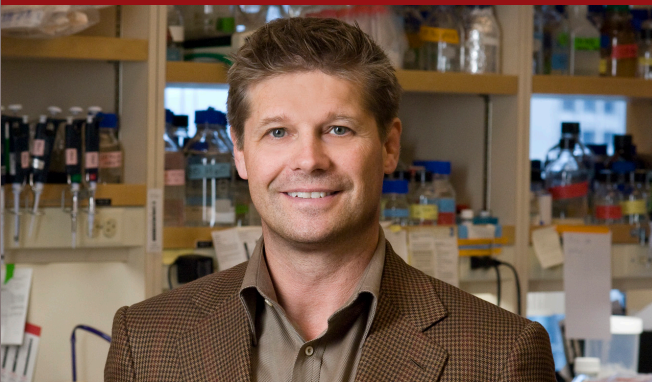Michael Smith Foundation for
Health Research

MSFHR Team Programs Analysis

Building BC's capacity for excellent health research

July 2011

The Michael Smith Foundation for Health Research is the provincial support agency for health research in BC.

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On the cover: Dr. Martin Gleave, 2004 MSFHR Research Unit leader

Summary

Background

The Michael Smith Foundation for Health Research (MSFHR) team awards are a set of programs supporting research groups in British Columbia (BC) at three stages of team development, with the overall goal of building a vibrant research environment to enhance investigators' capacity to excel in research. From 2002 up to and including the 2009/10 fiscal year, $32.7 million in funding was allocated to 23 team planning, 11 team start-up and 31 research unit awardees, representing 16 percent of the total MSFHR program funding granted during that period.

This analysis examines teams' activities and the outcomes of their health research using data from the 2008/09 and 2009/10 award recipient progress reports. The analysis primarily focuses on how MSFHR team programs build research capacity by contributing to team development and research; it then examines other health research outcomes to explore the benefits of supporting health research capacity in the province.

Major findings

Analysis findings indicate MSFHR team programs make a unique contribution to health research capacity by funding shared resources that support team development and research collaboration, which benefit grant applications and research activities. This in turn contributes to the development, dissemination and application of research knowledge. The analysis demonstrates:

- MSFHR support contributes to the development and collaboration of teams, as funding provides groups of investigators with shared resources to establish cohesive research agendas and communicate effectively as a team.

- Shared resources and team collaboration contribute to researchers' ability to attract additional resources. MSFHR team leaders attracted a total of $73.6 million from major Canadian funding agencies during their award terms, 66 percent of which was from the Canadian Institutes of Health Research (CIHR).

- MSFHR team funding enhances research activities and training, as groups of investigators are able to pool resources and expertise to collaboratively undertake multidisciplinary research projects and provide a unique training environment for trainees and staff.

- Eighty-five percent of teams reported specific contributions to health decision making, including consultation and expert commentary, membership on boards and advisory committees, involvement in working groups, and providing technical reports and other resources.

- Overall, 12 of the 45 teams in 2008/09 and four of the 13 teams in 2009/10 indicated their research activities had in some way contributed to changes in health-related areas.

Because of the MSFHR award we have been able to establish an international presence and reputation that would have been extremely difficult to develop as unconnected individuals doing research in this area. ~Research unit award recipient

MSFHR Infrastructure Programs: Team awards

About the programs

MSFHR's Infrastructure Programs[1] were created to establish a vibrant and sustainable research environment that is recognized for excellence, is responsive to BC's health needs, and contributes to building BC's economy. These programs provide funds for personnel, services, supplies and other resources that can be accessed by many across multiple research institutions, and have broad and unique benefits in the research community.

MSFHR team programs, which include team planning, team start-up and research unit awards, aim to increase researcher development and competitiveness by providing funds to support collaborative research activities at three distinct stages of team progression. Team planning is a one-year developmental award aimed at supporting new groups planning collaborative research activities; team start-up is a three-year developmental award intended to support emerging research groups to initiate multidisciplinary and cross-theme research; and research unit is a four-year award that supports established groups as they conduct health-related research in focused areas (Table 1).[2] These programs collectively contribute to the development and growth of teams and their research agendas along the progression from initial planning, to launching collaborative research, to the activities of a high functioning research team.

TABLE 1 MSFHR team awards			
	Team planning	**Team start-up**	**Research unit**
Funding	$25,000 – $37,500	$75,000/year	$150,000 – $300,000/year
Duration	1 year	3 years	4 years
Activities include	➢ Determining team operating and governance mechanisms ➢ Identifying research priorities ➢ Developing research plans ➢ Identifying and establishing collaborations ➢ Specifying agreed research methodologies and approaches ➢ Identifying opportunities for sharing and leveraging human and financial resources	➢ Launching planned research initiatives ➢ Initiating and advancing collaborative activities ➢ Increasing research productivity ➢ Leveraging additional funding that would not be otherwise available ➢ Starting to build a supportive research and training environment	➢ Advancing a research agenda ➢ Increasing research productivity ➢ Leading and fostering strategic alliance and collaborative research activities among academics, health practitioners and decision makers ➢ Fostering knowledge dissemination and knowledge transfer ➢ Leveraging additional funding that would not be otherwise available ➢ Enhancing research training ➢ Addressing BC health research priorities
Total # teams	23	11	31
Total $ funded	$720,000	$2.06 million	$29.94 million

1   From inception to 2010, MSFHR infrastructure awards have included research institutions, provincial networks and shared technology/methodology platforms, and research teams.

2   For more information on MSFHR team programs and eligible expenses, see Appendix A.

About the teams

Teams, which refer to all three MSFHR team programs in this report unless specified, have received a total of $32.72 million[3] in funding since 2002; this is approximately 16 percent of the total MSFHR program funds[4] granted up to and including the 2009/10 fiscal year. In the two-year time frame of this analysis, MSFHR funding to teams totaled $10.34 million.

The reach of MSFHR team programs is large, as each award can involve multiple researchers across different institutions. Teams include core and associate members. In 2008/09, 43 funded teams reported a total of 719 members, 430 of whom were core team members. Core members span more than one institution: team planning groups were located at an average of two research institutions per team, team start-up at three and research unit at four (Table 2). In 2009/10, the 13 teams with continuing team start-up and research unit awards reported a total of 217 members, including 139 core members from an average of four institutions per team.[5]

The majority of team funding is allocated to research, technical and administrative personnel hired to coordinate and contribute to team activities. Personnel accounted for 60 percent of team planning, 78 percent of team start-up and 92 percent of research unit expenses (Graph 1). While all teams have a need for personnel, the variation in fund allocation reflects the different stages and activities of teams. Emerging and established groups use the large majority of funds for personnel to support collaborative research; team planning groups, in addition to personnel, use funds for other resources to support developmental activities such as travel, meetings and workshops.

GRAPH 1 **% of annual expenses, by category**
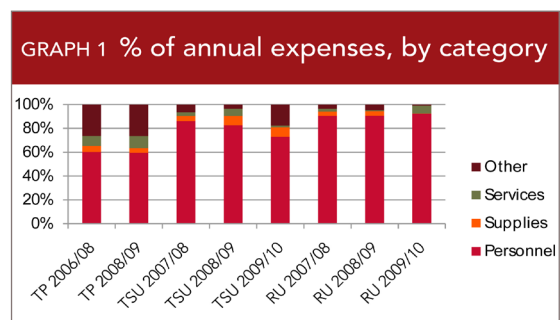
TABLE 2 **Average team membership***

Program	Year	(# of teams)[6]	Core members		Associate members	
			#	Research locations represented	#	Research locations represented
TP	2008/09 (5)		5	2	3	2
TSU	2008/09 (11)		7	3	6	4
	2009/10 (7)		9	4	7	4
RU	2008/09 (27)		12	4	8	4
	2009/10 (6)		12	4	5	3

*TP = team planning; TSU = team start up; RU = research unit

3 All funding dollars represent actual funding during the stated time period, rounded to the nearest $10,000.
4 Calculations for total program funds include career investigator, research trainee, research unit, team start-up, team planning, platform, network, and institutional awards.
5 See the appendices for more information on MSFHR teams (B) or the analysis (C).

6 In tables, number of teams refer to the number of teams providing data, not necessarily the total number of teams — the denominator in calculations.

About the analysis

Section 1 of this analysis presents the unique but related capacity building findings of MSFHR team programs from 2008/09 to 2009/10, which include the programs' contributions to team development, the researchers' ability to attract additional resources, and research activity including productivity and training. Team planning program findings relate primarily to team development and attracting additional resources, as teams are engaged in developmental activities but not research; team start-up and research unit program findings include similar results as well as research activities, as these teams conduct research. Section 2 examines the teams' additional health research outcomes facilitated by enhanced research capacity: contributions to research knowledge, disseminating to users, influencing health decision making, and initial economic contributions.

Proceeding carefully and systematically has led to dramatic success in improving our funding track record... MSFHR funding was instrumental in facilitating [our] systematic process [to seek out funding opportunities] and in enabling us to hire staff to assist with funding applications. ~Team start-up award recipient
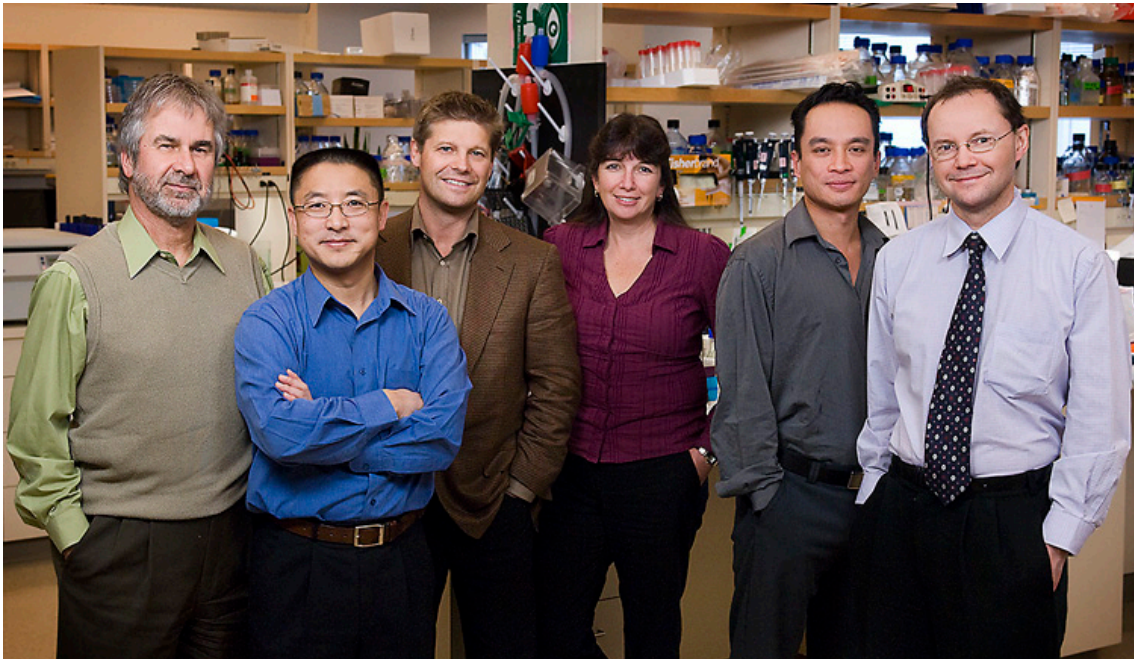
The MSFHR-funded PC-TRIADD Research Unit: Dr. Paul Rennie, Dr. Yuz-Huo Wang, Dr. Martin Gleave, Dr. Colleen Nelson, Dr. Christopher Ong and Dr. David Huntsman (Photo from spring/summer 2008)

1. Unique team support: Building research capacity

Capacity building refers to the opportunity for health research to be performed and applied, including the development of the research environment, individuals and groups (Canadian Academy of Health Sciences, 2009). By providing groups of researchers with funding for personnel and other shared resources, MSFHR team awards build capacity by facilitating team development, and enhancing investigators' ability to attract additional resources and engage in research activities.

While MSFHR team awards are only a portion of the overall infrastructure funding available to researchers, teams indicated MSFHR team programs make a unique contribution in the research funding environment. The team programs support resources not covered by other sources; therefore, MSFHR funding contributes to research capacity by augmenting or complementing other sources. For example, one team obtained equipment with approximately $26 million in infrastructure awards from other sources and requires highly trained specialists to serve as facility managers for the supervision and use of that equipment:

> Within the Canadian research funding environment, there is no other source of financial support for the salaries of these managers, all of whom hold PhD degrees. The MSFHR infrastructure [awards] fill a unique and vitally important niche that ensures full value is realized from these major financial investments [and would otherwise damage the performance of internationally competitive research]. (Research unit award recipient)

1.1 Team development

Teams were able to establish stable membership, with stability or growth more often reported than loss of members. Of those teams with multi-year awards, the average number of members remained similar: team start-up membership increased from approximately seven to nine core members per team, and research unit membership was consistent at approximately 12 core members per team.

Teams discussed the breadth of expertise in their interdisciplinary and multidisciplinary membership: each investigator brings different knowledge, and a valuable collection of expertise enables teams to take a more comprehensive approach to health research issues. As one group explained, with a diverse spectrum of perspectives they are "addressing the complexity of health behaviour through lenses that enable us to account for these multiple angles…." (Research unit award recipient)

While there are multiple components to a successful team, two emerged as major benefits of MSFHR funding: its support for a cohesive research agenda and team communication. Teams at each stage of their award reported meetings and other activities that contribute to developing a team and determining a focus; teams with start-up and research unit awards also reported technology, meetings and other resources that contribute to effective team communication.

By providing funding that contributes to team development, MSFHR programs support collaborative research activities. As one team discussed, "Our capacity to engage in the extent of highly productive teamwork that we have achieved — or even any collaboration at all — would have otherwise been unattainable." (Research unit award recipient) Support for collaboration benefits research capacity, as it enhances researchers' ability to acquire additional support and engage in research activities.

This funding has provided us with the catalyst needed to initiate a growing working relationship that has resulted in a truly provincial, researcher-practitioner relationship. ~Team planning award recipient

1.2 Attracting additional resources

Shared resources and team collaboration support researchers' capacity to attract additional resources as individuals and as groups. The most reported benefit of MSFHR team programs is the contribution of the awards to grant application and funding successes, as teams build upon MSFHR support to apply for and obtain other research funds. As one team reported, "The infrastructure support allowed investigators to apply for more grant funding than ever before as staff planning assistance could be covered. This resulted in the investigators being increasingly successful in obtaining grants, particularly from CIHR." (Team start-up award recipient)

Understanding team funding portfolios and the full extent to which MSFHR support contributes to additional funding is complicated. Grant applications can involve various combinations of researchers who may or may not be involved with the team, so if and to what extent funding is related to the team is not straightforward. Additionally, team collaboration and resources may have both direct and indirect effects on an individual's ability to successfully compete for awards, which we have not explored here. In this analysis, we look at the funding received by team leaders to understand teams' capacity to attract research funding to BC.

From 2002 up to and including 2009/10, MSFHR team leaders attracted a total of $73.6 million from five major Canadian funding agencies[7] while holding an MSFHR team award – 66 percent of which is from CIHR. During the analysis time frame, team leaders attracted a total of $13.9 million in 2008/09 from the major Canadian funding agencies and the National Institutes of Health (NIH) in the United States; in 2009/10, leaders attracted $22.8 million from all six agencies as well as additional sources,[8] including health charities, government ministries, health authorities, universities and industry (Table 3).[9]

MSFHR teams also attract in-kind contributions that build upon existing resources. Reported in-kind contributions include office space and equipment, staff time and salaries, operating costs, technical support, travel costs and communications support. These contributions were made by organizations such as health authorities, research institutes and universities, government ministries and health charities.

TABLE 3 Team funding (to the nearest $10,000)							
Year	Program (# of teams)	Additional funding received in reporting year					
		Canadian Institutes of Health Research	Other Canadian funding	National Insitutes of Health (US)	Other international	Industry	Total
2008/ 09	TP (5)	870,000	260,000	480,000			1.61 million
	TSU (11)	1.38 million	270,000	0			1.65 million
	RU (31)	9.42 million	1.26 million	0			10.68 million
2009/ 10	TSU (9)[10]	1.00 million	580,000	0	0	0	1.58 million
	RU (6)	1.68 million	12.94 million	0	3.26 million	3.32 million	21.20 million

7   Funding includes those grants listing the MSFHR team leaders as principal investigator from CIHR, NSERC, SSHRC, CFI and CRC. Awards that began prior to the MSFHR team award were not included.

8   Funding from other sources was self-reported. Teams were not asked to report on additional funding sources prior to 2009/10.

9   Funding totals in 2008/09 include CIHR, NSERC, SSHRC, CFI, CRC and NIH awards. Funding totals in 2009/10 include those major agencies as well as self-reported funding from additional sources.

10 Only seven of the teams provided self-reported funding from additional sources.

1.3 Research activity

Equipped with the strong base of resources from MSFHR and other sources, MSFHR teams are positioned to conduct quality, multi-disciplinary research. Measures of team activity include research productivity, which consists of research projects and collaboration with external partners, and training activities. As these largely involve the products of conducting research – activities not covered by team planning funding – this section includes findings only from MSFHR team start-up and research unit programs unless otherwise stated.

Research productivity

Teams reported productivity in research projects and other activities. In 2009/10, 13 teams reported a total of 107 research projects: an average of 7.7 per team with team start-up funding and 8.8 per team with research unit funding. In addition, team research often spans research pillars, resulting in multidisciplinary work. In 2008/09, half of the teams reported their work involves multiple research pillars: of 33 team start-up and research unit groups, 19 are involved in biomedical research, 17 in clinical research, nine in health services research and 13 in population health research.

Team awards support considerable breadth and depth of research activities, in large part because of the research, technical and administrative support provided – the primary expense of the award. For example, one team reported that funding for an administrative core resulted in "over 100 publications that would not have happened without this support." (Research unit award recipient) Another team indicated they not only engaged in a larger scale of investigation than feasible for an individual, but also approached research with a greater level of complexity: "Quite simply, the team start-up award presented the opportunity of a lifetime to members of our group and resulted in an evaluation of Canadian trauma systems that was unprecedented in depth and scope." (Team start-up award recipient)

Seventy-one percent of teams reported collaborations[11] external to the team, which benefit research projects, grant applications, publications and research events because of the additional resources and expertise contributed by the collaborators. On average, team start-up groups reported five collaborators, with more international collaborations in 2008/09 and more within BC in 2009/10; research unit groups reported an average of 13 collaborators, with most from within the province in both years (Table 4). The lead purpose of partnering is to facilitate or conduct research, although other purposes include sharing resources, applying with or receiving funding from partners, collaborating in knowledge translation activities, networking and sharing expertise.

TABLE 4 Average and total team collaboration activity

Program year (# of teams)	Collaborations reported[12]		# of collaborators involved		Type of collaboration					
					Provincial		National		International	
	Avg	Ttl	Avg	Ttl	Avg	Ttl	Avg	Ttl	Avg	Ttl
TP 2008/09 (5)			5	25	4	21	1	3	0	1
TSU 2008/09 (6)			3	18	1	5	1	4	2	9
TSU 2009/10 (7)	6	40	7	51	3	23	2	15	2	13
RU 2008/09 (27)			13	339	6	169	2	66	4	105
RU 2009/10[13] (6)	7	41	13	77	6	38	5	27	2	9

11 Teams identified partnerships and collaborations with external groups, networks or organizations that were created to achieve the team's research objectives.
12 Teams could report up to 10 collaborations in the team start-up and research unit programs in 2009/10.
13 Some locations unknown so not reflected in type of collaboration.

Training environment

MSFHR team programs facilitate a unique research training environment for future generations of health researchers because they have the capacity to reach a large number of trainees, offer opportunities to work with a group of diverse and experienced researchers, and provide formal training activities and additional resources.

Thirty-eight teams reported 978 graduate and post-graduate trainees in 2008/09, and 13 teams reported 233 trainees in 2009/10 (Table 5). Team planning groups, with funding not covering research itself, reported an average of three trainees per team. Team start-up groups reported an average of eight trainees per team in 2008/09 and 13 in 2009/10, and research unit groups involved the most trainees, with 34 in 2008/09 and 24 in 2009/10. During this time, core team members supervised or co-supervised 310 MSFHR-funded Master's, PhD and post-doctoral trainees.

The team environment provides an opportunity for trainees to collaborate with a group of experienced, multi-disciplinary and cross-institutional researchers, including team members and external collaborators. Trainees benefit from exposure to a range of expertise and opportunities throughout the research process. As one team reported, "Support from [the team] has created many research opportunities for [the team's] researchers with trainees. The [team's] network and funding has linked together many projects and people to provide a unique educational environment that exposes trainees to other researchers, clinicians and policy makers they might not otherwise have had the opportunity to work with." (Research unit award recipient)

In addition to training through research, teams have greater capacity to offer additional training programs and other skill development activities, including organizing events and providing trainees with team resources and funding. Many of these programs, activities and resources provide opportunities for trainees to attend events, present their work and learn from others. For example, "Monthly research symposia, research retreats, and presentations at meetings have provided structure to the learning environment. These sessions have been used to mentor students through all phases of the scientific process from formulation of a research question, to study design, to interpretation of results and manuscript preparation." (Team start-up award recipient)

Our program of research employs seven research assistants/coordinators and provides fellowships for four PhD students. Extensive training opportunities are built into all of these positions particularly given the collaborative and multi-disciplinary nature of the research. ~Research unit award recipient

Program	2008/09					2009/10				
	Master's	PhD	PDF	MD/ MPharm	Total trainees (# of teams)	Master's	PhD	PDF	MD/ MPharm	Total trainees (# of teams)
TP	9 (graduate)[14]	4	0		13 (5)					
TSU	20	16	13	1	50 (6)	36	33	14	5	88 (7)
RU	239	386	242	48	915 (27)	36	61	32	16	145 (6)
Total	263	407	259	49	978 (38)	72	94	46	21	233 (13)

TABLE 5 Total number of trainees

14 Team planning reports in 2008/09 asked for graduate trainees, while all others differentiated between Master's and PhD students. For overall totals, we evenly distributed team planning numbers between both categories.

2. Beyond capacity building:
Generating knowledge and influencing health decisions

By supporting collaborative activities at various stages of team development, MSFHR team programs aim to establish a vibrant research environment in the province that increases investigators' ability to excel. However, the purpose of building research capacity is to foster other outcomes that, in the long term, impact health and prosperity. Findings show the team planning program yields solely capacity building outcomes during the funding period, but team start-up and research unit programs support contributions to additional outcomes along the progression of health research to impacts (see Figure 1).

Figure 1:
Adaptation of the CAHS framework for health research progression to impacts (CAHS, 2009)
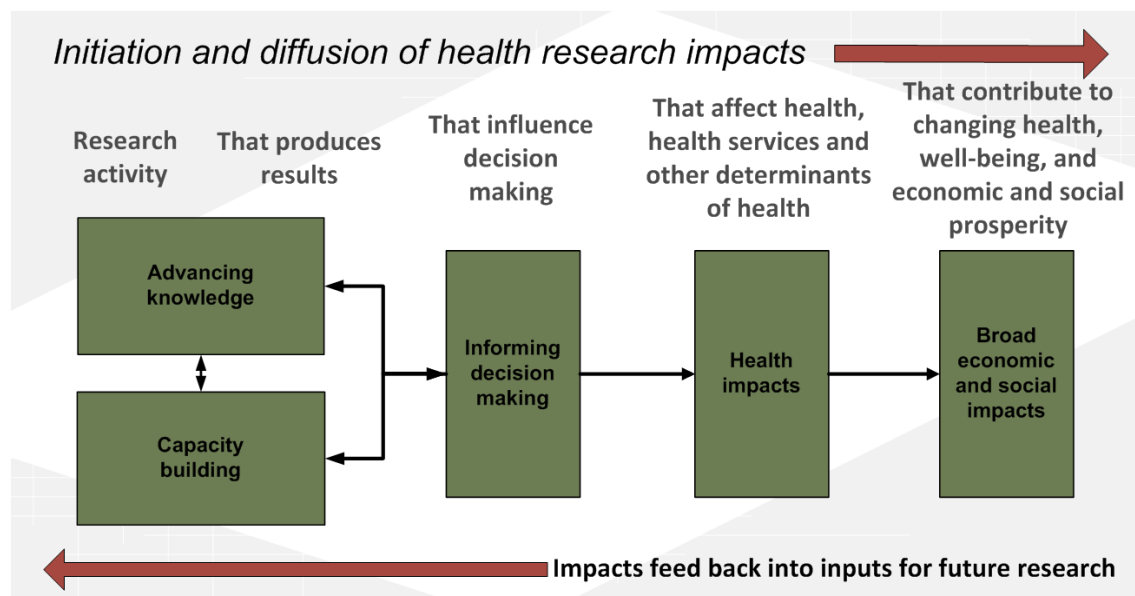
While broad outcomes are difficult to measure, the following sections discuss a number of initial outcomes reported by teams, including contributions to knowledge, dissemination to research users, influencing health decision making, and initial economic contributions.[15]

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15 Measuring the additional research outcomes of a team raises complications because of the overlap between team work and that of individual members. MSFHR conducted an analysis of the Career Investigator Program (MSFHR, 2011), and many of those award recipients are also members or leaders of the MSFHR-funded teams. Teams were asked to report as accurately as possible those activities related to the MSFHR team award.

2.1 Contributions to knowledge

Teams make important contributions to health research knowledge by engaging in research activities, which is in part evident through the recognition received in the media. Eleven teams in 2008/09 and nine in 2009/10 reported media attention during the reporting year, including radio, television, print and organizations' websites ranging from local, national and international sources. Exposure in the media involved press releases and feature stories highlighting research, interviews about their work, and consultation on health research issues. Some of the most recent examples include:

➢ A research unit leader, whose team made significant contributions to the research required during the H1N1 outbreak in 2009, was often interviewed by the media on H1N1 issues. The team led all four vaccine studies during the pandemic in Canada, and its investigators served as expert consultants to different governments for decision making on vaccine usage and infection control. (Leader Dr. Scheifele, research unit)

➢ Another research unit leader was interviewed for a segment on "The National" about islet transplantation, in a 10-year follow-up of diabetes advances and complications. Many of the team's research projects involve a focus on islet transplantation, including findings that "islet transplantation significantly reduces the decline of renal function compared with best medical therapy for diabetic patients." (Leader Dr. Warnock, research unit)

➢ One team demonstrated "that the various subtypes of ovarian cancer are different diseases, and should therefore be approached as such, for both research and treatment purposes." Their research findings in ovarian clear cell carcinoma, and the policy changes related to reducing the number of ovarian cancers, were covered nationally and internationally in the press. (Leader Dr. Gilks, research unit)

The importance of investigators' work is also evident in the awards, invitations and leadership in the research community. Three teams in 2008/09 and eight teams in 2009/10 reported primarily members' individual awards, conveying the high calibre membership of teams; 21 teams in 2008/09 and eight in 2009/10 reported invited authorship

and presentations, and leadership of national and international projects and initiatives.

➢ "[The team] has repeatedly been recognized nationally and internationally as a unique research unit in terms of its focus, the caliber of its work, and in the quality of its interdisciplinary collaboration. Our research addresses some of the most pressing health issues in the province and in the country. Our unit is poised, if funding is available, to continue making considerable contributions to the health of British Columbians and Canadians." (Research unit award recipient)

➢ "[A significant achievement is] the general growth and strengthening of our national/international reputation as leading researchers in the area of person-centred dementia care. This has included developing international writing and research collaborations and leading in the development of an international network of researchers doing work in this area. The strategic position of the [team] as a national and international leader in the area of holistic, person-centred dementia care has been explicitly recognized in almost all of the grant proposals submitted in the past two years by any [of] our researchers." (Research unit award recipient)

Team leadership in the research community is also evident in the contributions to research knowledge and expertise. In addition to organizing, hosting and leading meetings and other events, teams reported developing resources that benefit research in BC, nationally and internationally, including establishing and improving models, databases and other tools. Examples include:

➢ A national surveillance network established to identify adverse drug reactions in children and is unique in the world, and the creation of a clinical database with over 17,000 cases and controls. (Leader Dr. Carleton, research unit)

➢ The application of next-generation sequencing to human tumor samples: "We are world leaders in the use of rapid inexpensive sequencing technologies for discovery by drawing on the clinical strength of the [team] to ask clinically relevant questions of well-annotated patient samples. We have demonstrated the ability of small and innovative studies to generate exciting data, and put to rest the widely held belief that sequencing studies of

cancer would require study of hundreds of samples to yield meaningful results." (Leader Dr. Gilks, research unit)

2.2 Dissemminating knowledge to users

Teams engage in numerous activities to translate knowledge and expertise to various research users within and beyond the research community. Peer-reviewed publications were most commonly reported, but other dissemination approaches include presentations; technical reports; abstracts; summary reports; newsletters, booklets and educational materials; and websites. Examples of teams' dissemination activities are:

> The successful launch and distribution of the "Couples and Smoking" booklet. In partnership with two BC-based groups, over 20,000 booklets have been distributed, and it has been adapted by the US National Cancer Institute, Tobacco Control Branch for use on its website. (Leaders Drs. Bottorff, Johnson and Ratner, research unit)

> The InterCultural Online Health Network (iCON), which aims to bring culturally relevant, linguistically appropriate, and trusted health information on chronic disease management to BC's Chinese and Punjabi speaking populations. The project, which has engaged over 5,000 community members, supports the development of knowledge, attitudes and skills required to optimize patient self-care through free public forums, interactive websites and paper-based materials. (Leader Dr. Ho, research unit)

In addition to disseminating knowledge, teams also support events and develop resources that contribute to researchers' ability to engage users. Seven teams reported providing resources such as policy maps, a knowledge translation and exchange database, and online newsletters to the group or the larger research community; 15 teams were involved in facilitating events such as seminars, workshops and conferences. These resources and events, available to larger audiences, share information and provide access to expertise and support; profile the team, its members and their research; facilitate the exploration and formulation of ideas; and support collaboration.

2.3 Influencing health decisions

Engaging users is the step from which research can influence decision making, including providing expertise and resources for health decision making. Eighty-five percent of teams reported contributions such as policy advice and consultation; participation in boards, advisory committees and working groups; involvement in meetings and public hearings; and contributions through technical reports, guidelines, position papers and other resources.

Teams also reported research findings that have the potential to contribute to specific areas of health, such as clinical practice, health policy, and healthcare or service delivery. Examples include:

> Developing a tool used to discover lesions should help dentists pinpoint and remove oral lesions that have the potential to become cancers. Removing these lesions should decrease the incidence of frank oral cancer in the future. (Leader Dr. Gallagher, research unit)

> Developing new models of communication through the centre's research will positively affect the ability of persons with dementia to communicate and participate more actively in their lives. The models and technologies, which are being tested, can be employed in long-term care and community-care settings. (Leader Dr. O'Connor, research unit)

> Providing direct clinical evidence that islet transplant therapy, relative to the current state-of-the-art intensive insulin therapy, improves outcomes. (Leader Dr. Warnock, research unit)

> Working on chronic disease surveillance will improve identification of patients needing health care services. (Leader Dr. Carleton, research unit)

> Developing interdisciplinary learning modules for capacity assessors that improve capacity and incapacity assessment practices, in order to directly apply to health care and community-service settings and impact the well-being of vulnerable elders. (Leader Dr. O'Connor, research unit)

> Taking a detailed look at trauma care in relatively isolated populations in a paper on access in Northwestern BC, which will lead the way for development of injury control policy for these communities. (Leader Dr. Hameed, team start-up)

While the majority of groups reported engaging with decision makers or demonstrating important research findings, 12 teams in 2008/09 and four in 2009/10[16] indicated their research activities had in some way contributed to actual changes in health-related areas, including policy and legislation; health practice, diagnosis and treatment; and monitoring and data quality. Examples include:

➢ Changes to policy relating to school-based physical activity for children's health. (Research unit award recipient)

➢ Interim findings of a study on bicyclists' injuries and the cycling environment providing evidence toward Vancouver City Council's decision to develop new cycling infrastructure, including the Burrard Street Bridge trial. (Research unit award recipient)

➢ Health Canada and the American Food and Drug Administration mandating a label change for codeine for use by breast-feeding mothers based on findings regarding opiate intoxication in breast-fed newborns. (Research unit award recipient)

➢ Changes to various policies and guidelines around healthy eating, including reduction in trans fat content in the Canadian food supply and changes to foods and drinks available in places that service children and youth. (Research unit award recipient)

➢ Having identified a subset of ovarian cancer patients with such a favourable prognosis that surgery alone is curative, fewer patients in BC will receive chemotherapy for ovarian cancer treatment. The changes will decrease costs of ovarian cancer treatment by doubling the number of patients who would not benefit from chemotherapy, and by preventing the development of a significant number of highly lethal cancers. (Research unit award recipient)

2.4 Economic contributions

While economic benefits of research are expected over the longer term, findings reveal activities and initial contributions that suggest the potential for economic outcomes in the future. Approximately half of the teams in the research unit and one from the team start-up programs indicated commercialization and industry-related activities.[17] Of the 33 teams asked:

➢ Twelve reported research contracts and agreements, including collaboration with companies and industry sponsorship.

➢ Ten reported contributions to product and product licenses, including self-sterilization medical devices, transplantation surgical instruments, a blood bag closure device, and hardware and software systems to evaluate acoustical quality for speech and sound control measures.

➢ Seven reported pursuing patents, and having provisional, pending or issued patents.

➢ Seven reported contributions to vaccine or drug development.

➢ Four reported spin-off company formation or opportunities for future development.

➢ Three reported intellectual property filings and disclosures.

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16   Not all teams were asked about changes to health related areas.

17   Research unit annual reports requested information about contributions in 2008/09 and 2009/10, while team start-up annual reports only requested contribution information in 2008/09 from six teams.

3. Conclusions

MSFHR team programs build health research capacity in BC by supporting the development of teams and facilitating their collaborative research activities, all in an effort to increase investigators' development and competitiveness. Findings indicate:

➤ MSFHR team programs are unique in the research environment, as funding covers resources not supported by other funding mechanisms and augments or compliments infrastructure from those other sources.

➤ The programs support team development and collaboration by providing resources that enable teams to establish a cohesive research agenda and effective communication between members.

➤ Support for team collaboration and shared resources contributes to the capacity of researchers to attract additional funding and in-kind contributions. This support for grant applications and funding successes is the most reported benefit of the team programs.

➤ MSFHR teams contribute to the development, dissemination and application of health research knowledge, including informing health-related decision making and influencing actual changes to policy and practice.

MSFHR team programs build health research capacity in the province by contributing to the development and research activities of teams. A strong team environment, in turn, supports the progression of research knowledge from development to application, as findings indicate teams are informing decisions and making initial health and economic contributions.

The research unit award provides a unique opportunity to support the infrastructure needed to conduct multidisciplinary research... Despite the general recognition that such multi- and inter-disciplinary research is the way of the future, the mechanisms for support are limited. MSFHR has done an outstanding job of filling an important gap. ~Research unit leader

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Appendices

Appendix A — The team programs

A team is a group of researchers who aim to establish a cohesive and effective working relationship in a focused area of health research. A team must consist of core members (qualified health researchers) – at least three including the leader, with maximum allowed dependent on competition year but never more than 20 – while inclusion of associate members (associated health researchers) is optional. Researchers can be core members on one team planning or team start-up and two research unit teams.

Eligible expenses include personnel (e.g. salaries of staff and students providing infrastructure services that support team research activities), supplies (e.g. costs of computers and specialty software for team/unit staff and students), services (e.g. technical research staff, specialty animal facilities, database management, etc.), and other items (e.g. support for research training, costs related to the dissemination of knowledge, including conference travel and website development).

For more information on MSFHR team awards, see www.msfhr.org/funding/team_awards.

Appendix B — 2008/09 and 2009/10 MSFHR teams

Program	Active teams			Analysis data																		
	Competition year	# of awards	Award duration	2008/09										2009/10								
				Active awards	Annual report response rate	Team size: core members		Funding year						Active awards [18]	Annual report response rate	Team size: core members		Funding year				
						3-10	11+	1	2	3	4	5	6+			3-10	11+	1	2	3	4	5
Team planning	2007/08	5	1 year	✓	100%	5		5						×								
Team start-up[19]	2005/06	2	3 years	✓	100%[20]	10	1	5	4	2				×								
	2006/07	4	3 years	✓										✓	7/9	6	1		5	4		
	2007/08	5	3 years	✓										✓								
Research unit[21]	2003/04	14[22]	4 years + 2	✓	27/29	14	13			2	4	4	14	×								
	2004/05	9	4 years + 2	✓										×								
	2006/07	4	4 years	✓										✓	100%	4	2				2	4
	2007/08	2	4 years	✓										✓								

Team planning	Team leader(s)
Neuroethics for British Columbia	Dr. Judy Illes
Functional Lung Imaging for Radiation Therapy – FLIRT	Dr. Stefan Reinsberg
VITALiTY Team	Dr. Janet McElhaney
Collaborative Research Group for the Study of Human Vaginal Microbiota in Health and Disease	Dr. Deborah Money

18 If "x", award term ended for that cohort and no annual report was submitted by award recipients.
19 In 2007/08, the team start-up competition changed from a two-stage to a one-stage competition.
20 Five teams in 2008/09 filled out previous templates, providing only limited quantitative data for analysis purposes.
21 Research unit award recipients in cohorts one and two were granted extensions, and ended in September 2009.
22 MSFHR funded 16 teams; two awards were not extended beyond the four-year award term.

Workplace Traumatic Exposure Team	Dr. Ken Prkachin

Team start-up	Team leader(s)
Risk Reduction in Mental Health	Dr. Kevin Douglas
COPD and Inflammation Team (CAIT)	Dr. Donald Sin
Detecting, Treating and Preventing Drug-Related Morbidity: An Emergency Department Based Medication Optimization Program	Dr. Corinne Hohl
SCIP – Spinal Cord Injury Proteomics	Dr. Wolfram Tetzlaff
TB Research Group	Dr. Lindsay Eltis
Team for Monitoring and Control of Abnormal Brain Dynamics	Dr. Martin McKeown
Rehabilitation Aimed at Muscle Performance (RAMP)	Dr. Darlene Reid
BC Team to Study the Origins of Asthma and Allergy	Dr. Stuart Turvey
Public Health Services Renewal in BC: Implementation and Impact of the Core Public Health Functions Framework	Dr. Marjorie MacDonald
Health Innovation Design and Evaluation (HeIDE) Research Team	Dr. Ellen Balka
Optimization of Trauma systems	Dr. Syed Morad Hameed

Research unit	Team leader(s)
Animal Determinants of Emerging Infectious Disease	Dr. Craig Stephen
Cancer Control Research (Genes, Environment, Occupation and Cancer)	Dr. Richard Gallagher
Centre for Complex Disorders	Dr. William Honer
Centre for Allied Health Research and Evaluation (CAHRE)	Dr. Peter von Dadelszen
FIND: Fundamental Innovation in Neurodegenerative Diseases	Dr. Michael Hayden
Immunity and Infection Research Centre	Dr. Robert McMaster
Musculoskeletal Research Centre: New Coordinated Applications for Bone Health	Dr. Thomas Oxland
NEXUS: Researching the Social Contexts of Health Behaviour	Drs. Johnson Bottorff Pamela Ratner Joy Johnson
Solid Tumor Progression Research Unit	Dr. Calvin Roskelly
Centre for Health and Environment Research (CHER)	Dr. Mieke Koehoorn
Centre on Aging	Dr. Holly Tuokko
The James Hogg iCAPTURE Centre for Cardiovascular and Pulmonary Research	Dr. Bruce McManus
Terry Fox Laboratory	Dr. Connie Eaves
Centre for Blood Research (CBR) and Laboratory for Molecular Biophysics (LMB)	Dr. Ross MacGillvray
Pharmaceutical Outcomes and Policy Innovation	Dr. Bruce Carleton
Respiratory Sleep Disorders Research Unit	Dr. John Fleetham
Genetic Pathology Evaluation Centre	Dr. David Huntsman
Nutrition Research Program	Dr. Sheila Innis
Centre for Research on Personhood in Dementia Care	Dr. Deborah O'Conner
Stem Cell Physiology	Dr. John Schrader
Childhood Diabetes Research Unit	Dr. Bruce Verchere
PC-TRIADD: The Prostate Centre's Translational Research Initiative for Accelerated Discovery and Development	Dr. Martin Gleave

Child and Youth Developmental Trajectories Research Unit (CYDTRU)	Dr. Clyde Hertzman
Vaccine Evaluation Centre Research Unit	Dr. David Scheifele
Technology-Enabled Knowledge Translation Investigative Centre (TEKTIC)	Dr. Kendall Ho
Parkinson's Disease and Monoaminergic Function in the Central Nervous System	Dr. A. Jon Stoessel
Centre for Human Islet Transplant and Beta Cell Regeneration	Dr. Garth Warnock
Ovarian Cancer Research Initiative – OvCaRe	Dr. C. Blake Gilks
Model Systems and Cancer Therapeutics	Dr. Philip Hieter

Appendix C — About the analysis

Methods

Award recipients report retrospective, self-reported data about activities, outputs and outcomes annually throughout the award term. Data for this analysis were collected in progress reports and team expenditure statements over two years: during the 2008/09 and 2009/10 reporting cycles.

Progress reports were revised to align with an evaluation framework in 2008/09 and amended the following year to streamline and simplify reporting. While data varies in content by reporting year and by program, all reports except those from one team start-up cohort provided qualitative and quantitative information about team outputs and outcomes.

In 2008/09, the data included progress report information submitted by 43 teams, as well as additional information available from other sources for all 45 teams. Many of the team award terms ended after 2008/09, so 2009/10 data represents those teams that were active throughout the whole of 2009/10: 13 teams' progress report information, as well as additional information available from other sources including all 15 active teams.

The data were analyzed using the five health research impact categories of the PM&E framework: capacity building, advancing knowledge, informing decision making, health impacts, and broad economic and social impacts. Quantitative data were analyzed to explore means, medians, ranges and trends by program. Qualitative data were inputted into NVivo 8 and themed using the outcome areas of the PM&E framework. Quantification of qualitative data is provided when possible.

While findings indicate team programs build capacity, other opportunities exist to pursue the evaluation of teams, such as exploring different members' perspectives or the components of a successful collaborative team. Further analysis of MSFHR programs and initiatives will add to our knowledge of the outcomes of building and supporting research capacity in BC.

For more information about the PM&E framework, visit www.msfhr.org/about/monitoring_evaluation.

Analysis limitations

There are many commonly cited issues that make evaluating health research and research funding impact difficult, such as: the lag time of research means it can take many years before any impact is realized and can be measured; the chain of impact may not obviously connect a certain effect to a specific cause, such as one particular research finding or research grant; the research community is a vibrant and interconnected network of individuals and groups, thus making it difficult to associate impact to one; and for research to progress along the path to impact, a variety of non-research and indirect factors are required (for examples, see Bernstein, Hicks, Borbey & Campbell, 2006; CHSRF, 2008; Deloitte – Insight Economics, 2007; Frank & Nason, 2009). Issues most relevant to this analysis include:

➢ MSFHR transitioned to an evaluation framework and new reporting templates in 2008/09, and restructured and simplified in 2009/10 to streamline and simplify output and outcome reporting. This transition created inconsistencies: some teams submitted reports using the former templates in 2008/09, and information

collected in each reporting cycle differs in depth. These issues are noted where applicable.

➢ Quality and availability issues surrounding self-reported data: relying on teams to follow the progression of research activities, collect the applicable data and provide the information.

➢ The award terms ended for a number of teams during the analysis time frame. A smaller number of teams from only two of the three programs provided data across both years.

➢ It is difficult to differentiate between team and individual research outputs, as members are also involved in various other independent and collaborative research work. There may be direct and indirect contributions of team awards outside the scope of this analysis.

➢ It is difficult to measure research outcomes in health, policy, industry, etc. when analysis covers a short time frame of research activities or outcomes outside the scope of researchers' work.

➢ There were no specific benchmarks or indicators defined when the programs were originally launched, so it is difficult to evaluate the program.

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