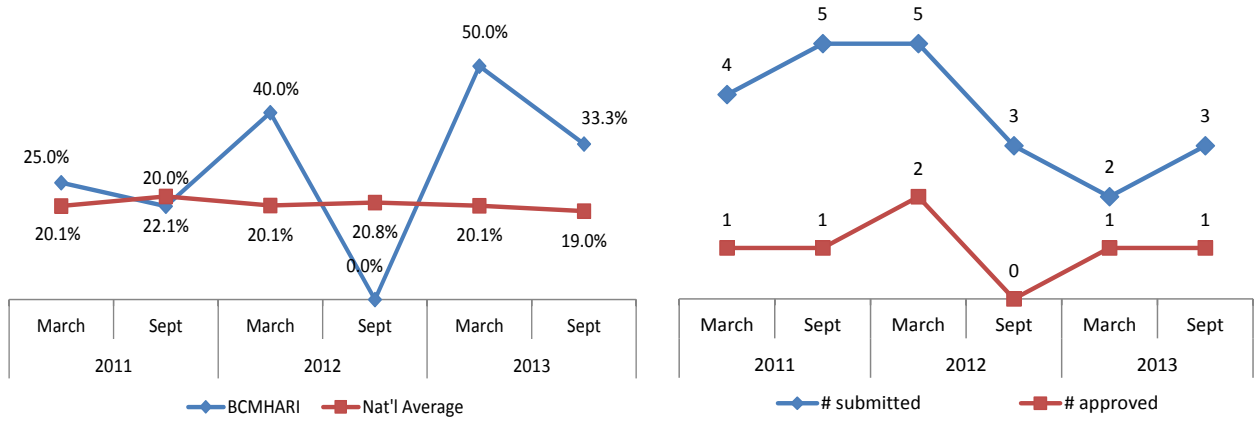
Total BCMHARI Research Funding by RISe Sector and Funding Source Category by Type



BCMHARI has demonstrated success in recent CIHR operating grant competitions, exceeding the national average in both the March and September operating competitions. Figure 37 below shows competition success rates and number of applications submitted and approved.

Figure 37

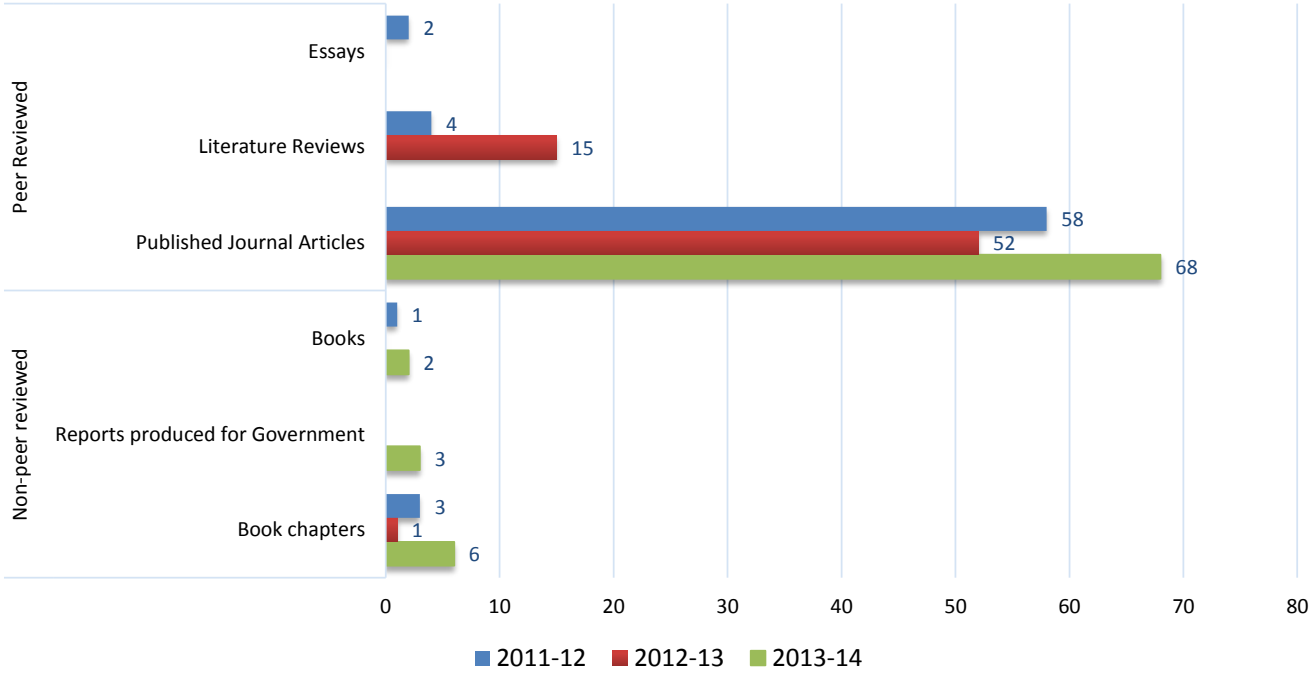
BCMHARI's CIHR Operating Grant Application Success Rate & Number of Applications Submitted/Approved



BCMHARI had a total of 79 publications in FY 2013-14 of which 86% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 38. The agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency.

Figure 38

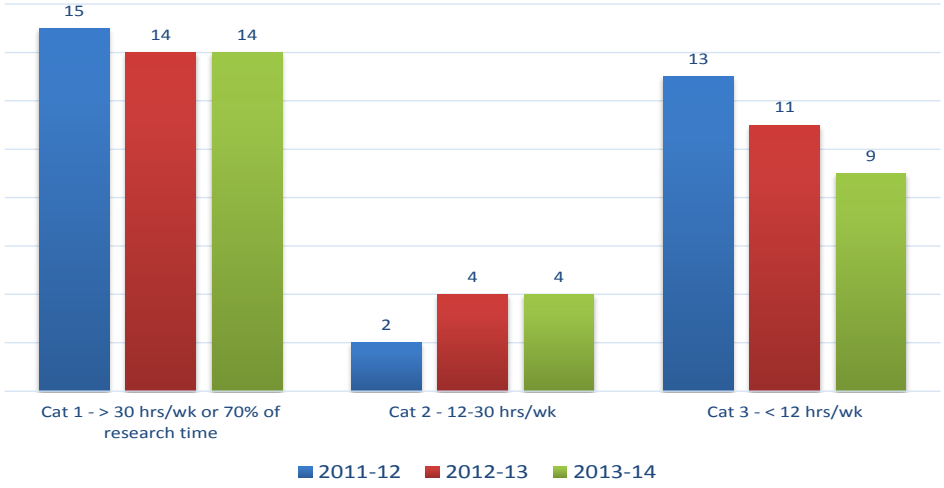
Total Number of BMHARI Publications by Type and Category



Building Research Capacity

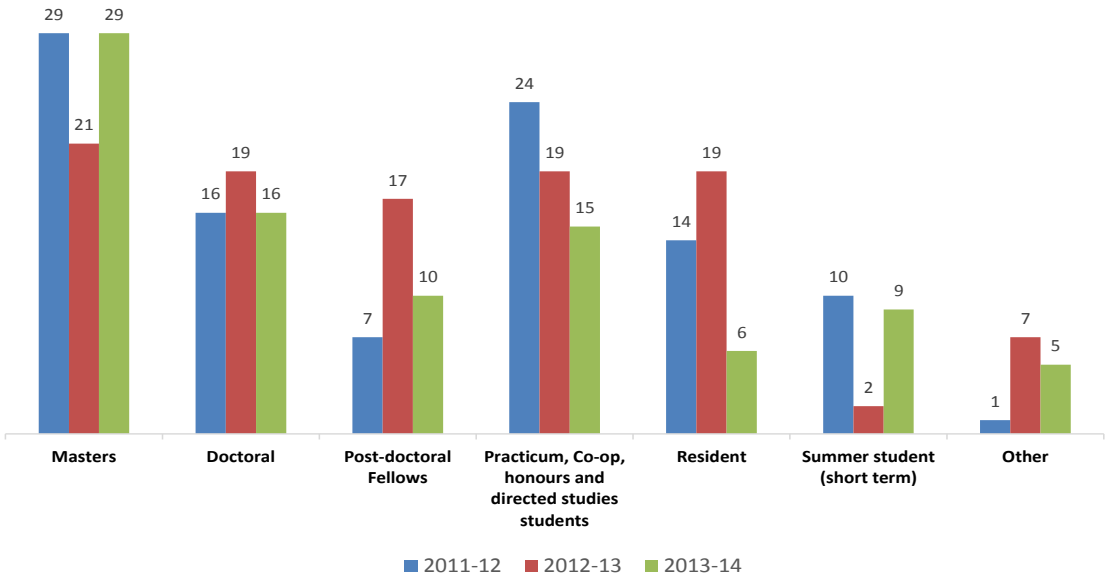
BCMHARI had a total of 27 researchers in FY 2013-14, with 14 having greater than 30 hours or 70% protected research time per week (Figure 39). BCMHARI continues to attract nationally and internationally recognized researchers to its research facility situated on the third floor of the Translational Research Building located on the Children's & Women's Health Centre of British Columbia (C&W) campus. BCMHARI is committed to integration of clinical and research activities that will lead to evidence-informed change of practice and system-wide improvements. In addition to the investigators, post-doctoral fellows, graduate students, research assistants, and technicians supporting the research enterprise at BCMHARI, many clinicians and front line staff also participate in research programs.

Figure 39
Total Number of BCMHARI Researchers by Category



During FY 2013-14, BCMHARI researchers provided training and supervision to a total of 90 trainees which was down by approximately 10% from previous years. While overall trainee head count decreased, there is variation across trainee categories. For example, although residents and post-doctoral fellows declined, masters-level trainees and summer students increased.

Figure 40
Total Number of BCMHARI Trainees by Category



Advancing Health and Policy Benefits

As described in the PHSA overall section, efforts continued this year to refine the data collection process to provide the most accurate and complete data. The process now entails capturing total subject enrollment and cumulative enrollment to date from the annual renewal applications at the UBC ethics boards (BCCA, C&W and CREB REBs). Previous years have utilized a manual process of requesting data from individual PIs and was subject to poor response. In addition, we were able to capture clinical trial data from PIs who utilize PHSA facilities and resources but are not formally affiliated with one of the PHSA research institutes and PHSA PIs who utilize a non-PHSA ethics board. These changes have resulted in the restatement of data for the past three fiscal years for all agencies and the removal of the enrollment within the FY data as it's not captured as part of REB post approval activities. Of note is that approximately 46% of BCMHARI trials had no enrollment figures. Once these fields are made mandatory as opposed to optional, as they now are, enrollment figures should increase.

Table 8
BCMHARI Clinical Trials

	11-12	12-13	13-14
Total Number of Clinical Trials active during the FY	9	10	7
Status of the Trial at the end of the FY:			
Total Number of Active Trials	9	10	7
Total Number of Trials that closed during the FY	6	5	2
Enrolment Numbers:			
Expected Local Subject Enrolment (for the term of the study)	618	828	688
Total Cumulative Subject enrolment at the end of the FY	323	16	56

Table 9 reflects a sample of key guidelines, drugs, diagnostic agents or devices adopted or approved in FY 2013-14 as a result of research driven by BCMHARI researchers, and their corresponding benefits. These outcomes represent important achievements in translational research that are improving patient outcomes and system sustainability.

Table 9

BCMHARI Outcomes Survey Responses

Please describe any guideline, drug, diagnostic agent or device adopted or approved in 2013/14 as a result of research driven by PHSA researchers.	**Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.**
Development of a manualized group treatment for youth presenting with disorders of somatization and their families. The manual is grounded in research, and its efficacy is currently being evaluated.	The uptake of this manualized intervention by mental health specialists will improve patient-related outcomes and reduce the burden of care on the hospital (e.g., reduced ER visits, inpatient stays, medical tests, etc.).
Five published articles on the rationale for Metacognitive Trading/Therapy (MCT) have come from research conducted at BCMHARI.). MCT is a non-pharmaceutical intervention which has been shown to improve symptomatology and functioning in individuals with psychosis. It focuses on increasing an individual's understanding of the psychological mechanisms associated with delusions and hallucinations and helping them develop strategies to improve reality testing and belief evaluation. One of these articles reported effects lasting three years post-treatment, and has been published in one of the top psychiatry journals (JAMA: Psychiatry) in the summer of 2014.	A five-year research study on the brain changes underlying MCT-based symptom improvement allowed 2-3 treatment groups to be run per month. The novel access to MCT has been shown to improve patient quality of life through symptom reduction and quality of patient care by reducing the side effects of medication. Cost savings related to pharmaceutical use may also be realized.
In 2013, the START tool (Short Term Assessment of Risk & Treatability) gained international recognition when it was included in Scotland's Risk Management Authority's (RMA) Risk Assessment Tools Evaluation Directory (RATED). START is considered a 'Validated Risk Assessment Tool' according to their criteria, and was one of more than 60 tools evaluated. RATED aims to provide a comprehensive directory of existing assessment tools and incorporates relevant research information, including validation evidence.	The ultimate objective of the START is to prevent adverse events and support rehabilitation and community (re)integration of diverse inpatient and community populations (corrections inmates/probationers and forensic and civil psychiatric patients). Reports supporting the reliability and validity of this tool may increase its uptake in appropriate populations.
The START (Short Term Assessment of Risk & Treatability) will continue to be supported throughout the Forensic Psychiatric Hospital and regional clinics, as it is currently incorporated into a number of Forensic Psychiatric Services Commission (FPSC) policies and practices. In addition, ongoing research via the FPSC research department continues to produce peer-reviewed conference presentations and publications in peer-reviewed journals that enhance international interest in the START.	The ultimate objective of the START is to prevent adverse events and support rehabilitation and community (re)integration of diverse inpatient and community populations (corrections inmates/probationers, and forensic and civil psychiatric patients). Reports supporting the reliability and validity of this tool may increase its uptake in appropriate populations. The uptake of the START tool to date has resulted in: 1. Large scale implementations of the START are currently underway at a number of psychiatric, correctional and out-patient settings. 2. To date, 30-plus START publications have been published in internationally recognized peer-reviewed journals. 3. As of June 2014, over 4,800 START manuals have been sold to civil psychiatric, forensic psychiatric and correctional organizations around the world. 4. The START Manual has also been translated into eight different languages, with further translations ongoing, including Dutch and Spanish translations. 5. The START has also been incorporated into clinical practice and large-scale research

Please describe any guideline, drug, diagnostic agent or device adopted or approved in 2013/14 as a result of research driven by PHSA researchers.	Please describe the benefits to patients, population health, and/or health system sustainability of the items identified.
	programs in 15 nations (e.g., Sweden, Australia, Ireland, etc.). 6. To date, well over 1,500 mental health professionals have been trained by the START authors through over 50 workshops in various countries around the world.
The overwhelming success of START (Short Term Assessment of Risk & Treatability) has resulted in the demand for an adolescent version of the START. The 'downward translation' of the START is completed, with the START team collaborating with colleagues in both Canada and the US. The START: Adolescent Version (AV) includes adaptations of the original 20 START items, as well as 6 new items, all specifically designed to reflect the risks and needs commonly associated with adolescent populations. Three papers were published in a special issue of the *International Journal of Forensic Mental Health* dedicated to the START:AV. Pilot studies evaluating the START:AV are underway in Vancouver, Canada, Northampton, United Kingdom, and Connecticut, USA.	The objective of the START:AV is to prevent adverse events and support treatment planning for adolescent mental health populations, including both civil mental health and justice populations.
A BCMHARI scientist participated in the development of the OCDbc website for the parent advocacy group working with the BCMHSUS pediatric Obsessive-Compulsive Disorder (OCD) Clinic. OCDbc's mission is to bring awareness to OCD and to improve access to effective treatment for those affected by OCD. http://www.ocdbc.ca/	The new website provides patients and families impacted by OCD with information and resources on treatment and support, with the ultimate objective of improving access to effective treatment for those impacted by OCD.
A BCMHARI scientist led the development and establishment of the first specialist psychiatric genetic counselling service in the world and is active in supporting the establishment of similar services internationally. Locally, the team is building capacity for increasing delivery of this service by training students. To date, 6 genetic counselling graduate students, and one psychiatry resident have spent intensive training in the delivery of this specialist service. In 2013, this research and scientist supported the establishment of a specialist psychiatric genetic counselling clinic in San Francisco and hosted a professor from the UK, to gain ideas regarding how to initiate a similar clinic in the UK. In 2014, support will be offered to clinicians in Germany and Romania to support their efforts to set up similar services.	Psychiatric genetic counselling services can help individuals with mental health disorders, and their family members, better understand the causes of the disorder and potential risks for them, their children or other family members.
A BMHARI research team published *The Hotel study: multi morbidity in a community sample living in marginal housing* in the top clinical journal in psychiatry (American Journal of Psychiatry) and was subsequently selected by the journal editor as his favorite paper in 2013.	The findings from the Hotel study have made a significant contribution to the Mayor's Task Force on the Mental Health Crisis in Vancouver.
A team of BCMHARI researchers co-authored a paper which established a novel approach for quantifying drug-related harm.	Personalized risk assessment of drug-related harm is associated with health outcomes.

BC Centre for Disease Control/UBC Centre for Disease Control (BCCDC/UBC CDC)

Producing and Advancing Knowledge

In FY 2013-14, researchers affiliated with BCCDC/UBC CDC were awarded a total of $3,657,415 in research funding. The amount awarded as Operating Grants ($3,047,418) makes up 83.3% of total awards. A breakdown of funding types and subtypes can be found in Figure 41 and by funding source category in Figure 42. BCCDC's portion of the Indirect Costs Program grant totaled $157,795 for FY 2013-14 but is not included in total research funding or the figures below. Because of its public and population health mandate, research at BCCDC is very much embedded within its clinical mandate and, as such, is also supported by operating funding to a significant degree.

Figure 41

Total BCCDC/UBC CDC Research Funding by Funding Type and Sub-type

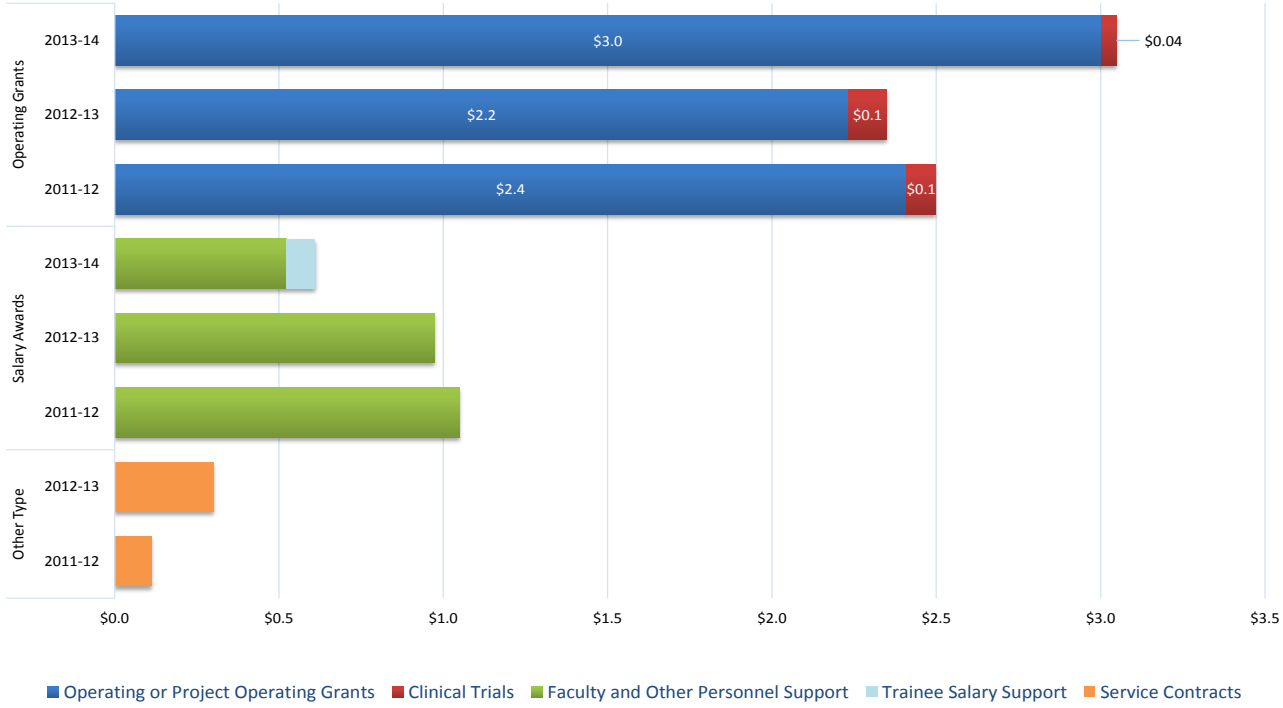
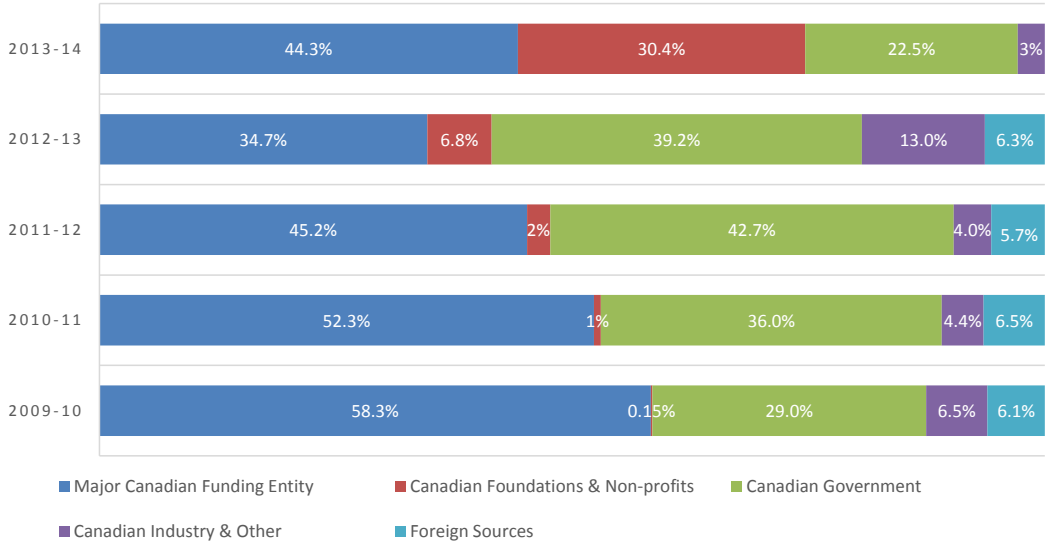


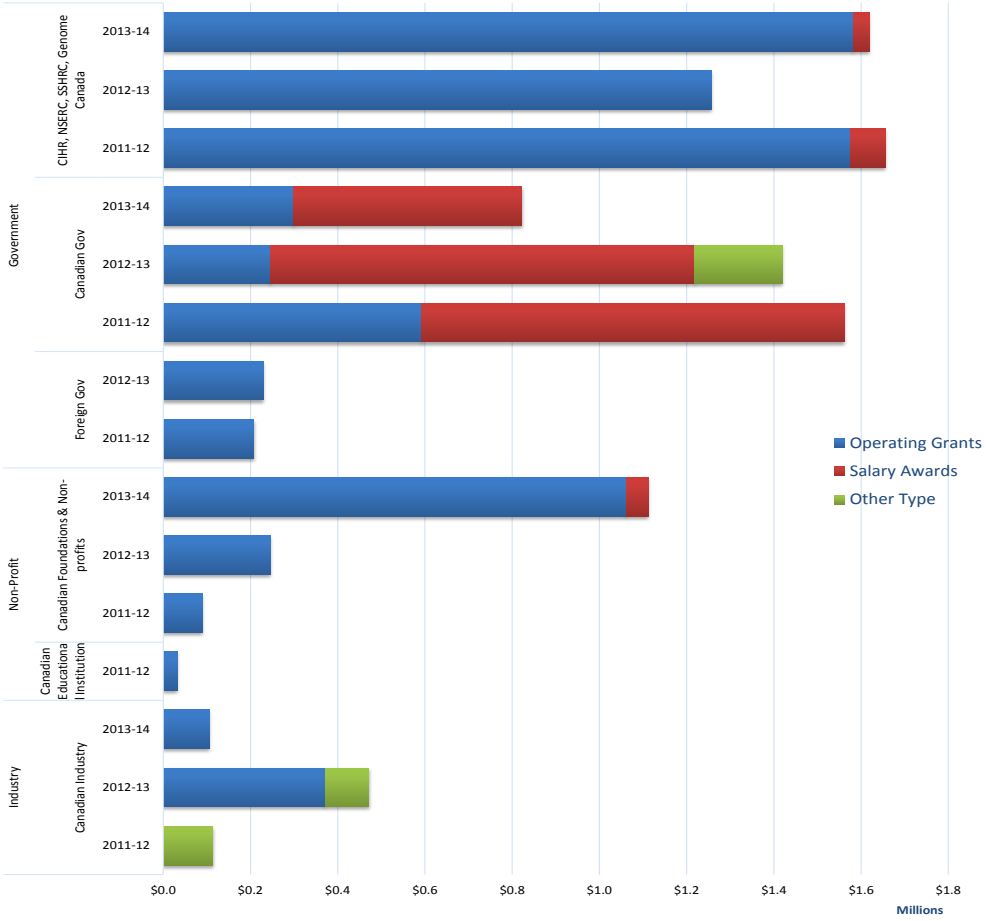
Figure 42

Percentage of BCCDC Research Funding, including Major CFI grants by Funding Source Category by FY



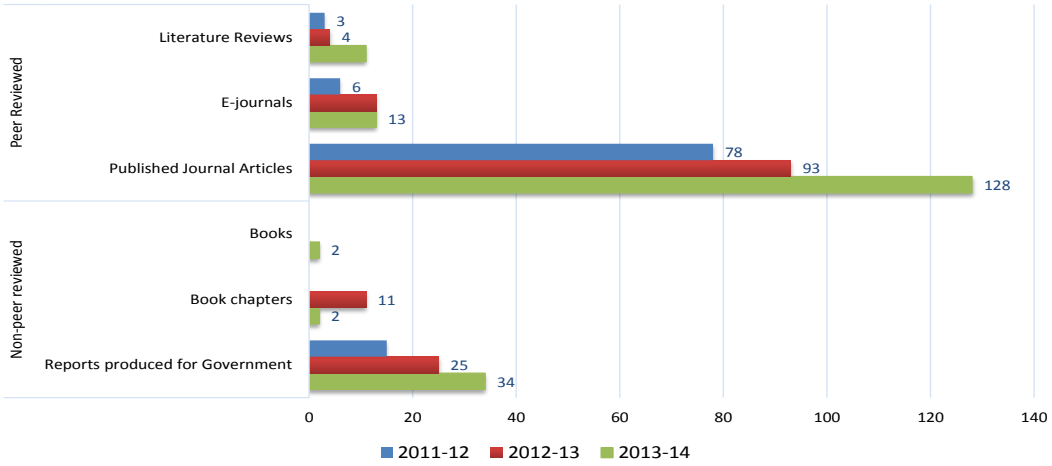
The top two funding categories are Major Canadian Funding Entity (44.3%) and Canadian Foundations & Non-profits (30.4%) and Figure 43 details the RISe sector and major funding categories by funding type.

Figure 43
Total BCCDC/UBC CDC Research Funding by RISe Sector and Funding Source Category by Type



BCCDC had a total of 190 publications in FY 2013-14 of which 80% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is seen in Figure 44. The agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency.

Figure 44
Total Number of BCCDC/UBC Publications by Type and Category

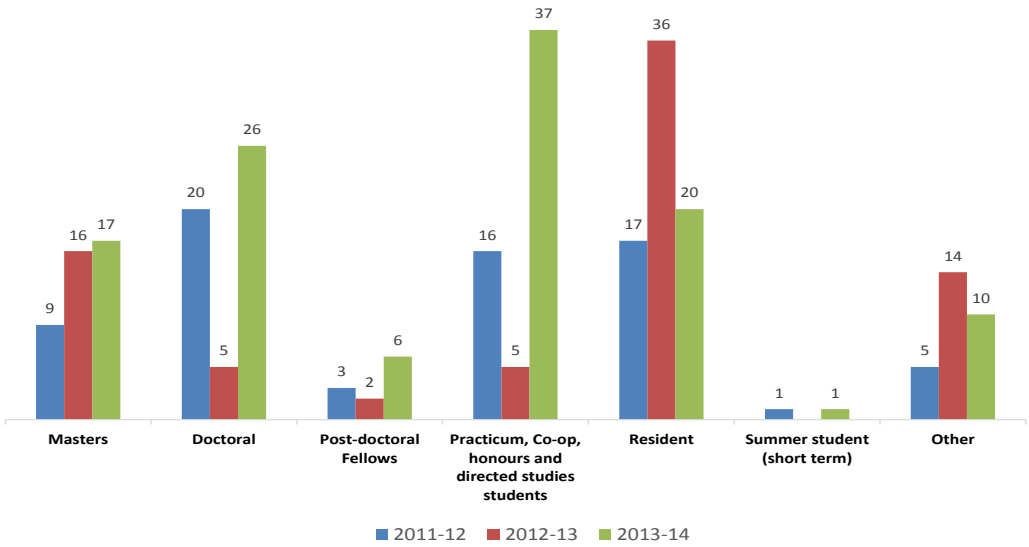


Building Research Capacity

BCCDC/UBC CDC defines a researcher as any principal investigator or co-investigator involved in BCCDC/UBC CDC research projects. BCCDC had a total of 33 researchers meeting this definition in FY 2013-14.

During FY 2013-14, BCCDC/UBC CDC researchers provided training and supervision to a total of 117 (up 39 from FY 2012-13) trainees (see Figure 45). The largest increase is seen in the doctoral and practicum, co-op, honours & directed studies categories.

Figure 45
Total Number of BCCDC/UBC CDC Trainees by Type



Achieving Economic Benefits and Innovation

While BCCDC had no new patent activity for FY 2013-14 applications filed in previous fiscal years related to the Chlamydia vaccine are still in process and may result in further patent activity next fiscal year.

Advancing Health and Policy Benefits

Due to the fact that we are capturing clinical trial data from all research ethics boards in FY2013-14, we are now able to report this data for BCCDC for the first time. The process now entails capturing total subject enrollment and cumulative enrollment to date from the annual renewal applications at the UBC ethics boards (BCCA, C&W and CREB REBs). Previous years have utilized a manual process of requesting data from individual PIs and was subject to poor response. In addition, we were able to capture clinical trial data from PIs who utilize PHSA facilities and resources but are not formally affiliated with one of the PHSA research institutes and PHSA PIs who utilize a non-PHSA ethics board.

Table 10
BCCDC Clinical Trials

	11-12	12-13	13-14
Total Number of Clinical Trials active during the FY	2	2	2
Status of the Trial at the end of the FY:			
Total Number of Active Trials	2	2	2
Total Number of Trials that closed during the FY	0	0	0
Enrolment Numbers:			
Expected Local Subject Enrolment (for the term of the study)	532	532	532
Total Cumulative Subject enrolment at the end of the FY	203	325	55

Table 11 reflects a sample of key guidelines, drugs, diagnostic agents or devices adopted or approved in FY 2013-14 as a result of research driven by BCCDC/UBC CDC researchers, and their corresponding benefits. These outcomes represent important achievements in translational research that are improving patient outcomes and system sustainability.

Table 11
BCCDC/UBC CDC Outcomes Survey Responses

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	**Benefits to patients, population health, and/or health system sustainability of the items identified**
Environmental Health Services of BCCDC developed guidance for public health decision making during wildfire smoke events.	Guidance for BC Public Health Decision Making During Wildfire Smoke Events ("the guidelines") have been applied by public health decision makers in BC and the Northwest Territories (NWT). Interest from other provinces and countries is building. These guidelines provide new evidence for use of portable filters to create clean air shelters in homes and community settings, mask use and evacuation.
Canadian guidelines on Antimicrobial resistance in *N. gonorrhoeae* – available at:	Influenced national guidelines for rapid change to increased dose for cefixime/dual therapy in the treatment of gonococcal infections.
BCCDC's work in harm reduction has set standards for participatory (i.e. including people who use drugs) methods in policy/guideline development, evaluation and research.	BCCDC introduced a provincial take home naloxone program 2 years ago which saves lives and morbidity related to opioid overdoses. We are the only province with a program that has run consistently for more than 1 year and to date have reversed 120 overdoses.
Research being conducted at BCCDC is one step closer to the creation of a vaccine to stop *Chlamydia*, one of the most widespread bacterial diseases in the world. *Chlamydia* causes an estimated 92 million infections globally per year, with over 11,000 infections last year in BC alone. With existing treatment programs failing to stem the spread of infection, a vaccine is widely acknowledged as the only way to prevent the suffering and significant infertility caused by *Chlamydia*.	Recently the patents, which PHSA co-owns with UBC, have been licensed out to a vaccine development company. Subsequent funding awarded from that to optimize the vaccine formation has been largely matched by a Genome BC supported Proof-of-Concept grant. After vigorous examination of the scientific value by the US National Institutes of Health, funding for consultants to help bring the discovery through the clinical pipeline have been awarded. Current negotiations are now underway with a possible big pharma sponsor for clinical trials which, if ultimately successful, would contribute to the well-being of all Canadians and result in substantial fiscal return on investment to the Province of BC.
Research conducted at BCCDC, in collaboration with the Canadian Sentinel Physician Surveillance Network (SPSN), contributed to recommendations made by the World Health Organization (WHO) Vaccine Strain Selection Committee (VSCC) for the northern and southern hemispheres. The WHO Global Vaccine Strain Selection Committee chose updated trivalent influenza vaccine (TIV) components for the northern hemisphere's upcoming 2014-15 influenza season. .	The Canadian SPSN involves collaboration between the 5 largest provinces of Canada and is led by the BCCDC. The interim 2013-14 publication of the SPSN was submitted to the WHO and lead BCCDC investigator was invited to present these findings to the WHO VSSC in Geneva on February 17, 2014. SPSN findings were incorporated in updated recommendations by the WHO for the trivalent influenza vaccine to be used by all countries of the northern hemisphere for the upcoming 2014-15 influenza season. The SPSN similarly contributed to the WHO VSSC meeting for the southern hemisphere in September 2013. In this way, the BCCDC-led SPSN rapid response research has influenced influenza vaccine production, national vaccine recommendations and the health of millions of influenza vaccine recipients in countries across the northern and southern hemispheres.

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
Literature review of published evidence related to the superiority of live attenuated influenza vaccine in children.	Literature review conducted in July 2013 by Dr. Skowronski in her role as influenza vaccine content expert informed recommendations in British Columbia for the preferential use of live attenuated influenza vaccine (over inactivated formulations) in children from age 2 years to less than 9 years of age. The literature review was also shared with Canada's National Advisory Committee on Immunization (NACI) leading to revision also of national guidelines and NACI statements related to pediatric LAIV and age-based preferential use.
Through in-depth sequence analysis of influenza A/H3N2 viruses contributing to low influenza vaccine effectiveness during the 2012-13 season, the Canadian Sentinel Physician Surveillance Network (SPSN), led by a BCCDC scientist, identified mutations in the vaccine virus that had emerged during egg-based vaccine production. The findings explained dramatic increase in facility outbreaks reported in BC and elsewhere during the 2012-13 season. This information has influenced the response to vaccines virus mutations introduced through egg based production and increased advocacy for cell based manufacturing approaches.	These findings were published in a peer-reviewed journal and were presented to the World Health Organization (WHO). The WHO subsequently highlighted the findings as important to the regulatory review and approval process and to advocacy for alternate approaches to egg-based manufacturing of influenza vaccine globally.
Drawing on several randomized controlled trial data sets, BCCDC scientists validated the methodologic innovation of the test-negative design (TND) for annual influenza vaccine effectiveness (VE) monitoring first pioneered by a team at the BCCDC.	This validation, published in peer review journal in September 2013, has been critical in supporting the TND for pre- and post-licensure evaluation of the annually revised trivalent influenza vaccine. Since introduced in BC for the purpose of annual influenza VE monitoring, the TND approach has been adopted by VE networks globally, including in the United States, Australia, and multiple countries of Europe and South America. Its validation has reinforced public health and regulatory acceptance of TND findings for monitoring the effectiveness of the annually-reformulated influenza vaccine administered to millions of people globally each year.
During the 2009 pandemic, Dr. Danuta Skowronski and her team at the BCCDC first reported an unexpected association between prior receipt of seasonal influenza vaccine and pandemic risk. This association was subsequently further demonstrated in at least four observational studies conducted across Canada during the spring-summer 2009. Results of a randomized controlled trial in ferrets published in a peer reviewed journal in early 2014, confirmed the increased pandemic disease risk in prior recipients of seasonal influenza vaccine and showed that seasonal influenza vaccine had a direct, negative impact on pandemic risk, clarifying the underlying mechanism.	These findings are critical in understanding the immunologic interactions between prior seasonal, human adapted influenza viruses and newly emerging pandemic strains, relevant to ongoing pandemic preparedness activities. The findings also directly influenced public policy in Canada through recommendations articulated in BC and elsewhere, to defer seasonal trivalent influenza vaccine receipt during the fall of 2009 pending availability of protective monovalent pandemic vaccine.
BCCDC researchers evaluated vaccine effectiveness (VE) of the annual trivalent influenza vaccine (TIV) with quadrivalent influenza vaccine (QIV), both inclusive of influenza B linages and influenza A subtypes. The vaccine is designed to protect against 3 flu viruses, whereas the QIV is to protect against 4.	Findings from this work shows that the QIV vaccine provides substantial cross protection from the influenza virus B included in the TIV and against a second strain of influenza B virus.

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
In collaboration with Quebec investigators, BCCDC investigators published findings showing a significantly greater risk of measles among 2-dose recipients whose first dose had earlier been given at 12 to 13 months rather than after ≥ 15 months of age.	The findings have been presented to the Pan American Health Organization in discussions related to assessing the optimal age at first dose of measles vaccine. The mechanism remains unknown, but vaccine failures in 2-dose recipients could have substantial implications for the goal of eliminating measles from the region of the Americas through a program of 2-dose vaccination
Preventive measures against the emerging swine-origin H3N2 variant (H3N2v) virus during agricultural fairs and petting zoos	The BCCDC Influenza & Emerging Respiratory Pathogens team has published three scientific papers assessing the epidemic risk and anticipated public health benefit of response activities such as immunization that have informed guidelines and policy recommendations related to agricultural fairs and the protection of swine workers in BC as well as nationally across Canada through the National Advisory Committee on Immunization.
A new computational method (TransPhylo) was developed to infer the network of potential person-to-person transmission events giving rise to an outbreak of infectious disease. The method uses as input a phylogenetic tree built from genome sequence data from the outbreak isolates, and returns a probability-weighted network of transmissions that could have given rise to the observed dataset. It has been made freely available over GoogleCode, giving researchers worldwide a starting point for the genomic analysis of a communicable disease outbreak.	This tool makes the emerging area of genomic epidemiology accessible to a wider array of researchers, giving them the ability to easily interpret their outbreak genomic data, and is able to reconstruct transmission patterns for outbreaks for which no epidemiological data is available

Women's Health Research Institute (WHRI)

Producing and Advancing Knowledge

In FY 2013-14, researchers affiliated with WHRI were awarded a total of $2,616,051 in research funding, which represents a 26.4% increase over last year. The amount awarded as Operating Grants ($2,403,946) makes up 92% of total awards. A breakdown of funding types and subtypes can be found in Figure 46 and by funding source category in Figure 47. WHRI's portion of the Indirect Costs Program grant totaled $99,651 for FY 2013-14 but is not included in total research funding or the figures below. WHRI shares investigators with a number of other health research institutes and universities and benefits from additional external grant revenues linked to these investigators. At this time, those research dollars are only included if a formal transfer agreement is in place to allocate attribution of shared investigator grants. As a result, total research funding below is understated.

Figure 46

Total WHRI Research Funding by Funding Type and Sub-type

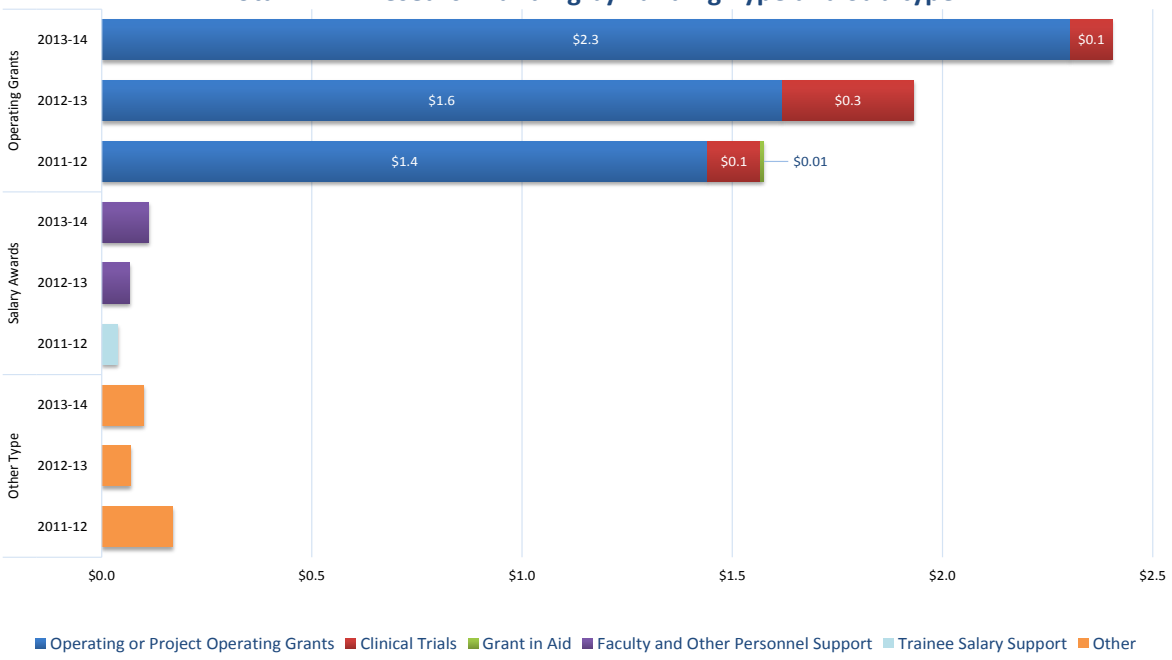
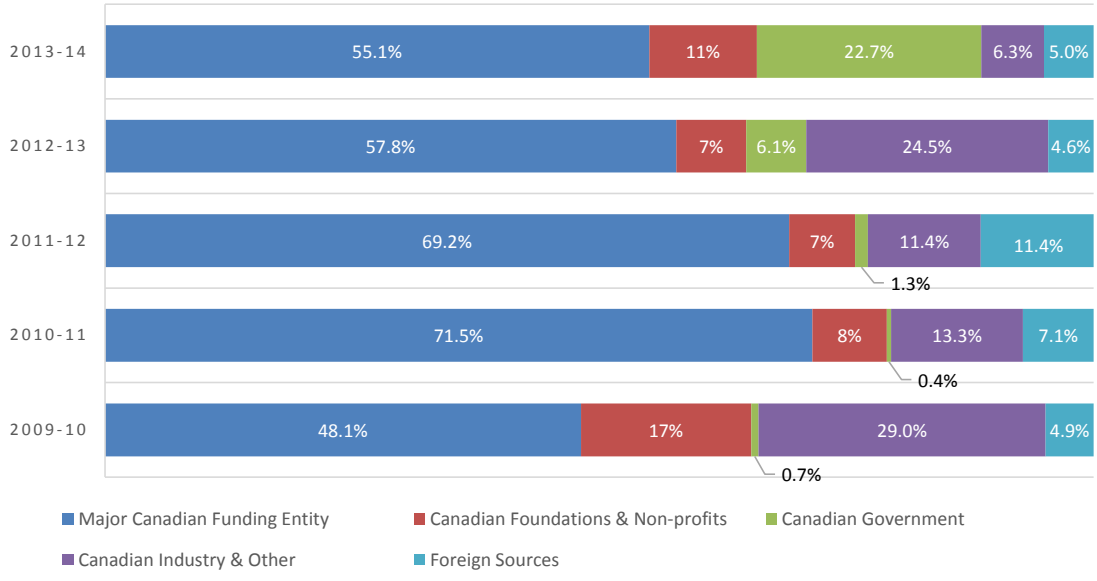


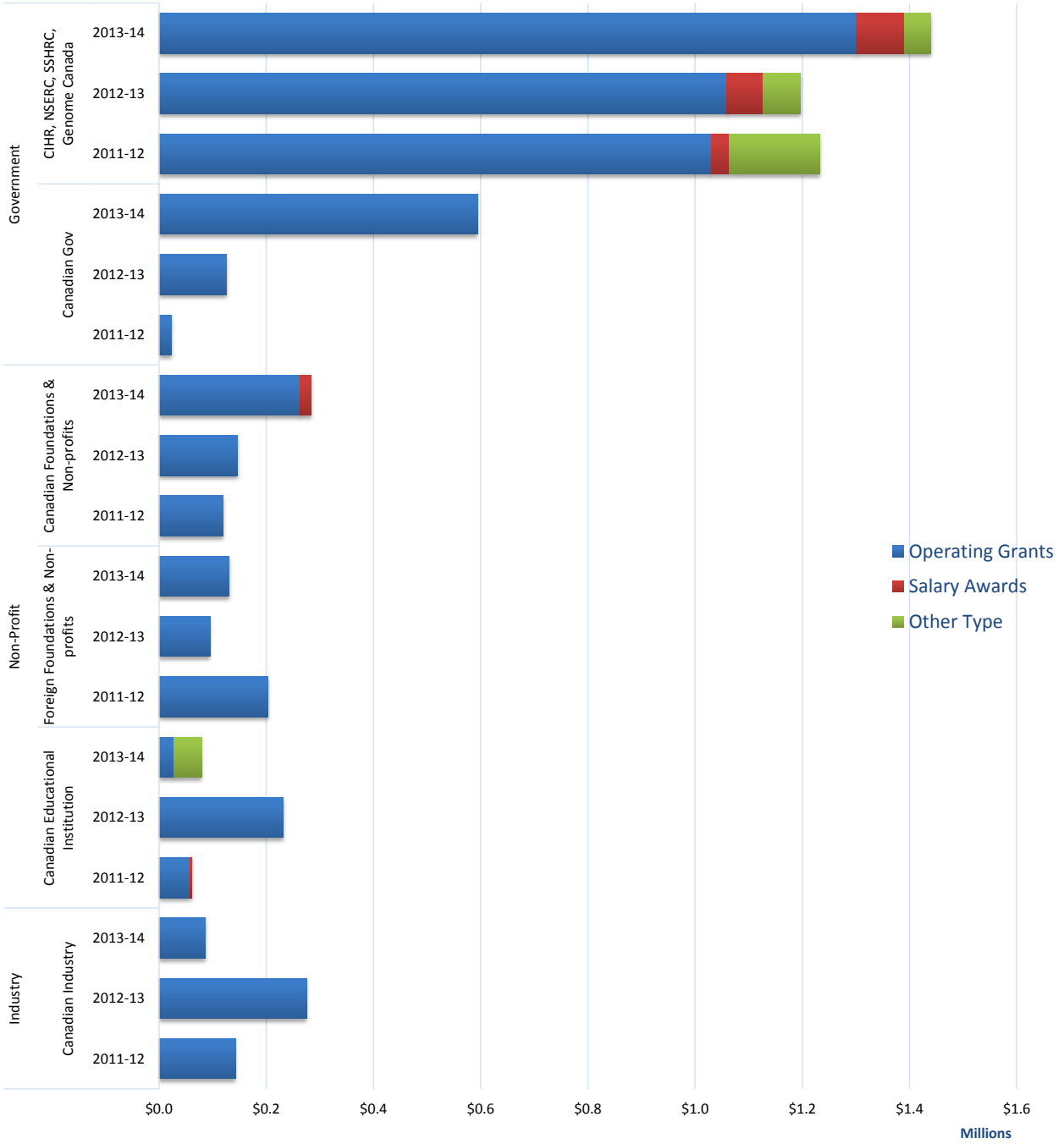
Figure 47

Percentage of WHRI Research Funding, including Major CFI grants by Funding Source Category by FY



In FY 2013-14, the top three funding categories are Major Canadian Funding Entity (55.1%), Canadian Government (22.7%) and Canadian Foundations & Non-profits (10.9%). Figure 48 details the major funding categories by funding type.

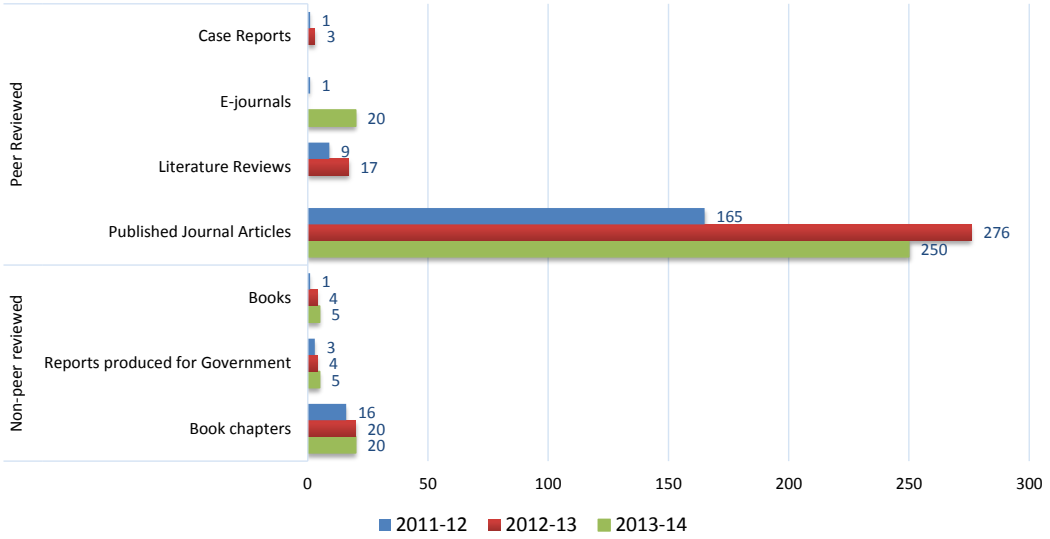
Figure 48
Total WHRI Research Funding by RISe Sector and Funding Source Category by Type



WHRI had one application submitted in the March and one in the September CIHR operating grant competitions. This is not graphically represented due to small sample size. Members of the WHRI apply for grant competitions that are offered by a variety of granting agencies.

WHRI had a total of 300 publications in FY 2013-14 of which 90% were peer reviewed. Total number of publications by type and category (peer vs. non-peer reviewed) is shown in Figure 49. Peer review represents the gold standard for scientific credibility. The agency total represents the number of publications where at least one agency researcher was an author of the publication. When researchers from more than one research entity/agency collaborate on the same publication, it is counted once for each agency.

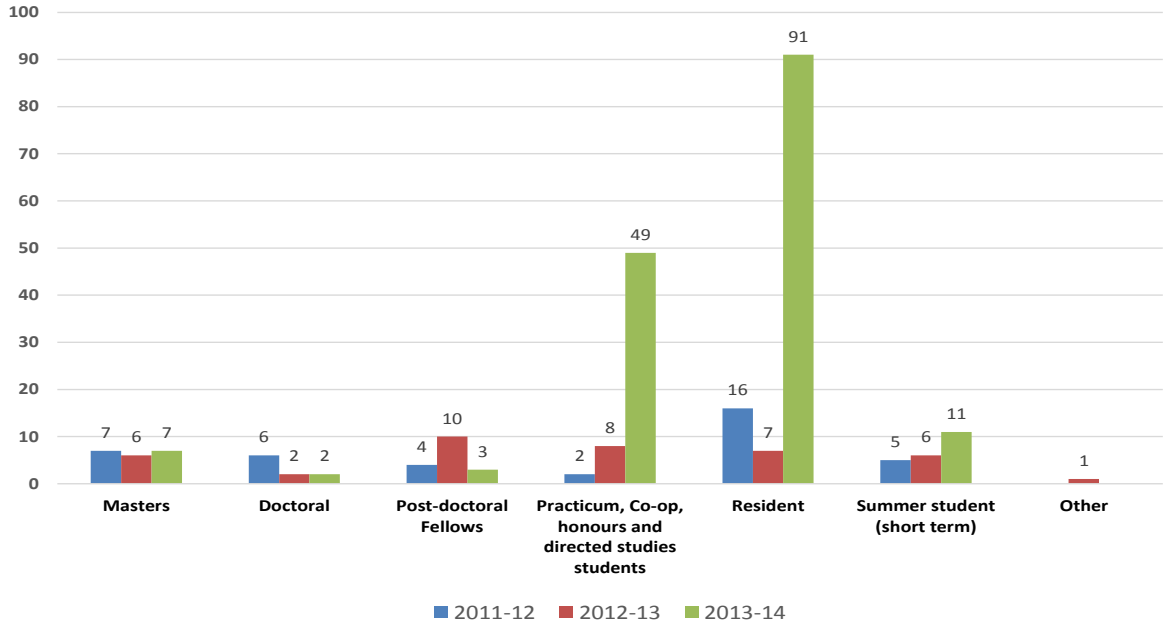
Figure 49
Total Number of WHRI Publications by Type and Category



Building Research Capacity

WHRI researchers provided training and supervision to a total of 163 trainees, more than twice what's been reported in previous years (see Figure 50). In FY 2013-14, WHRI trialed a new method of contacting members for data collection which resulted in a much higher response rate and more accurate data.

Figure 50
Total Number of WHRI Trainees by Type



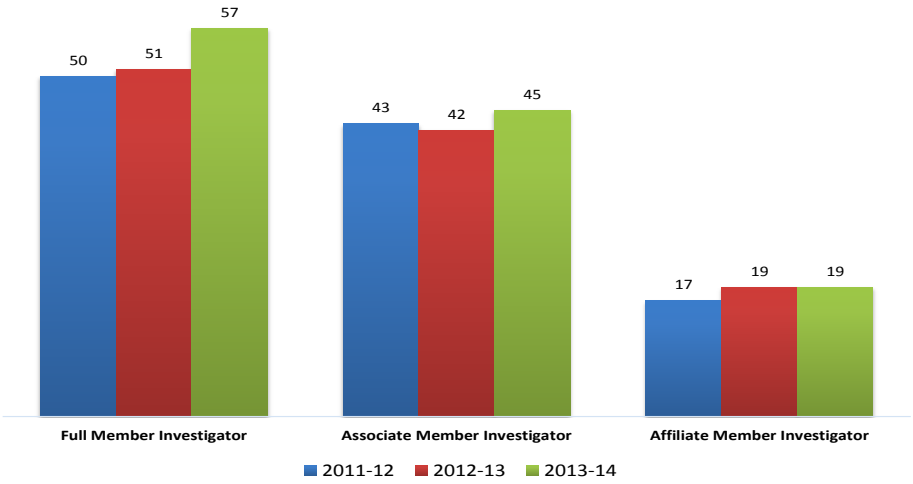
In an effort to show WHRI's activities, their membership statistics are shown (see Figure 51). In FY 2013-14, the number of full members increased by 6 and the number of associate members by 3. The membership categories are as follows:

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. CFRI) that they wish to maintain; the result is a dual membership with the WHRI and their current affiliation.

Affiliate Member Individuals who are extensively involved with another institute, but may have projects that would overlap with WHRI.

Figure 51
Total WHRI Membership by Category



Advancing Health and Policy Benefits

As described in the PHSA overall section, efforts continued this year to refine the data collection process to provide the most accurate and complete data. The process now entails capturing total subject enrollment and cumulative enrollment to date from the annual renewal applications at the UBC ethics boards (BCCA, C&W and CREB REBs). Previous years have utilized a manual process of requesting data from individual PIs and was subject to poor response. In addition, we were able to capture clinical trial data from PIs who utilize PHSA facilities and resources but are not formally affiliated with one of the PHSA research institutes and PHSA PIs who utilize a non-PHSA ethics board. These changes have resulted in the restatement of data for the past three fiscal years for all agencies and the removal of the enrollment within the FY data as it's not captured as part of REB post approval activities. Of note is that approximately 34% of WHRI trials had no enrollment figures. Once these fields are made mandatory as opposed to optional, as they now are, enrollment figures should increase.

Table 12
WHRI Clinical Trials

	11-12	12-13	13-14
Total Number of Clinical Trials active during the FY	30	26	26
Status of the Trial at the end of the FY:			
Total Number of Active Trials	30	26	26
Total Number of Trials that closed during the FY	13	7	6
Enrolment Numbers:			
Expected Local Subject Enrolment (for the term of the study)	4,479	3,694	3,709
Total Cumulative Subject enrolment at the end of the FY	1,885	2,223	1,811

Table 13 reflects a sample of key guidelines, drugs, diagnostic agents, or devices adopted or approved in FY 2013-14 as a result of research driven by WHRI researchers, and their corresponding benefits. These outcomes represent important achievements in translational research that are improving patient outcomes and system sustainability.

Table 13
WHRI Outcomes

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	Benefits to patients, population health, and/or health system sustainability of the items identified
WHRI researchers participated in a trial brought before the Supreme Court of British Columbia that resulted in the reinstatement of the Mother-Baby Program at the Alouette Correctional Centre for Women.	Based on the evidence provided by WHRI researchers from the trial, the court ruled that the BC Government's decision to cancel a correctional program for the mothers of newborns was unconstitutional since it was a violation of women's right to security of the person and not in the best interest of the child as it caused separation of mothers and infants during a critical bonding period. The reinstatement of the program will result in improved outcomes for the babies of incarcerated women, through bonding, breastfeeding and the development of close familial attachments.
Participation in the Genetics Committee initiative that led to the development of the national clinical practice guideline: *Pregnancy Outcomes After Assisted Human Reproduction*.	Improved maternal and fetal outcomes due to optimized obstetrical management of assisted human reproduction pregnancies and more accurate counseling of prospective parents regarding the risks of obstetric and pediatric complications.
A WHRI/CFRI researcher was one of the principle authors of a guidance document for specialized pediatric infectious disease training for clinicians: *Recommended Curriculum for Training in Pediatric Transplant Infectious Diseases.*	The guidance document produced will lead to improved health care sustainability and improved patient outcomes due to specialized training for pediatric infectious diseases practitioners in the area of pediatric transplant infectious diseases.
WHRI/CFRI participation in the Maternal Fetal Medicine Committee initiative led to the development of the national clinical practice guideline: *Intrauterine Growth Restriction: Screening, Diagnosis, and Management*.	The development of the national guideline will improve outcomes for neonates diagnosed with intrauterine growth restriction due to better long-term clinical follow-up, increased clinician recognition of intrauterine growth restriction and evidenced-based intervention.
A WHRI researcher was one of the leads of a study designed to compare automated and manual office blood pressure measurement. The findings of this study have led to the inclusion of automated office blood pressure measurement in clinical practice guidelines.	The new clinical practice guideline has improved outcomes for patients undergoing in-office blood pressure measurement in a primary care setting. Increased accuracy of in-office blood pressure measurement results in more optimal diagnosis and treatment of hypertension.
WHRI participation in the Genetics Committee initiative has led to the development of the national clinical practice guideline: *Investigation and Management of Non-Immune Fetal Hydrops*.	The new guideline Improves maternal and fetal outcomes due to better counseling and optimized obstetrical management of cases of prenatally diagnosed non-immune hydrops.
WHRI researchers authored a review of clinical practice guidelines targeted at preventing HIV transmission from mother to child at the time of delivery: *Prevention of Vertical HIV Transmission and Management of the HIV-Exposed Infant in Canada in 2014*.	Improved outcomes for HIV-exposed infants, including reduced risk of vertical transmission of HIV at the time of delivery and improved long-term clinical follow-up of HIV-exposed infants and children.
Development of the national clinical practice guideline: *Best Practices to Minimize Risk of Infection with Intrauterine Device Insertion*.	The new national clinical guideline improves patient outcomes due to decreased rates of complications and infection. Appropriate use of screening for sexually transmitted infections and use of prophylactic antibiotics will result in decreased costs to the health care system and will reduce associated harms to the patient.

Guideline, drug, diagnostic agent, or device adopted or approved in 2012-13 as a result of research driven by PHSA researchers	**Benefits to patients, population health, and/or health system sustainability of the items identified**
A WHRI researcher was the principle author of national clinical practice guideline: *The Prevention of Early-Onset Neonatal Streptococcal Disease.*	Improved maternal and neonatal outcomes due to evidence-based screening and management of pregnancies at risk for neonatal group B streptococcal disease. These guidelines will also result in cost savings due to targeted use of antibiotics.
Drafting of the national clinical practice guideline: *Cervical Insufficiency and Cervical Cerclage.*	This national guideline will Improve maternal and fetal outcomes, including the avoidance of unnecessary procedures and their associated risks. Cost savings and improved patient safety in limiting the use these procedures to situations of maximal benefit to patient outcomes.
Development of the national clinical practice guideline: *Abnormal Uterine Bleeding in Pre-Menopausal Women*.	Improved patient outcomes due to use of evidence-based guidelines for the diagnosis and management of abnormal uterine bleeding among women of reproductive age. This new guideline will also decrease costs to the health care system and increase patient safety through recommendations for the use of least invasive surgical modalities.

Registries & Datasets

Advancing Health and Policy Benefits

Modification to the annual Registries as Research Resources survey were made this year after consultation with PHSA registry data stewards. In addition to the data collected in previous years, this year's survey was redesigned 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 14 PHSA registries or datasets, were invited to participate in a survey designed to assess the research activities of the registry/dataset. Completed surveys from 12 out of the 14 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.

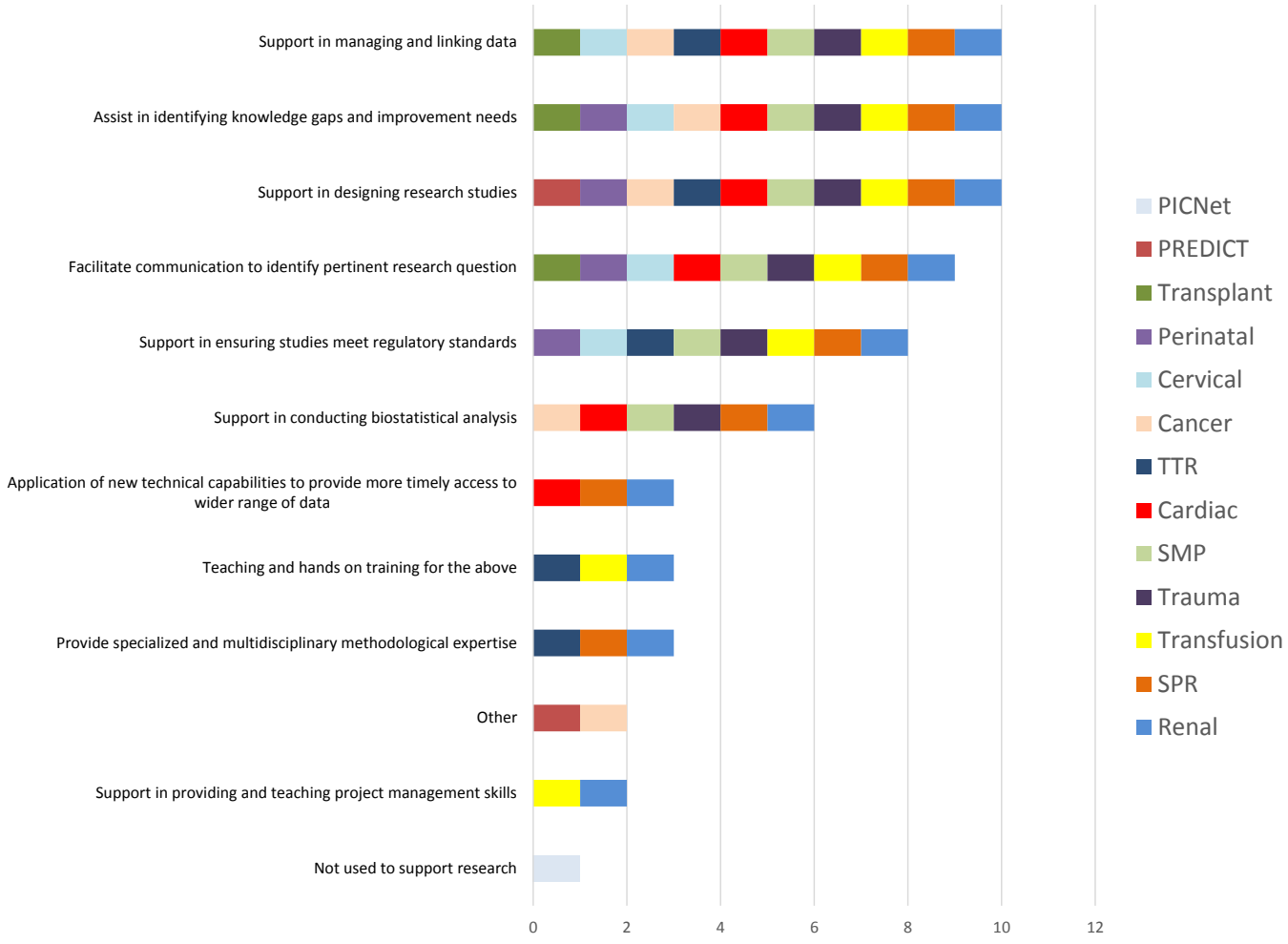
Registry/Dataset	Purpose
BC Cancer Registry	The BC Cancer Registry is a population-based registry of all cancers diagnosed in British Columbia residents. It collects data and generates cancer statistics on the BC Population for the purpose of monitoring the burden of cancer in the province. It also serves 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.
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 Transfusion Registry (CTR)	The (CTR) is a population based 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 PBCO and its provincial stakeholders use the CTR to support transfusion medicine utilization, quality and safety initiatives.
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.
PREDICT	PREDICT - Personal Response Determinants in Cancer Therapy is a unique centre-wide research project that has embedded a research culture into the day to day clinical care activities of the BC Cancer Agency's Vancouver Island Centre (VIC). The goals of PREDICT are to: 1) create a population-scale biobank of blood samples obtained prior to initiation of systemic therapy from 20,000 new cancer patients; 2) obtain permission from all new patients to be contacted to participate in future research projects, overcoming ethical and logistical hurdles to translational health research; and 3) engage 75% of new patients and staff at the VIC in a common research endeavour that changes the culture of a cancer centre. PREDICT provides a unique platform to support specific research into host factors, such as the patient's immune system and adverse reactions to therapy, that influence the outcome of cancer therapies.
PICNET	Provincial Infection Control Network of BC's aim is to to reduce healthcare-associated infections in BC healthcare facilities. Key areas of focus are surveillance, evidence-based guidelines, and education.
PROMIS-BC Renal Agency/Transplant	Patient Records and Outcome Management Information System – is the renal care community's clinical information system. With data collected from the 39 renal units in British Columbia, PROMIS supports: Individual patient care management; Renal unit management;

	Continuous quality improvement and research; Outcomes-based planning. PROMIS database is used as a source of important epidemiological data in support of clinical trials and for assessing new therapies.
Screening Mammography Database (SMP)	Clinical system for scheduling, reporting and tracking of screening mammography exams.
Surgical Patient Registry (SPR)	SPR is a provincial program involving the five regional Health Authorities, the Provincial Health Services Authority (PHSA) and the Ministry of Health (MoH). SPR tracks patients waiting for surgery in British Columbia and provides information to evaluate and monitor surgical wait times in the province.
Tumour Tissue Repository (TTR)	TTR is a provincial resource to support translational cancer research at the BCCA, 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

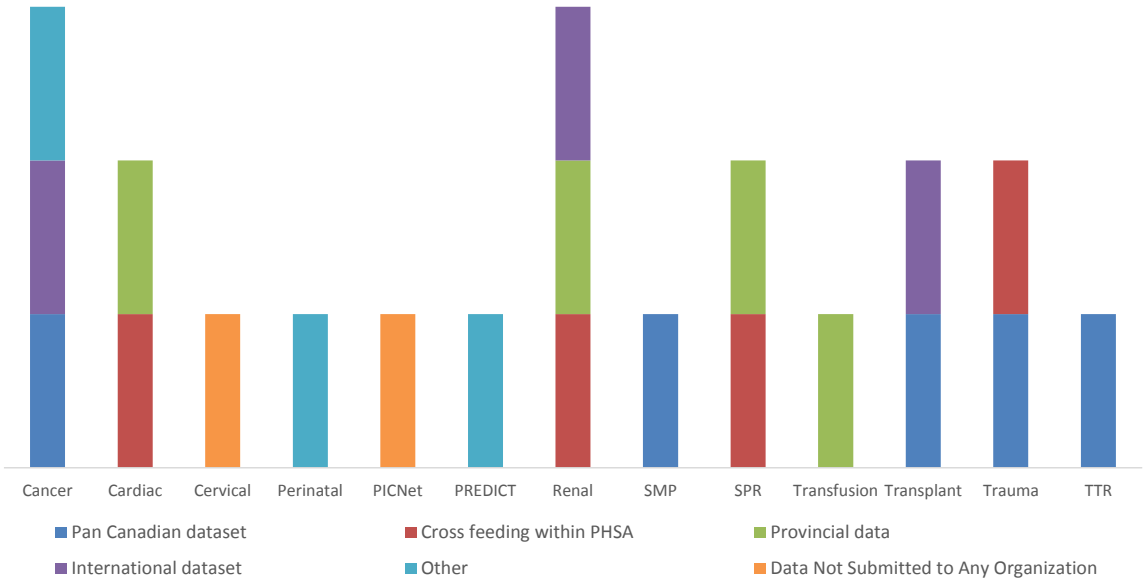
Eleven (11) out of the fourteen (14), or 79% of registries/datasets are used for the purpose of research as defined by UBC (see Glossary, page 72). In addition, respondents were asked to identify other activities they provide in support of research. Figure 52 lists the support activities by registry/dataset. An additional support activity was defined as supporting investigators by providing research infrastructure and/or sample data.

Figure 52
Research Activities Supported by Registries and Datasets



Respondents were asked for the first time this year if they submit data to external organizations for the purposes of research. See Figure 53 for the breakdown of data set type by registry/dataset for FY 2013-14. The **Other** category in Figure 53 refers to registries identifying the submission of data which is then used for other data linkages.

Figure 53
Provision of Data to external Data Sets by Type



Names of the external datasets include:

Provincial: Surgical Patient Registry (SPR) Completed Surgical Cases
Population Data BC
Statistics Canada

Pan Canadian: Canadian Cancer Registry
Canadian Organ Replacement Registry (CORR)
Public Health Agency of Canada (Canadian Breast Cancer Screening Database)
National Trauma Registry
Terry Fox Research Institute – Canadian Ovarian Experimental Unified Resource (COEUR)
Canadian Tumor Repository Network (CTRNet)

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

In addition to Registries listed above, BC Emergency Health Services (BCEHS) submits data to an international registry, the Resuscitation Outcomes Consortium (ROC) which is a clinical trial network focusing on research in the area of pre-hospital cardiopulmonary arrest and severe traumatic injury. The result are 4 distinct data sets; Cardiac Clinical Trials, Trauma Clinical Trials, Cardiac Arrest Registry and Trauma Registry. There were no requests or approvals to access these data sets in FY 2013-14.

Nature of Research Activities

CIHR (Canadian Institutes of Health Research) categorizes health research into four broad themes: biomedical research, clinical research, health services research (research respecting health systems and services); and social, cultural, environmental and population health. Research pursued using the registries/datasets above are categorized in Figure 54. Access requests are summarized in Figure 55. For examples of the types of research questions posed by researchers, please see Appendix 1.

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

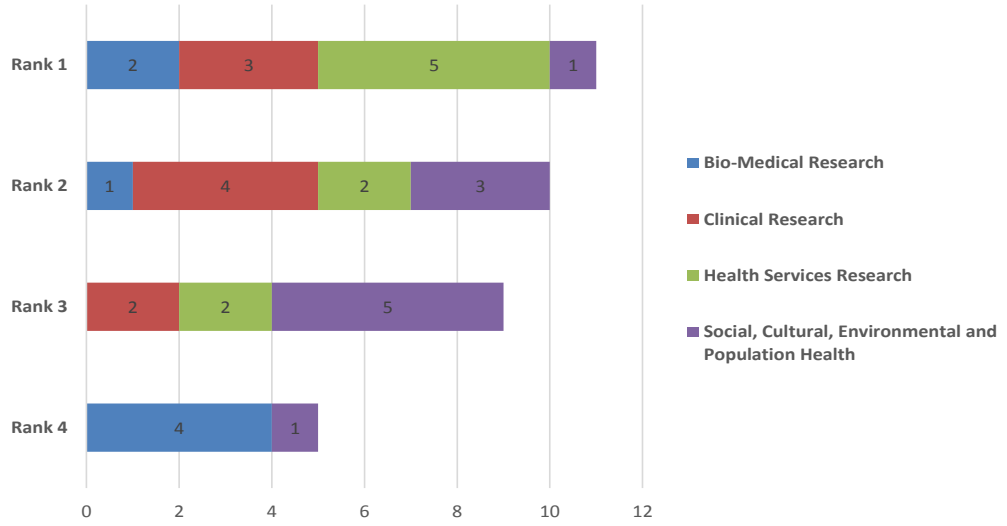
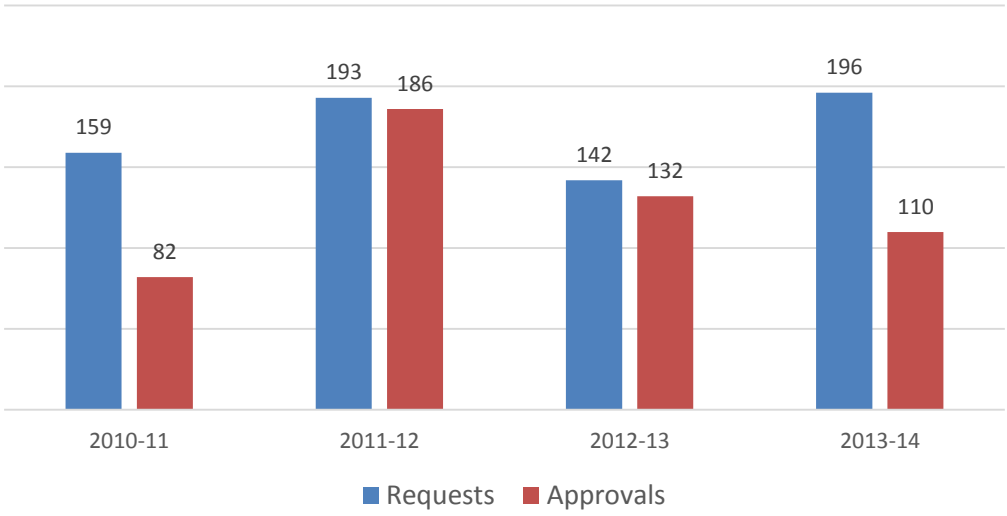


Figure 55
Research Access Requests and Approvals from Registry/Dataset by Fiscal Year



In addition, BCEHS manages two distinct data sets for ongoing research; King Airway and the Red Blood Cell Products Pilot Project. There were two (2) requests and one (1) approval for access to these in FY 2013-14. BC Emergency Health Services is mainly a health service delivery agency whose mandate includes the production of knowledge in the patient populations they serve.

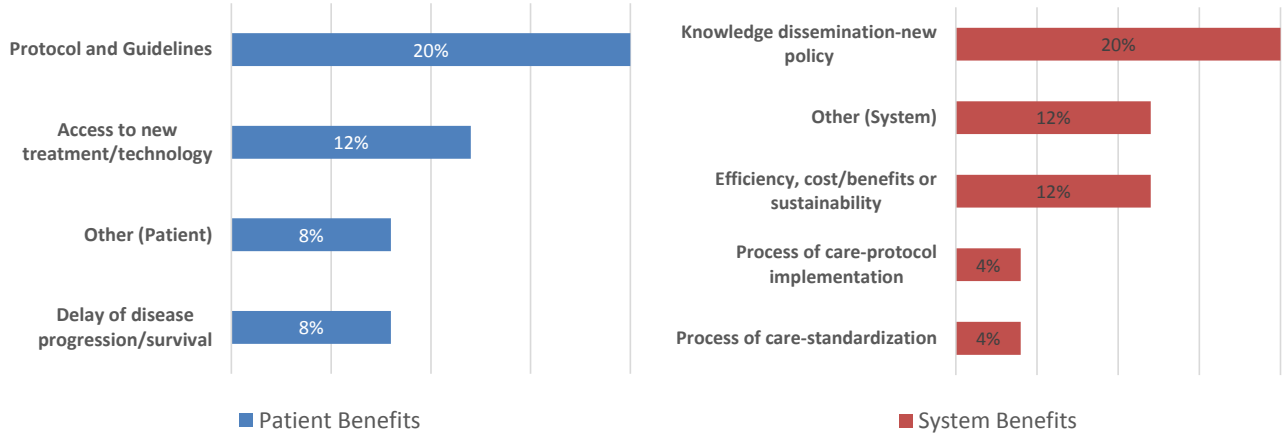
Research Benefits

In this year's revised survey, data stewards were asked to classify the research benefits identified for FY 2013-14 into two distinct categories; Patient Benefits and System Benefits. See below for further detail on benefit types. Benefits resulting from research activities are close to being evenly split with 52% attributed towards System Benefits and 48% towards Patient Benefits.

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

Figure 56 shows the percentages for each benefit category as a result of the registry and dataset usage for FY 2013-14.

Figure 56
Percentage of Benefit Sub-type by Type for FY 2013-14



A sample of patient and/or system benefits that were quantified, identified, or attained in FY 2013-14 that resulted from research based on the registry or dataset is excerpted below.

Table 15

Registry/dataset Patient and System Benefits

BC Perinatal Database Registry (Perinatal Health Program)	• One study that looked at the use of maternal serum markers to predict obstetrical risk factors found the use of combination of serum and clinical risk factors help to identify women at higher risk for serious perinatal events. This will assist physicians and midwives to provide relevant clinical observation for those at risk.
PREDICT	• The PREDICT infrastructure is supporting a clinical trial that is testing a new method to detect ALK mutation using very small amounts of tissue. • Due to the use of this new methodology (mentioned above) mutation has been detected and the patients then received treatment and are surviving longer. • The PREDICT research infrastructure (consenting, database, project management) has supported different projects within our centre making the system more efficient.
BC Trauma Registry	• New Hypothermia Protocol to improve the outcome of patients who obtained hypothermia in a particular manner. • Non-operative method to rib fracture fixation. • Injury prevention initiatives. • Informing new BC Policy on alcohol liberalization. • Reduction of speed limit in the downtown eastside from a GIS study of injuries.
BC Cancer Registry	• In terms of cancer prevention, two studies that used the BC Cancer Registry were part of an international evidence review by IARC (the cancer research wing of the WHO) which made the recommendation to declare PCBs carcinogenic in humans (IARC reviews evidence for many chemicals and their recommendations form the backbone of much of the regulation around potentially carcinogenic compounds). • A paper which used the BC Cancer Registry data was published this year that evaluated whether PSA screening for prostate cancer would be cost-effective for BC. This contributes additional important information to this issue as to whether PSA programmatic screening would benefit us as a population or not. • Three papers which used the Registry data investigated the safety of using a type of radiotherapy (RT) in BC in terms of several long-term outcomes. This RT has been used in BC and felt not to have long-term consequences compared to regimens delivered more commonly in other jurisdictions. Generally the data support the way BC has been providing this radiotherapy and this information suggests patients can safely receive this.
BCEHS/ROC	• We utilize this database as part of our cardiac arrest data collection towards the reporting of EMS response times and patients survival to hospital discharge rate.
Screening Mammography Database	• Decision Aid tool developed using screening outcome data.
Surgical Patient Registry	• Areas of high variation have been identified through research. This will enable us to standardize care processes through protocols and guidelines. • Less blood transfusions results in dollar savings for blood processing, transfusion and follow up care, plus reduced length of stay in hospital. • Literature and best practice has been reviewed and shared provincially. • Fewer transfusions for the patient result in less risk of having a side effect.
Tumour Tissue Repository	• Contributing to the national certification of biobanks in coordination with provincial, national and international biobanking organizations. • Creation of a "Return of Biospecimens for Clinical Purposes" Standard Operating Practice for the Canadian Tumour Repository Network.
PROMIS - Renal	• Access to nocturnal dialysis in centre dialysis • Improved access and use of erythropoietin-stimulating agent (ESA) therapies; improved symptom control for pain management • Protocol for anemia management; Pain management protocol • Use of TPA for catheter related problems

Appendix 1 - Example Research Questions by Registry/Dataset

BC Perinatal Database Registry (Perinatal Health Program)	• To evaluate the risk of pulmonary embolism (PE) and deep vein thrombosis (DVT) in major rheumatic diseases. • What are the risks of adverse maternal and perinatal outcomes associated with different pre-pregnancy weights? • To determine if the benefits of scheduling planned repeat cesarean deliveries (PRCD) at or after 39 weeks outweigh the risks of such scheduling practices in terms of adverse maternal and neonatal health outcomes in term births to mothers scheduling a planned repeat cesarean delivery. To determine the maternal and infant responses to maternal vitamin D supplementation during pregnancy and lactation. • To determine the maternal and infant responses to maternal vitamin D supplementation during pregnancy and lactation • What is the prevalence and pattern of arthritis medication use before, during, and after pregnancy among women with arthritis?
PREDICT	• What is the prevalence of PD-L1 in serum of patients with pancreatic cancer? • What are the effects of a 6-week supervised physical activity program on physical activity behaviour and quality of life of people with CRC?
Surgical Patient Registry	• How is blood used for surgical cases, by clinical specialty group and by HA, surgeon and facility? • What is the need for blood products for provincial surgical services in the future? • What are the determinants affecting blood use?
BC Cancer Registry	• A provincial database review of long-term health outcomes of HIV uninfected children born to HIV infected mothers, and cellular aging and HIV comorbidities in women and children. • What sources do prostate cancer patients use for disease information? • A randomized controlled trial of an online support group for sexual distress due to gynecologic cancer • TNM staging and prognostic factors for neuroendocrine tumours of the small bowel, appendix and rectum • Cervical cancer in Women ≤ 25 yrs: an investigation of screen-detection rates in young women • The BC Glomerulonephritis Registry: the justification for a provincial registry of patients with glomerulonephritis • Pediatric Melanoma in British Columbia: a review • Personalized Treatment of Lymphoid Cancer: British Columbia as Model Province • Healthcare Services Utilization of HIV-positive Persons in BC • Breast reconstruction wait times in BC
BC Trauma Registry	• Early Determination of Neurological Prognosis in ICU Patients with Severe Traumatic Brain Injury: TBI – Prognosis Multicenter Prospective Study. • Trends in spinal cord and column injury from a single institution over a decade. • Observational and investigator driven access to care and timing (ACT) study for spine injuries tracking experience and outcomes. • Epidemiology of Traumatic Brain Injury in BC. • Evaluation of Pre-Hospital Blood Transfusions. • Evaluation of a 64-slice Computed Tomography protocol to clear cervical spinal injuries. • The Spatial Epidemiology of Traumatic Head Injury in British Columbia and Alberta. • Retrospective analysis of presence of Pulmonary Embolism in trauma patients. • Retrospective study to look at severely injured polytrauma patients at VGH to determine if there is evidence of shock that can be identified on CT Effectiveness of MDCT in the Screening of Blunt Vascular Neck Injuries scans.
Screening Mammography	• Development of a Micro-simulation Model for Breast Cancer to Evaluate the Impacts of Different Early Detection and Screening Strategies. • CAN-IMPACT: Towards Comprehensive Care throughout the Breast Cancer Care Trajectory in British Columbia, Canada. Describes time to diagnosis and characteristics of pre-diagnosis care among women diagnosed with breast cancer in British Columbia (BC), and high users of care in this phase. • Estimates of the effect of a single screening mammogram on the recognized risks and benefits of screening.
Cervical Cancer Screening Program	• Incidence of cervical carcinoma and CIN3 in women under 25 years old: the BC Cervical Cancer Screening program experience • Evaluation of Post-LEEP clinical outcomes for the BC Cancer Agency Cervical Cancer Screening

	Program • The Effectiveness and impact of Pap smear screening in the prevention of cervical cancer
PROMIS – Transplant Registry	• Evaluation of chronic allograph nephropathy with novel ultrasound technology • Chronic kidney disease, Home Care utilization and expenditures • Sequential therapy for the initial treatment of post-transplant lymphoproliferative disorder (PTLD). • Determine the association of MPA dose reductions with post-transplant outcomes in patients who did not receive maintenance corticosteriods post-transplant. • Longitudinal analysis of the status and wait times of liver transplant recipients. • To understand the characteristics of the donor (age/cause of death) whether numbers are increasing/decreasing over the time frame and view trends. • To elucidate whether there is an association between hypomagnesaemia ant the development of nephrotoxicity in liver transplant recipients. • Treatment of Patients with Diabetes (Type I & II) and Coronary Artery Disease in British Columbia: An Outcomes Analysis of the Past, Present and Future. •
BC Cardiac Registry	• Influence of peri-operative stroke on early and late mortality following open heart surgery. • Impact of a red blood cell utilization quality assurance project on cardiovascular surgery in British Columbia. • Clinical significance of exercise induced ST-segment elevation in lead aVR. • Sex Differences and Temporal Changes in Patient-Reported Health Status among Younger Adults Following Acute Myocardial Infarction (AMI). • FFR Select Trial: A Randomized Comparative Effectiveness Study of Routine versus Selective Use of Fractional Flow Reserve (FFR) to Guide Non-Emergent Percutaneous Coronary Intervention (PCI). • Causes of mortality and morbidity after PCI in a regional cardiac program in BC. • Temporal Trends in Utilization of Evidence-based Medications for Secondary Prevention of Cardiovascular Events in British Columbia. • Temporal Trends in Utilization of Evidence-based Medications for Secondary Prevention of Cardiovascular Events in British Columbia. • Cardiac Medication Use Post-Catheterization in Patients Undergoing Coronary Angiography for Suspected Ischemia with Non-Obstructive Coronary Artery Disease.
Tumour Tissue Repository	• Can specific subsets of T cells distinguish between new primary and true recurrence types of ipsilateral breast tumour recurrence? • Can immune cells and cell membrane proteins indicate disease progression and cancer treatment responses in non-small cell lung cancer? • What is the specificity of antigen receptors in different populations of lymphocytes in ovarian cancer? • How can the study of rare tumours be utilized to improve treatments in both the rare and common cancers?

Appendix 2 - Framework for PHSA Research Metrics

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

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

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

   a. Total # trainees by agency/research entity
   b. Scholarships/fellowships by agency/research entity
   c. Total # researchers by agency/research entity
   d. Infrastructure investments
      i. E.g. – hospital research fund, CFRI, capital projects etc.
      ii. Databases (patient, tissue) etc.
   e. Indirect Costs Program

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

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

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

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

Appendix 3 - Research Metrics Working Group Membership*

Julie Wei
Manager, Quality Analytics, BC Emergency Health Services

Ellen Chesney
Chief Administrative Officer - Research, PHSA

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

Ognjenka Djurdjev
Corporate Director, Performance Measurement & Reporting, PHSA

Nur Eisma
UBC/C&W Coordinator Pre & Post Awards

Karin Jackson
Director, Research Administration & Performance Improvement
BC Mental Health & Addiction Services

Karen Hagan
Grants Advisor, Office of Research Facilitation, BC Cancer Agency

Nathalie Pilkington
Coordinator, Faculty & Institutional Initiatives, Child & Family Research Institute

Beth Palacios
Consultant, Performance Measurement & Reporting, PHSA

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

*As of September, 2014

Appendix 4 - Glossary

Glossary

Term	Description
Metric Definitions	
Metrics 1ab, 2b – Total annual grant awards, Total annual external grant awards by major funding categories and Scholarships/fellowships all by agency or research entity	Total Annual Award ($) for Grants, Awards and Contracts by Funding Source
Metric 1c – Annual grant application success rate by agency/research entity. Added in FY 09-10	Success rates for two CIHR operating grant competitions (March and September of applicable year) for BCCA and CFRI, BCMHARI and WHRI.
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 fiscal 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.
Metric 2a – Total number of trainees by agency/research entity	Total Number (head count, not FTE) of Research Trainees by Student Type. (Exclude clinical trainees who are supported during their brief research rotations.) Research trainees counted will be any individuals who are primarily supervised by a researcher affiliated with the reporting unit, during all or a portion of the reporting year.
Metric 2c – Total number of researchers by agency/research entity	List of Researcher Names including Research definition (This metric is to be collected based on CFRI methodology category types wherever possible, if not available in that format, please designate your category as "5" and add your research definition in the space provided.) Added in FY 11-12 is a column to collect whether a researcher is a shared resource or 100% attributable to a specific agency.
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.
Metric 2e – Indirect Costs 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, 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 Indirect Costs Program (ICP).

Glossary

Term	Description
Metric 3a - # of intellectual property disclosures, patents by agency/research entity	Total number of Invention Disclosure (internal documents), provisional patent and PCT applications by fiscal year.
Metric 3b – Licenses, royalty income and # spin-off companies (Revised FY 10/11)(Revised Net Licensing Rev definitions in FY 2013-14)	Total number of active license/assignment agreements and spin-off companies. List the names of all active spin-off companies. These numbers represent cumulative totals from year to year and are no longer reported by region. IP related revenue shall follow the UILO (University-Industry Liaison Office) definitions from FY 2010-11 forward. **Definitions:** **Gross licensing revenue** = Royalties + Equity Liquidated + Option Fees + License Fees + License Management + Technology Assignment; Royalties - royalty payments including minimum annual royalty payments License Fees – upfront payments, milestone payments and other payments associated with the license License Management - legal fees incurred by TDO (Technology Development Office) or UILO relating to the licensed IP and reimbursed by licensees **Total TDO Expenses for patenting and legal costs -** ? **Expenses for Licensed IP** – patenting, legal and related costs associated with licensed IP **Realized revenue per distribution agreements** – revenue accrued to PHSA agency after distribution to inventors, obligations due to affiliated academic institutions, granting agencies and inventor departments. The revenue distribution varies by entity and will be noted in the narrative. **Royalty, equity liquidated and licensee fees** When the UILO licenses technology to a company, the terms of the license typically includes a requirement to pay a % royalty on product sales, an upfront license fee and an annual license maintenance fee. The UILO may also negotiate an equity component (company stock) as part of the license agreement. Under the licensing scenario, the University still owns the technology but is granting a license to a third party. **Option Fees** This relates to the scenario when a company desires an option on a technology (essentially reserving/holding the technology). These are usually short-term contracts that have a modest option fee. **Technology Assignment** This relates to the scenario when a company wishes to take ownership of the technology and in return pays an Assignment fee.
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.

Glossary

Term	Description
Salary Awards	
Faculty and other personnel support	Dollar amount for FY for supported faculty salary awards including chairs.
Trainee salary support	Dollar amount for FY for supported trainee salary awards including trainee research allowances.
Infrastructure Awards	
Human Resources	Dollar amount for FY for Human Resource Infrastructure including Michael Smith Foundation for Health Research (MSFHR) - team start-up, team, research units, platforms, networks and institutional infrastructure, CFI Infrastructure Operating Fund (IOF) awards.
Capital, Equipment, Construction	Dollar amount for FY for capital, equipment, or construction awards including BC Knowledge Development Fund (BCKDF), matched sources (charities, industry) and other large equipment grants. Excluded are Canada Foundation for Innovation (CFI) awards (see next category).
Capital, Equipment, Construction - Major CFI (Added in FY 10-11)	Dollar amount for FY for capital, equipment, or construction Major Canada Foundation for Innovation (CFI) awards for Leading Edge Fund (LEF)/New Initiatives Fund (NIF) awards. Also included in these amounts are the matching funds (industry, educational, charity, etc.) to these awards. Excluded are $'s associated with the Infrastructure Operating Fund (IOF) or Leaders Opportunity Fund (LOF) from DFI. These get reported under Infrastructure - HR and Operating Grant categories respectively. (see Metric definition 2d for further detail)
Operating Grants	
Operating or Project Operating Grants (not exclusive of the next three columns)	Dollar amount for FY for operating or project operating grants including when the salary component is embedded in a grant; includes establishment grants; includes development grants.
Clinical Trials (4a) (Definition clarified in FY 10-11)	Dollar amount for FY for any research project that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes. Health related interventions include any intervention used to modify a biomedical or health-related outcome, for example drugs, surgical procedures, devices, behavioral treatments, dietary interventions, and process-of-care changes. Health outcomes include any biomedical or health related measures obtained in patients or participants, including pharmacokinetic measures and adverse events.
Clinical Trials (4a) (Definition clarified in FY 10-11)	Dollar amount for FY for research involving a new laboratory technique or process, e.g. a new more cost effective processing for a genetic diagnostic test, or a new tissue preparation process, etc. Trials that may use clinical material but do not directly involve patients in the research or involve a risk to the patients (may involve their tissue or blood samples however).
Grant in Aid	Dollar amount for FY for Grant-in-aid awards (Broad topic but not directed). A Grant-in-Aid is essentially a donation to one or more researchers, normally to conduct research in an area that is of mutual interest to both the donor and the researcher(s). These grants are normally in the form of a one page letter addressed to a researcher and signed by the donor, and accompanied by the grant funds. Characteristics: • Sponsor supports research activities of an individual researcher or group of

Glossary

Term	Description
	researchers. Sponsor does not restrict use of funds • Funds are paid in advance • No invoicing or financial statements are required by Sponsor • University/Host Institution retains all rights to inventions and other intellectual property • University/Host Institution is free to publish results • University/Host Institution provides the Sponsor with a final report only • Parties to the Agreement: University/Host Institution and Sponsor (may include University/Host Institution Affiliated Hospitals)
Other Funding Type – Service Contracts Added as sub-type of Other Funding Type category in FY2010-11	Characteristics: (1) Solely for testing, evaluation or analysis of materials or compounds owned by the Sponsor with no intellectual input or value-added by UBC. (2) Sponsor retains all rights to intellectual property provided by the Sponsor for the services
Other Funding Type – Donations & Endowment Interest Added as sub-type of Other Funding Type category in FY2010-11	A donation is a gift given by an individual or an organization to a non-profit organization, charity or private foundation in support of a specific purpose. Endowment – gift of money or income producing property to a public organization (such as a hospital foundation or university) for a specific purpose (such as research or scholarships). Generally, the endowed asset is kept intact and only the income (known as endowment interest) generated by it is consumed.
Other Funding Type	Dollar amount for FY, combined, of any grant, award or contract that does not fit into the above categories. Please specify name of Funding Type in space provided.
Funding Source Categories (rows)	
UBC RISe Sector	Sector denotes an area of the **economy** in which the funder is assigned. This decision is based on how the organization is funded. Three sectors are currently utilized by UBC's Research Information System (RISe) and include: **Non-Profit** – funding provided mostly by private donations and endowments. **Industry** – funding provided by a for-profit business in the private or commercial sectors of business. **Government** – funding provided by local, provincial, national, federal or foreign government entity. [definitions to be further developed with input from Working Group and RISe personnel]
Funding Sources/Granting Agency	The rows on worksheet 1ab, 2b that correspond to the funding sources agreed to by the Research Metrics Working Group on July 22, 2009 and modified in subsequent fiscal years.

Glossary

Term	Description
CIHR and its institutes (included in Major Canadian Funding Category)	The Canadian Institutes of Health Research and its thirteen subsidiary institutes: * Aboriginal Peoples' Health * Aging * Cancer Research * Circulatory and Respiratory Health * Gender and Health * Genetics * Health Services and Policy Research * Human Development, Child and Youth Health * Infection and Immunity * Musculoskeletal Health and Arthritis * Neurosciences, Mental Health and Addiction * Nutrition, Metabolism and Diabetes * Population and Public Health
CCSRI (formerly NCIC/Canadian Cancer Society/CCSR) – (name changed to CCSRI for FY 11-12 and moved to CDN Foundation & Non-profit category)	On February 1 2009, the Canadian Cancer Society integrated the operations of the National Cancer Institute of Canada (NCIC), creating the Canadian Cancer Society Research Institute. Grants from all three of these organizations should go in this category.
NSERC (included in Major Canadian Funding Category)	Natural Sciences and Engineering Research Council
SSHRC (included in Major Canadian Funding Category)	Social Sciences and Humanities Research Council
Genome Canada and provincial Genome agencies (included in Major Canadian Funding Category)	Genome Canada, and its regional centres: Genome BC, Genome Alberta, Ontario Genomics Institute, Genome Quebec, Genome Prairie, and Genome Atlantic
MSFHR (included in Major Canadian Funding Category)	Michael Smith Foundation for Health Research (BC)
Canadian Industry	Canadian-based for-profit corporations. Decisions on whether a funding source is Canadian or Foreign are driven by award payment or contract address.
Canadian Foundations & Non-Profits (name modified in FY 12-13 to align with UBC categories – all historical data was recoded)	Canadian not for profit organizations including foundations and charities. These include grants that are “internally” sourced (i.e. that are from CFRI, BCCA or their affiliated Foundations such as BCWF, BCCHF, 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.

Glossary

Term	Description
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.
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 agency for a limited period (e.g. over the summer, a few weeks)
Residents	MDs engaged in a residency program that may include a research rotation
Practicum, co-op, honors and directed studies students	High school and/or university students whose assignment to the reporting organization is according to a practicum, co-op, honours and/or directed studies program
Other Research Trainee Type	(Reporting organization to specify definition)
Research Trainees (rows)	
Do you Support These Types of Research Trainees	To be answered Yes or No for each Research Trainee Category listed above. Is used to indicate that a research entity does have Research Trainees of this type but has no data collection ability. This will distinguish between those with zero (0) Trainee types from those that have them but can't count them.
Total Head Count	Total number of research trainees of that type, not an FTE (Full Time Equivalent number).

Glossary

Term	Description
List of Researcher Name (columns and row)	
Category (modified to add Shared Membership sub-category under CFRI categories 1-3 in FY 2010-11)	A number one through five (MUST have one selected). Categories 1-4 are as described in the CFRI "Guide for Completing an Application for Membership" available online at http://www.cfri.ca/research_support/forms/membership.asp. These categories are based on a calculation of a given individual's research hours/week. Category 5 will be for those research entities/agencies who do not utilize the CFRI categories. If you utilize category 5, please indicate the definition that your research entity/agency uses to define Researchers. A shared membership sub-category available in CFRI Categories 1-3 was added in FY 2010-11. This new category allows individuals to formally declare their alignments (including percentage affiliation) with more than one organization. Category 4 was clarified to include only affiliate investigators that are not based on site but who collaborate with agency members. Their primary affiliation will be with another academic and/or research institution.
First, Last, Middle name	Self-explanatory, e.g. Jane Mary Smith
Short Name	Name as it would appear in PubMed, for example, Smith, JM
Count Attributed to Agency Added in FY 11-12	An indication by number (1 or .5) of whether a researcher is attributable to applicable agency 100% (full) or 50% (shared).
UBC's definition of Research Added in FY 13-14	UBC defines research involving human subjects as "any systematic investigation (including pilot studies, exploratory studies, and course based assignments) to establish facts, principles or generalizable knowledge which involves: living human subjects; or human remains, cadavers, tissues, biological fluids, embryos or foetuses." It does not include…"quality assurance studies, performance reviews or testing within normal educational requirements, or activities undertaken for administrative or operational reasons…" unless they include an 'element of research.'
OTHER	
Fiscal Year 08-09	April 1, 2008 – March 31, 2009
Fiscal Year 09-10	April 1, 2009 – March 31, 2010
Fiscal Year 10-11	April 1, 2010 – March 31, 2011
Fiscal Year 11-12	April 1, 2011 – March 31, 2012
Fiscal Year 12-13	April 1, 2012 – March 31, 2013
Fiscal Year 13-14	April 1, 2013 – March 31, 2014