



IMHA *Reports*

Outcomes of the *Seed Grant:*
Disparities in Oral Health
program supported by the
Institute of Musculoskeletal
Health and Arthritis of the
Canadian Institutes of Health
Research

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April 2011

Prepared for the Institute of Musculoskeletal Health
and Arthritis of the Canadian Institutes of Health
Research



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Instituts de recherche en santé du Canada

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© Her Majesty the Queen in Right of Canada (2011)
Cat. No.: MR21-162/2011E-PDF
ISBN: 978-1-100-18966-6

<http://www.cihr-irsc.gc.ca/e/13217.html>



Acknowledgments

Marc Milot, PhD, developed the Micro Impact Survey tool, carried out the survey, data extraction and analysis and wrote this report in collaboration with Jane Aubin, PhD, IMHA's Scientific Director. We would like to thank other IMHA staff for their input and guidance on numerous points – Liz Stirling, Elizabeth Robson, Tanya Gallant, Julie de Courval and Esther Rosenthal. We also acknowledge the contributions of IMHA's Performance Evaluation Committee, the Institute Advisory Board, as well as the feedback of the researchers who tested the pilot version of the survey tool. Finally, we thank the IMHA-funded researchers who responded to the survey and to other evaluation-related requests.

Table of contents

Preface	1
Executive Summary	3
CHAPTER 1 Introduction.....	5
Background.....	6
IMHA’s Seed Grant: Disparities in Oral Health program.....	7
Funded research projects:	8
CHAPTER 2 Results and Outcomes	10
Relevance.....	11
Team building and networking	13
Team building	13
Networking: collaborations.....	14
Knowledge creation and dissemination.....	15
Peer-reviewed publications.....	15
Dissemination of results	16
Bibliometric analysis.....	17
Health care impacts	19
Training	20
Funding opportunities.....	21
CHAPTER 3 Success Stories.....	22
Seed Grant 1: Developing a team to address oral health disparities in Canada.....	23
Addressing oral health care disparities in a number of vulnerable populations	23
Team building and collaboration in oral health care improvement	23
Pilot studies in oral health care informing grant applications.....	23
Training in oral health disparities research.....	24
New partnerships and future funding opportunities.....	24
Seed Grant 2: Increasing capacity to inform oral health policy regarding vulnerable populations and the KT Plan.....	25
Informing policy regarding oral health of vulnerable populations such as seniors	25
Increasing Capacity to Inform Oral Health Policy (ICOH) project	25
Multi-stakeholder oral health forum.....	25
Next steps and future developments.....	26
Opportunities provided and further grant applications.....	26
Seed Grant 3: Alleviating disparities in oral health: Responding to the information needs of key decision-makers (and the KT plan)	27
Addressing oral health disparities in the working poor.....	27
Engaging governmental decision-makers in the oral health needs of low-income families	27
Informing governmental decision-makers in oral health policy	27
Knowledge translation activities led to a 135 million dollar investment in dental care for children of low-income families	28
Seed Grant 4: Developing an agenda for reducing oral health care disparities in British Columbia	28



Multidisciplinary team to address oral health disparities in British Columbia.....	28
Educational trials to encourage health professionals to attend to oral health disparities	28
Collaborative workshop with local and foreign researchers.....	29
Development of community-based clinics to address needs of low-income and other vulnerable populations.....	29
Submission of a grant request to CIHR for an operating grant to seek equity in oral health care for disadvantaged populations	29
CHAPTER 4 Conclusion	30
CHAPTER 5 Micro Impact Survey/Methodology.....	34
Micro Impact Survey.....	35
Methodology and analysis	35
Relevance analysis	36
Bibliometric analysis	37
References	40
Appendix: MIS Survey.....	41

Preface

This report, prepared for the Institute of Musculoskeletal Health and Arthritis (IMHA) by its Analysis and Evaluation Unit, describes the outcomes of research projects supported by the program Seed Grant: Disparities in Oral Health (DOH) launched in December 2006 and funded by the institute's Strategic Initiatives (SI) budget in 2008.

IMHA is the primary source of funding for Canadian health research across six research foci: arthritis, musculoskeletal (MSK) rehabilitation, bone, skeletal muscle, skin and oral health. Each of these areas is equally important and offers significant opportunities for advancement of research and knowledge translation. IMHA's vision is to sustain health and enhance quality of life by eradicating the pain, suffering, and disability caused by arthritis and other MSK, oral and skin conditions. Advances in understanding, preventing and treating diseases and conditions across all six research foci provide a formidable means of achieving this vision. IMHA's mission reflects that of the Canadian Institutes of Health Research (CIHR) - to excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge in all relevant areas, and to translate that new knowledge into improved health for Canadians, more effective health services and products, and a strengthened Canadian health care system¹.

The Analysis & Evaluation Unit aims to help IMHA understand the impact of its targeted funding and programs, and to assist the Institute Advisory Board (IAB) in decision-making and the development of strategic initiatives via evidence-based approaches. IMHA has systematically collected data on funding trends within its mandate, and from time to time surveyed researchers funded by their programs. Both funding trends and data collected on research outcomes are analyzed and used to inform strategic directions and activities. Recognizing the potential value of such data to others, IMHA initiated a more comprehensive approach to its data collection, analyses and evaluation activities. Amongst new elements of the approach was a knowledge translation activity initiated in 2010 and entitled "IMHA Reports" entailing the generation of reports on outcomes of IMHA's programs and initiatives.

¹ <http://www.cihr-irsc.gc.ca/e/40490.html>

IMHA Reports are disseminated to IMHA's IAB as well as to a variety of interested stakeholders including senior management and staff at IMHA and CIHR, researchers, organizations, policy makers and others interested in knowledge translation and/or outcomes of projects funded in relevant health research areas. The reports may also be of interest to other funding agencies and evaluators interested in measuring the impact of similar research programs.

For more information about IMHA, visit the following website:

<http://www.cihr-irsc.gc.ca/e/13217.html>

Executive Summary

- IMHA created the Seed Grant: Disparities in Oral Health (DOH) program based on the recommendations of two IMHA-supported consultation workshops. Those recommendations included building capacity for research and knowledge translation to help reduce disparities in oral health care within Canadian vulnerable populations.
- CIHR/IMHA's processes were successful in meeting program objectives, i.e., identifying and strategically funding four highly relevant disparities in oral health research projects directed to health services/systems or social-cultural-environmental/population health research.
- Together, the four research projects targeted disparities in oral health care in several vulnerable Canadian populations including seniors, aboriginal populations, low-income families/individuals and the working poor.
- The formation of large multi-sectoral teams (average of 8 co-applicants per team) and the development of many new collaborations (average of 6 per project) that included stakeholders from academic, government and public sectors ensured rapid mobilization of activities and the translation of knowledge for purposes of reducing disparities in oral health in Canada.
- At the time of survey of outcomes, 21 articles related to oral health care and disparities were (or have plans to be) published in peer-reviewed journals; research findings have also been disseminated to a broad array of stakeholders ranging from government policy makers to health professionals to community-based health care clinics.
- Interactions with oral health care experts were reported by all the research teams and most indicated that their findings were impacting (or were to impact) health care policy.
- The nature of the interactions of the DOH-funded teams with the involved stakeholders provided an excellent example of dynamic and interactive knowledge translation which appeared integral to the mobilizing of the project activities.

- At time of survey of outcomes, half the teams reported that the DOH support helped acquire pilot data and additional research funding from extra-CIHR agencies and the others anticipated additional funding in the near future on topics related to disparities in oral health care. Many applications had also recently been made to CIHR and/or other funding agencies to follow-up on initial DOH findings or associated outcomes.

- Other noteworthy outcomes to date of the DOH-supported projects include:

Support of the Increasing Capacity to Inform Oral Health Policy initiative, a unique project that established the Oral Health Research Affinity Group comprising researchers, health policy makers and professionals, community members, and government officials working to reduce oral health disparities and with plans to develop a national multi-site initiative with a strong knowledge translation emphasis.

Knowledge translation activities with government decision-makers led to a C\$135 million investment in dental care for children of low-income families in Ontario.

Findings informed the development and evaluation of dental clinics to address the needs of low-income individuals and others who have difficulty accessing dentistry in British Columbia.

One DOH-supported team leader is now the chair of a Canadian Academy of Health Sciences assessment on improving access to oral health care for Canadians.

- Overall, the investment of only \$463,275 in the four DOH teams leveraged multi-million dollar additional investments and successfully seeded new projects directed to research, training, and knowledge translation activities aimed at reducing disparities in oral health care in Canada.

CHAPTER 1 Introduction

This chapter describes the background and objectives of the Seed Grant: Disparities in Oral Health program and the research projects that received funding.

Background

Oral disorders encompass a wide spectrum of conditions from tooth decay, gum disease and associated chronic pain, to congenital craniofacial deformities and oral cancers. Poor general health often leads to poor oral health, and accumulating evidence indicates that the reverse is also true. People with chronic diseases, such as diabetes and AIDS, are more prone to developing persistent gum infections and there's mounting evidence that chronic gum infection correlates, for example, with an increased risk of heart disease and with premature labour and low birth-weight babies. The Canadian health care system however largely excludes publicly funded oral health services and many vulnerable populations such as the elderly, aboriginal people and low-income families have limited access to oral care. There is consequently a need to better understand and ameliorate disparities in access to optimal oral care from a health services/systems and social-cultural-environmental/population health perspective (CIHR Themes III and IV, respectively).

Through mechanisms that include broad consultations and workshops, IMHA gathers input from multi-sector stakeholders including researchers, partner organizations and consumers in specific health areas, to aid in the development of health research priorities. Amongst workshops in the area of IMHA's strategic priority "Pain, Disability and Chronic Disease" was one titled "Oral Health Assessments for Seniors: Building Capacity for a Canadian Consensus", held in Halifax, Nova Scotia, in March 2004. Workshop participants sought to "develop a model to be used as part of a national initiative to collect baseline data and identify treatment needs for seniors' oral health in Canada". The workshop was also intended to promote development of collaboration amongst stakeholders concerned with issues of seniors' oral health - academia, government, health care providers, seniors' advocates, seniors' caregivers, and seniors. An important outcome of this workshop was the identification of the need for development of networking strategies to work towards a national consensus. A subsequent IMHA-sponsored workshop entitled "Oral Health Assessments for Seniors: Building an Atlantic Canadian Strategy", was held in Halifax, Nova Scotia, May 2006. Via their unique perspectives, workshop participants developed a set of key components for conducting oral health research and action plans for seniors, including First Nations and Inuit senior populations.

Together, the two workshops led to recommendations to build capacity for oral health data collection within vulnerable populations in Canada. One overarching outcome was recognition of the need for national partnerships between key communities and cross-pillar oral health researchers to build multidisciplinary and cross-sector networks. This broad range of knowledge users and sources of knowledge would engage in ongoing networking and consensus building in the area of oral health disparities.

IMHA's Seed Grant: Disparities in Oral Health program

To help move the workshops' outcomes forward, IMHA crafted the Seed Grant: Disparities in Oral Health (DOH) program, which emphasized the need for team building and networking for dealing with Canadian disparities in oral health care, such as those observed with seniors, aboriginals, or other vulnerable populations at risk for limited access to care and poor oral health. In December 2006, IMHA launched the DOH Request for Applications (RFA) with a contribution of \$400,000.

The DOH program was designed to provide one year grants of \$100,000 (the average funding per grant was eventually \$115,819; the effective date of funding was January 8, 2008) to successful research teams that had a clear and well-developed set of important research questions to address disparities in oral health and/or gaps in oral health services among vulnerable populations, including inter-relationships between oral health and general health and well-being. A Seed Grant program like the DOH is not intended to generate outcomes normally expected from grants of greater duration and funding level, but to stimulate the development of research and knowledge translation activities with potential for longer-term impact. Further, while the program was not explicitly referred to as a Team Planning and Development Grant, the RFA had similar elements in that it sought to provide opportunities for planning and development activities of multidisciplinary and/or cross-theme (sometimes referred to as pillars) research teams. Applicants were encouraged to bring together oral health researchers with investigators from other fields and sectors to develop novel team approaches to address oral health disparities within the context of any one of IMHA's strategic priorities, which include:

- Tissue injury, repair, and replacement
- Physical activity, mobility, and health
- Pain, disability, and chronic diseases

The specific objectives of the DOH program included funding research comprising the following elements:

- Oral health research
- Health services component
- Research addressing disparities in Canada
- Vulnerable populations as focus
- Team building/networking

Support was to enable researchers to meet, plan, and execute pilot collaborative studies for the purpose of generating preliminary data for the team to be successful in subsequent CIHR open and strategic competitions or extra-CIHR funding competitions in the area of oral health disparities. It was mandatory that at least one new investigator be included as part of the proposed team. A new investigator was defined as a researcher who had completed all formal training but with 5 years or less experience as an independent investigator.

Funded research projects:

From the nine DOH applications submitted, CIHR’s peer-review process identified the top four projects that were scored as excellent and subsequently approved for funding. Below are the details of the four projects (by author alphabetical order):

Nominated Principal Investigator	Project title	Funding amount	Theme
Dr. Paul Allison McGill University	Developing a team to address oral health disparities in Canada	\$121,750	Social/Cultural/Environmental/Population Health
Dr. Joanne Clovis Dalhousie University	Increasing capacity to inform oral health policy regarding vulnerable populations and the KT plan	\$110,668	Social/Cultural/Environmental/Population Health

Outcomes of the Disparities
in Oral Health Program

Dr. David Locker ² University of Toronto	Alleviating disparities in oral health: Responding to the information needs of key decision makers (and the KT plan)	\$109,900	Health Systems/Services
Dr. Michael MacEntee University of British Columbia	Developing an agenda for reducing oral healthcare disparities in British Columbia	\$120,957	Social/Cultural/Environmental/Population Health

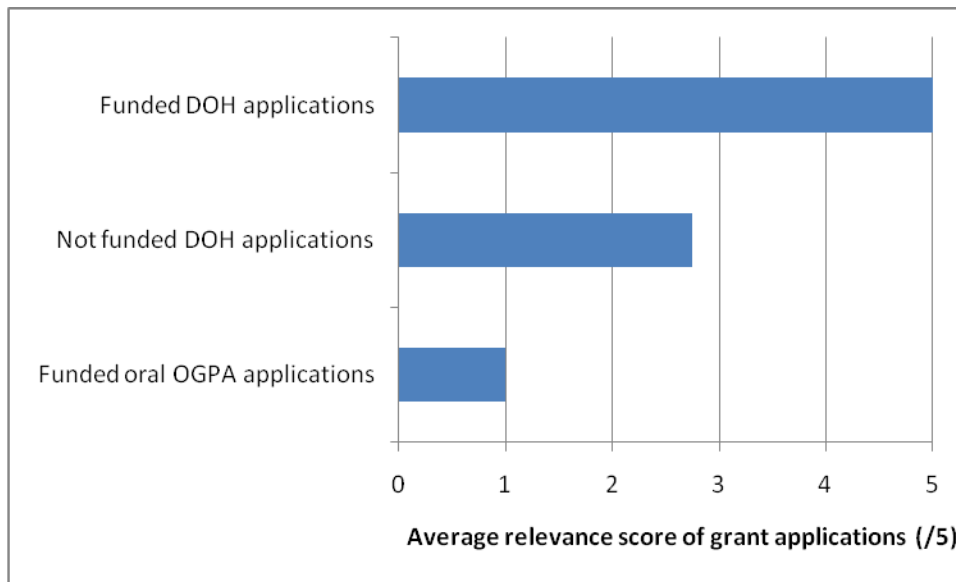
² Dr. Locker is now deceased and the current NPI is Dr. Carlos Quiñonez

CHAPTER 2 **Results and Outcomes**

This chapter outlines the outcomes of research projects funded by the DOH program as determined by results summarized from IMHA's Micro Impact Survey (MIS; see Chapter 5 for details on methodology).

Relevance

The average relevance score of the four funded projects supported by the DOH program was 5/5, as all the program criteria were met. These criteria included research activities explicitly targeting oral health, oral health care and services, disparities in oral health, vulnerable populations, and team building/networking. In contrast, the average relevance score of the five DOH applications not funded was 2.75. Four oral-related research projects supported by CIHR's Operating Grant: Priority Announcement (OGPA) in a similar time period and receiving similar funding amounts had an average score of 1. This shows that the DOH RFA was successful at identifying and strategically funding oral health research different than that funded by a concurrent open competition (i.e., at non-strategic, researcher capacity level), and that the oral health research projects eventually funded were distinct even from those applications not funded (e.g., scoring lower in peer-review).



The average relevance score (out of 5) of the DOH applications (funded and not funded) and OGPA-funded oral research projects to the specific objectives of the DOH program.

Of note, the funded DOH applications were either health systems/services or social-cultural-environmental/population health research, while those that were not funded were either biomedical, clinical, or social-cultural-environmental/population health research; the OGPA oral research projects were all biomedical. The fact that health systems/services or social-cultural-environmental/population funded applications were scored very relevant to the objectives of the

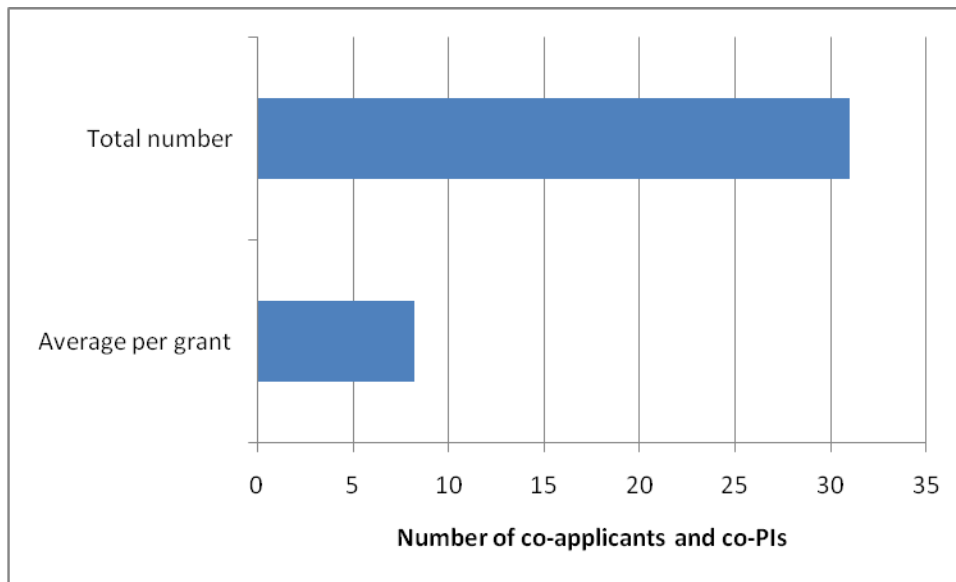
DOH program likely explains in part their higher probability of receiving approval for funding compared to the not funded group.

These findings confirm that CIHR's process (e.g., defining objectives, reviewing project relevance, and ranking excellence by peer-review) was successful at identifying and strategically funding research projects highly related to the specific objectives of the DOH program and distinct from the oral research funded in a concurrent open competition.

Team building and networking

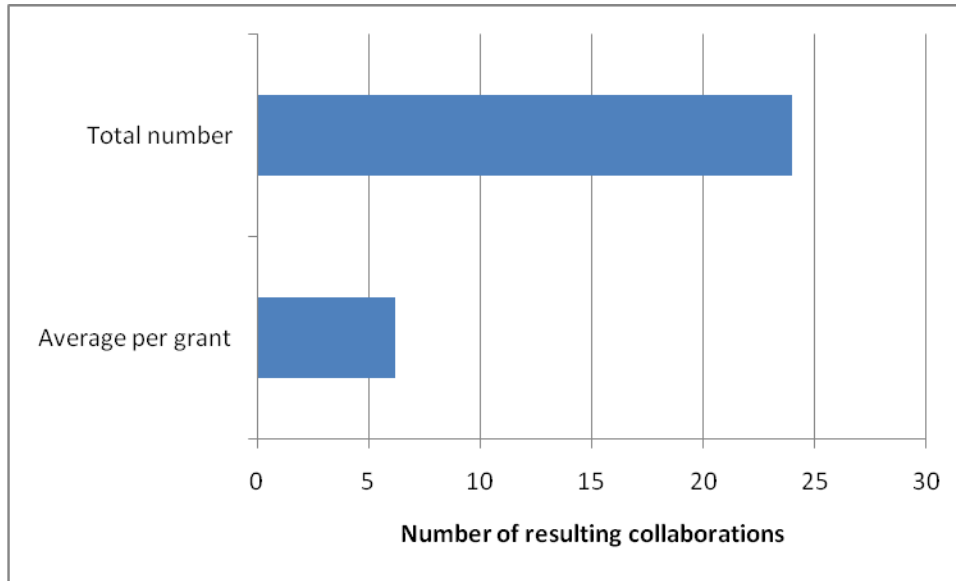
On average, each of the four research projects had 8 co-applicants/co-PIs, with a total of 31 researchers involved to some degree in DOH-related research activities. There was an average of 6 new collaborators on each of the projects, with a total of 24 collaborators (see below figures). These findings show that the DOH program supported research projects comprising large teams dedicated to developing the collaborations needed to meet project objectives. It is not uncommon for health systems/services and social-cultural-environmental/population health research teams to engage in such collaborative networking, as the involvement of many stakeholders from academic, government, and public sectors is often required to mobilize activities in these research areas. Chapter 3 outlines in greater detail the team building and collaborations resulting from all four research projects.

Team building



The total and average number of team members (co-applicants and co-PIs) on each of the DOH-supported projects as reported by the Nominated Principal Investigators (NPIs).

Networking: collaborations



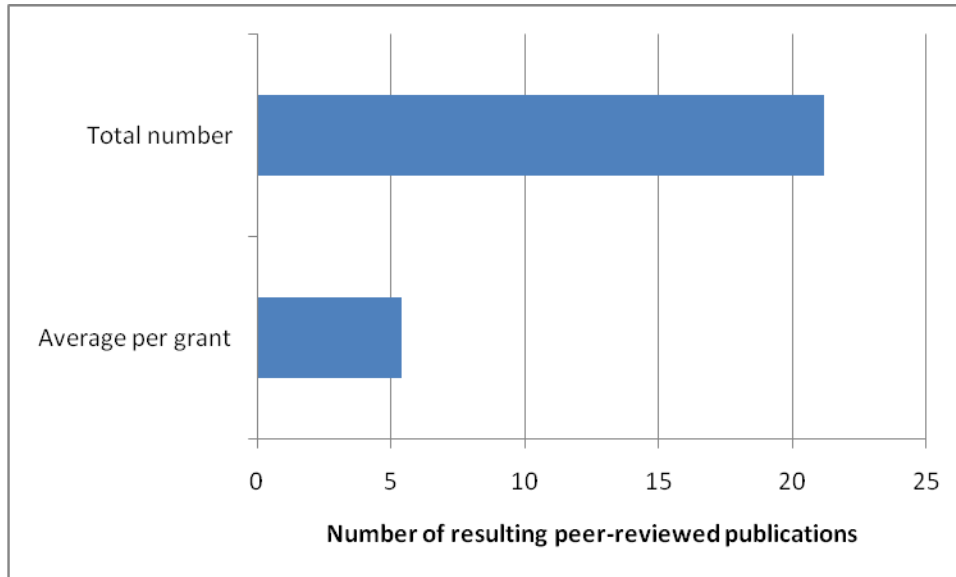
The average and total number of collaborators (excluding co-applicants and co-PIs) resulting (or expected to result) from each of the DOH-supported projects as reported by the NPIs.

The large teams and the development of collaborations resulting from the DOH-funded projects were positive outcomes of the program, which was designed to promote such activities. The high degree of multi-sectoral collaboration likely facilitated the development of research activities and associated outcomes aimed at developing and implementing strategies to reduce oral health disparities in Canada.

Knowledge creation and dissemination

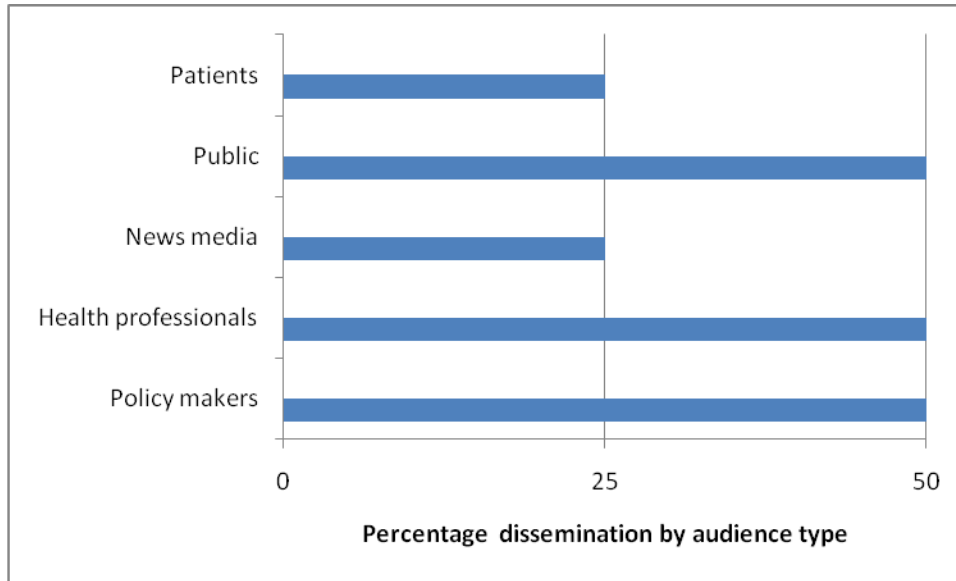
On average, 5 peer-reviewed publications resulted from each of the DOH-funded projects, with a total of 21 articles. Results were reported to be disseminated to a diverse number of knowledge users including policy makers, health professionals, news media, the public, and patients (see below figures). This wide dissemination of findings is consistent with health systems/services and social-cultural-environmental/population health research, where collaborators (for example, government officials) are also often users of the knowledge generated by the projects. Chapter 3 describes in greater detail some of the important contributions made to knowledge creation and translation by the teams involved in the DOH-supported research grants, such as interactions and collaborations between research teams and government officials.

Peer-reviewed publications



The total and average number of publications in peer-reviewed journals resulting (or expected to result) from the DOH-supported projects as reported by the NPIs.

Dissemination of results



The percentage of NPIs reporting dissemination of results of research supported by the DOH program to a specific population of knowledge users.

The DOH program supported projects that had significant knowledge creation and knowledge translation outcomes in the area of oral health disparities, with research results disseminated to a wide array of stakeholders, including other researchers, patients and government policy makers.

Bibliometric analysis

The bibliometric analysis revealed that both the funded and not funded DOH applicants were prolific in knowledge creation (peer-reviewed and/or other published materials; see Methods). The number of years (e.g., range) over which articles were published was the only significant difference between the two groups, with the funded NPI group exhibiting a longer publication history, with an average of 9 more publication years compared to the not funded group (see below table). The DOH funded NPIs had on average 80 career publications (note the high variability however: min 12/max 179). It was clear however that both groups had extensive experience with knowledge creation and dissemination via peer-reviewed publication, with a minimum and maximum of 13 and 33 years of contributions to publications, respectively.

Variable	Group	Avg.	Std. Error	Min	Max	Stat. Diff.	Sig.
Years of publication	Funded NPI group	29.3	2.1	24	33	Yes	0.04
	Not funded group	20.4	2.6	13	26		
Number of publications (to date)	Funded NPI group	80.3	35.2	12	179	No	0.59
	Not funded group	59.4	18.4	16	124		
Number of publications (between 2003-2008)	Funded NPI group	27.0	10.6	2	51	No	0.67
	Not funded group	21.6	6.9	5	46		
Total citations of articles (pub. between 2003-2008)	Funded NPI group	372.5	207.3	2	960	No	0.95
	Not funded group	390.4	188.5	24	1072		
Citations per article (pub. between 2003-2008)	Funded NPI group	9.8	3.6	1	19	No	0.46
	Not funded group	13.9	3.6	5	23		
h-index for articles (pub. between 2003-2008)	Funded NPI group	10.5	3.9	1	20	No	0.89
	Not funded group	9.8	2.9	2	19		

The bibliometric indices associated with applicants (NPIs) to the DOH program, grouped by application status: funded and not funded [Terms: Avg. = average; Std. Error = standard error of the mean; Stat. Diff. = statistical difference; Sig. = statistical significance reported as p-value. A number less than 0.05 indicates a significant difference between groups].

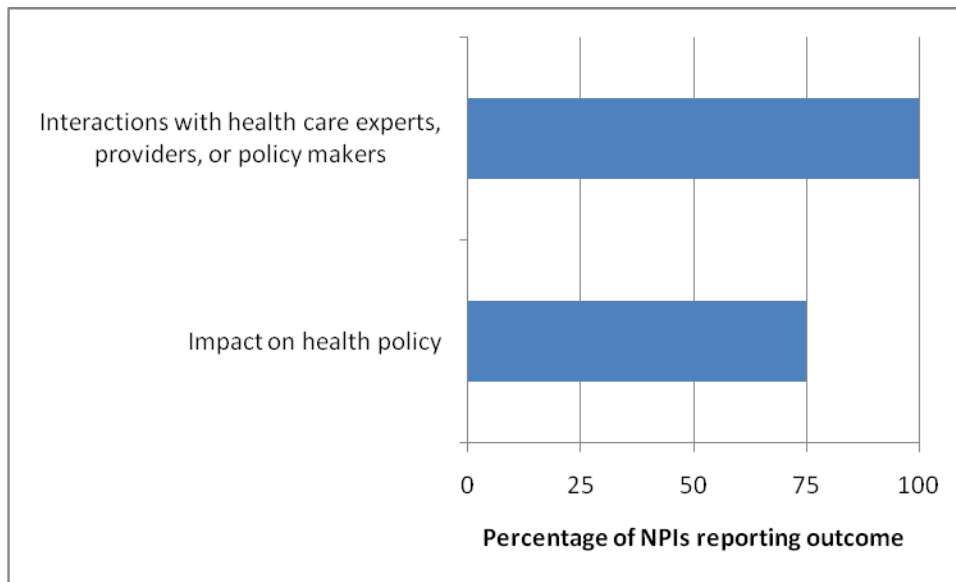
In the years (2003-2008) leading up to the DOH effective date of funding year, both groups contributed extensively to knowledge creation and dissemination, with an average of 27 and 21.6 publications for funded and not funded NPIs, respectively. The average total citations of these articles were 372.5 and 390.4. The h-index, a measure of researcher productivity and impact, was similar between the two groups (10.5 and 9.8). Although power of the statistical analysis (via ANOVA) was limited because the samples in the groups were small and variability was high for

certain parameters, these bibliometric indices provide important context about the NPIs' research backgrounds.

Applicants to the DOH program were prolific in knowledge creation and dissemination via peer-reviewed publication in the years leading up to the date of funding. The funded group showed a slightly longer history in career research publications compared to the not funded group. Due to the high output of both the funded and not funded NPIs, the relevancy of the projects to the objectives of the DOH program (as discussed previously) was likely a more important contributing factor to the success of applicants than past productivity.

Health care impacts

All of the DOH-supported NPIs reported that they interacted with health care experts and three of four reported (see below figure) that their findings are impacting health care policy (e.g., results cited by health care documents, policy, or guidelines). This confirms that the teams were engaged in the type of interactions necessary to mobilize and inform health systems/services and social-cultural-environmental/population health outcomes in the area of oral health disparities. Further, that research results were reported as cited by policy documents or guidelines is an important indicator of health care-associated impacts. Chapter 3 describes in greater detail how the four research teams and involved stakeholders are planning to make (or are actively already making) important contributions to reducing disparities in oral health care in Canada.

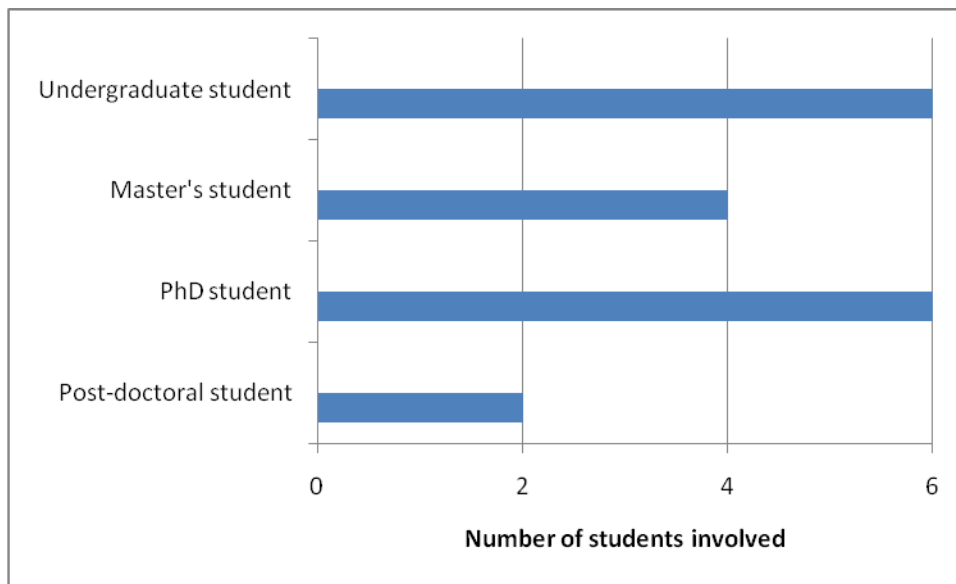


The percentage of NPIs reporting interactions with health care stakeholders/experts, as well as those reporting impacts (to date or expected) on health policy.

The DOH program was successful in its goal of funding research teams that achieve health care-related outcomes/impacts in the area of disparities in oral health.

Training

A total of 18 trainees received financial support or worked (e.g., despite not receiving financial support from the grant) on research projects supported by the DOH program (see below figure). All of the four NPIs reported training at least one undergraduate, Master's, PhD, or post-doctoral fellow on projects, with undergraduate (6) and PhD (6) students being the most frequent, followed by Master's students (4) and post-doctoral fellows (2). Chapter 3 describes in greater detail the training activities and/or how trainees made significant contributions to the outcomes and future developments of the DOH-supported research projects.

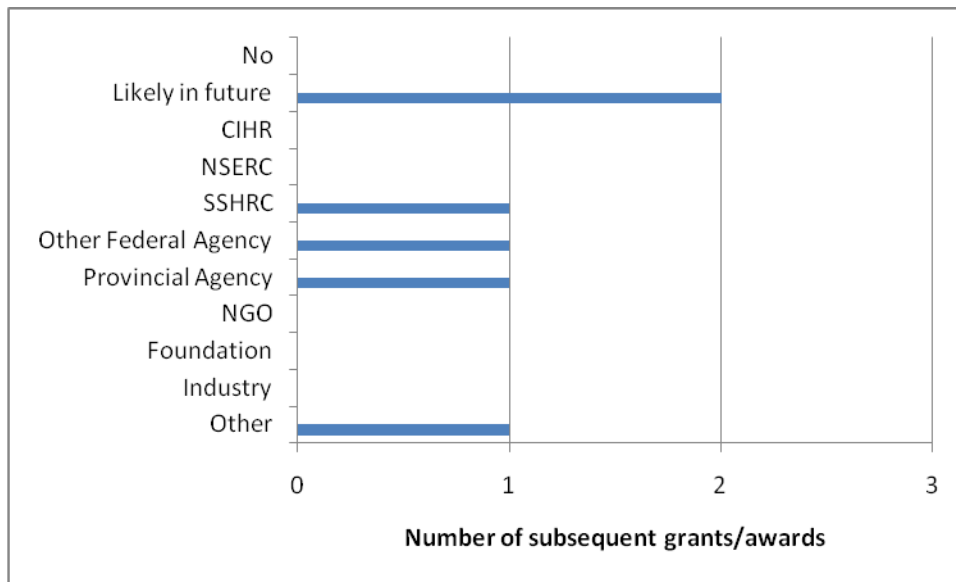


The number of trainees working on the DOH-supported research projects as reported by the NPIs.

Research capacity was increased in the area of oral health care disparities, with many students/post-doctoral fellows trained on the DOH-supported projects, including both undergraduate and graduate students.

Funding opportunities

At the time of survey, two of the four DOH-funded NPIs reported having received additional funding (a total of 4 funding awards) from extra-CIHR agencies (see below figure). The other two NPIs reported additional funding as “not yet (received), but likely in future”. These outcomes are consistent with the objectives of most of CIHR’s Seed/Catalyst programs (such as the DOH), which include the goal to position grantees to be successful in acquiring additional funding to follow-up on initial results. As outlined in greater detail in Chapter 3 which includes evaluation data acquired via e-mail/phone follow-up up to one year after survey deployment, the research teams have recently made a number of grant applications to CIHR and other funding agencies.



The number of post-DOH funding awards received as reported by NPIs.

Funding through the DOH program helped some NPIs acquire additional funding and/or helped better position the teams for success in future applications to follow up on the initial DOH activities.

CHAPTER 3 Success Stories

In this section, we report project-specific activities and outcomes of each of the DOH-supported projects as assessed by the Micro Impact Survey and recent follow-up e-mails and/or phone interviews³.

³ It should be noted that most of the teams reported that their overall research projects were still in progress and that anticipated endpoints had not yet all been reached.

Seed Grant 1: Developing a team to address oral health disparities in Canada

- **Addressing oral health care disparities in a number of vulnerable populations**

The project led by Drs. Paul Allison and Christophe Bedos at McGill University was the first stage of a long-term goal to form a multidisciplinary team with a multi-methodological approach to describe and understand the main determinants of oral health and access to care among vulnerable and under-privileged groups in Canada. These include rural communities, people in poverty, and elderly people. The specific goals of the project were : 1) the identification of individuals and organizations with the potential to contribute to the aforementioned goals; 2) the identification of information required to address the aforementioned goals; 3) the identification of methodological approaches for the investigation of the determinants of oral health and oral health care within vulnerable groups; and 4) the planning of a program of research to address the current lack of understanding of the problem.

- **Team building and collaboration in oral health care improvement**

The research group brought together researchers, health care professionals, health service decision-makers and individuals representing under-privileged groups. To date, they have already built a team comprising a mixture of researchers from a variety of backgrounds and across the country, in addition to health professionals and people representing important client groups. Bringing together client groups and health professionals and researchers to address questions that have impacts on oral health has helped the team ask difficult but relevant questions in oral health care disparities. This was the first step of the longer-term goal to develop means to improve the oral health and oral health care of vulnerable groups and reduce disparities between the less and more privileged groups in Canada.

- **Pilot studies in oral health care informing grant applications**

Two ongoing studies are investigating the perception of oral health and oral health care in populations living in rural communities, with preliminary data already presented at a relevant conference concerning rural health. Importantly, these pilot studies are informing the development of two study designs for grant applications to CIHR and Fonds de la recherche en santé du Québec (FRSQ) dealing with health care utilization and barriers

among rural Quebecers. Another outcome of the project is the development of a new research axis focusing on people with disabilities, and because of their condition, living in poverty. The aim is to better understand the perspectives of people with disabilities in terms of access to dental services, beginning with a pilot project in partnership with community organizations and professional bodies.

- **Training in oral health disparities research**

Students training with the research team are working on a knowledge translation initiative in partnership with ATD-Quart Monde entailing the development of an information document for dissemination to individuals on social assistance. The purpose of this document is to provide people on social assistance with relevant information on dental coverage and access to dental care. Additionally, a collaborative project on urban aboriginal peoples' access to dental services has been initiated at McGill University with a PhD student conducting this project as of 2011. It is expected that this project, based on qualitative interviews with indigenous people and oral health professionals, will provide concrete solutions to improve urban indigenous peoples' access to dental services. Finally, in 2010 two summer students participated in the preliminary work of the aforementioned project concerning people with disabilities, a project which is now being conducted by a recently recruited Master's student.

- **New partnerships and future funding opportunities**

The team partnered with geriatrician experts in frailty at Dalhousie University in the submission of a CIHR Catalyst Grant: Pilot Projects in Aging in September 2010, entitled "Exploring the connections between oral health and frailty". Further, the team is planning a "Partnerships for Health System Improvement" grant application dealing with improving oral health care services for people living in poverty. Finally, a new project was submitted to the CIHR operating grant competition in 2010 based on the aforementioned oral health survey conducted by a summer student in a First Nations community organization.

Seed Grant 2: Increasing capacity to inform oral health policy regarding vulnerable populations and the KT Plan

- **Informing policy regarding oral health of vulnerable populations such as seniors**

The goal of this project was to increase the capacity within both Nova Scotia (NS) and Newfoundland and Labrador (NL) to inform policy regarding the oral health of vulnerable populations, beginning with the senior population. The intention was to develop strategies to monitor the oral health of seniors in rural and remote areas, provide assistance to program providers in assessing oral health care needs, determine the effectiveness of oral health care programs, and to translate and disseminate research results to government, academic, and other communities associated with oral health care.

- **Increasing Capacity to Inform Oral Health Policy (ICOH) project**

The overall research project is named "Increasing Capacity to Inform Oral Health Policy" (ICOH). The team led by Dr. Joanne Clovis at Dalhousie set out to explore the consequences of the Canadian health care system, which largely excludes oral health care, on vulnerable populations such as the aged who have the poorest levels of oral health and often lack access to the private system of oral care. The research project aimed to bring together a group of researchers at Dalhousie University (NS) who have expertise in oral health surveillance with other oral health experts and communities across NL, and with the Government of NL. The Government's (NL) recently released Strategic Health Plan includes the development of a unique oral health component.

- **Multi-stakeholder oral health forum**

A forum held October 21-22, 2009 brought together oral health stakeholders and partners who discussed the assessment of oral health in NL. The research team identified key informants to be interviewed and established the Oral Health Research Affinity Group (OHRAG), which comprises researchers, oral health professionals, policy makers, government, and community members interested in oral health in NL. OHRAG's primary purpose is to consider and promote areas of oral health research that may benefit from the implementation of applied health research and to promote, encourage and facilitate such research. This new research group has created a focus on oral health within a health

research unit that is part of a major university that does not have any oral health professional education programs.

- **Enhanced understanding and use of distance technology for oral health**

The research established linkages between two provinces and two universities and increased knowledge of oral health and oral health policy in both. By exploring the use of distance technology, barriers and enablers were identified. With some system modifications and the development of an educational tool, Dalhousie researchers can now provide additional guidance to NL in the development and execution of oral health status surveys and surveillance for baseline assessment and program evaluation.

- **Next steps and future developments**

In terms of future plans and further development, the “ICOH: Oral Health in Newfoundland and Labrador – Next Steps” forum was held on October 1 and 2, 2010 in St. John’s, NL. The goal of the forum was to bring together stakeholders and partners supportive of improvements in oral health, to discuss the outcomes of the ICOH project, to learn of oral health initiatives in NL and other provinces, and to plan future initiatives to improve oral health. Several options were outlined and recommended to the OHRAG group for their consideration.

- **Opportunities provided and further grant applications**

The ICOH project has resulted in the establishment of a network of individuals and organizations in NL with vested interests in oral health promotion and further research to reduce oral health disparities. OHRAG is currently developing an application to CIHR for funding, and members of ICOH in a new collaboration have recently submitted an application to CIHR. Throughout ICOH and in the new grant applications, there has been an emphasis on protocols to determine oral health status and how these contribute to informing policy on oral health. It is anticipated that networking and collaboration of this research team with three other teams across the country will lead to further funding to develop a national multi-site initiative with a strong knowledge translation emphasis.

Seed Grant 3: Alleviating disparities in oral health: Responding to the information needs of key decision-makers (and the KT plan)

- **Addressing oral health disparities in the working poor**

This project now led by Dr. Carlos Quiñonez⁴, at the University of Toronto, focused on the issue of working poverty and access to dental care, a topic that was catapulted into the public sphere largely due to the efforts of advocacy groups and via extensive media coverage. The last Ontario provincial election proved to be a vehicle for the topic of oral health disparities and the idea of a dental care plan for working poor families turned out to be a policy platform for a variety of political parties.

- **Engaging governmental decision-makers in the oral health needs of low-income families**

The team engaged key decision makers at the federal, provincial, and local levels and answered the research questions they had as a policy community. The decision-makers were members of various agencies, including: Office of the Chief Dental Officer, Health Canada, Federal/Provincial/Territorial Dental Working Group, Canadian Dental Association, Canadian Dental Regulatory Authorities Federation, Government of Ontario, and Toronto Public Health. As reported by Dr. Quiñonez, the governmental interest in addressing oral health inequalities and access to dental care in Canada is relatively recent (circa 2004).

- **Informing governmental decision-makers in oral health policy**

The team was engaged in research that fed directly into the information needs of all parties. The type of research information acquired and shared with the political parties included topics such as working poverty and access to care, emergency room use for preventable dental problems, and provincial approaches to public dental care programs. One example of knowledge translation activities between the research team and the policy community that received a lot of attention was a national webinar hosted by the Conference Board of Canada on the issue of access to dental care and working poverty.

⁴ Dr. David Locker was the original NPI but is now deceased

- **Knowledge translation activities led to a 135 million dollar investment in dental care for children of low-income families**

As a result of the aforementioned activities and those of other grassroots and professional communities, the later re-elected provincial Liberals announced plans to develop a program dealing with working poor families and access to oral health care. This plan led to the announcement in October 2010 of a C\$135 million investment over a three-year period for dental care for children of low-income families. Dr. Quiñonez reported that the team appeared to be at the right place at the right time, making reference to the term “policy window”. He also noted that these events and outcomes can be regarded as a real victory for the oral health community.

Seed Grant 4: Developing an agenda for reducing oral health care disparities in British Columbia

- **Multidisciplinary team to address oral health disparities in British Columbia**

The project led by Drs. Michael MacEntee and Rosamund Harrison at the University of British Columbia (UBC) explored the policies, health services, and educational programs associated with the oral health of low-income individuals in BC where approximately 3/4 million people live below the poverty level. Over five years, the multidisciplinary team (dental, social work, medical) is to investigate three ways to enhance and improve existing responses to oral health disparities, including: 1) government-administered financial benefits; 2) community-based clinical services; and 3) educational programs for health professionals.

- **Educational trials to encourage health professionals to attend to oral health disparities**

One important objective was the development and implementation of educational trials to encourage new health professionals to attend to the least advantaged in society. This would have the impact of raising awareness in the health community of disparities in oral health with the potential for greater interest and attention to the subject. The team thus far has acquired a better understanding of how dental personnel learn about disparities in oral health care, which could help improve the dental, dental hygiene and dental assisting curricula at UBC and at community colleges in BC.

- **Collaborative workshop with local and foreign researchers**

The team hosted local and foreign researchers, policy makers, organized dentistry, and staff from low cost clinics from around the province in a workshop focused on research needs relevant to inequities in oral health care in BC.

- **Development of community-based clinics to address needs of low-income and other vulnerable populations**

The team expects that their findings and future research will contribute substantially to the development and evaluation of dental clinics throughout BC to address the needs of low-income people and others who have difficulty accessing dentistry.

- **Submission of a grant request to CIHR for an operating grant to seek equity in oral health care for disadvantaged populations**

The team developed a research proposal for the September 2010 CIHR open competition to further explore how to meet the oral health care needs of low-income adults and their families, and the needs of institutionalized elders in the absence of universal oral health coverage. The grant request was not funded but comments were supportive and the team is revising the proposal accordingly for later resubmission in 2011.

CHAPTER 4 Conclusion

The outcomes of the Seed Grant: DOH program funded by IMHA revealed it was successful in its objective to help seed the building of multidisciplinary teams and multi-sector networks contributing to knowledge creation and dissemination that has the potential to reduce disparities in oral health and improve access to care in vulnerable Canadian populations.

The DOH program identified and funded health systems/services and social-cultural-environmental/population health research projects targeting oral health disparities in vulnerable populations such as the elderly, aboriginal peoples, low-income families/individuals, and the working poor.

As summarized in the quantitative data acquired with the survey, the DOH program successfully promoted the building of multidisciplinary and multi-sectoral teams and collaborations to address oral health disparities. The responses to the open-ended survey items and the follow-up interview questions (Chapter 3) revealed that the networking and team building was crucial to the outcomes reported, as well as those expected to develop over time. The DOH-supported research teams produced a large number of publications in the area of oral health disparities, and findings were disseminated to a broad array of stakeholders and knowledge users including government officials and health care professionals and policy makers. The bibliometric analysis revealed the NPIs had long publication histories, were prolific contributors to knowledge creation and dissemination in the peer-reviewed literature, and were highly cited, indicating that their research findings have a large researcher audience. The broad dissemination of DOH research findings not only to other researchers but other stakeholders has had important impacts and implementation of findings to date, with more expected, outcomes that appear to be related to the collaborative process underpinning the projects.

DOH-supported researchers contributed significantly to knowledge creation in oral health and health care disparities and interacted with health care experts, policy makers and providers, and findings were cited in health care documents, policy documents and/or guidelines. This supports the reports of the research teams that they are having (or expecting to have) significant impacts on Canadian oral health care and related policy for vulnerable populations.

The teams appeared committed to the translation of research knowledge of disparities in oral health to make it more useful to government, professionals and the community at large. As outlined in greater detail in Chapter 3 of this report, the research projects seeded by the DOH program are expecting to continue to build on significant interactions with health care professionals, health service decision-makers and individuals representing under-privileged groups, and governmental bodies interested in reducing disparities in oral health care.

The reported interactions between DOH-supported researchers and health care stakeholders appear to have translated into processes that will aid in the development of national and province-wide strategies to reduce oral health disparities and disparities in access to care in many of Canada's vulnerable populations.

An additional important outcome of the DOH program was the high number of trainees working on DOH-supported projects, including undergraduate and graduate students, and post-doctoral fellows. Of interest, of those undergraduates who received a training stipend (via an IMHA summer research award) in the last 10 years and who responded to a recent survey we conducted, 65% reported they had continued or planned to continue into graduate research or professional training in IMHA-related area. Consequently, a certain proportion of undergraduate students trained in and/or supported by a stipend on the DOH projects might be expected to continue their training at a graduate or professional level in the area of oral health disparities.

The high number of trainees working on the DOH-supported research projects is expected to increase research capacity in the field of oral health disparities.

Another noteworthy outcome is that Dr. Paul Allison, the NPI on one of the DOH grants, is now the chair of a Canadian Academy of Health Sciences (CAHS) assessment on improving access to oral health care for Canadians. The work of the assessment panel is funded by a number of grants and sponsorships from a variety of sources (including IMHA, other granting agencies, and dental and private sectors) and includes individuals with diverse (including international) expertise and from a wide variety of academic and non-academic backgrounds. The task of the panel is to make recommendations aimed at improving access to oral health care services particularly for vulnerable groups living in Canada.

Despite the clear indicators of significant progress made by the DOH-supported research projects, more time is needed to allow for continued development of the research projects in their goal to bridge the gap that currently exists in oral health care across a wide variety of vulnerable populations in Canada.

Other than time, additional funding is also necessary to ensure continued development of the DOH research and knowledge translation activities and maximize their impact. At the time of survey (early 2010), two of the four NPIs reported having received additional funding from extra-CIHR agencies and none from CIHR. However, in a recent follow-up (March 2011), three of the four teams were in the process of developing grant applications to CIHR's operating grant competition or had already submitted applications in late 2010 to follow-up on the DOH-supported (or related) projects. This outcome is important because one goal of the Seed Grant program is to better position research teams not only for extra-CIHR funding, but for success in CIHR's other grant competitions.

It is anticipated that some applications made by the DOH teams for additional research funding will be successful, and that early momentum and outcomes catalyzed by the DOH program will be sustained.

In addition to the notable outcomes achieved to date by the DOH-supported projects, there are important "lessons learned" for a variety of DOH stakeholders, including researchers, CIHR and IMHA, government policy makers and other organizations or communities implicated in reducing disparities in oral health care in Canada. One noteworthy lesson is that the ability of the DOH teams to impact disparities in oral health care appeared dependent on or enhanced by the extensive nature of knowledge translation vehicles used within each of the projects. As defined by CIHR, knowledge translation is a complex process entailing synthesis, dissemination and exchange of research findings. While most, if not all, research projects inherently include knowledge synthesis (e.g., of research findings) and dissemination (e.g., via publications), it is the exchange of knowledge with other user sectors that appeared key in the ability of the DOH research teams to begin addressing oral health care disparities from a population health and/or health systems/services level. Impacts at this level necessitate that the many stakeholders (from academic, government, and public sectors) engage in knowledge exchange to mobilize activities

and resulting outcomes. In this context, all stakeholders are working together to develop the research questions and information needs that are the most useful for governing bodies or policy makers to make informed and evidence-based decisions impacting the health of Canadian populations; the separation between knowledge user and knowledge creator therefore becomes less apparent and knowledge translation is a multidirectional exchange rather than a unidirectional one. For example, the C\$135 million investment by a provincial government in dental care leveraged by one of the DOH-supported projects is an important example of “collaborative problem-solving between researchers and decision makers that happens through linkage and exchange...” which “results in mutual learning through the process of planning, producing, disseminating, and applying existing or new research in decision-making”⁵. Knowledge translation occurring between research teams and governmental officials and health policy experts therefore likely provides one of the best platforms for dealing with disparities in oral health from a Theme III and IV perspective. In particular, and as discussed by one DOH-funded NPI, the timing of such exchanges (e.g., “policy window”) might be crucial and should be considered by researchers aiming to translate their findings into improved health of Canadians.

The activities of the DOH-funded funded research teams are a prime example of a dynamic and interactive form of knowledge translation (including synthesis, dissemination, and exchange) integral to their success in working towards solutions for disparities in oral health in Canada.

⁵ <http://www.cihr-irsc.gc.ca/e/39033.html>

CHAPTER 5 **Micro Impact Survey/Methodology**

This chapter explains the methods and survey tool used to collect the data measuring outcomes of the four DOH-funded projects.

Micro Impact Survey

The MIS was developed to gather information pertaining to outcomes of research projects supported by IMHA's SI budget. It is a web-based survey instrument designated for the Nominated Principal Investigators (NPIs) or other leaders of the research project. The MIS was constructed and conducted online using kwiksurveys.com, a cost-effective and flexible survey creation website allowing responses to be collected and data to be exported in Excel format. The survey was designed to be suitable for assessment of any type of research grant funded by IMHA, and the question format allowed for both quantitative and qualitative input. Pilot testing confirmed the MIS was suitable for assessing outcomes of research projects from all of CIHR's research themes, i.e., biomedical (Theme I), clinical (II), health services/systems (III), and social-cultural-environmental/population health (IV) research areas.

The survey has 19 and 5 questions, requiring quantitative and qualitative input respectively, under the impact categories of (for actual survey, see Appendix):

- Advancing knowledge (e.g., publications)
- Capacity building (e.g., training, collaboration, team building)
- Knowledge exchange, synthesis and dissemination
- Health systems impact (e.g., health policy documentation, clinical guidelines)
- Economic impact (e.g., employment, patents, commercialization)

The MIS takes on average only 5-10 minutes to complete. Its low burden likely contributed to the high response rate. However, the brevity also means that the reportable outcomes are not as comprehensive or detailed as might be achieved with a longer and more extensive survey.

Methodology and analysis

The first MIS e-mail survey invitations to DOH-supported NPIs were deployed in February 2010. Up to two additional reminder e-mails were sent to non-respondents, and the survey was closed in April 2010. All four DOH-supported NPIs (or other team leader) responded to the survey. In November/December 2010 e-mails were sent to the four NPIs requesting further details related to outcomes of their research projects; some of the NPIs were contacted via telephone. In March 2011, NPIs (and/or other team leaders) reviewed their project section (in Chapter 3) and provided additional feedback and updates to ensure accuracy.

The MIS has two types of questions: those inquiring about number of contributions or “planned contributions”, and others inquiring about outcomes answerable by “Yes” or “No” or “No but likely in future”. NPIs therefore had the opportunity to report both “to date” and planned outcomes. The data summarized in this report are the combination of “to date” and planned outcomes of selected questions. An analysis of the entire MIS dataset, which includes data from outcomes of multiple programs comprising over 150 projects in the last 10 years, revealed no statistically significant difference between the total outcomes (“to date” + planned) of projects reported as “completed” (with little/no further planned outcomes reported) versus those reported as “ongoing” (with more planned outcomes reported). This finding suggests that the NPIs of more recent and ongoing research projects (such as the DOH) do not overestimate planned outcomes; thus, total outcomes (“to date” + planned) of recent projects measured by the MIS are likely a good estimate of eventual/actual outcomes.

The item-based outcomes (number of publications, collaborations, etc.) of all the DOH-supported projects were evaluated and analyzed in terms of the number of total contributions and the average outcome per project. Some data are reported in percentages of researchers reporting a particular outcome. For the purposes of this report data from questions 5, 6, 7, and 8 (see Appendix) were not analyzed because they assessed outcomes not highly relevant to the DOH program, such as commercialization-related questions which were largely left blank. Together, the remaining items allowed for the examination of the outcomes on team building and networking, collaborations, knowledge creation and dissemination, health care impacts, and funding opportunities provided.

It is also important to note that outcomes measured by the MIS are those associated with research projects often receiving additional funding from other grants or financial sources, thus do not necessarily reflect outcomes related only to the CIHR/IMHA funding opportunity, but to those of broader research projects funded in part, if not mainly by CIHR/IMHA funding.

Relevance analysis

The abstracts of the four DOH-funded projects were scored for relevance based on the program objectives, and were assigned a score of 1 (for a possible total of 5) each time one of the following criteria was met:

- Oral health Research
- Health services Research
- Research examining disparities in oral health
- Research focused on vulnerable populations
- Team building/networking

To help determine whether the DOH program had the impact of funding research projects different from those expected from a concurrent open competition, the relevance scores were compared to those calculated based on four oral health research projects funded (same amount and time period) via the program Operating Grant – Priority Announcement: Musculoskeletal Health, Arthritis, Skin, and Oral Health. The priority announcement program used CIHR's open competition program where oral health researchers (or any IMHA-relevant) researchers can apply for funding for investigator-initiated research. By contrasting relevance scores of the oral projects funded by DOH to those of the OGPA program, one can therefore determine if the former program was successful at strategically funding research projects different than those concurrently funded at non-strategic, researcher capacity level. DOH-funded grants should generate a higher relevancy score compared to those funded by the OGPA, indicating that CIHR/IMHA was successful at identifying and funding research of a particular strategic focus relevant to the RFA. Of note, however, comparing the outcomes (e.g., publications, collaborations, etc.) of the DOH program to those of the OGPA would not be valid, as the latter grants are not necessarily new projects and are generally already in progress (e.g., bridge funding in most cases) and more developed than projects funded by Seed Grants. Finally, the relevance scores of the five not funded DOH applications were also calculated and compared to the other relevancy scores.

Bibliometric analysis

A bibliometric analysis of both the funded and not funded DOH NPIs was conducted with the free to use Publish or Perish software (PoP; www.harzing.com/pop.htm) and the freely accessible Google Scholar (GS; scholar.google.com). PoP interacts with GS, a web search engine that indexes the scholarly literature across different publishing formats and disciplines. It includes most peer-reviewed online journals and many other types of publications, including

grey literature associated with a particular author. Sources include full-text journals, technical reports, theses, books, and other published documents. In this context, GS can provide a much broader view of researcher contributions to knowledge creation compared to other databases (Walters, 2007), including Scopus or Web of Science (Falagas, Pitsouni, Malietzis, & Pappas, 2008; Mikki, 2009). The bibliometric information generated by GS has also been found to correlate highly with those generated by Web of Science and Scopus (Bar-Ilan, Levene, & Lin, 2007). One disadvantage of GS due to its large database (e.g., journal articles and all items acquired via its web crawling algorithm) is that results may be “noisy” (Falagas et al., 2008; Mikki, 2009), containing duplicates or otherwise unrelated or insignificant information (e.g., non-publication/knowledge creation items). As with any bibliometric database, a good screening procedure (see below) can help improve the results in terms of author specificity. Finally, GS includes items such as grey literature documents which may not impact certain citation scores (for example, due to lack of citations) but which nonetheless capture aggregate contributions of specific researchers/authors to knowledge creation.

The PoP software interfaces with GS and returns author-specific publications, as well as dozens of bibliometric indices, including total or article specific citations, Hirsch’s h-index, Egghe’s g-index, and more. The bibliometric data used in the current analysis to provide an index of the years of research experience were total career publications and range of years of publication. Additional indices providing a snapshot of the contributions to knowledge creation in the years leading up to the effective date of DOH funding were the number of publications, total citations of all articles, citations per article, and the h-index of items published between 2003-2008. The h-index is a measure of researcher productivity and impact; the score is based on a combination of the number of publications and the citations per article. A researcher with an index of h has published h papers each of which has been cited at least h times. For example, a score of 5 indicates that the author has published 5 articles, each one of which has been cited at least 5 times. Consequently, the h-index is not an indication of total publications, but rather an index of impact of publications.

The NPI names were individually run in the PoP “Author Impact” tab, using (including quotations) “Firstname Lastname”. Middle initials were not included in the initial analysis, as they were not available for each NPI. The author-associated publication data outputted by PoP

was screened and specific items omitted from analysis. The screening procedure was used to exclude non-publication items, errors, false positives (e.g., items not associated with author), and duplicates. Each publication item was individually screened to ensure author affiliation; for example, those with different initials or those articles not containing the NPI name as an author were omitted. To further reduce the number of false positives, the following unrelated research areas (as classified by GS) to the DOH program were excluded from the search by unchecking “Business, Administration, Finance, Economics”, “Engineering, Computer Science, Mathematics”, and “Physics, Astronomy, Planetary Science”. Patents were also not included in the analysis as they are not knowledge creation items per se, or at least are a different form than the other items. The remaining items were used by PoP to generate the bibliometric indices. In the current analysis no anomalies were detected in that the items included appeared concordant with the area of research of specific authors, thus the occurrence of false positives was likely kept to a minimum. It is important to note that not all databases provide 100% accurate results; however, by applying the above methodology across all individual researchers, comparisons made between the DOH funded and not funded groups are possible. The group scores (funded versus not funded DOH applicants; N=4 and 5, respectively) were compared by using one-way analysis of variance (ANOVA) on each of the variables. Although the power of the statistical analysis is limited because the samples in the groups are small, the comparisons may help contextualize any differences between funded and not funded DOH applicants.

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Appendix: MIS Survey

The Micro Impact Survey questions are reproduced below.

Micro Impact Survey - Principal Investigator



******Important instructions/notes**

Your answers are to be based solely on the single grant referred to in the e-mail. While some of the measured outcomes may not fit with your project, please do your best to answer the questions.

Do not enter 0; leave blank instead.

TIP: when reporting outcomes related to publications or training, referring to an up to date CV will hasten the process.

* 1.

Identification number provided in e-mail:

2.

The research funded by the grant is:

Completed

Ongoing

Not yet initiated (if so, please skip to end of survey and click "finish survey")

3.

Number of articles in peer-reviewed journals resulting from research funded by grant:

Accepted/published

Submitted

Planned for submission

4.

Number of technical reports resulting from research funded by grant:

Published

Planned for publication

5.

Number of conference proceedings (including those currently registered for)
resulting from research funded by grant:

Posters

Oral presentations

6.

Number of published/in press (resulting from research funded by grant):

Books (main author or co-author)

Book chapters

Planned book contributions

7.

Number of patents resulting from research funded by grant:

Licensed

Granted

Applied for

Planned patent applications

8.

Number of copyrights resulting from research funded by grant:

Licensed

Granted

Applied for

Planned copyright applications

9.

Did receiving the grant significantly contribute to interactions with other researchers (non-industrial)?

Yes

No

No, but likely in future

10.

Did receiving the grant significantly contribute to interactions with researchers in industry?

Yes

No

No, but likely in future

11.

Did receiving the grant significantly contribute to interactions with health care providers and policy makers, or other health care experts?

Yes

No

No, but likely in future

12.

If answered "Yes" to question 9 or 10, were interactions made with researchers in a discipline different than your own?

Yes

No

13.

Did the grant contribute to the formation of new and lasting relationships with other researchers? If yes, please provide the number of such researchers that you have, are currently, or planning to collaborate with on other research projects unrelated to the grant (count each different researcher only once).

Already collaborated with

Currently collaborating with

Planning to collaborate with

14.

Did your research involve or lead to the development or trialling of interventions or products such as therapeutic pharmacological agents, stem cell therapy, gene therapy, diagnostic tests, or medical devices?

Yes

No

No, but likely in future

15.

Have any of the results directly impacted the health system via translation into clinical or medical practice (including new clinical or medical tools, instruments, procedures, techniques, or diagnostics)?

Yes

No

No, but likely in future

16.

The results from this grant have been disseminated to (via, but not restricted to, seminars, presentations, booklets, interviews) - click all that apply:

Policymakers

Health professionals

News media

Public

Patients

17.

Did your research results impact health policy (e.g., cited by clinical guidelines or health policy documents)?

Yes

No

No, but likely in future

18.

Number of trainees and personnel who received financial support (stipend/salary) from this grant:

Post-doctoral student
PhD student
Master's student
Undergraduate student
Research associate
Technician/technical staff
Other

19.

Number of trainees and personnel who worked on projects related to the grant despite not receiving financial support from grant:

Post-doctoral student
PhD student
Master's student
Undergraduate student
Research associate
Technician/technical staff
Other

20.

Did the funding from this grant enable you to acquire additional or other funding (click all that apply)?

Yes - from CIHR
Yes - from NSERC
Yes - from SSHRC
Yes - from other federal agency
Yes - from a provincial agency
Yes - from an NGO
Yes - from a foundation
Yes - from industry
Yes - from other funding source
No
No, but likely in future

21.

If there was funding from another organization that enabled the research results reported in the previous questions, was CIHR the major contributor?

Yes
No

22.

How long has it taken you to complete the survey up to this point?

- less than 10 min
- less than 20 min
- less than 30 min
- less than 1 hour
- more than 1 hour
- more than 2 hours

OPEN-ENDED QUESTIONS (with large boxes provided for entry of text):

23.

(Optional - 1 of 5) Please comment on any other impact or success story that you think arose from this grant:

24.

(Optional - 2 of 5) What is your vision of the long-term impacts of your research?

25.

(Optional - 3 of 5) Describe your collaboration with other researchers and how these collaborations have impacted the capacity for research and the relevance of the research questions addressed:

26.

(Optional - 4 of 5) For clinical research, describe how the research project relates to needs of patients and communities:

27.

(Optional - 5 of 5) Please feel free to comment on your experience with CIHR or provide any type of feedback for CIHR or IMHA: