



Summary
Report on Funds Available for Research in Rehabilitation
(2000-2010)

Requested by:

The Quebec Provincial Research Network in Rehabilitation (REPAR)

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Carol L. Richards".

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Quebec, June 28, 2013

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Mandate given to Dr. Carol L. Richards

In 2009, the REPAR (Quebec Provincial Rehabilitation Network) conducted an important review of its activities to serve as a guide for the development of the next 4-year research plan. This review identified funding for rehabilitation research as a potential barrier to future developments, in part because of a poor understanding of the funding possibilities, the flow of research funds in the past ten years and the perceived lack of sufficient funds and low success rates.

To inform the REPAR and its partners of the state of funding for research activities in the field of rehabilitation, it was decided to form a task group to do an environmental scan and to write a report on the state of rehabilitation funding. Dr. Carol L. Richards accepted to act as chairperson for this task group and was given a free hand in the creation of an Advisory Committee and the methodology.

The mandate

To form a task group composed of leaders in the field of research in rehabilitation and social integration that will fulfill the three following objectives:

- a. Carry out a comparative analysis “benchmarking” of research in the field and to report on research funds available to finance such research in order to better determine the possibilities for financing and synergistic partnerships to meet the challenges raised by the 2009 REPAR review;
- b. Establish the most effective strategies (e.g. provincial and federal partnerships) to augment funding resources for research in rehabilitation and social integration;
- c. Propose an action plan to interest and engage various organizations (partners) to participate in the research funding.

SUMMARY

Introduction

This environmental scan was funded by the Quebec Provincial Rehabilitation Research Network known as REPAR. It reports on the research funds available for studentship and scholar grants or salaries and research projects primarily in Quebec, but also in other Canadian provinces, as well as the evolution in the number of researchers applying for these funds over a ten-year period from 2000-2010. The report does not give a complete view of funds available in Canada because the scan has focused on the major federal funding agencies, the Centers of Excellence that include rehabilitation research, and some major national research foundations. Funds invested by the governments of four Provinces: Quebec, Alberta, British Columbia and Ontario are also reported. The data presented were obtained from the funding sources and for the most part have been verified by them. The information sources are given in the report.

Obtaining the data for this environmental scan was a difficult and lengthy process for several reasons. The main reason being the lack of systematic and uniform data bases and the various keywords and definitions for rehabilitation. Some funding sources such as the *Fonds de recherche en santé du Québec* (FRSQ)¹ and Canadian Institutes of Health Research (CIHR) had extensive data banks that could be mined, while others did not have such a systematic approach. Another problem was the often very slow response to requested information or the months needed by the funding sources to obtain, verify or correct data. Information on the evolution of the number of researchers from the different Universities was also problematic because the information was often unavailable and had to be collected. Some Universities did not respond to requests for information.

This report thus attempts to summarize, for the first time, the main federal and provincial funding investments for research in rehabilitation. It also provides information on the allocation of funds to research projects, studentships and salary awards. To enable an estimate of the ratio of investments to the known ever-increasing number of researchers in the field of rehabilitation, an attempt was made to quantify the evolution in the number of researchers applying for the available funds.

Limitations:

It is important to outline the limitations of this environmental scan so that the findings may be seen in the proper context.

- Initially, because the project was funded by the Quebec Provincial Network (REPAR), the emphasis was placed on funding in the Province of Quebec. As the work progressed it became clear that the researchers in rehabilitation in Quebec received funds from many sources outside of the Province and that to render a more complete picture of the funding for Quebec researchers that the scan had to be broader. Given, the many grants received by Quebec researchers from one of the three main federal granting agencies and the role of Quebec researchers in the Centers of Excellence related to rehabilitation, it became clear that these had to be included. Finally, it was decided to include three other Provinces, known for their research activities in rehabilitation and having Provincial funding agencies. The reader must be

¹ In this document, we will refer to the FRSQ although it was replaced by the *Fonds de recherche du Québec – Santé* (FRQS) in 2011.

advised, however, that the information reported for these provinces is incomplete and reports only what could be obtained from the main funding agencies.

- The lack of data bases that target the performance of researchers in rehabilitation is a major limitation. Information contained in data bases referring to similar programs do not necessarily concur because methods for data accumulation, archiving or timeliness of the information vary.
- The definition of rehabilitation research used to mine the data bases is highly variable. Furthermore, given the wide range of types of research and scientific disciplines involved in the bio-psychosocial continuum of rehabilitation and the application of modern technology to this field of research, capturing the contribution of all the contributors to the research endeavor is a daunting task. We examined the official FRSQ registries of the funds obtained by the researchers in three rehabilitation-related research centers located in Quebec, Sherbrooke and Montreal. The 139 different sources of funds obtained by the researchers in these three research centers gives us an inkling of the vastness of the research enterprise.
- Much of the information sought, especially pertaining to the number of researchers, was very difficult to gather because it was not included in most of the data bases. Only the FRSQ and CIHR data bases had information on the number of applicants over the years. Attempts to get information from the University Programs proved difficult because many did not have the information available or did not answer requests for information. A decision was made not to try to obtain information from non traditional rehabilitation programs or medical programs because we not only had little chance of obtaining the information but also of covering all the bases. Consequently, although we know from the partial information available that the number of researchers since the year 2000 has increased exponentially, we cannot be sure of the exact figures.
- This scan documents research funding for researchers in rehabilitation without attempting to justify the need for continued funding or increased funding on the basis of research impact or outcome on the health of Canadians.

I. Sources of funds from Provincial Governments

a. Quebec

The government of Quebec determined research in the field of rehabilitation to be a priority from the early 1980s. This offered candidates in rehabilitation an exceptional opportunity to obtain MSc and PhD studentship and investigator salary awards. Another initiative was the development of two Research Consortia (1989-1994) that encouraged clinicians to partner with established University researchers to carry out pilot research projects. These Consortia also introduced the beginnings of a research infrastructure in rehabilitation establishments. The next step was the development of a Rehabilitation Provincial Research Network (REPAR) that played an important role in defining a research model based on the Production of Handicap model. It brought together researchers in non-traditional and more traditional rehabilitation disciplines to carry out interdisciplinary and inter-University pilot projects funded by the network. It impacted on research capacity by granting about 50 studentships and post-doctoral awards and some investigator salary awards from 1994-2002. This increased capacity led to the creation in the year 2000 of two Research Centers dedicated to the full continuum of rehabilitation research. The REPAR, created in 1994, continues to play an important role in rehabilitation research in Quebec today with a focus on partnerships to fund innovative initiatives and knowledge translation.

Funding agencies in Quebec: In the years covered by this survey, Quebec (2000-2010) had three major governmental funding agencies, one related to health (FRSQ), one to social sciences and culture (FQRSC). The other, the FQRNT (formerly *Fonds pour la Formation de chercheurs et l'aide à la recherche*, le *Fonds FCAR*) was related to science, engineering and education. Since the Ministry of Health and Social Services data bank discontinued data collection on FQRNT investments in rehabilitation given its small investments in this field, they were not considered in the summary.

FRSQ:

Training, career awards and research grants: As illustrated in Table 1 and Figure 7, the FRSQ awarded a grand total of 98.6M\$ in training, career and research grants from 2004-2011. This amount corresponds to a yearly mean of 8.5% of the total amount awarded by the FRSQ for these programs.

Table 1. FRSQ. Distribution of investments in training, career awards and grants (2004-2011)

Type of investment	Amount Non-rehab	Amount Rehab	Total	% Rehab
Training awards	\$ 33 568 155	\$ 3 280 728	\$ 36 848 883	8,9 %
Career awards	\$ 42 502 313	\$ 3 671 365	\$ 46 173 678	8,0 %
Research grants	\$ 7 065 795	\$ 768 187	\$ 7 833 982	9,8 %
Total	\$ 83 136 263	\$ 7 720 280	\$ 90 856 543	8,5 %

The annual investment by the FRSQ (see Figure 8) in career awards (all disciplines) and grants rose from 2005 to 2009 when it began to fall quite dramatically. From 2004-2011, the 73 rehabilitation career awards that were funded had an important impact on the recruitment of University Faculty and of researchers in the Research Centers. Over the years, the average funding rate for career awards is somewhat lower in the field of rehabilitation. Also, fewer rehabilitation professionals have received clinician career awards and even less (n=3) have attained a national scholar status.

Figure 1. Evolution of funds granted over the years by the FRSQ (Figure 8 in report)

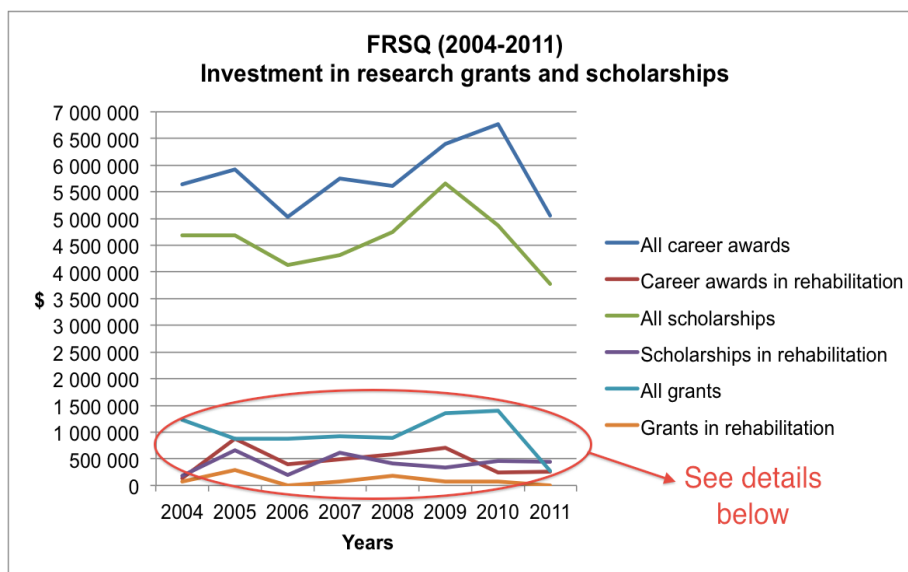
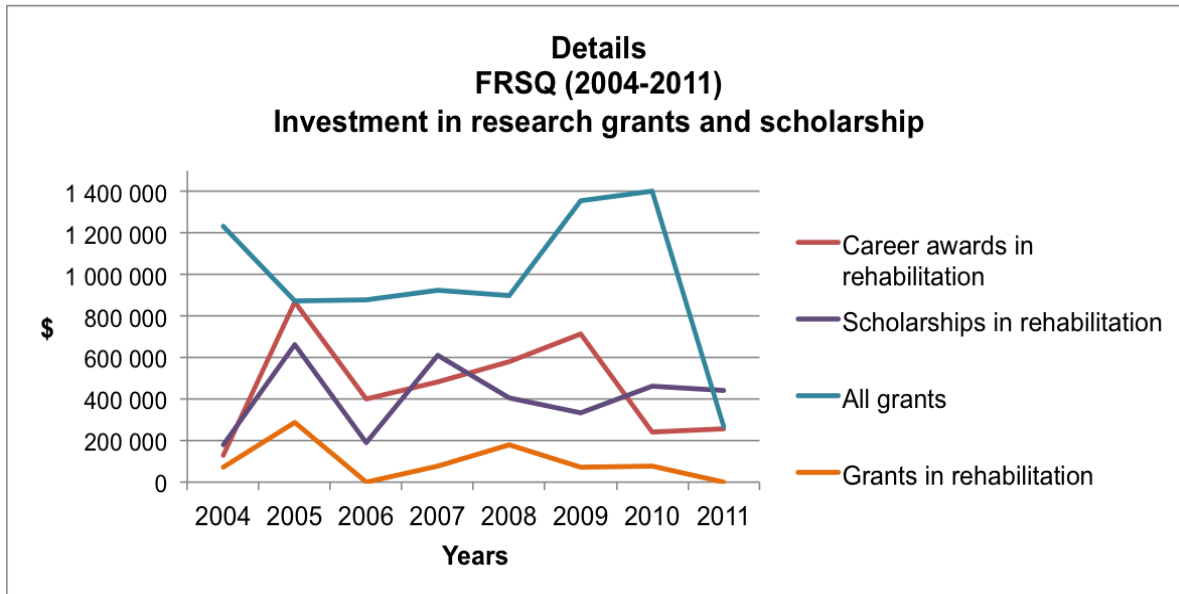


Figure 2: Detailed view for the rehabilitation sector of Figure 1 (Figure 9 in report)



The number of training awards decreased from a high of 24 in 2007 to 12, 18 and 17, respectively, in 2009, 2010 and 2011. The success rate for studentships in the field of rehabilitation is similar or better than that of other disciplines, except for postdoctoral candidates which has a lower success rate.

Infrastructure grants for Research Centers and Research Networks: The FRSQ also invests in infrastructure funds for its four Research Centers with rehabilitation research mandates, its main rehabilitation research network, the REPAR and three other networks with a rehabilitation research component.

Research centers

- Centre de recherche en réadaptation de Montréal Métropolitain (CRIR) in Montréal** *dedicated to research in rehabilitation*)
- Centre de recherche en réadaptation et intégration sociale (CIRRIS) in Quebec City** *(dedicated to research in rehabilitation)*
- Centre de recherche sur le vieillissement du Centre de santé et de services sociaux - Institut universitaire de gériatrie de Sherbrooke (IUGS) *(has a rehabilitation component)*
- Centre de recherche de l'Institut universitaire de gériatrie de Montréal (CRIUGM) *(has a rehabilitation component)*

Provincial networks dedicated to rehabilitation or having a rehabilitation component include:

- Réseau provincial de recherche en adaptation-réadaptation (REPAR) (dedicated)
- Réseau québécois de recherche sur le vieillissement (RQRV) (component)
- Réseau québécois de recherche sur la douleur (RQRD)(component)
- Réseau de recherche en santé de la vision (RRSV) (component)

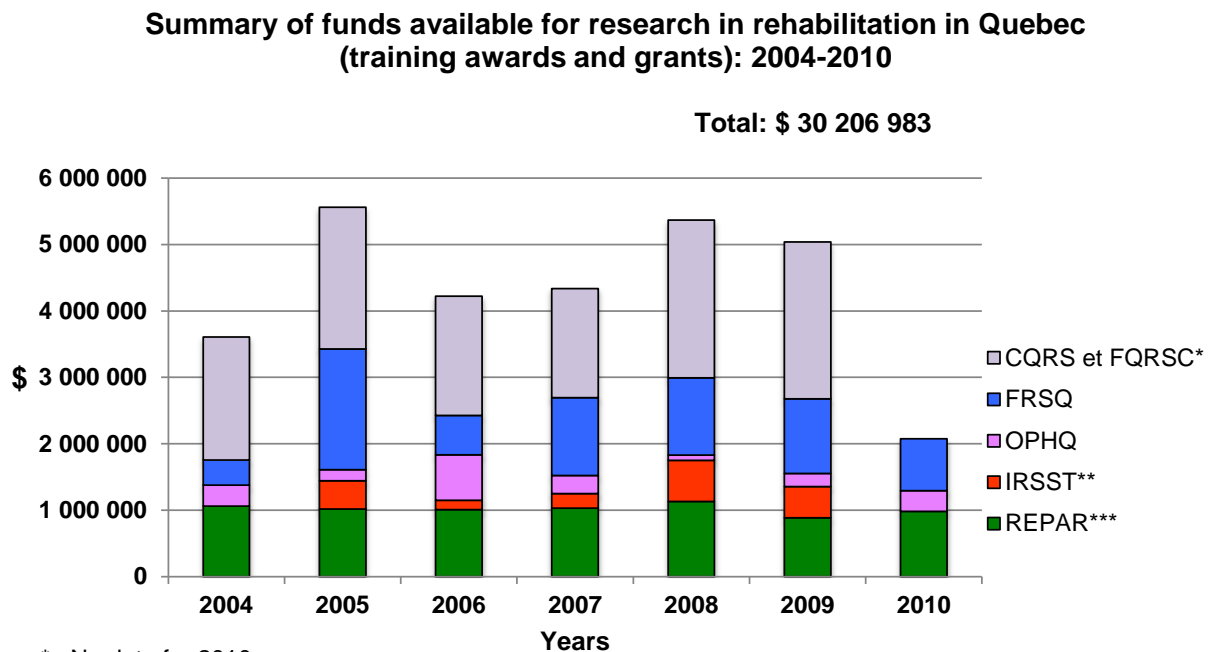
** The **two research centers** dedicated to research in rehabilitation and social integration are funded by 3 sources: the MSSS (Quebec Health and Social Services Ministry), the FQRSC (social research) and the FRSQ (health research). These two rehabilitation research centers receive infrastructure funds annually, estimated at 1.8 million \$ (combined) since the year 2000, for a total investment of about 19.8 M \$. If we estimate the infrastructure funds received for rehabilitation research by the two research centers related to aging to be 900,000\$ (combined) annually, this means an additional 9.9 M\$. In addition, the REPAR received 9,787,500 \$ from the FRSQ. The estimated grand total for infrastructure to the research centers and the REPAR research network from 2001-2011 is approximately 39.5 M\$.

FQRSC:

The Quebec Ministry of Health and Social Services data bank indicates that from 2000-2010, the CQRS, which became the FQRSC, invested approximately 22M\$ in rehabilitation research. The investigator salary program was discontinued in 2002.

Other funding sources include the IRSST (approx. 1,8M\$ from 2005-2009 for research grants) and the OPHQ (approx. 4,2M\$ for grants from 2001-2011).

Figure 3. Summary of Research Investments in Rehabilitation in Quebec (Training Awards and Grants)(Figure 19 in report)

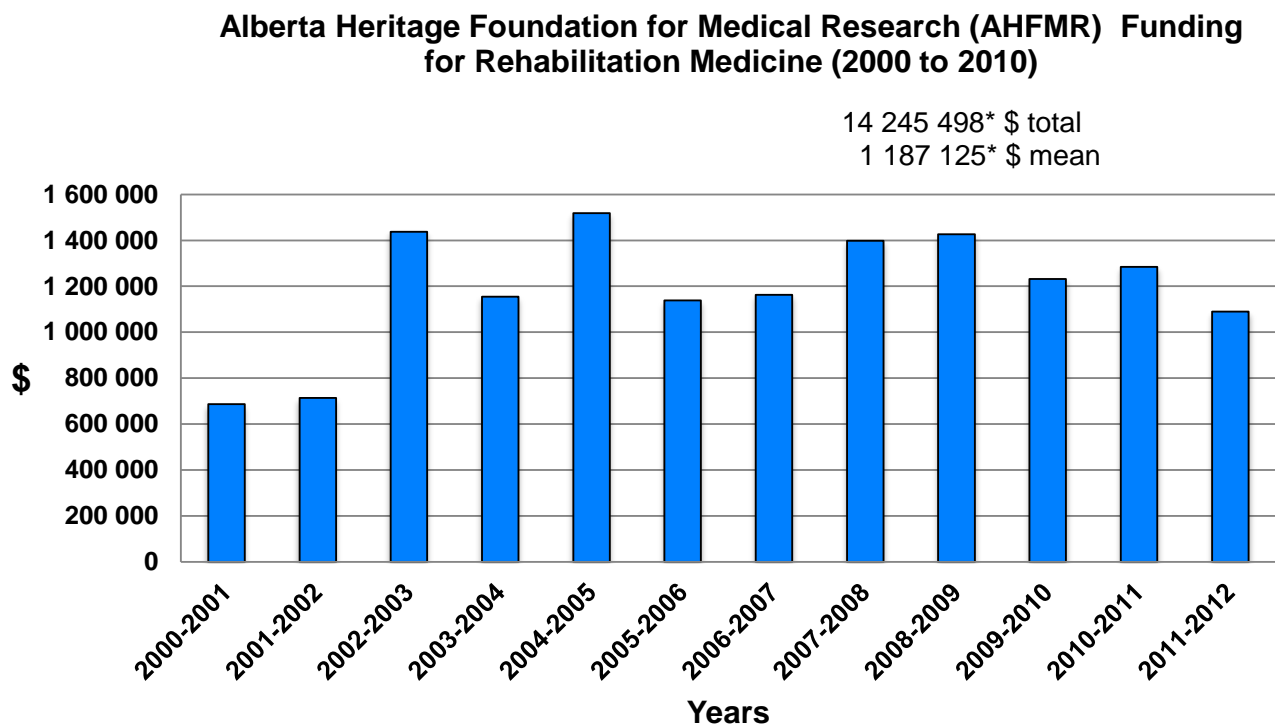


* No data for 2010
 ** Grants only. Data for 2005 to 2009
 *** Total without management and salaries

b. Alberta

In Alberta, the major funding agency, the Alberta Heritage Foundation for Medical Research (AHFMR), ceased operations as of December 31, 2009 but expenditures continued to honour long-term awards. AHFMR made the majority of the funding contributions to salaries and benefits of investigators. Other types of funding include: visiting lecturer grants, conference grants, secretarial support, lab renovations, summer studentships, research allowances, and AHFMR research prizes. The latter were amounts of money given to each of the funded investigators each year (amounts determined by seniority of AHFMR funding category) to enhance their competitiveness. The amounts shown in the graph are approximate.

Figure 4. AHFMR Funding for Rehabilitation Medicine (2000 to 2010)(Figure 20 in report)



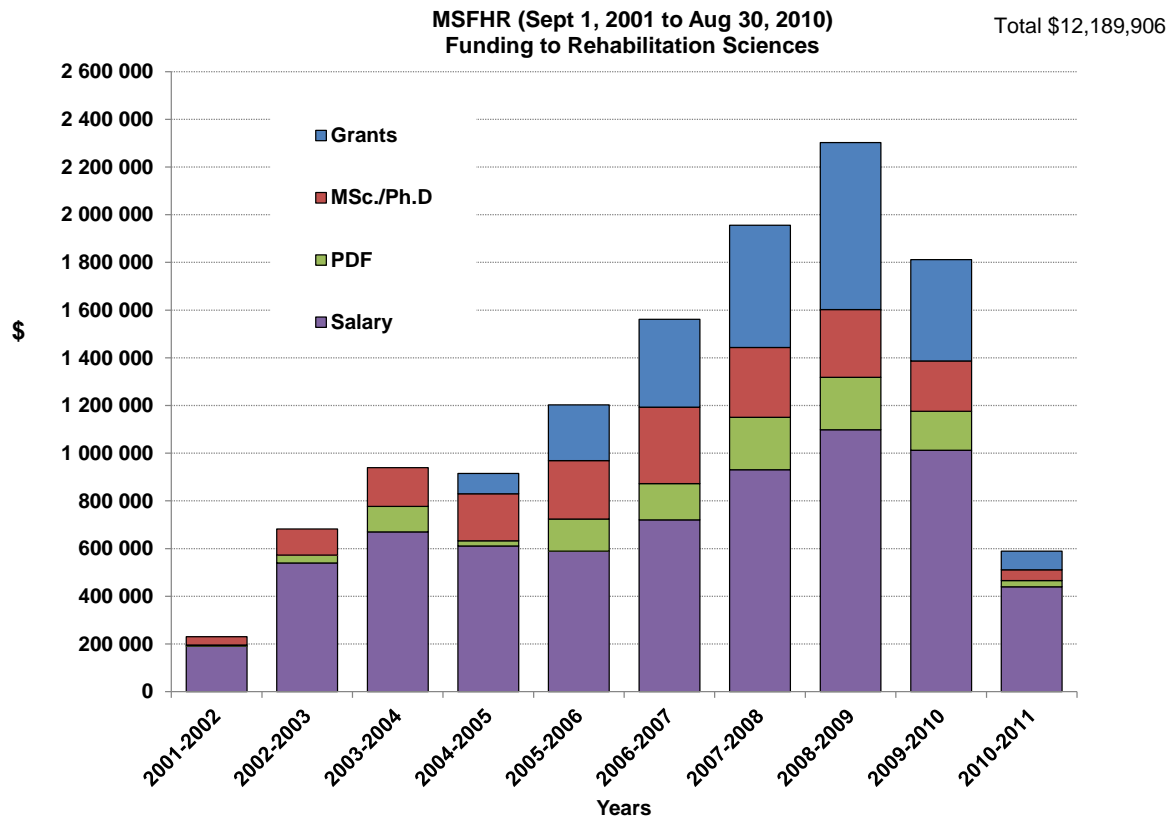
*All amounts are approximate

On January 1, 2010, the AHFMR became Alberta Innovates - Health Solutions, part of the province's stronger, more aligned research and innovation system described in Bill 27, the Alberta Research and Innovation Act. This scan does not include funds allocated by this new agency.

c. British Columbia

The Michael Smith Foundation for Health Research (MSFHR) harnesses the power of health research to improve the health of British Columbians and their health system. It does this by building BC's capacity for world-class research by funding the best scientists; coordinating the sharing of health research resources across the province; and bringing people together for health research planning and action. Learn more at www.msfhr.org.

Figure 5. MSFHR (2001-2010) Funding to Rehabilitation Sciences (Figure 22 in report)



The Rick Hansen Institute (RHI) located in British Columbia invested a total of \$3 872 157 (in both complete and committed grants) from 2008 to 2012. These funds were awarded to researchers in British Columbia, Ontario, Quebec, Alberta, New Brunswick and Nova Scotia.

This amount does not include grants which may have a rehab research component such as Ontario Government funding directed through the Institute to Ontario Neurotrauma Foundation, Alberta Government funding directed through the Institute to Alberta Paraplegic Foundation, awards for researcher development, awards to the practice networks (PN's) or research management team (RMT), awards for access to clinical trials through Wheels in Motion and the recent Access to Care and Timing grant. It also does not include RHI contracts that may have a rehab research component such as work with Accreditation Canada or Knowledge Mobilisation Network or grants related to the RHSCIR (Registry).

d. Ontario

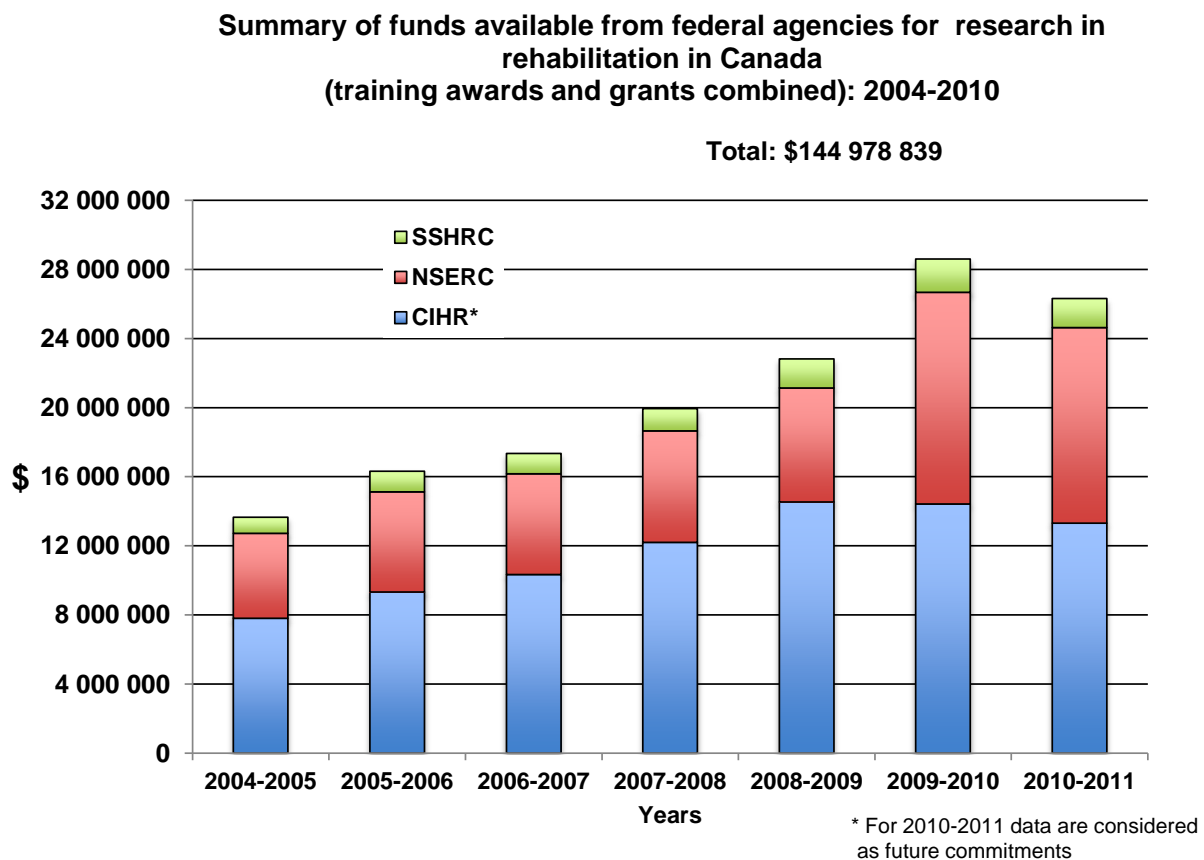
Because there is apparently no central tracking of funds allotted for rehabilitation research across the Ministries in Ontario, the data obtained for provincial funding is partial. Research funding to ONF and Toronto Rehabilitation Institute (TRI) are managed by the Ministry of Health Research Unit. Ms. Deborah VanOosten, Senior Research Planning/Advisor in the Research Unit of the Health System Strategy Branch, confirmed that Toronto Rehab and ONF funding are the two main (provincial) investments in rehabilitation research and these investments are associated with the Ministry of Health Research Unit.

From 2000-2011, the Ministry of Health and Long Term Care for Ontario invested 33 M \$ in the Toronto Rehabilitation Institute (TRI). The Ontario Neurotrauma Foundation (ONF) awarded a grand total of \$12,373,924 to rehabilitation research. Of this amount, most went to fund 69 M \$ research grants and the remainder to fund 18 studentships. Data concerning funds awarded by the Canadian Foundation for Innovation and Career grants from the Province were unavailable. It is clear that a total of approximately 56.3 M\$ does not give a true picture of the investments from the Government of Ontario to Rehabilitation Research but rather the information that we were able to obtain.

II. The declining total amount of research funds available from SSHRC, NSERC and CIHR combined

As expected, of the three major funding agencies (CIHR, SSHRC and NSERC), CIHR is by far the most important source of funds for rehabilitation research. Since the year 2000-2001, the amount invested by CIHR (grants and awards combined) has risen from about 1.3 million\$ to about 14.5 Million \$ in the year 2009-2010. The amount invested by SSHRC rose from about 379 856\$ in 2000-2001 to 1.9 Million \$ in 2009-2010. Data for NSERC was only available from 2004-2005; the amount awarded rose from 4,9 M \$ to 11 M \$ in 2010-2011. As shown in Figure 31, the total amount awarded by the three agencies together rose from 13,6 M\$ in 2004-2005 to 26,3 M\$ dollars in 2010-2011, attaining a peak of about 28,5 M\$ in 2009-2010. The apparent decrease in 2010-2011 is due to incomplete data from CIHR.

Figure 6. Summary of Investment in Rehabilitation research by the three Federal Agencies (2004-2005 to 2010-2011)(Figure 31 in report)



III. Contribution of the three Centers of Excellence with a rehabilitation focus and the Heart and Stroke Foundation of Canada

The total contribution of the three Centers of Excellence (Canadian Arthritis Network (CAN), NeuroDevNet and the Canadian Stroke Network (CSN) was about 16.6 M\$. CAN invested 3.3M \$ (2004-2010), NeuroDevNet, 1.7 M\$ (2010-2013), and the CSN 11.7 M \$ (2000-2011), respectively, for rehabilitation research related to arthritis, childhood neurodevelopmental disorders and stroke. Since 2010, the Heart and Stroke Foundation (part managed by the national office in Ottawa) has provided close to 13M\$ to support stroke rehabilitation (does not include contributions from provincial chapters).

IV. Research Chairs Related to Research in Rehabilitation

The maturity and excellence of rehabilitation researchers is reflected in the number of research chairs held by University Professors in the Rehabilitation Programs across Canada. They held a total of 28 Research Chairs, 13 of which were highly competitive Canada Research Chairs (CRCs). The salary support of the CRCs was not included in the amounts reported for the three federal funding agencies.

V. Estimating the evolution in the number of researchers involved in rehabilitation research

Estimating the number of researchers presented quite a challenge. First, the breadth of disciplines involved in the continuum of rehabilitation research meant examining various sources of information. Secondly, the lack of data bases on applicants to most of the funding sources (only available from CIHR and FRSQ) limited use of applicant data. Thirdly, despite multiple requests the information was not always provided.

In the end, converging information from the REPAR, CIHR records of applicants and information provided by the University Rehabilitation Programs led to an estimate of the magnitude of the increase in the number of researchers. REPAR membership records showed that the number of researchers increased from 135 in 2002 to 210 in 2010, representing an increase of 56%. CIHR data on the number of applications revealed an increase of 1002% or a 10-fold increase from 51 in the year 2000-2001 to 551 in the year 2010-2011. FRSQ data shows that the number of applications (studentships and career awards combined) rose from 23 in 2004 to 112 in 2011, an increase of 387% (3.87 times).

The number of professors involved in the University Rehabilitation Programs in the Province of Quebec increased from 68 (3 Universities) in 2000 to 141 (5 Universities) in 2012, an increase of 107%.

VI. Main Findings:

1) Evolution of the field of rehabilitation:

The evolution of the field of rehabilitation has been remarkable over the last 40 years. One must remember that the first MSc programs in this field were initiated in the early 1970s and there were only a few PhDs in this field in the early 80s. Today it is a highly dynamic multidisciplinary (bio-psycho-social and technological) research endeavor. Fueled by the WHO (1980; 2001) and PPH (1998) conceptual models and the increasing number of clinicians, basic scientists, engineers, social scientists and psychologists, and many other areas of expertise interested in various aspects of the rehabilitation continuum, as well as research infrastructures and funding opportunities that encourage a multidisciplinary approach, the rehabilitation research community has attained a critical mass that has grown exponentially in the last ten years as demonstrated in this scan.

2) The mounting needs for rehabilitation in the Canadian population:

The aging Canadian population, especially in the Province of Quebec, as well as technological and medical advances that save or prolong life result in an ever-increasing number of persons who will require rehabilitation services in the future. The most recent Canadian and Provincial statistics on disability rates date from 2006. The disability rate has no doubt increased over the last 6 years given the aging population as predicted. It is not unreasonable to say that at any one time, the number of persons with permanent or disabilities due to disease, accidents, or overuse, that require rehabilitative care is approximately one in four (25%) of the population. The projected increase in the number of persons requiring rehabilitation in the future has already led to an increase in enrollment in Physical and Occupational therapy and Speech and Language programs in the Province of Quebec and this has spurred the recruitment of University Professors with PhD degrees.

3) Declining investments in rehabilitation research since the year 2008-2009

This scan has revealed that the four provinces in which inquiries were made had supported research in the field of rehabilitation by investing considerable funds. Of the Provinces, the investment of the Province of Quebec is noteworthy because it has not only funded career and studentship awards and research projects but has also invested a great deal in research infrastructure with the creation of a Provincial Research Network since 1994 and two Research Centers dedicated to rehabilitation research since the year 2000. Ontario has also provided infrastructure support for the Toronto Rehabilitation Institute (TRI). For the Province of Quebec, the FRSQ statistics show that their investment for career and studentship awards and research projects was about 8.5% of the total investment for these three programs and that the success rate for rehabilitation applicants was similar to that of other disciplines or areas of research for all programs except the post-doctoral program. Statistics on the percent of funds invested or success rates in rehabilitation were not available for other provincial agencies. Were the amounts of Provincial investments adequate to meet the needs of the rehabilitation research enterprise in each province? Probably not, because, as demonstrated by FRSQ data, many applications rated fundable are not funded each year because of lack of funds.

An alarming trend was the decrease in available funds in the most recent years at both the Provincial and Federal levels. The contributions of all three federal agencies together rose to a peak in 2008-2009 of 28,5 M\$. This funding pattern reflects the effects of the economic climate on the full spectrum of research in Canada.

From 2000-2010 the CIHR has invested a total of about 83.2 M\$ for rehabilitation research, about 61.1 M \$ for grants and 22 M\$ for training awards. MSK-related rehabilitation received the largest amount, followed by CNS-related rehabilitation, with little funding awarded to cardiac rehabilitation. Funding for childhood disorders was not mentioned in the CIHR statistics. Success rates were only available for rehabilitation research related to the Institute off Musculoskeletal Health and Arthritis (IMHA). The IMHA data bank shows an overall success rate for rehabilitation research that oscillates from a high of 42.2% (2007-2008) to a low of 24% (2005-2006). These are excellent success rates that speak to the quality of the proposals. One must also remember that as the denominator grew across all disciplines applying for grants (some more than others such as rehabilitation) since the beginning of CIHR in the year 2000 and the increases to the overall CIHR budget decelerated, CIHR's overall success rates declined. The finding that success rates for rehabilitation researchers are higher than the overall CIHR success rate likely reflects not only the excellence of the applications but also the review of rehabilitation-related grants by many committees in addition to the MOV committee.

Between the years 2000-2010, SSHRC invested about 12.1 M\$ in rehabilitation research with 6,2M \$ for grants and 5,8M \$ for training grants. SSHRC does not have information on personal salary awards. It should also be noted that since the 2009 Federal budget, SSHRC funding is reduced for health-related research that is eligible under the mandate of CIHR.

From 2004-2005 to 2010-2011, NSERC invested about 61,8M\$ for rehabilitation research, 49M \$ for grants and 12,6M \$ for training grants. It should be noted that these data were provided by NSERC personnel with keywords provided by research personnel involved in this environmental scan. These keywords were used to search the NSERC Awards Search Engine. It was interesting to note that the NSERC investment was much larger than that of SSHRC, reflecting the importance of technology in the rehabilitation research enterprise.

The three Centers of Excellence (CAN, CSN and NeuroDevNet), particularly CAN have made significant investments in rehabilitation research. The role of the CSN in transforming the approach to research on the rehabilitation of persons post stroke has had a major impact on the Canadian Stroke Strategy. Much of the work of the CSN was done in collaboration with the Heart and Stroke Foundation of Canada. NeuroDevNet, the youngest of the three networks, has already fostered multidisciplinary approach to the rehabilitation of childhood neurodevelopmental disorders, particularly cerebral palsy while the arthritis network (CAN) has encouraged a multidisciplinary approach to arthritic disorders, particularly osteoarthritis.

4) An increasing number of researchers in the field of rehabilitation

An important statistic that reflects on the coming-of-age of research in rehabilitation is the number of research chairs (n=28) held by rehabilitation researchers. The 13 Canada Research Chairs speaks to the excellence of the candidates and also to the involvement of the respective Universities in the promotion of research in this field. Other Research Chairs such as a Chair for Research in Military and Veteran's Health and a Chair in Telerehabilitation reflect developing rehabilitation research foci.

The number of Professors in the Rehabilitation Programs (Physical and Occupational Therapy and Speech Pathology and Audiology) in the Province of Quebec has more than doubled from 68 in the year 2000 to 141 in the year 2012. This increase no doubt impacted on the 387% increase in FRSQ admissible career and training grants from 2004-2011. According to membership data from REPAR, the total number of researchers in rehabilitation in Quebec increased from 137 in the year 2002 to 210 in the year 2010, an increase of 53.2%.

The data obtained to date on the number of researchers involved in rehabilitation in Canada is incomplete. Because other provinces do not have Provincial Rehabilitation Research Networks, we cannot use estimates based on their membership. Information on the evolution on the number of Professors attached to the University Rehabilitation Programs across the country is incomplete but nevertheless shows a marked increase in the number of Professors. A current estimate of the number of Professors teaching in Canadian Rehabilitation Programs is 454. This estimate is based on a combination of information from the Programs, although incomplete, and websites. No attempt was made to document the evolution of the number of researchers in programs such as engineering, social sciences, kinesiology, physicians involved in rehabilitation research, nursing, psychology, neuropsychology, or the basic sciences such as neurophysiology, physiology, etc. If we assume that all 454 Professors are involved in research and that 50% more are involved in research but are not associated with University Rehabilitation Programs, we come to a figure of about 680 researchers in rehabilitation in Canada.

5) Mismatch: Investments, Number of Researchers, Population Needs

While this environmental scan confirms that there is a flourishing rehabilitation research endeavour that spans the rehabilitation research continuum, it also demonstrates the need for investments from a multitude of funding sources to cover the different types of research involved in this continuum. Thus at the federal level the three main agencies are involved: CIHR, NSERC and SSHRC. In Quebec, the FQRNT and the FRSQ are also involved as is the Ministry of Health and Social Services have partnered to fund the two Rehabilitation Research Centers.

There is no doubt that the Canadian Foundation for Innovation (CFI) has played a major role in providing infrastructure funds for a number of individual and groups of researchers across Canada. Some of these infrastructure grants were associated with awards of Canada Research Chairs while others were awarded on the basis of excellence in competitions. This scan was not able to document the number and amount of CFI awards in Ontario, Alberta and British Columbia and only to estimate awards in Quebec.

Profiles of the funding levels at the Provincial and Federal levels show an alarming levelling off or a decrease in funding after a peak attained in 2008-2009. As mentioned previously, such a funding scenario affected all spheres of research in these years and mirrors the economic situation. This decreasing availability of funds, however, came at a particularly bad time for the expanding rehabilitation research endeavor across Canada. This decline in funds is associated with a more than two-fold increase in the number of researchers involved over the same time span. Moreover, this funding mismatch comes at a time when there is an ever-increasing need for rehabilitation research to guide the evolving rehabilitation service organisation as the number of persons requiring rehabilitation services is ever-increasing due to the changing demographics of Canadian society.

VII. Examples of successful Networks that have had an impact on the development of rehabilitation research in Quebec and in Canada

- **The REPAR:** In the Province of Quebec the creation of a Provincial Rehabilitation Research Network (REPAR) in 1994 had a huge impact on the development of research capacity and multidisciplinary priority clinically driven research initiatives in the Province. In addition to funding studentships and scholars, the REPAR integrated clinicians in the research process and was instrumental in developing a research infrastructure in the rehabilitation centers. As mentioned above in the partnership section, REPAR developed research programs with other networks, the Ministry of Health and Social Services, the Quebec Car Insurance Board, the Research Institute for Health and Security in the Workplace (IRSST). REPAR also partnered with the CIHR and the Canadian Stroke Network. Importantly, in the transition period between the MRC and the creation of the CIHR, the REPAR exerted a leadership at the National level (lobbying influential persons implicated in the CIHR creation, organisation of meetings bringing together key players from across Canada, the planning of a consensus conference and the writing of arguments to the Council governing the creation of the Institutes) to promote the need for an Institute dedicated to rehabilitation research.
- **The CIHR Institute model** has proven to be a good way to promote strategic research activities. Of particular interest are their partnership model and their multidisciplinary team grant approach in strategic initiatives.
- **The Canadian Network of Centers of Excellence Program (NCE)** was created in 1989 as a joint initiative of the Natural Sciences and Engineering Research Council, the Social Sciences and Humanities Research Council, the Canadian Institutes of Health Research, Industry Canada and Health Canada. The NCE currently funds 46 networks and centers through its suite of programs, which mobilize Canada's best research, development and entrepreneurial talent, and focus it on specific issues and strategic areas.
 - Networks of Centers of Excellence (NCE) (16 networks)
 - Three Centers of Excellence (CAN, CSN and NeuroDevNet) have greatly contributed to the enhancement of rehabilitation research in their respective sectors.
 - Knowledge Mobilization Initiative Networks (NCE-KM) (3 networks)
 - Canada-India Research Centre of Excellence (CIRCE) (1 center)

- Centers of Excellence for Commercialization and Research (CECR) (22 centers)
- Business-Led Networks of Centers of Excellence (BL-NCE) (4 networks)

VIII. Decisions “perceived” to have impeded the growth and impact of rehabilitation research

- **Decision to not create a CIHR Institute for Rehabilitation:** Unfortunately, rehabilitation in 1999 was not perceived to have a large enough capacity to merit an Institute and moreover, it was considered to be more of a cross-cutting component of many of the 13 Institutes that were created rather than a field of research. Officially, the Institute of Musculoskeletal Health and Arthritis (IMHA) was given the mandate of overseeing research related to rehabilitation in the musculoskeletal field. It was one of the six research foci of this Institute along with arthritis, bone, skin, muscle and physical activity.

This decision meant that researchers interested in different aspects of the rehabilitation continuum could find a research “home” in many of the Institutes and especially when these participated in strategic initiatives related to rehabilitation. Thus those interested in the rehabilitation of childhood disorders, or persons with stroke, the aging population, chronic lung disease, cancer, HIV, arthritis, service organization, or the psychosocial aspects of disability could apply to different Institutes. While the opportunities were available, many found the funding environment to be difficult without the clear pathway that an Institute could have provided.

One can also argue that IMHA championed the field of rehabilitation among the other 12 Institutes and often kept it prominent in discussions across multiple areas and Institutes. In fact, such an organization may be seen as a plus for the field of rehabilitation giving it the opportunity to align with multiple Institutes that then invest into particular request for applications (RFAs). In fact, many RFAs have led to successful rehabilitation-related team grants.

- **Lack of dedicated peer review committees for Rehabilitation Research:**
 - The National Health Research and Development Program (NHRDP) played a very important role the development of research activities in the field of rehabilitation. In the 80s and early 90s, the NHRDP one and sometimes two, peer-review committees dedicated to rehabilitation research and also launched strategic initiatives such one related to the development of outcome measures in rehabilitation in 1987. With the loss of the NHRDP research program for rehabilitation (around 1993), the field no longer had a dedicated peer-review committee.
 - The MRC and later the CIHR did not have a dedicated peer review committee for rehabilitation. This led to the creation of the MOV committee (Movement & Exercises) in an attempt to fill this void for the mobility related rehabilitation. This committee has not played

its anticipated role in the promotion of rehabilitation research related to movement disorders because many experienced neurosciences researchers, who could already apply to two committees in their field, chose to send their grants to this new MOV committee and the focus quickly shifted from movement-related research in humans to basic work involving animals. Also, this committee was much too focused on movement disorders to cover the continuum of rehabilitation research from impairments to social integration.

On the other hand, the tremendous growth in rehabilitation research happened in spite of only the MOV committee being related to a specific aspect of rehabilitation. Rehabilitation research thus grew despite the apparent limitation of a dedicated committee, presumably in part because there are multiple committees that review rehab-related work. This can be perceived as a plus because it means that rehab is not limited to a specific % of grants or limited to one committee. The finding that the success rate of rehabilitation researchers was much higher than the overall CIHR success rate speaks to the quality of the applications and also likely that the grants were reviewed in multiple committees.

IX. An action plan to enhance the infrastructure and research funds available in Canada for research across the full rehabilitation continuum.

There have been many changes in the research funding environment since 2010 in Canada and in the different Provinces. These changes include: the restructuring of Provincial funding agencies in Quebec and Alberta, the re-design of peer review at CIHR and its SPOR initiative, SHERC's change in research priorities, the end of the funding cycles of the Canadian Stroke Network and the Canadian Arthritis Network and a restructuring of Foundations such as the Heart and Stroke Foundation.

These major changes in the research funding environment can be seen as an opportunity to re-examine the funding structure and funding opportunities for research in the field of rehabilitation over the coming years. The picture of rehabilitation research in 2010 as painted by this environmental scan is very different from that of 2000 and light years different from that of the early 1980s when the first researchers with PhDs in the field started their careers. Today, the field of rehabilitation is reaching maturity, it has capacity in terms of number of researchers, and researchers in this field have demonstrated excellence by their ability to obtain grants in a period of budget constraints. Importantly, the needs for evolving rehabilitation services and of research to guide these changes are ever-increasing with the demographics of the Canadian population.

1). Main recommendation: Convene a Brainstorming-type of Conference on Rehabilitation Research Funding in Canada

The main recommendation is to convene a “ brainstorming” type of Conference that would bring together representatives of the major funding agencies (federal and provincial), foundations and other funding partners, researchers, patients and caregivers representing the continuum of rehabilitation research and other key persons known to be visionary thinkers. The objectives of such a Conference would be to examine the Canadian funding landscape for rehabilitation research in the next 10 years and on the basis of this analysis to propose how to best position rehabilitation research in the evolving funding landscape.

This environmental scan lays the ground for further discussion. Analysis of the research investments and the ever-increasing number of researchers in the field of rehabilitation over a 10-year span from the year 2000 to 2010 and the organizational structure of the rehabilitation research enterprise in Canada has documented many points for discussion:

- An ever-increasing proportion (which may be as large as 20-25% at any one time) of the Canadian population require effective state of the art rehabilitation services
- Investments in rehabilitation research began to decline in the year 2008-2009; a situation that mirrors research funding for all disciplines.
- The number of researchers has more than doubled in the last 10 years
- Mismatch between investments and needs (number of researchers and best practice requirements)
- Research infrastructures and changes in the funding objectives and organization
- The success of REPAR as a Provincial Research Network
- The success of the Centers of Network of Excellence
- The success of strategic CIHR Team Grants
- Is the current organizational structure for rehabilitation in CIHR optimal? If not, what are alternative organizational structures?
- How can ongoing changes in the CIHR peer review system and the SPOR initiative favor the development rehabilitation research along its full continuum?
- What is the impact of the reduced role of SSHERC in rehabilitation research since 2009
- Are there lessons to be learned from the American organizational model for research in the different aspects of rehabilitation research?
- What type of partnerships can be envisaged that would promote rehabilitation research?
- Are there lessons to be learned from the new research structure in Alberta, the “Alberta Innovates Health Solutions” ?

2). Strike an organizing committee that has representatives from the CIHR, NSERC and SSHERC, the main Provincial Research Agencies and REPAR to plan the Conference and to solicit funding.

3). Funding for such a Conference:

The recommendation is that such a Conference should be a national endeavor and that funding should be sought from the main federal and provincial funding agencies.

X. Designated Holder of the mandate from REPAR

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