

Chiropractic research capacity in Canada in 2008

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Introduction

Research is needed in any health care profession to advance knowledge and find more effective and safer ways to help patients. There is no exception for chiropractic. It is necessary to conduct both basic biological research and clinical research to link discoveries with practice.¹ For this to occur however, an adequate number of trained and committed researchers is required as is the appropriate infrastructure and funding. Working in collaborative networks may help as well.² The traditional avenue to become an

independent researcher is to undertake postgraduate research training and earn a PhD and for many, to get a post-doctoral fellowship. Combining formal clinical and research training has the advantage of providing one with an overview of both worlds and an in-depth understanding of the needs in a specific area.³ Perhaps one of the greatest challenges in all health professions is developing a sufficient pool of clinician-scientists to meet the research needs of that profession.

A clinician-scientist can be defined as an individual

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Key message

«This means that considerably less than 1% of the profession is conducting the majority of the research to provide the evidence required to substantiate what the remaining 99% of the profession does clinically in terms of patient care. To achieve a level of 1% of the profession doing research on a full-time basis would require an additional 40 chiropractors.»

with a clinical doctoral degree (such as a DC or MD) who performs research as their primary or major professional activity.¹ This is ideally in some combination with professional practice. These clinician-scientists tend to conduct more patient-oriented clinical research than PhDs who tend to conduct more basic science research.⁴ Professional practice benefits researchers by informing research questions and aiding with result interpretation, something PhD researchers without clinical backgrounds may find more challenging.^{1,4} Few clinicians are interested in a research career however. Concern over a reduction in physician-scientists has been raised.^{2,4} In the United States the number of physicians who reported research as their major professional activity has gone from over 23,000 in 1985 (4.5%) to 14,521 (1.8%) in 2003, and this is despite increased funding for biomedical research.^{2,4} This may be partially explained by an increase in the total number of physicians as well as a decrease in those pursuing a research career.⁴ Other explanations include the renewed interest in patient care, having to deal with increasing debt loads upon graduation, a lack of a research mentor and lack of exposure to research as students, heavy clinical requirements during medical school, and greater demands for patient care.² In addition, increased regulation of clinical research and the relative lack of clinical research emphasis in academic health centers have also been deemed detrimental to clinician-scientist numbers.²

A survey of the 1985 to 1995 graduating classes from Penn State College of Medicine found about a third (34%) of respondents actively participated in clinical research.⁵ A large majority (80%) of these spent less than

20% of their time conducting research, and only 10% spent the majority of their time doing research.⁵ Non-researchers gave numerous reasons for not conducting research including financial (84%), family social reasons (76%), practice philosophy (89%) and research not being part of their career plan (74%).⁵

Roughly 4% of medical students are engaged in MD-PhD programs.⁴ Recently initiated programs from the National Institutes of Health (NIH) and several not-for-profit institutions designed to revitalize the physician-scientist career pipeline seems to help renew interest, particularly among those who become interested in research once they enter practice.^{1,2,4} There are some indications that this is also occurring within the chiropractic profession, with many acquiring formal research training after completing their DC degrees. Publication in scholarly journals by clinician-scientists has significantly contributed to the chiropractic profession's evolution in the past 25 years. It is thought that their particular understanding of sensitive issues for the profession benefit primary providers and stakeholders.³

The purpose of this preliminary project is to quantify the chiropractic profession's capacity to undertake research in Canada. The project set out to answer two key research questions:

1. What percentage of the chiropractic profession is engaged in conducting research on a full-time basis?
2. What strategies should be employed to increase the chiropractic profession's current capacity to undertake research in Canada?

Methods

Phase I

A twelve question survey (six multiple choice and six fill-in-the blank questions), along with a letter of invitation and instructions for completion in both English and French languages was distributed by e-mail to all of the provincial associations, regulatory colleges, and to the Canadian Chiropractic Association for distribution to their membership. There were three rounds of survey distribution over a period of two months. Associations and regulatory bodies could distribute the survey by either e-mail or fax. A link was provided to allow chiropractors to complete the online survey (using Lime Software). Alter-

natively, subjects could print the survey, complete it manually and submit their responses by fax to one of the authors (AG). Data obtained from those completing the online survey was automatically tabulated by survey software. The data of those who sent in their responses by fax was entered manually into the online survey software to allow easier data management. Simple descriptive statistics were calculated from these results. This strategy has likely permitted nearly all Canadian chiropractors to participate in the survey.

Phase II

Respondents of interest from the Phase I survey included postgraduate degree holders or candidates, chiropractors who are faculty members at post-secondary institutions, those who have or are pursuing degrees in other health professions (including medicine, dentistry, physiotherapy, etc), and those who indicated conducting chiropractic research on a part-time or full-time basis, noting that there was likely overlap in these groups. This group comprised the population of interest for the Phase II survey. This second survey was also available in both English and French and included a letter of introduction, specific instructions, and 19 fill-in-the-blank questions. Topics on this survey included number of hours spent seeing patients weekly, research funding, areas of interest, number of publications over the past five years, types of research projects that the respondent has conducted, whether they are full time or part time researchers, whether they hold faculty positions, and if they have training in other health professions. There was an additional question for part-time researchers to ascertain their level of interest in becoming a full time researcher. This survey was also sent to known Canadian chiropractic researchers who had not responded to the first survey. A total of 198 subjects were sent this second survey. Respondents were asked to complete the survey by simply filling out the survey in a reply e-mail to one of the authors (AG). Simple descriptive statistics were calculated from these results.

Results

Phase I

Of the over 6000 chiropractors invited to complete the initial survey, 684 responded, representing approximately one tenth of the profession in Canada. Fifty nine respond-

ents (8.6%) had completed a Master's degree and an additional 35 were in progress. Twenty four (3.5%) individuals had completed a PhD, 6 others were currently pursuing one. In addition, 24 people said they were studying in another health profession. Among respondents, 20 said they were full time researchers and 72 others considered themselves as part time researchers. There were 65 (9.5%) faculty members (38 within chiropractic institutions and 25 in Universities, including UQTR). Table 1 provides a summary of the responses to the Phase I survey.

Breakdown of postgraduate education by Canadian provinces is presented in Table 2. The large majority are Ontario and Quebec residents. Among full-time researchers, 14 live in Ontario, three in Quebec and only one in the following provinces: British Columbia (BC); Alberta (AB); and Nova Scotia (NS). Among part-time researchers, 48 reside in Ontario, 8 in Quebec, four in BC and AB, three in Manitoba, two in NS and only one in New Brunswick, Newfoundland and in the Yukon as seen in Table 3.

Phase II

Of the 198 invited participants, 123 (62.1%) completed and returned the second survey. As seen in Table 4, forty eight respondents (39%) indicated they did not participate in any research, 20 (16.3%) and 55 (44.7%) said they were full-time and part-time researchers respectively. Among those, 54 (43.9%) are faculty members. On average, full-time researchers spent 4.9 hours per week (range 0-20) seeing patients and published 17.8 papers in the past 5 years (range 0-59). The type of research conducted was as follows: 8 full-time researchers conducted clinical research, 9 did mostly population and public health or epidemiology type studies, and 10 individuals dedicated their time to neurophysiologic or biomechanical research.

As Table 5 indicates, among full-time researchers the types of studies conducted included case reports or series (n = 7), observational studies (n = 13); interventional studies (n = 16); systematic reviews (n = 12); basic science studies (n = 5) and survey research (n = 1). Finally, full-time researchers main sources of funding included Government funding (n = 10); Institutional funding (n = 5); Private funding (n = 4); and funding from the profession (n = 4).

Table 6 shows that on average, part-time researchers spent 19.7 hours per week (range 0-50) seeing patients.

Table 1 *Phase I responses*

Total respondents	684
Master's degree completed	59 (8.6%)
Master's degrees in progress	35 (5.1%)
PhD completed	24 (3.5%)
PhD's in progress	6 (0.9%)
Other health professions	24 (3.5%)
Full time researchers	20 (2.9%)
Part time researchers	72 (10.5%)
Faculty members	65 (9.5%)
Faculty members at chiropractic institutions	38 (1 NYCC, 1 Cleveland CC-KC, remaining CMCC and UQTR) (5.6%)
University-based faculty members (includes UQTR)	25 (3.7%)

Table 2 *Provincial postgraduate education summary*

Province	#PhD	#PhD(c)/(s)*	#MSc	#MSc(c)*
British Columbia	2	0	1	2
Alberta	1	0	6	0
Saskatchewan	0	0	2	1
Manitoba	0	0	3	2
Ontario	17	3	31	22
Quebec	3	3	10	6
Nova Scotia	1	0	3	2
New Brunswick	0	0	0	0
Prince Edward Island	0	0	1	0
Newfoundland	0	0	1	0
Yukon Territory	0	0	1	0
Northwest Territories	0	0	0	0
Nunavut	0	0	0	0
TOTAL	24	6	59	35

*Denotes PhD student, PhD candidate, Masters candidate.

Thirty-one held faculty positions and part-time researchers published an average of 3.2 papers in the past 5 years (range 0–14). The type of research conducted was as follows: 36 part-time researchers were involved in clinical research, 26 conducted population and public health or epidemiology studies, 13 individuals conducted research

in the field of neurophysiology and an additional 17 others in the field of biomechanics studies.

An equal number of part-time researchers wrote case reports or series (n = 24), observational studies (n = 24) and interventional studies (n = 25). Fourteen respondents in this group conducted systematic reviews. Only 3 did

Table 3 *Provincial researchers by time summary*

Province	#Full-time researchers	#Part-time researchers
British Columbia	1	4
Alberta	1	4
Saskatchewan	0	0
Manitoba	0	3
Ontario	14	48
Quebec	3	8
Nova Scotia	1	2
New Brunswick	0	1
Prince Edward Island	0	0
Newfoundland	0	1
Yukon Territory	0	1
Northwest Territories	0	0
Nunavut	0	0
TOTAL	20	72

Table 4 *Phase II responses*

Total respondents	123
No research	48 (39%)
Full time researchers	20 (16.3%)
Part time researchers	55 (44.7%)
Other health professions	16 (13%)
Faculty members	54 (43.9%)

research in the field of basic science studies and 4 did survey research. Finally, the main source of funding for part-time researchers was Institutional (n = 12). An equal proportion of part-time researchers received funding from Government, Private, and from the profession (n = 3-4, respectively).

Discussion

This paper represents the first formal attempt by the chiropractic profession in Canada to ascertain our ability to conduct research and our personnel resources to do so. When undertaking the next steps of this project we would advocate the use of an online survey reporting checklist such as the “CHERRIES” tool to improve the quality of our reporting.⁶ Despite several attempts to

Table 5 *Phase II responses by full-time researchers (n = 20)*

Average hours per week seeing patients	4.9 (range 0–20)
Other health profession degrees	1
Faculty positions	14
Average papers published in past 5 years	17.8 (range 0–59)
Clinical research	8
Population and public health, epidemiology	9
Neurophysiology	6
Biomechanics	4
Conducted case reports or series	7
Conducted observational studies	13
Conducted interventional studies	16
Conducted systematic reviews	12
Conducted basic science studies	5
Conducted survey research	1
Government funding	10
Institutional funding	5
Private funding	3
Funding from profession	4

elicit responses, the response rate to Phase I remained low. This is not surprising however, as those interested in conducting research are more likely to complete such surveys as revealed by the much higher response rate to Phase II. However our results show an unprecedented number of chiropractors actively involved in conducting research, with a large majority having completed post-graduate training or education that enables them to do so effectively.

Where do our strengths rest?

University-Based Research Chairs/Professorships

One of the successful initiatives for chiropractic research in Canada has been the Canadian Chiropractic Research

Table 6 *Phase II responses by part-time researchers (n = 55)*

Average hours per week seeing patients	19.7 (range 0–50)
Other health profession degrees	5
Faculty positions	31
Average papers published in past 5 years	3.2 (range 0–14)
Clinical research	36
Population and public health	26
Neurophysiology	13
Biomechanics	17
Conducted case reports or series	24
Conducted observational studies	24
Conducted interventional studies	25
Conducted systematic reviews	14
Conducted basic science studies	3
Conducted survey research	4
Government funding	4
Institutional funding	12
Private funding	3
Funding from profession	3
Highly interested in becoming a full-time researcher	12

Foundation's (CCRF) University-Based Research Chair/Professorship program. In short, the CCRF has provided the support, partnerships with the Canadian Institute of Health Research (CIHR), and funding necessary to establish chiropractic research chairs/professorships in a growing number of major universities across Canada with at least two additional chairs/professorships, in Manitoba and Saskatchewan, expected to commence in 2009 and 2010 respectively. Establishing these research chairs/professorships has enabled young researchers at the PhD level to conduct full time research in a university environment and allows them the benefits of conducting research in an academic institution while creating new inter-professional collaborations. It has also opened doors for additional

funding opportunities for these researchers. These researchers are then in a position to mentor other chiropractic researchers. A similar program with funding coming from the Fondation de Recherche Chiropratique du Québec (FRCQ) has provided similar opportunities and successes.

Chiropractic Institutions

The Canadian Memorial Chiropractic College (CMCC) and the Université du Québec à Trois-Rivières (UQTR) have histories of producing highly capable researchers and quality research. A majority of the respondents who indicated having any sort of faculty position had them at either UQTR or CMCC, and most respondents are believed to be either CMCC or UQTR alumni. Most of these CMCC and UQTR faculty members indicated conducting research on a part-time basis. The ability of the institutions to encourage their faculty members and students to conduct research and to provide the resources, instruction, funding, and protected time to do so is important for the health of research in the profession. Our educational institutions produce the pool of clinicians from which much of the next generation of clinician-scientists will arise. It has been noted that participation in research as a health professions student may be a determinant of future involvement in clinical research.⁵ Recent trends indicate that increasingly larger proportions of matriculating and graduating medical students have indicated serious interest in research and teaching careers, implying that current educational experiences increase interest in research.⁴

Part-Time Researchers

Through both the Phase I and II studies it is apparent that the profession has a small but dedicated group of part-time researchers. As indicated above, many of the CMCC and UQTR faculty members conduct part-time research in addition to their teaching and administrative duties. In the phase II study it was found that the part-time researchers have published an average of 3.2 papers over the past five years (with a range from zero to fourteen). This achievement is impressive in light of the fact that this is generally accomplished without full funding or support, giving reason to think that this group's talents and abilities could perhaps be further developed. Furthermore, part-time researchers see patients 20 hours per week on average compared to full time researchers who

see patients for an average of five hours per week. Part-time researchers are more likely to conduct clinical research (Tables 5 and 6). This is a likely group from which more full-time researchers could be developed.

Linkages with Other Researchers

Relationships between researchers in the profession and noted researchers have led to fruitful collaborations. Several such researchers have supervised at least one chiropractor to completion of a PhD, and published research in the field of chiropractic that is beneficial to the profession. Nurturing these relationships and establishing new collaborations around the country remains important. One example is the development of the Consortium of Canadian Chiropractic Researchers.

Where can we improve?

Regional Disparity

Tables 2 and 3 provide a stark illustration of a tremendous inequity of postgraduate trained chiropractors and those doing research on a full-time or part-time basis between Ontario and the rest of the country. While Ontario's chiropractors account for approximately half of the chiropractors in the country, they account for a majority of the full-time researchers (70%), part-time researchers (66.7%), chiropractors with PhDs (70.8%) and chiropractors with master's degrees (52.5%) as well as chiropractors who are currently postgraduate students/candidates (61%). There is an impressive number of chiropractors with master's degrees and master's degree students in Québec and as many PhD students in Québec as in Ontario. Québec also possesses the second most researchers (part-time and full-time combined) outside of Ontario. Much of this is likely related to the two chiropractic education programs in Canada.

While the situation in Ontario is strong and research and research training in Québec is growing, the rest of the country suffers from a disproportionate lack of chiropractors conducting research and who have or are obtaining postgraduate education. According to our survey results, there is only one chiropractor with a PhD, five with master's degrees, and two master's students in all of Atlantic Canada and many of the Master's degree holders do not conduct research. There is only one full-time researcher and four part-time researchers in this region. The Prairies

(Alberta, Saskatchewan, and Manitoba) similarly lack chiropractors with PhDs (only one) and have only eleven with master's degrees and three master's students presently. There is only one full-time researcher in the Prairies along with seven part-time researchers. The commencement of the University-based research chairs/professorships in Manitoba and Saskatchewan over the next two years should improve this situation, but considering the number of chiropractors in these provinces, the number in training or who having completed postgraduate education and who are conducting research is still low. British Columbia presently has only two chiropractors with PhDs, and only one with a master's degree that responded to our survey along with two additional master's degree students. There is only one full-time researcher in British Columbia and four part-time researchers.

Funding and Opportunities for Part-Time Researchers

As already mentioned, there is a small but committed group of chiropractic researchers who are involved in part-time research. CMCC and UQTR faculty members are encouraged to do research and benefit from some technical support. For part-time researchers who are not faculty members, however, projects they undertake generally require using their own resources and are often funded out-of-pocket. There is no program currently in place to enable these researchers to conduct research with the support that part-time researchers in other health professions would often be afforded.

Where should we be heading?

There are three major approaches that the profession should consider to further increase our research capacity. The first is to support the current University-Based Research Chair/Professorship program and to create additional Research Chairs and Professorships across the country. The Research Chair/Professorship program has the stated goal of having a Chair/Professorship in a major University in each province across the country. With the two new Chair/Professorships in Saskatchewan and Manitoba hopefully coming online in the next two years that vision will be largely accomplished. However additional University-Based Research Chair/Professorships could and should still be added across the country.

A second approach is to increase opportunities and

support for the profession's part-time researchers. There are numerous ways that this could be accomplished. One example being that the CCRF and/or FRCQ could create Fellowship training programs (with a stipend and small amounts of research seed funding) that would allow part-time researchers to train under University-based researchers while maintaining part-time practice. Such a program could potentially be partnered with the CIHR or even CMCC or UQTR through their graduate education departments. This program is potentially beneficial as it could provide the support, resources, and funding to make them worthwhile for part-time researchers and could provide the necessary connections and training to encourage these researchers to become full-time researchers. This approach would help to develop a group of clinician-scientists so valued in other health professions. Such research fellowship programs have seen success in the medical profession in the United States.^{1,2} However these programs are frequently for medical students and not new graduates, whereas in chiropractic, these fellowship programs are likely best suited to graduates.^{1,2}

The length of these medical research fellowships varies between one to three years, with a two to three year fellowship with a research emphasis being more the norm; however there is evidence suggesting that one-year fellowship programs may be more effective than multiyear programs for the career development of clinician-scientists.^{1,2,7} It has been previously recommended that clinician-scientist training programs include training in evidence-based medicine, statistics and epidemiology, research design and management, ethical conduct and grant application writing, along with project-specific training.⁷ Such a program would also require adequate mentoring (from perhaps a group of mentors) in clinical knowledge, research methodology, and career planning.⁷ Some authors have argued for a minimum of four publications as an indicator of minimal research skills for clinical research workforce needs.⁸ Research skills are largely gauged by scientific publication output and in one dental research training program 50% of their trainees had at least four publications and that publication number increased quickly from there.⁸

A common argument against research fellowship programs is that they do not provide sufficient training to become an independent investigator, and it is felt that

completion of a PhD is the only way to gain the necessary skills and experience. However, in other health professions (medicine in particular) completing a PhD is not the only route into a career in research. There are likely chiropractic researchers, particularly some part-time researchers, who have the necessary aptitudes and interest in conducting research, but simply do not have the time or ability to invest in the nearly five years of full-time study necessary for a PhD program. A research fellowship would allow those researchers to obtain additional research training and allow them to begin conducting research in a shorter amount of time. While this may not be sufficient for establishing oneself as a full-time independent researcher, it could provide linkages with established researchers that would allow for more research to be conducted after completion of the fellowship program. Completing such a program could also provide the encouragement for some of these researchers to go on to complete a PhD.

The final approach involves increasing inter-disciplinary research conducted by the profession. The University-based Research Chairs/Professorships are in an optimal position to lead such research; however researchers in other multi-disciplinary research institutions (such as CREIDO in Ontario) are also in potential leadership positions for initiating such research.

Regardless of which of the above approaches are adopted or considered, it is imperative for the profession to provide the necessary support to current researchers. At the same time, new graduates and students should be encouraged to consider conducting research as part of their careers and made aware of the opportunities in the profession. Research mentoring programs for students at CMCC and UQTR may be an effective avenue to interest students in research. Still, there are many students who likely graduate from chiropractic college interested in research, but without the direction to actually enable them to do so. Other authors have advocated using numerous approaches to show that research is a feasible career path for those interested, and attempts should be made to remove financial and institutional obstacles.⁴

What commitment should the profession make to research capacity?

Between full time and part-time researchers, there are roughly one hundred Canadian chiropractors conducting

research across the country. This represents approximately 1.5% of the profession, as there are greater than 6000 chiropractors across the country, with approximately twenty of those being full time researchers, or 0.3% of the profession in Canada. This means that considerably less than 1% of the profession is conducting the majority of the research to provide the evidence required to substantiate what the remaining 99% of the profession does clinically in terms of patient care. To achieve a level of 1% of the profession doing research on a full-time basis would require an additional 40 chiropractors. Even this level is markedly lower than the 1.8% of American medical doctors conducting full-time research in 2003 previously reported.⁴ Urgent steps must be taken to increase the number of full-time chiropractic researchers in this country.

The CCRF has shown a tremendous capacity to establish government and educational institution relationships that have reaped benefits for the profession, and particularly for those researchers who have received CCRF Research Chairs/Professorships. Professional support of the CCRF over the past several years has increased but additional support in terms of memberships and contributions are necessary for the CCRF's plans to move forward. Members of this profession have contributed significantly to support new research. Much remains to be done to achieve our goals.

Note to reader:

In the final part of our survey, we focused on the "financial aspects" of funding health research, health researchers and researchers in training positions. We are attempting to quantify in a general sense the amount of funding which supports chiropractic research and researchers in Canada. This information is important for many reasons. For ex-

ample, it will allow us to better focus strategic planning over the next 5 year period to prioritize and partner strategically. It will help us continue to build capacity and create new funding opportunities. It will help us accelerate the application of knowledge, and identify gaps in capacity, research and funding. Finally, it will help us increase the number of trainees and researchers.

We will be reporting on part 3 of the survey at a later date.

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