

**Organization and Provider Factors That Influence the  
Utilization of Arthritis Best Practices in Primary Care**

by

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# Chapter 1

## Introduction and Overview

Arthritis and related conditions affect over 4.5 million Canadians aged 15 years and older and in 2003 accounted for close to 9 million physician visits<sup>1,2</sup>. Most treatment for people with arthritis occurs at the primary care level yet many studies have documented the need for improved arthritis management in this environment<sup>3-8</sup>. Challenges include delay of physicians in referring to specialists<sup>6,9</sup> and underutilization of non-pharmacological interventions<sup>8-12</sup>.

The dissemination of clinical practice guidelines (CPGs) has been suggested as one method for improving care delivery; however, for CPGs relating to chronic disease management, results have been mixed<sup>3, 5, 6, 8-11, 13-24</sup>. Factors influencing the uptake of CPGs have included organizational context<sup>25-30</sup>, provider<sup>25, 26, 28, 31-34</sup> and patient<sup>35</sup> characteristics and the nature of the intervention<sup>19, 36, 37</sup> or the guidelines themselves<sup>20, 38-48</sup>.

Getting a Grip on Arthritis© is an inter-professional educational program designed to disseminate best practices for the management of osteoarthritis (OA) and rheumatoid arthritis (RA) to primary health care providers<sup>49</sup>. Arthritis best practices were developed by a team of primary care providers, researchers, funders, decision makers and affected individuals, using evidence from the literature and taking into account the environment in which the clinicians worked. The program was implemented and pilot tested in Ontario Community Health Centres (CHCs). OA is the most common type of arthritis with a prevalence of 10% in the general population and RA is the most common type of the more severe inflammatory arthritis with a prevalence of one percent<sup>50</sup>. The program included factors known to influence behavior change such as social influence and reinforcement. Arthritis best practices were developed by a



team of primary care providers, researchers, funders, decision makers and affected individuals, using evidence from the literature and taking into account the environment in which the clinicians worked. The pilot demonstrated that this inter-professional accredited workshop followed by a reinforcement phase could improve provider and patient outcomes related to the evidence-based management of OA and RA<sup>49</sup>. This intervention was one of the first to show changes in the management of arthritis in a primary health care setting. The project also demonstrated a practical approach to the implementation and dissemination of CPGs in this environment. However, the project was limited by the program's lack of generalizability due to the unique characteristics of the CHC environment.

Following this successful pilot, a submission was made to Health Canada and funding was received through the Primary Health Care Transition Fund for implementation of the program in a variety of primary health care settings across Canada. Primary care organizations representing four models of care agreed to participate in the program and sent 553 multidisciplinary providers to one of 30 workshops. After the workshops, a variety of activities were provided to reinforce the learning and support the delivery of arthritis care in the community. Participants were surveyed at baseline and six months following the workshops to evaluate their intended use of arthritis best practices for OA and RA. In addition, organizations had an opportunity to request educational materials to disseminate to their patients following the workshops. This was considered an arthritis best practice. Therefore, this study presented an opportunity to examine the organization and individual level factors that contributed to improved provider use of arthritis best practices six months following the workshops and in particular to examine differences based on model of care.

In this thesis, the literature on educational interventions for the implementation of arthritis CPGs was first reviewed and synthesized to identify factors that might influence the utilization of arthritis CPGs in primary care. Two models of knowledge utilization (KU) of arthritis best practices were then developed for testing. In Model 1 the dependent variable was conceptual or intended use of best practices, indicated by a total best practice score derived from providers' written responses to questions on the management of three hypothetical case scenarios. Hierarchical linear modeling was used to determine which organization and individual factors predicted total best practice scores six months following participation in the workshop. In Model 2 the dependent variable was whether or not the organization requested educational materials to disseminate to people with arthritis following their providers' participation in the workshop. Logistic regression was used to determine which organizational factors influenced the probability of an organization disseminating educational materials to patients following the workshop.

## Chapter 2

### Literature Review

Arthritis and related conditions affect over 4.5 million Canadians aged 15 years and older and in 2003 accounted for close to 9 million physician visits<sup>2, 51</sup>. Most treatment for people with arthritis occurs at the primary care level yet many studies have documented the need for improved arthritis management in this environment<sup>3-8</sup>. Challenges include lack of integrated care<sup>a 52</sup>, delay of physicians in referring to specialists<sup>6, 9, 53</sup> and underutilization of non-pharmacological interventions<sup>9-12, 54</sup>.

The dissemination of clinical practice guidelines (CPGs) has been suggested as one method for improving delivery of care. CPGs can be defined as ‘systematically developed statements to assist practitioners and patients in arriving at decisions on appropriate health care for specific clinical circumstances’<sup>19</sup>. However, the dissemination of CPGs relating to chronic disease management in primary care<sup>b</sup> has shown mixed results<sup>18-21, 55, 56</sup>, with the utilization of CPGs being influenced by organizational<sup>19, 57-60</sup>, provider<sup>19, 26, 61-66</sup> and patient level factors<sup>19</sup> as well as the nature of the interventions<sup>17, 59, 67-76</sup> and the guidelines themselves<sup>17, 19</sup>. A literature search was done in order to identify the factors that influence the implementation of CPGs for chronic diseases in primary care. These factors are summarized briefly below.

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<sup>a</sup> Multidisciplinary integration of guidelines into hospital and community practice

<sup>b</sup> Care delivered by physicians, nurse practitioners or other health professionals providing the first point of contact to a person requiring care or advice

## **2.1 Factors Influencing the Implementation of Clinical Practice Guidelines (CPGs) for Chronic Diseases**

### **2.1.1 Characteristics of the Organization**

At the organizational level, barriers to guideline implementation have included conflicting priorities, limited resources<sup>27-30, 37, 77</sup> and lack of infrastructure support<sup>52</sup>. Dobbins et al<sup>77</sup> reviewed the literature on research dissemination and utilization and found that variables such as practice complexity and size, geographic location and internal communications and decision-making processes were significant factors in the adoption of research evidence. In a rural setting, Siminerio et al<sup>78</sup> examined providers' perceptions of barriers to diabetes care and 80% identified external factors such as finances, staffing and access to care issues as barriers. Brand and Cox<sup>52</sup> used qualitative techniques to better understand the system and setting-specific factors that influenced the implementation of best practices for the non-surgical management of OA of the hip and knee. The major system barrier was lack of integrated care across multidisciplinary groups in the hospital and the community.

Factors that facilitate guideline implementation have included involvement of patients in the governance of the program<sup>67</sup> and computer support systems<sup>65</sup>. However, Eccles et al<sup>69</sup> suggested that limited staff training in the use of computer support systems may have accounted for poor results following the implementation of computer based guidelines for asthma and angina. Several studies have concluded that computer-generated guidelines (web-based or CD-ROM) were generally not effective<sup>19, 37, 59, 69</sup>, often due to technical difficulties<sup>59</sup>. Computer decision aids have shown mixed results in other settings<sup>52, 69, 71, 79, 80</sup> and it has been suggested that successful implementation may be limited by their complexity, costs, availability and physician acceptance<sup>81</sup>. However, studies that have incorporated computer-generated

guidelines and reminders as part of an existing electronic health record have shown better results<sup>56, 57</sup>.

### **2.1.2 Characteristics of Patients**

Nutting et al<sup>82</sup> examined barriers to depression care delivered by physicians and nurse educators. Using a checklist, they identified and weighted the barriers that applied to care of 64 patients with depression. Cluster analysis was used to identify five predominant barrier profiles: patient resistance to the diagnosis and treatment, patient non-compliance with visits, over-ruling of the guidelines by the physicians, patient psychosocial problems and health care system issues. Seventy-six percent of the barriers were shown to be related to patient-centred issues and 15% to physician-centred issues. System barriers accounted for the remaining 9%. The authors concluded that increased efforts were needed to address the patient level barriers including their attitudes, beliefs and psychosocial issues. Powell-Cope et al<sup>65</sup> also found that patient non-compliance and comorbid conditions affected providers' implementation of ischemic heart disease guidelines.

In a literature review on the challenges of implementing asthma guidelines, Price and Thomas<sup>83</sup> reported that patient factors such as beliefs about the efficacy of treatment, lack of self-efficacy, level of social support, and comorbidity might affect treatment and adherence. Cabana et al<sup>66</sup> also found that patient preference affected provider adherence to practice guidelines.

### **2.1.3 Characteristics of Providers**

Provider beliefs and attitudes towards guidelines have been shown to be important factors associated with clinician adherence<sup>26, 61, 62, 65, 70</sup>. Using focus groups with primary care physicians, cardiologists and internists, Powell-Cope

et al<sup>65</sup> examined key facilitators and barriers to the implementation of ischemic heart disease guidelines. Facilitators that were identified included endorsement by professional groups, expert colleagues and journals. The most frequently identified barriers were perceived lack of guideline relevance to individual patients, difficulty in accessing the guidelines, and high physician workloads with many complex patients. Barriers related specifically to prescribing guidelines included lack of consensus on contraindications, difficulty in providing follow-up and lack of patient adherence.

Baker et al<sup>64</sup> assessed obstacles to depression guideline implementation. Lack of self-efficacy (lack of confidence in ability to counsel patients) and cognitive dissonance (guidelines conflicting with current beliefs) were identified as possible factors influencing physician adherence. Similarly, in a study on tobacco control, Ockene et al<sup>84</sup> found that physicians with a feeling of ‘low preparedness’ to counsel smokers were less likely to implement guidelines. Using qualitative techniques, Roumie et al<sup>85</sup> examined providers’ responses to computer alerts to guidelines for hypertension. Provider inertia (difficulty in changing habitual behaviours) was the most frequently identified factor influencing adherence, along with lack of agreement with the guidelines and lack of knowledge. Lack of time to implement guidelines has also been cited as a problem in several studies<sup>26, 65, 86</sup>.

#### **2.1.4 Characteristics of the Intervention**

In a review of research on the implementation of CPGs, Davis et al<sup>19</sup> concluded that academic detailing (educational outreach) interventions and reminder systems were amongst the strongest methods for changing provider behaviour. Educational outreach can be defined as “a personal visit by a trained person to health professionals in their own setting”<sup>87</sup>. In a Cochrane review, O’Brien et

al<sup>87</sup> concluded that educational outreach visits alone or in combination with other interventions have a small but potentially important effect on prescribing and small to modest improvements on other types of professional performance. Educational outreach has also been shown to improve dyspepsia management in primary care<sup>88</sup>, reduce the prescription of inefficient or contraindicated drugs<sup>89</sup> and to improve case detection of tuberculosis and prescribing practices related to inhaled corticosteroids in patients with respiratory diseases<sup>90</sup>. In combination with other behavior change interventions, outreach has been shown to improve diabetes management, alcohol screening and counseling, rates of back surgery and smoking cessation practices in primary care<sup>75, 91-95</sup>. In a review of the effectiveness of interventions for tobacco dependence, Anderson et al<sup>95</sup> concluded that outreach combined with other multifaceted interventions such as educational interventions and changes to the practice environment were most likely to be successful for changing the behaviours of practicing clinicians.

Forsetlund et al<sup>96</sup> reported that 6 of 10 studies on interactive workshops demonstrated small, significant and potentially important effects on physician prescribing practices.

There have been mixed results from audit and feedback interventions<sup>97-102</sup>. However in their review article, Davis et al<sup>19</sup> concluded that audit and feedback was 'moderately effective' in changing provider performance particularly when the feedback was concurrent and delivered by peers or opinion leaders. Often audit and feedback are a part of multi-faceted interventions<sup>63, 92, 93, 103-108</sup>, making it difficult to determine the true effect of each component of the intervention. In a Cochrane Review, Jamtvedt et al<sup>109</sup> concluded that although the results were varied, audit and feedback might be effective in improving practice, especially when baseline compliance with guidelines was low and when the intensity of the feedback was high.

Grol et al<sup>110</sup> found opportunities for networking to be an important factor in guideline dissemination. Who delivers the message also appears to be important. Opinion leaders have been shown in many studies to be influential in facilitating the uptake of CPGs<sup>111-115</sup>.

### **2.1.5 Characteristics of the Guidelines**

The characteristics and quality of the guidelines have also been identified as a possible reason for the lack of implementation of CPGs<sup>38, 41-46</sup>. Price and Thomas<sup>83</sup> reviewed the asthma guidelines for use in primary care. They cited several factors limiting the applicability of the guidelines, for instance they did not apply to patients who had different levels of disease severity or comorbidity and the suggested therapies were unavailable or too costly for general use. They also suggested that guidelines were often not generalizable because of the strict criteria used for recruitment in studies.

Powell-Cope et al<sup>65</sup> and Kramer et al<sup>116</sup> note that knowledge uptake is enhanced by presenting a synthesis of research evidence rather than information based on one study. Guidelines also need to be easy to use. In a qualitative study, Larmer et Pugh<sup>26</sup> examined barriers to type 2 diabetes guideline dissemination. The complexity of the management of diabetes was considered a significant challenge by the 26 participating primary care providers.

Cabana et al<sup>66</sup> and Grol et al<sup>20</sup> also found that lack of agreement with a guideline was a barrier to implementation. This was due to many reasons, including that guidelines were perceived to be biased, lacked credibility or were costly, or because of perceptions that benefits were not worth the patient risk. Similar concerns have been reported for other chronic diseases such as heart disease<sup>65</sup>. Dobbins et al<sup>77</sup> suggested that guidelines need to be compatible with



providers' existing values and experiences and offer an advantage over existing practices. The degree to which a guideline can be tested on a limited basis (trialability) may also affect implementation<sup>117</sup>.

## **2.2 Arthritis Clinical Practice Guidelines**

In the past 10 years multiple CPGs have been developed for OA and rheumatoid arthritis RA<sup>47, 118-135</sup>. Briefly, the guidelines for the management of OA recommend medications (acetaminophen, Non-steroidal Anti-inflammatory Drugs (NSAIDs), and intra-articular injections), patient education, exercise, physical therapy, social support, surgical referral for advanced OA and weight loss for overweight people with OA of the knee. For RA, recommendations include medications (NSAIDs, Disease Modifying Anti-Rheumatic Drugs (DMARDs)), patient education, exercise, physical and occupational therapy, social support and referral to a rheumatologist. Many authors have documented the failure of providers to implement guidelines for OA and RA in the primary care environment<sup>3, 8, 11, 13, 14, 23, 24</sup> and others have questioned the quality of the guidelines themselves<sup>40, 47, 48</sup>. The remainder of this chapter reviews the empirical literature on the implementation of CPGs for OA and RA in primary care and identifies facilitators and barriers to implementation.

## **2.3 Literature Search Methods**

The literature on educational interventions for the implementation of arthritis CPGs in primary care was reviewed and synthesized to identify the factors that might influence the implementation of arthritis CPGs in primary care. A literature search was conducted using the Cochrane, Embase, PubMed, and CINAHL databases. Articles were included if they were English language, published between the years 1994 (when the first arthritis guidelines were published in the United States) and 2009 and were related to the implementation of arthritis CPGs in the primary care environment. MeSH

headings included arthritis or rheumatic disease and guideline, best practice, professional education, disease management or evidence-based practice. The reference lists of the articles were also reviewed for relevant papers. Articles were selected for review if they were prospective evaluation studies that targeted primary health care providers working with non-surgical adults with RA or OA and reported behavioural outcomes. Behavioural outcomes were chosen for this review because this thesis focuses on knowledge utilization in primary care. Studies with knowledge outcomes only were excluded as well as the prevention and screening literature.

A standardized approach was used to assess the quality of the individual studies using methods recommended by Law et al<sup>136, 137</sup>. Guidelines and an accompanying form (see Appendix A) allowed each article to be evaluated based on the outcome measures chosen, potential biases identified, intervention integrity, and appropriateness of the analytical methods. To determine the strength of the design and clinical relevance of the interventions, studies were then reviewed using a modified version of the Philadelphia Panel methodology<sup>138</sup>. The Philadelphia Panel system allows for the grading of studies based on design strengths as well as clinical and statistical significance (see Table 1). A difference of  $\geq 15\%$  in the outcome of interest compared to a control group was considered clinically important. This was determined by a panel of clinical experts representing organizations with an interest in rehabilitation. To receive an A grade (good), there must be one or more randomized controlled trials (RCTs) that show clinical relevance of  $\geq 15\%$  and statistical significance of  $\leq 0.05$ . Grade B (fair) interventions include one or more non-randomized controlled clinical trials with clinical relevance  $\geq 15\%$  and a statistical significance of  $\leq 0.05$ . Cohort or case-control studies were included as grade B in the Philadelphia Panel system but were not included in the modified version used in this review. Grade C (poor) interventions include

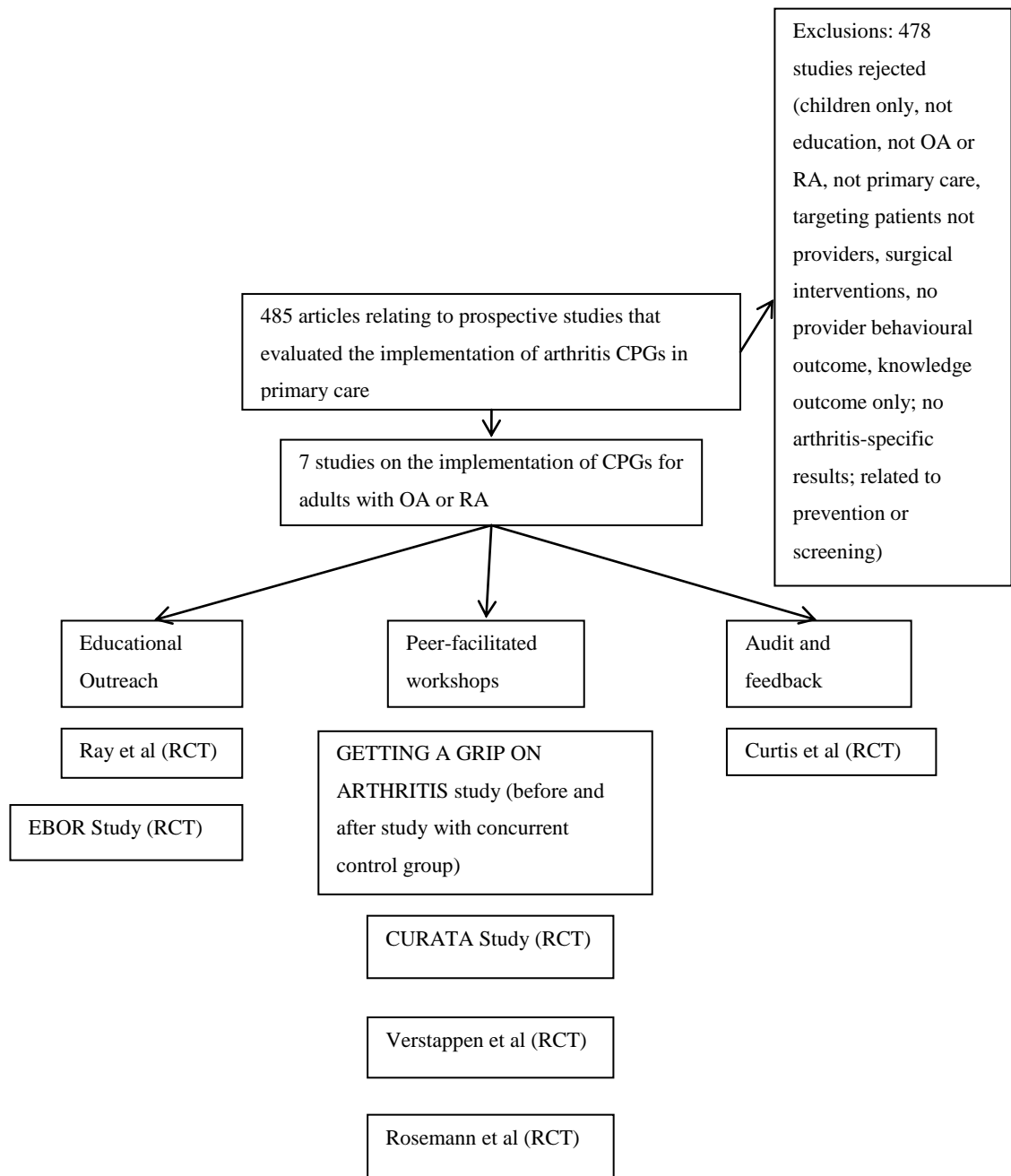
studies of any design with a clinical significance  $<15\%$ . In this case, statistical significance is not considered. Grade C+ is used to categorize interventions using any study design with clinical relevance of  $\geq 15\%$  but no statistical significance, suggesting that there may be potential for clinical benefit. Barriers and facilitators to guideline implementation, identified by the authors, were also summarized for each intervention.

**Table 1: Modified Philadelphia Panel Grading System**

Grade	Definition
Grade A (good)	one or more randomized controlled trials (RCTs) that show clinical relevance of $\geq 15\%$ and statistical significance of $\leq .05$ compared to controls
Grade B (fair)	one or more well designed non-randomized controlled clinical trials with clinical relevance $\geq 15\%$ and a statistical significance of $\leq .05$ compared to controls
Grade C+	any study design with clinical relevance of $\geq 15\%$ suggesting that there may be potential for clinical benefit but the observed effect did not achieve statistical significance
Grade C (poor)	studies using any design with a clinical significance $< 15\%$ . In this case, statistical significance is not considered

## 2.4 Results

The search identified 485 articles that related to the implementation of arthritis guidelines; seven studies were selected for review based on the inclusion and exclusion criteria described above. Figure 1 is a flow chart representing inclusion/exclusion criteria and the success of the search strategy. The seven identified studies represented the following three strategies for the dissemination of guidelines 1) educational outreach, 2) peer-facilitated workshops and 3) audit and feedback. Each study is described briefly below by type of intervention. See Appendix B for additional details.



**Figure 1: Flow Chart Representing the Success of the Search Strategy**

### 2.4.1 Educational Outreach

Two RCTs provided evidence that supported educational outreach for improving physician prescribing behavior. In a well designed study based on American College of Rheumatology (ACR) guidelines for hip and knee OA, Ray et al (2001)<sup>139</sup> evaluated the effect of a physician education program on reducing long-term exposure to NSAIDs in elderly patients. This program included several strategies, namely educational outreach by physician educators, reminder systems and nurse follow-up. There was a significant reduction in the number of patients taking NSAIDs (7%) in the intervention group relative to the control group at one year follow-up. Seventy-three percent of the physicians received the full intervention. In this group, there was a 15% increase in the days of acetaminophen use relative to the control group and a 10% decrease in the number of patients taking NSAIDs. From the quality assessment, the study's main limitation was high physician attrition (27%). No barriers or facilitators were identified by the authors.

In the Evidence-Based OutReach (EBOR) study, Freemantle et al (1999)<sup>140, 141</sup> evaluated the effectiveness of an educational outreach program delivered by trained pharmacists on physician prescribing guidelines for four conditions, including NSAIDs for non-specific joint pain. Overall, there was a significant improvement in overall prescribing practice. Smaller practices (two or fewer full time equivalent (FTE) practitioners) had a greater improvement than larger ones (13.5% compared to 1.4%;  $P < 0.001$ ). The authors suggested that it might be more difficult to change behavior in larger practices due to complex organizational structures. Surprisingly, for joint pain, there was a 3% *decrease* in the number of patients being managed according to the guidelines (P value not provided). This could have been due to failure to monitor use of over the counter medications. The authors speculated that this might also have been due to the lack of power to detect change in prescribing practices for non-specific

joint pain. Lack of diagnostic specificity was also an issue in this study resulting in an inability to generalize the findings to OA or RA. In a follow-up to this study, Nazareth et al<sup>25</sup> evaluated the process outcomes that contributed to the primary outcome. The participating GPs were surveyed and rated the visits highly, but only 63% reported application of the NSAID guideline in practice. The pharmacists' feedback indicated that GPs experienced difficulties in identifying appropriate patients with arthritis, were skeptical of the guidelines and lacked interest in changing their behaviours. They reported that some physicians perceived that the patients would be reluctant to change their current medications.

#### **2.4.2 Peer-facilitated Interactive Workshops**

Four studies evaluated the impact of peer-facilitated interactive workshops to improve arthritis management by health care providers. Peer-facilitated interactive workshops can be defined as those where there is group interaction among participants<sup>96</sup>. Using a three arm clustered RCT, Rosemann et al (2007)<sup>142</sup> evaluated the effect of an educational intervention based on EULAR<sup>c</sup> guidelines for the management of OA. The authors compared the effect of peer-facilitated group meetings and peer group meetings plus nurse case management on Xray orders, referrals to orthopedics and prescription of analgesics and anti-inflammatory medications for patients with OA. At nine months post intervention, participants in the peer group decreased their Xray orders and increased prescriptions for acetaminophen compared to the control group ( $P \leq .05$ ). The group that also had nurse case management support for patients had similar improvements with additional increases in prescriptions for NSAIDs and opioids ( $P \leq .02$ ) and an decrease in referrals to orthopedics ( $P=0.04$ ). There were several limitations to this study. There was no description

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<sup>c</sup> European League Against Rheumatism

of the control group, the training or reliability of the chart extractors, blinding of outcome assessors and characteristics of workshop faculty. No facilitators or barriers were identified in this study.

Glazier et al (2005)<sup>49</sup> evaluated the impact of the Getting a Grip on Arthritis education program on the use of 10 arthritis best practices based on OPOT<sup>d</sup> guidelines for the management of OA and RA. Providers from five Ontario Community Health Centres (CHCs) were invited to participate. The intervention included an interactive two- day inter-professional workshop that focused on arthritis best practices and skills enhancement (joint examination) delivered by trained local faculty. Reinforcement activities were provided after the workshop for participating organizations, their providers and the community. One year post workshop, there was a significant increase in the number of referrals to rehabilitation services compared to providers in the two control CHCs, as well as improvements in both provider confidence and satisfaction and a reduction in their perceptions of barriers to arthritis care (P<0.05). Further, patients from intervention CHCs reported receiving more information on their type of arthritis, medications, disease management strategies and community resources compared with the control group (P<0.05). Major study limitations were the lack of randomization to intervention and control groups and potential lack of generalizability due to the unique characteristics of the CHC environment. In key informant interviews one year after the workshop, providers indicated that they had improved their assessment skills, their knowledge of arthritis and community resources, their pharmacological management of arthritis, their team function and their referral practices to specialists.

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<sup>d</sup> Ontario Program for Optimal Therapeutics



In a 5 month RCT, Rahme et al (2005)<sup>143</sup> evaluated the effect of the evidence-based CURATA<sup>e</sup> peer-facilitated workshops with and without a decision tree on physician prescribing behavior for OA. Eight cities in Quebec were randomized and then physicians (n=249) in each city were entered into to one of four groups. Group 1 received a peer and rheumatologist facilitated case-based accredited workshop and decision tree for OA (including non pharmacological management) (n=84). Group 2 received the workshop only (n=29). Group 3 received the decision tree only (n=54). Group 4 received no intervention (the control group, n=82). Using intent to treat analysis, the authors reported a reduction in the number of arthritis prescriptions filled (assessed through a provincial administrative database) and improvement in prescribing practices in the two workshop groups (odds ratio:1.8(1.3,2.4)). The odds ratio for the 'per protocol' analysis (excluding physicians who did not attend the workshop) was 1.9(0.9, 3.8). The largest improvement from baseline was associated with the peer-facilitated workshops (4%) compared to the control group (2%). Larger practices benefited less and recent graduates benefited more. Poor physician attendance due to bad weather (20%) was a problem in this study and the authors identified potential inaccurate coding of OA in the administrative database as an issue.

In a six month multi-centre RCT, Verstappen et al (2003)<sup>144</sup> evaluated the effects of guideline dissemination together with small group discussion and personal feedback reports on physician test ordering for a number of chronic diseases. Practices in 5 regions in the Netherlands were stratified by region and group size then randomized to intervention or control groups. For degenerative arthritis, X-ray orders decreased 19% in the intervention group compared to 9% in the control group at 6-months post intervention; however the difference was

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<sup>e</sup> CURATA=Concertation pour une Utilisation Raisonnee des anti-inflammatoires dans le Traitement de l'Arthrose/An Integrated Approach to Improving the Appropriate Utilization of Anti-inflammatory/Analgesic Medications in the Treatment of Osteoarthritis in Quebec

not statistically significant, possibly due to insufficient statistical power. As well, there was study contamination because both groups received training on the general implementation of CPGs.

### **2.4.3 Audit and Feedback Interventions**

Audit and feedback can be defined as a summary of clinical performance that is given to health care providers in a written, electronic or verbal format over a specified period of time to improve their performance<sup>109</sup>. Curtis et al (2005)<sup>35</sup> conducted a seven month clustered RCT to determine the impact of chart audit, feedback and educational materials on rheumatologists', internists' and general physicians' use and monitoring of NSAIDs and cyto-protective agents. Physicians were identified through randomly selected patients in an administrative pharmacy database. There were no significant differences between the intervention and control groups at follow-up, although physicians in the control group increased the number of creatinine tests compared to baseline by 42% compared to 0% in the intervention group and CBC testing increased 52% in the intervention group compared to 25% in the control group. Improved prescribing was more strongly related to physician type and patient factors (risk status, number of NSAID prescriptions, number of physician visits) ( $P < 0.05$ ) than the actual intervention. A subset of the physicians ( $n=50$ ) were surveyed by fax to determine receipt of intervention materials; only 20 (40%) confirmed receipt of the materials. In this study the percentage of patients with a diagnosis of arthritis was unclear and physician attrition (85/101 or 16%) may have reduced the authors' ability to detect group differences. A ceiling effect (some physicians following guidelines at baseline) might have also influenced the results.

#### 2.4.4 Grading of Interventions

The seven studies were then graded according to the modified Philadelphia Panel Grading system. The results are presented in Table 2. Peer-facilitated workshops with nurse case-management support (Rosemann et al<sup>145</sup>) increased referrals to orthopedic surgeons for patients with OA (Grade A evidence). As well, inter-professional peer-facilitated workshops (Glazier et al<sup>49</sup>) improved referral practices for patients with OA and RA (Grade B evidence). Educational outreach by trained physicians with nurse follow-up (Ray et al<sup>139</sup>) resulted in statistically significant and clinically important improvements in providers' prescribing of acetaminophen for elderly patients with hip and knee OA, although this effect was not observed in the intent to treat analysis<sup>146f</sup> (Grade B evidence). Audit and feedback (Curtis et al<sup>35</sup>) resulted in clinically important but not statistically significant improvements in the use and monitoring of cyto-protective agents (Grade C+ evidence) suggesting there might be potential for this intervention to be effective.

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<sup>f</sup> a strategy for the analysis of randomized controlled trials that compares patients in the groups to which they were originally randomly assigned

Table 2: Summary of the Seven Studies with Provider Behavioral Outcomes

Study/Design/ Guideline	n	Behavioral Outcome	Clinical Importance	Statistical Significance	Grade
<i>Educational Outreach</i>					
Ray et al, 2001: RCT; ACR guidelines for the management of hip and knee OA in the elderly	209 solo physicians	Days of prescribed medication use; cessation of NSAID use; drug costs	In the subset of physicians who received the full intervention (protocol completers):	P<0.001	B
			<ul style="list-style-type: none"> <li>15% increase in the #days of acetaminophen use compared to control group</li> </ul>		
			<ul style="list-style-type: none"> <li>10% decrease in the #days of NSAID use</li> </ul>	“	C
			In all physicians randomized to either intervention or control group (Intent to treat analysis):	“	C
<ul style="list-style-type: none"> <li>7% decrease in the number of patients taking NSAIDs</li> </ul>					
			<ul style="list-style-type: none"> <li>7% reduction in the number of days of NSAID use</li> </ul>	“	C

<b>Study/Design/ Guideline</b>	<b>n</b>	<b>Behavioral Outcome</b>	<b>Clinical Importance</b>	<b>Statistical Significance</b>	<b>Grade</b>
EBOR Study (Freemantle et al, 1999): RCT; prescribing guidelines for three conditions including NSAIDS for non specific joint pain	162 physicians	Reimbursed prescriptions in an administrative database	3% decrease in patients being managed according to guidelines for joint pain compared to control group	Not reported	C
<b><i>Peer-Facilitated Workshops</i></b>					
Rosemann et al, 2007: 3 arm clustered RCT; evidence-based strategies for management of OA	75/503 GPs	Changes in #radiographs; #referrals to orthopedics; #prescriptions for analgesics and anti-inflammatory medications	Compared to control group: <i>Peer group meetings:</i> 7% decrease in the number of radiographs; 9% increase in prescriptions for acetaminophen;	P=0.05  P<0.01	C  C

<b>Study/Design/ Guideline</b>	<b>n</b>	<b>Behavioral Outcome</b>	<b>Clinical Importance</b>	<b>Statistical Significance</b>	<b>Grade</b>
			<i>Peer group meetings plus case management</i>		
			23% decrease in orthopedic referrals;	P=0.04	A
			9% decrease in radiographs	P=0.03	C
			8% increase in prescriptions for acetaminophen;	P<0.01	C
			4% increase in prescriptions for NSAIDs;	P=0.02	C
			8% increase in prescriptions for opioids	P=0<.01	C
GETTING A GRIP ON ARTHRITIS Study (Glazier et al, 2005): non- randomized trial using cross sectional data at two time points; OPOT guidelines for the management of OA and RA	21/30 providers	Number of provider referrals to rehabilitation	Referrals to community arthritis services (The Arthritis Society) increased from 0 to 60 in the intervention group compared to 0 to 2 referrals in the control group	P<0.05	B

<b>Study/Design/ Guideline</b>	<b>n</b>	<b>Behavioral Outcome</b>	<b>Clinical Importance</b>	<b>Statistical Significance</b>	<b>Grade</b>
CURATA Study (Rahme et al, 2005): RCT; guidelines for prescribing NSAIDs or acetaminophen for OA	249 GPs	Adequacy of prescribing of (COX)-2 inhibitors, NSAIDs or acetaminophen from the Quebec provincial health database	4% improvement in total prescribing in the workshop and workshop and decision tree group combined compared to 2% in the control group	Not reported	C
Verstappen et al, 2003: Multi-centre RCT; Dutch College of Primary Care Physicians guidelines for diagnostic test ordering	174 GPs	Total number of Xrays ordered per clinical problem	Mean number of Xrays for degenerative joint disease group decreased by 19% compared to 9% in control group	P=0.34	C
<b><i>Audit and Feedback Interventions</i></b>					
Curtis et al 2005: cluster RCT;	101 GPs	Medical record review (audit) and feedback	CBC testing increased 52% from baseline compared to 25% in the control group; for	NS	C+

<b>Study/Design/ Guideline</b>	<b>n</b>	<b>Behavioral Outcome</b>	<b>Clinical Importance</b>	<b>Statistical Significance</b>	<b>Grade</b>
guidelines for monitoring and use of cyto-protective agents			creatinine testing, physicians in the control group increased the number of tests by 41% from baseline compared to 0% in the intervention group		

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ACR=American College of Rheumatology  
 OPOT = Ontario Program for Optimal Therapeutics  
 CBC=complete blood count  
 RCT=randomized controlled trial  
 NSAIDs=non-steroidal anti-inflammatory drugs  
 COX-2= cyclooxygenase-2  
 EBOR= Evidence-Based OutReach  
 GP=general practitioner



## 2.5 Summary

There were relatively few studies in the literature that evaluated the impact of interventions for implementation of CPGs for OA and RA in primary care and many studies experienced difficulties in physician recruitment and retention, a major challenge identified by others<sup>19, 66, 147</sup>.

The seven identified studies were graded in order to determine the strength of study design and clinical relevance of the results. Only one study was graded as good in terms of study design and both statistically significant and clinically important behavioural outcomes (Rosemann et al<sup>142</sup>). Peer facilitated workshops with nurse case-management support for patients decreased the number of referrals to orthopedics in OA (Grade A evidence)<sup>142</sup>; however study quality may have been an issue due to failure of the authors to describe the control group, the training and reliability of the chart extractors, blinding of the assessors or who delivered the workshop content. In addition, one well designed RCT provided fair (Grade B) evidence to support educational outreach by trained physicians for improving prescribing of analgesics for OA<sup>139</sup>. One well designed non-randomized controlled study supported the use of inter-professional peer facilitated workshops (Getting a Grip on Arthritis) in changing provider referral patterns<sup>49</sup>. More specifically, this educational program was successful in increasing referrals to rehabilitation services for people with OA and RA. It was also the only study evaluating an educational intervention for the dissemination of CPGs for RA. This review also suggested that audit and feedback might have promise for improving physician monitoring and use of NSAIDs and cyto-protective agents for OA<sup>35</sup> (Grade C+ evidence).

Methodological issues such as lack of power, ceiling effects<sup>35</sup>, attention bias<sup>g</sup><sup>49, 143</sup>, and problems with program implementation due to high physician attrition<sup>35, 139, 143</sup> may have been factors in the studies showing non-significant results. As well, several of the studies included multiple interventions making it difficult to attribute outcomes to any one component of the program<sup>35, 49, 139, 142</sup>.

Barriers at the intervention level included poor physician attendance<sup>143</sup> and high attrition rates<sup>106, 139</sup>. This might be due to lack of interest or skepticism towards the guidelines, physician time constraints, or their perceptions about their ability to apply the guidelines in practice. It was also suggested that there might be a ceiling effect with physicians already knowing and applying the guidelines before the intervention<sup>35</sup>. This may be guideline specific, for instance, NSAID prescription is a common intervention for arthritis as well as other non-musculoskeletal problems, so physicians may have many years of experience using these medications.

Provider characteristics were also important. In the studies reviewed here, Rahme et al<sup>143</sup> concluded that more recent graduates may be more receptive to guideline implementation. Curtis et al<sup>35</sup> found that improved prescribing was more related to patient characteristics, for example, higher patient risk status and physician type, than to the intervention itself. In a qualitative study of the EBOR intervention, Nazareth<sup>25</sup> reported that some physicians lacked interest in changing their behaviour or perceived difficulties in changing their patients' behaviours.

In this review, the effect of practice size was unclear, however it appears that smaller practices may make the implementation of CPGs easier. Rahme et al<sup>143</sup>

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<sup>g</sup> Bias resulting from people in the intervention group receiving more attention than the control group

reported that providers in larger practices benefited less from the peer-facilitated workshop intervention and in the Freemantle study<sup>141</sup>, the authors suggested that larger practices may make guideline implementation through educational outreach more complex. Practice size was measured differently in each study (number of prescriptions<sup>143</sup>, number of FTEs<sup>141</sup>) making interpretation more difficult. Given the methodological issues involved in these studies, different definitions of practice size and speculative conclusions of the authors, the effect of practice size is still unclear.

## **2.6 Conclusions**

There was sparse literature evaluating educational interventions for the implementation of CPGs for OA and RA in the primary care environment. Only seven studies were identified that measured behavioral outcomes relating to guideline implementation. Based on the quality and grading of the studies reviewed, academic detailing by trained physician educators may improve physician prescribing for OA and peer-facilitated workshops with nurse case-management support for patients may decrease referrals to orthopedics. In addition, inter-professional workshops facilitated by peers (Getting a Grip on Arthritis) may improve referral patterns for OA and RA. This program will be further evaluated in this thesis.

Facilitators and barriers to guideline implementation included factors related to the guidelines themselves, the intervention, the characteristics of the providers, patients and the organization. Practice size was the most frequently mentioned factor influencing the uptake of CPGs<sup>141, 143</sup>. The current study provides an opportunity to add to the literature on the organization and provider factors that influence the utilization of CPGs for OA and RA in primary care. Specifically, a model to determine the predictors of provider use of arthritis best practices in

a primary care environment will be developed using data from the Getting a Grip on Arthritis program. Practice size will be included in the model.

## **Chapter 3**

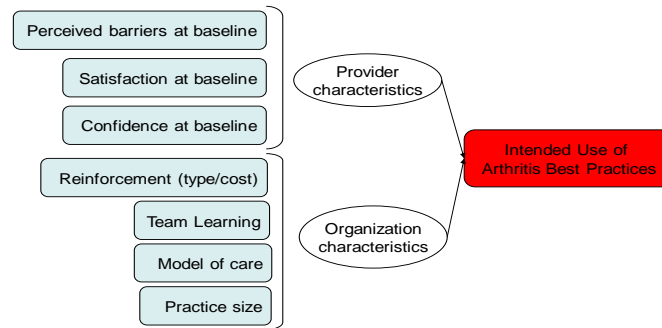
### **The Development of the Models for the Utilization of Arthritis Best Practices**

Two models of knowledge utilization (KU) were developed. Secondary data collected through the national implementation of the Getting a Grip on Arthritis program were used to test the models. In Chapter 4 there is a detailed description of the design and methods of this program.

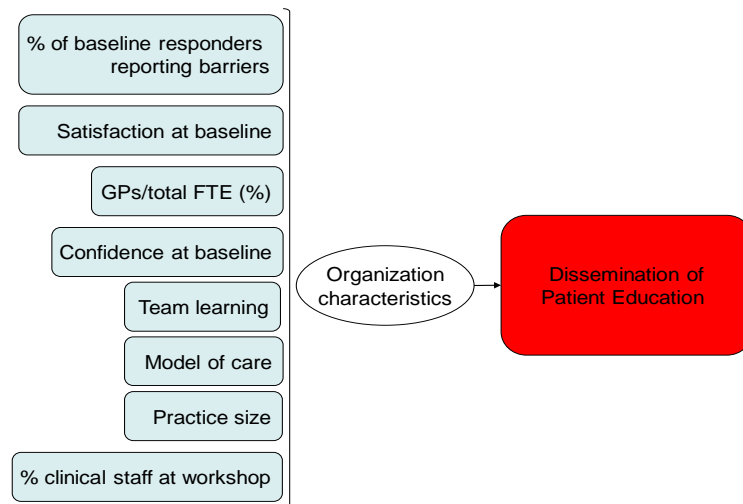
Kramer<sup>116</sup> suggested that ‘knowledge utilization’ can be demonstrated in four ways: 1) ‘conceptual use’, 2) ‘making the effort to use’, 3) ‘procedural use’ and 4) ‘structural use’. Conceptual use is reflected in the use of a common language and the ways users think about problems<sup>148</sup>. Making the effort to use refers to people attempting to use knowledge in their decision making activities. Procedural use refers to the use of knowledge in policy or procedural decisions. Structural use includes changes at an organizational level. For this study, KU reflects conceptual use and making the effort to use only. In Model 1 (see Figure 2), conceptual use of knowledge was the dependent variable and was operationalized using provider level responses to questions pertaining to the management of three hypothetical cases with early RA, late RA, and moderate knee OA respectively. These responses were thought to reflect providers’ intended use of arthritis best practices in the management of their RA and OA patients with similar characteristics as those described in the case scenarios. In Model 2 (see Figure 3), making the effort to use knowledge was the dependent variable and operationalized at the organization level, specifically whether an organization requested educational materials to disseminate to either people with arthritis or to the community during the six months following their participation in the Getting a Grip on Arthritis workshop.

Predictor variables in these two models were based on the following criteria:

- secondary data were available from the original Getting a Grip on Arthritis data set which included information from 275 multidisciplinary primary care providers collected at baseline (pre workshop) and six months post workshop (refer to Methods section in Chapter 4)
- there was evidence in the CPG literature to support their inclusion



**Figure 2: Model 1 for the “Conceptual Use” of Arthritis Best Practices**



**Figure 3: Model 2 for “Making the Effort to Use” Arthritis Best Practices in Primary Care**

### 3.1 Model 1: Conceptual Use of Arthritis Best Practices

#### 3.1.1 Provider Characteristics

The Getting a Grip on Arthritis program included constructs known to influence provider behavior such as perceptions of barriers to care and their confidence (self-efficacy) and satisfaction with arthritis care delivery<sup>149</sup>. In a review article, Cabana et al<sup>66</sup> also found that lack of self-efficacy was a barrier to adherence to CPGs. The Getting a Grip on Arthritis program was designed to influence perceived barriers, self-efficacy and satisfaction, therefore these variables were included in the model.

#### 3.1.2 Organizational Characteristics

In the literature review, practice size was identified as a factor influencing the implementation of CPGs<sup>12, 141, 150</sup> and was therefore included in the model. In this study, practice size was defined by the number of full time equivalent

(FTE) clinical staff, including physicians and other allied health professionals. Additional organizational level variables included in the model were type and cost of reinforcement activities provided during the six months following the workshops and team learning. Team care is described as an essential component of primary health care reform in Canada<sup>151, 152</sup> and has been identified as important for the delivery of care especially in complex diseases such as arthritis<sup>52, 86, 153</sup>. Studies in the arthritis field have demonstrated that multidisciplinary team care can improve overall health and functioning and decrease pain and disability<sup>154-166</sup>. Inter-professional education (IPE) is seen as important for supporting team-based care and influencing behavior change<sup>167-171</sup>. In the current study, there was a unique opportunity to understand whether providers who attended the workshop with other members of their multidisciplinary team (exposed to team learning) were more likely to use arthritis best practices than providers who attended without a multidisciplinary team member.

Social cognitive theory (SCT) suggests that reinforcement of learning will enhance behavior change<sup>149</sup>. The literature to support this claim is sparse and typically is focused on reinforcement of patient behaviours not health professional behavior<sup>172</sup>. It is important to know whether reinforcement activities were an important component of this health professional intervention and whether the reinforcement costs (approximately \$1000.00 per organization) were justified. In this study, six months of reinforcement activities were provided to the organizations that sent participants to the workshops (see Methods section of Chapter 4). These activities were tracked and included the number and type of activities provided to or requested by each organization and the costs of providing this support. According to Baranowski et al<sup>173</sup>, internal (intrinsic) reinforcement is a person's own experience or perception that an event had some value and results in the person expressing interest or



demonstrating retention of the learning or seeking more learning. The following reinforcement activities in this project were classified as intrinsic: ordering or requesting educational materials, completing a reflective practice exercise (chart audit) required for Mainpro C credits<sup>h</sup>, requesting additional staff training, or requesting the donation of arthritis books to a local library to make information available to community members. The total cost of all types of reinforcement activities was also included in the model.

It has also been suggested that model of care may be important in determining the effectiveness and quality of health care in the primary health care environment<sup>152, 174</sup>. The results of the Grip pilot study were limited in terms of generalizability due to the unique characteristics of the CHC environment. Providers from four different models of primary health care participated in the national implementation and this provided an opportunity to understand the differences in KU between these models. This could have implications for policy and decision makers concerned with primary care reform and the delivery of evidence-based health care in Canada. A description of the four models is provided in Table 3 below. CHCs and Centres de sante et services sociale (CSSSs) were combined because both were represented by a partner organization in the study, the Canadian Alliance of Community Health Centre Associations (CACHCA).

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<sup>h</sup> Credits provided by the College of Physicians of Canada to their members on completion of accredited educational programs

**Table 3: Description of Models of Primary Health Care in the Getting a Grip on Arthritis Study**

Model of Care	Staffing	Funding	Population Served	Integration with Community
CHC/CSSS	Interdisciplinary teams providing a broad range of medical and social services; most have physicians and nurses or NPs; some have PTs, OTs, SWs, health promoters, pharmacists, podiatrists	Provincial global funding; salaried employees or capitation	Defined geographic location or target group; often socially disadvantaged or hard to serve populations	Co-operate with the community to provide a range of services; volunteer community board governance
Networks	Physicians in solo or group practices along with nurses, NPs, and occasionally other providers; team members may be located in different	Provincial funding; payment to physician through mixed methods (per capita,	Rostered patients	Informal arrangements with community

Model of Care	Staffing	Funding	Population Served	Integration with Community
	physical locations.	sessional fees or fee for service); other staff salaried or contract		
Federal	Aboriginal: physicians, nurses, NPs, community health representatives; often solo providers Military: multidisciplinary providers including PT, OT, SW	Federal funding, salaried	Special populations (aboriginal, military)	Aboriginal band council; military has varied arrangements with community for secondary and tertiary care services
Regional	Multidisciplinary providers plus fee for service physicians	Regional health authority funding; payment to physician	Defined geographic area	Informal arrangements with community

Model of Care	Staffing	Funding	Population Served	Integration with Community
		mostly fee for service; other staff salaried or contract		

CHC=Community Health Centre, CSSS=Centres de sante et services sociale

Networks = Groupes de medecine de famille (GMF), Family Health Networks (FHNs), Family Health Groups (FHGs), Primary Care Networks (PCNs)

NP=nurse practitioner

### 3.2 Model 2: Making the Effort to Use Arthritis Best Practices

In Model 2 the dependent variable was the request for patient educational resources during the six months following the workshop (Figure 3). This behavioral outcome and ‘best practice’ was tracked by the study team when participating organizations requested educational materials to distribute to their patients or when they requested arthritis books and videos to donate to a local library.

At the organizational level, the predictor variables were the same as in Model 1 with the exception of the type and cost of reinforcement activities. These were removed because the dissemination of patient education was a subset of these activities and likely to be highly correlated. Additional organization level variables were calculated using individual level variables in Model 1 to reflect organization satisfaction, organization confidence and organization perception of barriers (see Methods 4.5.2.2 of Chapter 4). The percentage of total clinical staff (FTE) that attended the workshop and the

percentage of total clinical FTEs who were physicians were also added to this model.

### **3.3 Conclusion**

Based on the literature review, it was determined that provider and organizational characteristics might be important factors in the utilization of arthritis best practices in the primary care environment. Two models of KU were developed for testing to determine the influence of selected factors on two types of KU following participation in the Getting a Grip on Arthritis program.

## **Chapter 4**

### **Methods**

Study methodology has been described in detail elsewhere<sup>175</sup> and is summarized briefly below. The project received ethics approval from the University of Toronto, Health Canada, the University of Waterloo and relevant provincial, regional, university and hospital ethics boards across Canada.

#### **4.1 Purpose**

The purpose of this thesis was to identify organization and provider level factors that influenced the use of arthritis best practices in primary care following implementation of the Getting a Grip on Arthritis program across Canada.

#### **4.2 Project Infrastructure**

In order to facilitate the national roll out of the Getting a Grip on Arthritis program, the partners from the pilot study were expanded to include organizations concerned with the delivery of arthritis care nationally<sup>i</sup>. The Partners' Group met regularly and was responsible for the design and implementation of the project. An advisory committee met yearly to discuss issues related to communication, dissemination of results and sustainability. Patients and primary care providers sat on both groups. Health professionals, one in each of Canada's five regions, were hired along with support staff to coordinate implementation of this two and half year project. The Arthritis Society provided administrative support nationally.

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<sup>i</sup> Canadian Alliance of Community Health Centre Associations (CACHCA), Canadian Nurses Association (CNA), Canadian Rheumatology Association (CRA), Arthritis Health Professions Association (AHPA)

### **4.3 Study Population and Recruitment of Providers**

Primary health care organizations across Canada (defined broadly as not-for-profit organizations serving adults with arthritis and delivering primary health care services) were identified through provincial ministry of health representatives, partner organizations and through stakeholder meetings in each province. A list of CHCs and CSSSs was provided by the Canadian Alliance of Community Health Centre Associations (CACHCA), a partner in the project. The Ontario Association of Family Health Networks (OFHN), also a partner, provided lists of Family Health Networks, Family Health Groups and Primary Care Networks for Ontario. Provincial Ministry of Health representatives provided lists of primary care organizations in other provinces. A letter of invitation was sent to the executive director (ED) of each organization outlining the project and the benefits of their participation. The ED of each participating organization was asked to complete a practice profile describing their organization in terms of region, mandate, staffing, funding and population served. If this was not possible, a provider who attended the workshop was asked to complete the profile. OFHN provided basic practice profile information for Network sites in Ontario.

All health care providers from the participating organizations (sites) who had a role in identifying, preventing and /or treating arthritis were then invited by their organization to register for a free workshop in their community or region. Efforts were made to hold the workshops in an equal number of urban and rural locations. Where space allowed, health professionals from the surrounding communities were invited to attend. All travel costs for participating providers were covered by the grant funding.

## **4.4 Interventions**

The design of the “Getting a Grip on Arthritis”© project has been described previously<sup>49, 175</sup>. Briefly, the intervention consisted of provider and patient educational materials and an accredited interdisciplinary provider workshop followed by six months of activities to reinforce workshop learning and to support the delivery of arthritis care in the community. The program was based on Social Cognitive Theory (SCT)<sup>149</sup> and included multiple approaches to support behaviour change (opportunities for skill development, multidisciplinary team learning, networking with local arthritis specialists; the use of credible role models as workshop faculty, personal goal setting and reinforcement following the workshops).

### **4.4.1 Educational Materials**

In the pilot study the design team developed educational materials for project participants. For the national version of the program, materials were updated following a systematic review of the recent literature on OA and RA. This resulted in modifications of the pharmacological content of the workshops to include biologic therapy for RA, information on glucosamine and chondroitin, and information on nutrition and weight management for OA. Updated materials included a patient resource kit (including lay versions of the CPGs, list of arthritis books, videos, websites and financial resources by province) and a poster for the public which included primary and secondary prevention messages related to OA<sup>176</sup> and encouraged people with early signs of arthritis to seek care from their health care provider. Materials were reviewed by patients to ensure clarity and relevance. Provider resources consisted of a laminated pocket card summarizing arthritis CPGs and a prescription pad to prompt appropriate community referrals.



#### **4.4.2 Provider Workshop on Osteoarthritis and Rheumatoid Arthritis**

Workshop faculty were identified through provincial stakeholders and partner groups and consisted primarily of local multidisciplinary professionals with expertise in arthritis (e.g. rheumatologists, physiotherapists, occupational therapists, social workers, dietitians, pharmacists) who received materials (slides, props, key articles) and training to support standardized delivery of content.

Regardless of discipline, all providers completed a survey prior to attending the workshops (online or paper) based on a modified version of the ACREU<sup>j</sup> Primary Care Survey<sup>9, 10</sup>. The completion of the baseline survey was necessary for MAINPRO C accreditation provided through the College of Family Physicians of Canada. It also primed the participants to think about arthritis care delivery prior to the workshop.

The content of the workshops focused on guidelines for evidence-based arthritis care or ‘best practices’ for OA and RA. They were derived from Ontario CPGs<sup>134</sup> and adapted by health care providers and patients to the primary care environment (see Appendix C). Workshops were based on the format and content used in the pilot study with an additional session on weight loss for OA and were shortened from two full days to nine hours based on provider feedback. The workshop consisted mostly of small group hands-on activities, with ample opportunity for providers to interact with local arthritis specialists. Sessions covered the differentiation between degenerative and inflammatory arthritis; non-pharmacologic interventions (occupational therapy and joint protection, physical therapy and exercise,

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<sup>j</sup> Arthritis Community Research and Evaluation Unit

psychosocial interventions and the Arthritis Self Management Program, nutrition and weight management); pharmacologic interventions; and a review of the musculoskeletal (MSK) examination with trained patient educators<sup>k177</sup>. Stages of change theory<sup>178, 179</sup> and PACE Canada tools<sup>1180, 181</sup> based on this theory were presented as a basis for counseling patients about physical activity and weight management. A communications module provided an interactive opportunity to discuss the challenges of inter-professional communications and referral<sup>182</sup>. Regardless of discipline, all providers were encouraged to educate their patients about all best practices and facilitate appropriate referrals. At the end of the workshop, providers met in their teams with community representatives to discuss implementation of arthritis best practices both in their organizations and within their communities and returned to their practices with implementation plans and personal goals to change their practice.

#### **4.4.3 Reinforcement Activities**

Primary health care sites that agreed to participate in the project and sent providers to one of the workshops were eligible for reinforcement activities during the six months post workshops. These activities included the passive dissemination of regional newsletters, educational materials for their providers, referral templates, and community resource lists to all sites. In addition, workshop participants were invited to request support and resources to help them implement arthritis best practices in their community (intrinsic reinforcement). For the purposes of this study, either ordering educational materials for their patients or requesting and organizing the

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<sup>k</sup> Patient Partners in Arthritis: The Patient Partners in Arthritis program is funded through an unrestricted educational grant from Pfizer Canada Inc.

<sup>l</sup> Educational materials developed by PACE Canada to help health professionals change patient behaviours related to healthy eating and physical activity [www.pace-canada.org](http://www.pace-canada.org)

donation of patient books and videos to a public library were considered to meet the patient education best practice.

At three months post workshop, participants were asked to complete a self-administered chart audit (reflective practice exercise). This was followed by team meetings to discuss audit findings and reinforce best practices and to meet the requirements for MAINPRO MC accreditation.

Reinforcement activities with associated costs that were covered by the Health Canada grant were tracked by the research team. Costs assumed by the sites or providers were excluded. Those activities provided at no cost, such as connecting people to resources and emailing information, were not tracked.

## **4.5 Measures**

### **4.5.1 Model 1**

Model 1 was developed to test the influence of selected individual and organizational characteristics on providers' *conceptual* use of arthritis best practices, measured by their responses to questions regarding their intended management of three hypothetical case scenarios (early RA, late RA, and moderate knee OA) six months post workshop. Separate analyses were done for each of the three case scenarios to determine if differences existed based on the type and severity of arthritis.

#### **4.5.1.1 Dependent Outcome Variable**

The dependent variable was providers' intended use of arthritis best practices six months following the workshops. This was operationalized using a revised version of the Arthritis Community Research and Evaluation

Unit (ACREU) Primary Care Survey (see Appendix D)<sup>4, 9, 10, 49</sup>. In this survey, intended use of arthritis best practices was determined through providers' responses to questions on the management of three case scenarios (see questions 1-3). These scenarios were based on the clinical profiles of actual patients affected by early RA, late RA and moderate knee OA. At the time of development of the ACREU Primary Care Survey, guidelines did not exist for the management of arthritis in primary care, therefore arthritis best practices for each case scenario were developed by a 36-member multidisciplinary panel involving a family physician, rheumatologists, a physical therapist and an epidemiologist using a three round Delphi process to ensure face validity<sup>9</sup>. A consensus of 70% among panel members was required for inclusion of a 'best practice'. The survey was pilot tested on a convenience sample of 16 academic and community based family physicians<sup>9</sup>. From a standard list of items, respondents were asked to select the investigations, interventions and referrals that they would choose for the management of each case. One point was given for each selected best practice. Table 4 summarizes the scoring of the reported best practices. The scoring has been used in three published studies and has shown to distinguish between physician management of early and late RA<sup>9</sup> and between intervention and control groups in the Getting a Grip on Arthritis pilot study<sup>49</sup>. Reliability of the scoring has not been reported, however. For the pilot study<sup>49</sup>, the best practices were revised based on newly published guidelines<sup>134</sup> and input from multidisciplinary primary care providers in Ontario.

In the current study, best practices for each case scenario were again revised *a priori* based on the consensus of the Partners' Group and were slightly different from those used in the pilot study. More specifically, occupational therapy/assistive devices were added because of new guidelines in the

literature supporting these interventions<sup>183-193</sup>. For OA, social support was removed because it was felt that there were no indications for this intervention in the case scenario. In addition, weight management/nutritional counseling was included even though there was no indication that the patient in the case scenario was overweight. Messages around weight management and proper nutrition were discussed during the workshop as important for all people with OA regardless of their weight. This reflected the importance of weight management in the reduction of risk for the progression of knee OA<sup>194-200</sup>. Use of DMARDs<sup>m</sup> was added for RA since initiation of DMARDs was now considered first line treatment<sup>201-203</sup>. Finally, questions were changed to an open-ended format so that providers were not cued by the standardized response items.

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<sup>m</sup> Disease Modifying Anti-Rheumatic Drugs

**Table 4: Summary of Scoring System for Best Practices in Past Studies  
Using the ACREU Primary Care Survey**

Reference/Study Population/Case Scenarios	Best Practices	Ranking of Best Practices
Glazier 1996/529 members of the College of Family Physicians of Canada/2 case scenarios (early and late RA)	<p>Best practices based on consensus among family physicians</p> <p>Standard list of items provided for each case scenario included: NSAIDS, rest, ice/heat as recommended interventions and PT, OT and rheumatologist as recommended referrals. Referral to SW was recommended for late RA only</p> <p>One point given for each recommended intervention or referral</p> <p>Summed the points for intervention and referral categories separately, then divided by total number of recommended items in each category giving a % score for each category</p> <p>The mean scores</p>	<p><i>for early RA</i>, the ranking of recommended interventions and referrals was:</p> <p>NSAIDs (86.0%), referral to rheumatology (58.4%), ice/heat (43.3%), rest (41.4%), referral to PT (38.9%), OT (13.6%) SW (7.8%)</p> <p>mean percentage scores for the early RA scenario were 55.3 % for interventions and 33.3% for referrals</p> <p><i>for late RA</i>, the ranking was:</p> <p>referral to rheumatology (91.3%), NSAIDs (72.0%), referral to PT (67.1%), SW (46.9%), OT (44.8%), ice/heat (34.2%), rest (33.3%)</p> <p>mean percentage scores for late RA were 45.0% for interventions and 61.0% for</p>

Reference/Study Population/Case Scenarios	Best Practices	Ranking of Best Practices
	for each category were calculated by adding the individual % scores and dividing by the number of respondents	referrals
Glazier 1998/529 members of the College of Family Physicians of Canada/3 case scenarios (shoulder problem, moderate knee OA, acute hot knee)	Best practices based on consensus  Standard list of items provided for each case scenario including NSAIDS, and exercise as recommended interventions and PT as recommended referral for moderate knee OA  Scoring as per Glazier 1996	<i>for moderate knee OA</i> , the ranking of recommended interventions and referrals was:  NSAIDs (61.0%), referral to PT (54.2%), exercise (33.1%)
Glazier 2005/21 primary care providers working in Community Health Centres) – Getting a Grip on Arthritis pilot study/3 case scenarios (early and late RA, moderate knee OA)	Scoring as per Glazier 1996	Not reported

PT = physiotherapy

OT=occupational therapy

SW=social work

NSAIDs=non-steroidal anti-inflammatory drugs

OA=osteoarthritis

RA=rheumatoid arthritis

#### 4.5.1.2 Coding of Open-ended Responses

Open-ended responses were coded independently by two reviewers using a coding manual as a guide (see Appendix E). The coding manual provided a list of acceptable numeric codes and guidelines for the use of each code. For example, code 4 was used for any reference to the Arthritis Self-management Program and code 80 was used for referral to a rheumatologist. The two reviewers were asked to code the responses of the first 30 providers and then meet with their coding partner to compare their codes before continuing; the coding of these provider responses were considered training and were not included in the reliability scoring. They were asked to use a red pen to circle the codes agreed upon for each unit (numerator), use a circle with a star for those codes disagreed upon. They also flagged those items that needed to be discussed with a third party to gain consensus. Circles and circles with stars were added up as the denominator. If the partners had < 75% agreement, they were asked to review and discuss the units and codes with the study investigators and corrections were made. Reliability between the coders was 90% for early RA, 91% for knee OA and 83% for late RA.

#### 4.5.1.3 Scoring of Best Practices

Scoring of each case scenario is outlined in Appendix C. For the *early RA case*, one point was given for each of the following seven interventions or referrals considered to be best practices based on current CPGs<sup>127, 128, 204, 205</sup>: 1) education; 2) exercise/referral to a physiotherapist/exercise program; 3) assistive devices/joint protection or energy conservation/referral to an occupational therapist; 4) social support/referral to a social worker,



psychologist, psychiatrist or mental health worker/counselor; 5) prescription, recommendation or referral for an NSAID or 6) DMARDs; and 7) recommended/referral to a rheumatologist. Total best practice score could vary from zero to seven. For the *late RA case*, the scoring was the same as for early RA with the addition of one point for consideration of or referral to a surgeon. The total best practice score could vary from zero to eight. For the *moderate knee OA case*, one point was given for each of the following eight interventions: 1) education; 2) exercise/referral to a physiotherapist/exercise program; 3) assistive devices/joint protection or energy conservation/referral to an occupational therapist; 4) prescription, recommendation or referral for analgesics, 5) an intra-articular injection, or 6) NSAIDs; 7) weight management/ proper nutrition; and 8) recommendation or referral to a surgeon. Total best practice score therefore could vary from zero to eight. A response of ‘not in scope of practice’ was considered zero. It was felt by the Partners’ Group that all primary care providers have a role in advocating for all best practices for patients with arthritis regardless of their scope of practice.

#### 4.5.1.4 Weighting of Best Practices

With regards to potential weighting of the best practices, advice was sought from study co-investigators at ACREU. They suggested not weighting them because all best practices were discussed equally at the workshops and all were listed in the educational materials used in the program. As well, in the development process for the original survey, panel members weighted items for scoring best practices based on perceived importance. Weights were uniformly high for all items, therefore weights were not used in the final analysis<sup>9</sup>. Weighting of the best practices could be done based on ranking of the best practices in past studies (Table 3). However, the best practices in the first two studies were based on consensus only and guidelines did not

exist for the management of arthritis in primary care. The third study (Getting a Grip on Arthritis pilot study) did not report results on the ranking of best practices. Streiner and Norman<sup>206</sup> suggest that you can weight for theoretical reasons or empirical reasons. Based on the above, there is no theoretical reason to weight items. Empirically, they suggest that if a scale has less than 40 items, there may be some value in applying weights, but it is far from clear. In the summary, they conclude that ‘differential weighting of items rarely is worth the trouble’ (Streiner, page 77).

#### 4.5.1.5 Predictor Variables

##### 4.5.1.5.1 Provider Level

The following three variables from the ACREU Primary Care Survey (Appendix D) were included as predictor variables in Model 1:

- Provider satisfaction with ability to manage arthritis. This was measured on a 10 point rating scale with 1=not satisfied and 10=extremely satisfied.
- Provider confidence in the management of arthritis. This was measured on a 10 point rating scale with 1=not at all confident and 10= extremely confident.
- Perceived barriers to physiotherapy, occupational therapy, social work, and rheumatology. Barriers included any one of the following: available but waiting time was unacceptable, available but travel time was unacceptable, available but no confidence in the service, available but funding was a barrier, not available at all or the provider was not sure if the service was available. The perceived barrier variable was scored as 0=no barriers and 1 = 1 or more barriers.

#### 4.5.1.5.2 Organization Level

Each participating site was asked to complete a Practice Profile describing urban/rural status, language, practice size, model of care, and so forth (see Appendix F). See earlier description of models in Table 3. Practice size was defined as the total number of full time equivalent (FTE) clinical staff providing care at the organization. Urban/rural status for each site was defined as follows: urban if the population density was greater than 400 people per square kilometer with a population of at least 1000 and rural if the population density was less than 400 people per square kilometer or with a population less than 1000. Population density of each community was verified through the Statistics Canada website for community profiles at <http://www12.statcan.ca/english/profil01/PlaceSearchForm1.cfm>.

Team learning was another organizational characteristic coded as 1= team learning (two or more providers of different disciplines from the same organization attended the workshop<sup>207</sup>) and 0 = no team learning (one or more providers of the same discipline at workshop). Information on team learning was captured through the workshop registration process. Reinforcement activities were scored as 1=intrinsic, 0= not intrinsic. ‘Intrinsic’ reflects resources and activities *requested by the organization* after the workshop. The total cost of reinforcement activities by organization was also calculated. Reinforcement costs were tracked throughout the project by the research team.

#### **4.5.2 Model 2**

Model 2 was developed to examine the possible influence of organizational characteristics on the implementation of one specific best practice for arthritis care, that is, dissemination of patient education during the six

months post workshop. All variables in this model were organization level variables.

#### 4.5.2.1 Dependent Variable

The dependent variable in this model was the dissemination of patient educational materials after the workshop, as indicated by sites ordering educational materials for their patients or community or by requesting arthritis books and videos for donation to their local libraries. This variable was a subset of the intrinsic reinforcement variable described for Model 1. The variable was coded '1=yes' or '0=no'.

#### 4.5.2.2 Predictor Variables

Predictor variables in this model included the organization level variables previously described for Model 1, namely team learning, model of care and practice size, along with the percentage of total clinical FTE that attended the workshop and the percentage of total clinical FTE who were physicians. In addition, the individual level variables in Model 1 (perceived barriers, satisfaction and confidence) were aggregated to derive the percentage of respondents from each organization who perceived barriers to arthritis care, as well as mean baseline satisfaction and mean confidence of respondents for each organization.

### **4.6 Analyses**

Descriptive statistics were used to describe organization and provider characteristics at baseline and appropriate non-parametric and parametric tests were used to compare characteristics of participating organizations with non-participating organizations. Statistical analyses were performed using SAS, version 9.1.

## **4.6.1 Analysis of the Models**

### **4.6.1.1 Model Building Strategy**

#### **4.6.1.1.1 Model 1- Conceptual Use**

To better understand baseline differences in arthritis best practice scores (dependent variable), baseline scores were first regressed to assess variation between sites. This initial model did not include any predictor variables. Baseline scores were next regressed on the organization level variables (urban/rural status, type and cost of reinforcement activities, team learning, model of care, practice size). Backward elimination was used to reduce the number of organization level variables in the model. This involved eliminating non-significant predictors, one at a time, until all predictors in the model were significant with  $P < 0.10$ . Individual level variables (gender, language spoken, and providers' perception of barriers, confidence, satisfaction, and discipline) were then added into the model and then eliminated one by one using the same statistical significance criteria until a final baseline model was determined. Any predictors of baseline best practice scores were accounted for by entering these variables as additional predictor variables in Model 1.

Model 1 (Figure 2) was then tested. Once again the first set of analyses tested for variation in the dependent variable between sites. Organization level variables (including those variables found to predict baseline best practice scores) were then added into the model and backward elimination was used to eliminate those variables with a  $P$  value of  $< 0.10$ . Individual level variables including those found to predict baseline best practice scores were then added into the model and again backward elimination was used to determine the final model.

#### **4.6.1.1.2 Model 2 – Making the Effort to Use**

Model 2 was first analyzed with no predictor variables to assess variation in the dependent variable between sites. Organization level variables were then added into the model and backward elimination was used to eliminate those variables with a P value of <0.10.

#### 4.6.1.2 Analysis of Model 1 – Conceptual Use

Two-level hierarchical linear regression was used to test the model and to identify the individual level and organizational factors that predicted arthritis best practice scores at 6 months post workshop controlling for baseline best practice scores and adjusting for potential clustering of providers within organizations. A partial F test was used to examine the statistical significance of the unique contributions of each variable entered into the model. The model was tested separately for each case scenario.

#### 4.6.1.3 Analysis of Model 2 – Making the Effort to Use

A logistic regression model was constructed to identify the organization level variables that predicted the dissemination of patient education during the 6 months post workshop, adjusting for potential clustering of providers within organizations. Logistic regression provided the ability to predict the probability of dissemination of patient education, based on values of the predictor variables. Dissemination of patient education was regressed on baseline level of organization satisfaction, confidence, % of respondents perceiving barriers to care, % physicians on staff, % staff at the workshop, practice size, model of care and team learning. Least squares means analyses were used to estimate the predicted probabilities of dissemination of patient education for the class variables in the model.

## 4.7 Sample Size

This study involves secondary analysis of an existing dataset and it was not possible to determine sample size *a priori*. Raudenbush and Bryk suggest that sample size depends on the aims of the study and whether the explanatory variables of interest are at level one or level two<sup>208</sup>. In this study, the questions of primary interest relate to organization variables (level two), in particular model of care. With 553 providers from 189 sites participating in this project (average: 3 providers per site) representing four models of care, it was anticipated that there would be adequate numbers to detect a difference in best practices scores between models of care. However, to be sure, a power calculation was done post hoc to determine the power to detect a 15% difference in arthritis best practice scores between models of care for each case scenario. A 15% difference is greater than the 10% median improvement reported by Grimshaw et al in a large review of the effectiveness and efficiency of guideline implementation strategies<sup>18</sup> and less than the percentage expected for clinical trials evaluating arthritis medications<sup>209</sup>.

Providers were clustered within organizations and therefore the sample size needed to be adjusted to take clustering into effect at that level. Campbell et al call the effect of clustering the ‘design effect’<sup>210</sup>. This variance inflation factor (VIF) is calculated by using the following formula:  $(1 + (m-1) \rho)$  where  $m$  is the average cluster size, and  $\rho$  is the intra-cluster correlation coefficient (ICC). The ICC can be calculated using the following formula

$$\rho = \frac{\sigma_S^2}{\sigma_S^2 + \sigma^2}$$

where  $\sigma_{\xi}^2$  is the between site variation, and  $\sigma^2$  represents the variation among providers within sites<sup>210</sup>.

Sample sizes, assuming no clustering, are then adjusted by multiplying by the VIF. This technique has been used by others. For example, in a clustered RCT, Baker et al<sup>101</sup> evaluated three strategies for implementing angina and asthma guidelines in primary care. Sample size was adjusted by using an ICC of 0.1 and an average cluster size of 18 patients per practice, resulting in a sample of 486 patients per study arm and 81 practices. Thapar et al<sup>68</sup> evaluated the implementation of a physician prompt and reminder system to improve epilepsy care (patients within practices). Sample size was adjusted using an ICC of .2 and an average practice size of 3.5 physicians, resulting in a sample size of 600 patients and 20 practices in each arm of the study.

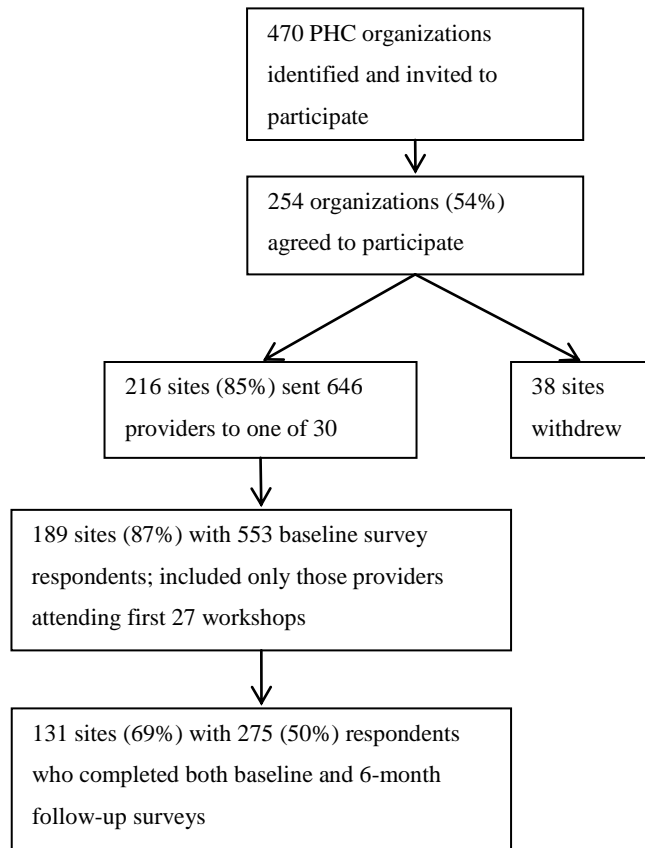


## Chapter 5

### Results

#### 5.1 Organization and Provider Recruitment

Figure 4 demonstrates the success of the recruitment strategies for the Getting a Grip on Arthritis program. Four hundred and seventy primary health care organizations that treated adults with arthritis in 10 provinces were identified and 254 organizations accepted the invitation to participate in the program (54.0%). Once the final workshop dates were set, 38 organizations (15%) withdrew from the program, leaving 216 (85.0%) organizations (sites) that sent 646 providers to one of 30 workshops delivered over a one year period. Due to lack of funding, analysis was only completed for 553 providers from 189 sites who attended the first 27 workshops. At six months follow-up, there were 275 providers from 131 sites who completed follow-up surveys representing a 49.7% response rate.



**Figure 4: Success of Recruitment of Primary Health Care Organizations and Providers**

## 5.2 Organization Characteristics

Among the 254 sites that initially agreed to participate, there were four different models of primary health care delivery, specifically Regional models (36.6%), CHCs/CSSSs (42.6%); Networks (7.4%) and Federal sites (13.4%)<sup>n</sup>. Most sites were rural (59.3%) and delivered services in English (85.8%). As shown in Table 5, there were no statistically significant

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<sup>n</sup> The Federal sites were not specifically targeted in this project.

differences in the characteristics of the sites that participated (n= 216) and those that withdrew (n=38) in terms of region of Canada, urban/rural status, language or practice size; however, the participation rate was lower in the Networks (P=0.05).

**Table 5: Characteristics of Participating Primary Health Care Organizations (n=216) and Those That Withdrew Prior to Workshop (n=38)**

Variable	Participating Sites (n=216)	Withdrawn Sites (n=38)	P Value
	Mean (SD); min:max	Mean (SD);min:max	
Practice Size (FTEs) <sup>a</sup>	24.9(45.5);0.1:293	19.2(30.6);2.2:100	0.90*
	%(n)	%(n)	
Urban/rural status			
<i>Rural</i>	82.6(128)	17.4(27)	0.17**
<i>Urban</i>	88.9(88)	11.1(11)	
Language			
<i>English</i>	85.8(194)	14.2(32)	0.34**
<i>French</i>	78.6(22)	21.4(6)	
Model of Care			
<i>Regional</i>	84.9(79)	15.1(14)	0.05**
<i>CHC/CSSS</i>	87.6(92)	12.4(13)	
<i>Networks</i>	66.7(16)	33.3(8)	
<i>Federal</i>	90.6(29)	9.4(3)	
Region			
<i>ON</i>	73.7(14)	26.3(5)	0.28**
<i>Atlantic</i>	90.2(37)	9.8(4)	

<b>Variable</b>	<b>Participating Sites (n=216)</b>	<b>Withdrawn Sites (n=38)</b>	<b>P Value</b>
<i>Prairies</i>	90.4(47)	9.6(5)	
<i>BC/AB</i>	81.4(79)	18.6(18)	
<i>QC</i>	86.7(39)	13.3(6)	

FTE=full time equivalent

CHC = Community Health Centres/CSSS = Centres de Sante et Services Sociaux;

Networks = Family Health Networks (FHNs)/Family Health Groups (FHGs)/Primary Care

Networks (PCNs)/Groups de Medicine Familial (GMFs); Federal = aboriginal/military

ON=Ontario, BC=British Columbia, AB=Alberta, QC=Quebec

<sup>a</sup> 82 missing

\*Wilcoxon Two-sample Test

\*\* Chi-square test

The following analyses were based on the 189 sites that were represented at the first 27 workshops. Of these, 131 sites responded to the surveys at six months following the workshops. Participating sites were similar to those that didn't respond in terms of urban/rural status and language (n=58), however the participation rate was higher in the Networks and lower in the Federal sites (P<0.01). The participation rates were also higher in the Prairie Provinces and in Ontario (P<0.01).

**Table 6: Baseline Characteristics of Sites that Responded at Six Months (n=131)<sup>o</sup> and Those that Did Not Respond (n=58)**

Variable	Participating Sites (n=131)	Non-responding Sites (n=58)	P Value
	Mean(SD);Min:max	Mean(SD);Min:max	
Practice Size (FTEs) <sup>a</sup>	21.9(35.8)1:192	18.2(31.2);0.1:154	0.19*
	%(n)	%(n)	
Urban/rural status			
<i>Rural</i>	65.8(73)	34.2(38)	0.69**
<i>Urban</i>	74.4(58)	25.6(20)	
Language			
<i>English</i>	68.8(110)	31.2(50)	0.34**
<i>French</i>	72.4(21)	27.6(8)	
Model of Care			
<i>Regional</i>	70.2(47)	29.8(20)	<0.01**
<i>CHC/CSSS</i>	75.6(59)	24.4(19)	*
<i>Networks</i>	93.8(15)	6.2(1)	
<i>Federal</i>	35.7(10)	64.3(18)	
Region			
<i>ON</i>	100.0(14)	0.0(0)	<0.01**
<i>Atlantic</i>	66.7(24)	33.3(12)	*
<i>Prairies</i>	88.6(47)	11.4(5)	
<i>BC/AB</i>	52.2(36)	47.8(33)	
<i>QC</i>	69.2(18)	30.8(8)	

FTE=full time equivalent

<sup>o</sup> 131 sites represented at first 27 workshops

CHC = Community Health Centres/CSSS = Centres de Sante et Services Sociaux;  
Networks = Family Health Networks (FHNs)/Family Health Groups(FHGs)/Primary Care  
Networks(PCNs)/Groups de Medicine Familial(GMFs); Federal = aboriginal/military  
ON=Ontario, BC=British Columbia, AB=Alberta, QC=Quebec

<sup>a</sup> 40 missing

\* Wilcoxon Two-sample Test

\*\* Chi-square test

\*\*\*Fisher's Exact Test

### **5.3 Provider Characteristics at Baseline**

At six months post workshop, there were 275 providers from 131 sites who completed follow-up surveys representing 2.1 providers per organization (min:max=1:19).

Most respondents were English speaking (84.0%) and female (81.1%) and reflected the interdisciplinary model of care. Of the respondents, 30.9%, 22.6%, 22.6%, 10.9%, and 13.1% were nurses/licensed practical nurses, rehabilitation professionals, physicians, nurse practitioners (NPs), and other health care providers<sup>P</sup>/ non-clinical staff/students, respectively. There were no statistically significant differences between participants who responded at six months and those who failed to respond in terms of mean age, gender, language spoken, urban/rural status, discipline or model of care (Table 7); however, the response rate was highest in the Ontario region (P<0.01).

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<sup>P</sup> Included pharmacists, social workers, dietitians

**Table 7: Baseline Comparison of Provider Characteristics of the Six-month Responders (n=275) and Non-responders (n=278)**

<b>Provider Characteristics</b>	<b>6 Month Responders (n=275)</b>	<b>Non-Responders (n=278)</b>	<b>P value*</b>
Mean age in years (SD); min:max	42.7(9.9);21:74	43.1(9.6);22:66	0.58**
	<b>%(n)</b>	<b>%(n)</b>	
Gender			
<i>female</i>	50.3(223)	49.7(220)	0.29
<i>male</i>	56.6(47)	43.4(36)	
Language			
<i>English</i>	51.5(231)	48.6(218)	0.09
<i>French</i>	42.3(44)	57.7(60)	
Region			<0.01***
<i>ON</i>	88.0(22)	12.0(3)	
<i>Atlantic</i>	46.1(65)	53.9(76)	
<i>Prairies</i>	62.8(91)	37.2(54)	
<i>BC/AB</i>	39.9(63)	60.1(95)	
<i>QC</i>	40.5(34)	59.5(50)	
Urban/rural Status			
<i>rural</i>	47.5(135)	52.5(149)	0.25
<i>urban</i>	52.0(140)	48.0(129)	
Discipline			0.53
<i>Family physicians</i>	54.4(62)	45.6(52)	
<i>Nurse Practitioners</i>	57.7(30)	42.3(22)	
<i>Nurses/LPNs</i>	48.0(85)	52.0(92)	
<i>PT/OTs</i>	47.0(62)	53.0(70)	
<i>Other</i>	46.8(36)	53.3(41)	

\*Chi-square test

\*\* Wilcoxon Two-Sample Test

\*\*\*Fisher's Exact Test

LPN=licensed practical nurse, PT=physiotherapist, OT=occupational therapist,  
Other=other health care providers, non-clinical staff, students

#### 5.4 Conceptual Use of Arthritis Best Practices at Baseline

Conceptual or intended use of arthritis best practices was captured by the total best practice score. Table 8 compares the baseline best practice scores for each of the three case scenarios between six month responders and non-responders. Scores for all three cases were low at baseline (early RA: 2.28; moderate knee OA: 2.11; and late RA: 2.71). For the knee OA and late RA case, responders scored marginally higher than non-responders (P=0.05 and P=0.09 respectively).

**Table 8: Baseline Comparison of Best Practice Scores Between Six Month Responders (n=275) and Non-responders (n=278) for each Case Scenario**

<b>Dependent Variable</b>	<b>6 Month Responders</b> mean(SD);min:max	<b>Non-responders</b> mean(SD);min:max	<b>P value*</b>
Early RA case scenario	2.28(1.71);0:7	2.09(1.72);0:6	0.22
Late RA case scenario	2.71(1.90);0:8	2.44(1.93);0:7	0.09
Knee OA case scenario	2.11(1.65);0:8	1.84(1.60);0:7	0.05

Scores could vary from 0 to 7 for early RA and 0 to 8 for knee OA and late RA

\*Wilcoxon Two-Sample Test



## 5.5 Predictor Variables at Baseline

### 5.5.1 Provider Level Variables

#### 5.5.1.1 Baseline Confidence and Satisfaction with Ability to Manage Arthritis and Perceived Barriers to Care

At baseline, mean confidence and satisfaction were 6.2 and 4.9 respectively<sup>q</sup>, suggesting moderate confidence and satisfaction in their ability to manage arthritis. The vast majority of providers (97.5%) reported one or more barriers to accessing rheumatologists or rehabilitation specialists for patients with arthritis. As shown in Table 9, there were no differences between six month responders and non-responders (P>0.05)

**Table 9: Baseline Comparison of Providers that Responded at Six Months (n=275) and Non-responders (n=278): Satisfaction, Confidence and Perceived Barriers to Care**

Predictor Variable	6 Month Responders		Non-responders	P value*	
	n	Mean(SD):min:max	n	Mean(SD):min:max	
Satisfaction with ability to manage arthritis	257	4.9(2.2);1:10	253	4.7(2.4);1:10	0.27
Confidence in managing arthritis	216	6.2(2.5);1:10	202	5.8(2.7);1:10	0.15
Perception of barriers		%(n)		%(n)	
1 or more		49.8(268)		50.2(270) <sup>a</sup>	0.34**
None		70.0(7)		30.0(3)	

\*Wilcoxon Two-Sample Test

<sup>q</sup> Measured on a scale from 1 to 10 with 10 being extremely confident/satisfied

\*\*Fisher's Exact Test

<sup>a</sup> 5 missing

## 5.5.2 Organization Level Variables

### 5.5.2.1 Reinforcement Activities

All participating primary health care sites received at least one reinforcement activity following the workshop. The mean number of activities was six per site. Details of these activities have been reported elsewhere<sup>175</sup>. Of the 131 sites with providers responding at six months, 80.2% requested additional staff training or resources (intrinsic reinforcement) (Table 10). The average cost of all reinforcement activities was \$843.62 per site and this varied from \$0.00 to \$4321.00. Approximately three quarters of the responding sites (77.1%) ordered patient educational materials or donated books to a local library in the six months following the workshop. Not surprisingly, non-responding sites requested fewer reinforcement activities and the costs of these activities were less ( $P<0.01$ ). Six-month participation rate was higher for those sites that requested intrinsic reinforcement, for sites that ordered patient educational materials or donated books to a local library and for sites where the cost of reinforcement activities were higher ( $P<0.01$ ).

**Table 10: Comparison of Sites that Responded at Six Months (n=131) and Non-responders (n=58): Reinforcement Activities and Related Costs**

Variable	6 Month Responders	Non-responders	P value*
	(n)	(n)	
Intrinsic			

Reinforcement <sup>a</sup>			
Yes	76.6(105)	23.4(32)	<0.01
No	50.0(26)	50(26)	
Ordered patient educational materials or donated books to library <sup>f</sup>			
Yes	77.1(101)	22.9(30)	<0.01
No	51.7(30)	48.3(28)	
Total reinforcement costs: mean(SD); min:max	\$843.62(\$694.75); \$0:\$4321	\$445.67(\$477.07); \$0:\$2969	<0.01 **

\* Chi-square Test

\*\* Wilcoxon Two-Sample Test

<sup>a</sup> Intrinsic reinforcement = ordering or requesting educational materials, completing a reflective practice exercise (chart audit) required for Mainpro C credits<sup>s</sup>, requesting additional staff training, or requesting the donation of arthritis books to a local library

### 5.5.2.2 Practice Characteristics and Team Learning

At baseline, CHCs /CSSSs and Regional sites made up the largest response groups (Table 11). Perceptions of barriers to arthritis care were high with respondents at all but one site identifying one or more barriers.

Approximately 57% of the sites sent providers of more than one discipline to the workshops (team learning). This varied by models of care with approximately three quarters of the CHCs/CSSSs sending teams to the

<sup>f</sup> These activities were a subset of intrinsic reinforcement activities which included other activities such as requesting additional training or resources for staff or completing a chart audit

<sup>s</sup> Credits provided by the College of Physicians of Canada to their members on completion of accredited educational programs

workshops compared to approximately half of the Federal and Regional models ( $P < 0.01$ , data not shown). Only 13% of the Networks sent teams to the workshops. These numbers may be over or underestimated since some providers attended the workshops and did not complete a baseline survey ( $n=93$ ); therefore their discipline was unknown. On average, at baseline, site satisfaction and confidence in ability to manage arthritis was moderate (4.9 and 6.1 respectively).

There were no differences between responding sites and non-responders in terms of practice size, percentage of clinical staff attending the workshop, percentage of clinical staff who were physicians, percentage of responding staff who reported barriers to arthritis care, and the mean satisfaction or confidence of their providers who responded ( $P > 0.05$ ); however, participation rates were higher among those sites that did not send teams to the workshop (98.3%) and among Networks (93.8%) and were lower among Federal sites (35.7%) ( $P < 0.01$ ).

**Table 11: Baseline Comparison of Sites that Responded at Six Months (n=131) and Non-responders (n=58): Practice Characteristics and Team Learning**

Characteristic	6 Month Responders	Non-responders	P value*
	%(n)	%(n)	
Model of Care			
<i>Regional</i>	70.2(47)	29.9(20)	<0.01
<i>CHC/CSSS</i>	75.6(59)	24.4(19)	
<i>Networks</i>	93.8(15)	6.3(1)	
<i>Federal</i>	35.7(10)	64.3(18)	

<b>Characteristic</b>	<b>6 Month Responders</b>	<b>Non-responders</b>	<b>P value*</b>
<b>Site Barriers</b>			
Yes	69.9(130)	30.1(56)	1.00
No	100.0(1)	0.0(2)	
<b>Team Learning</b>			
Yes	56.5(74)	43.5(57)	<0.01
No	98.3(57)	1.7(1)	
	Mean(SD);min: max	Mean(SD);min: max	P value**
Practice Size - FTEs	21.9(35.8);1:192	18.2(31.2); 0.1:154	0.18
% of FTE at workshop	28.1(23.4);3.8:3 7.5	29.7(30.9);0:10 0	0.35
GPs/FTE (%)	26.0(27.5);0:100	19.6(23.6);00	0.20
Site Satisfaction	4.9(1.7)1:9	4.4(2.3)1:8	0.49
Site Confidence	6.1(1.9);1:10	5.2(2.8);2:8.5	0.50

FTE = full time equivalent clinical staff

GP=general practitioner

CHC=Community Health Centre; CSSS=Centres de Sante et Services Sociaux

\*Fisher's Exact Test

\*\*Wilcoxon Two-Sample Test

## **5.6 Results of Model Development**

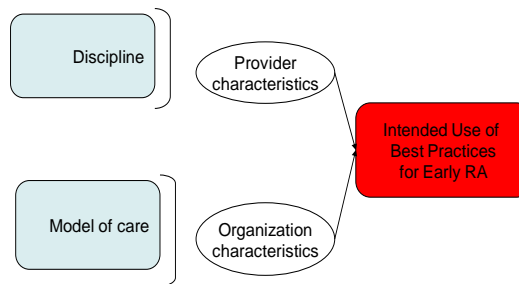
### **5.6.1 Model 1: Conceptual Use of Arthritis Best Practices for Three Case Scenarios**

#### **5.6.1.1 Early Rheumatoid Arthritis Case Scenario**

Mean best practice scores for the early RA case scenario increased from 2.28(1.57) at baseline to 2.68(1.74) six months following the workshop (n=271,  $P < .01$ ), representing a 17% improvement over baseline.

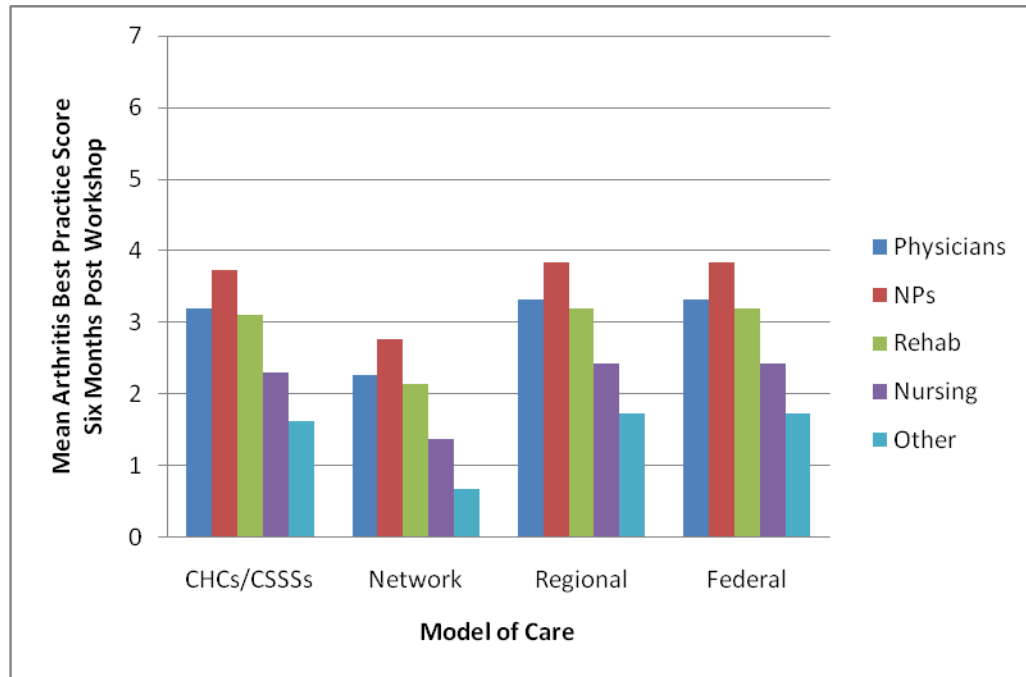
Controlling for all other variables in the model, baseline scores were predicted by provider satisfaction with ability to manage arthritis and discipline ( $P < 0.10$ ). These baseline differences were accounted for by entering discipline as an additional predictor variable in the development of the final model.

In the final model, differences between sites were marginally significant ( $P = 0.07$ ). Figure 5 shows that mean best practice scores at six month follow-up were predicted by the model of care in which the providers worked and discipline of the provider, after controlling for baseline best practice scores and clustering of providers around sites ( $P < 0.05$ ). The final statistical model is summarized in Appendix G.



**Figure 5: Final Model for the Conceptual Use of Arthritis Best Practices for Early RA**

As shown in Figure 6, providers from Networks scored significantly lower than providers from other models of care ( $P=0.02$ ), adjusting for discipline and mean baseline best practice scores. Further, nursing staff and other health care providers, non-clinical staff and students scored significantly lower than physicians, NPs and rehabilitation therapists ( $P<0.01$ ), controlling for model of care and mean baseline best practice scores.

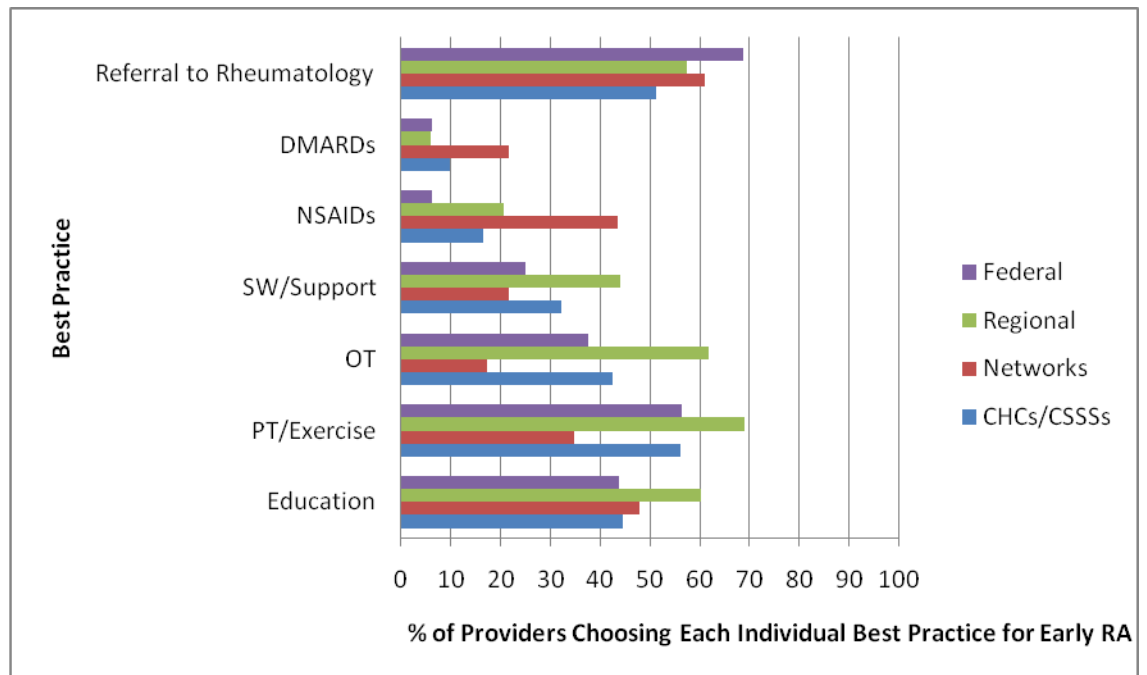


Controlling for mean baseline best practice score and clustering of providers around sites  
 NP=nurse practitioner  
 Rehab=occupational or physical therapist  
 Other=other health professionals, non-clinical staff, students  
 CHCs=Community Health Centres; CSSSs=Centres de Sante et Services Sociaux

**Figure 6: Model of Care and Discipline as Predictors of Mean Best Practice Score Six Months Post Workshop: Early RA**

Figure 7 shows the selection of individual best practices at six months post workshop for early RA by model of care. Providers from the Regional models were more likely to recommend OT interventions than other models of care (Chi-square test,  $P < 0.05$ ). Providers from the Networks were more likely to recommend anti-inflammatory medications (NSAIDs) and less likely to recommend exercise and OT interventions.

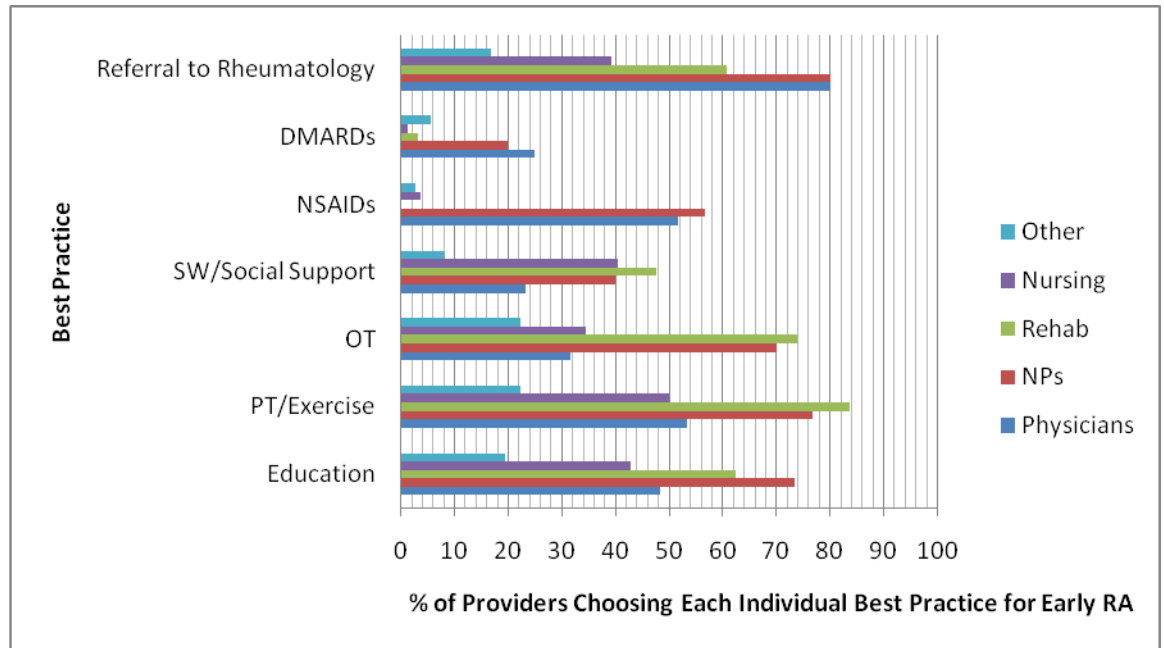




DMARDs=disease modifying anti-rheumatic drugs  
 NSAIDs=non-steroidal anti-inflammatory drugs  
 SW=social worker  
 OT=occupational therapy  
 PT=physiotherapy  
 CHCs=Community Health Centres  
 CSSSs=Centres de Sante et Services Sociaux

**Figure 7: Individual Best Practices by Model of Care: Early RA**

Figure 8 shows the selection of individual best practices at six months post workshop for early RA by discipline. Rehabilitation therapists and NPs were more likely to provide patient education and rehabilitation interventions than other disciplines (Chi-square test,  $P < 0.05$ ). Nurses, NPs and rehabilitation therapists were more likely to provide psychosocial interventions, while NPs and physicians were more likely to refer to rheumatology and recommend NSAIDs and DMARDs ( $P < 0.01$ ).



DMARDs=disease modifying anti-rheumatic drugs  
 NSAIDs=non-steroidal anti-inflammatory drugs  
 SW=social worker  
 OT=occupational therapy  
 PT=physiotherapy  
 Other=other health professional/non-clinical staff/students  
 Rehab=physiotherapist or occupational therapist  
 NP=nurse practitioner

**Figure 8: Individual Best Practices by Discipline: Early RA**

5.6.1.1.1 Post-hoc Power Calculation: Early RA

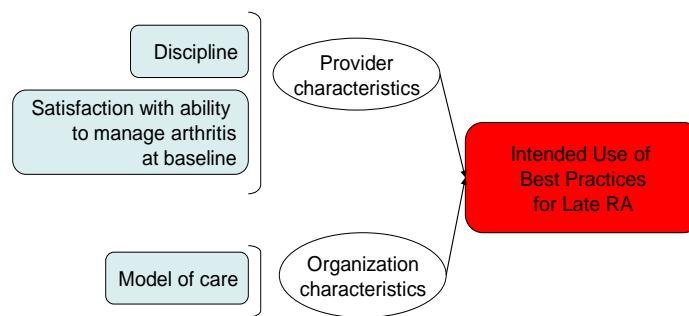
A calculation was done to determine whether the sample size was adequate to detect a 15% difference in scores for the early RA case scenario between models of care adjusting for clustering around sites. In this study, the average cluster size (number of providers per site) was 2.9. For the early RA case scenario, the estimate of  $\sigma^2$  was 3.2 and the estimate for  $\sigma_S^2$  was 3.9 resulting in a  $\rho$  of .076, therefore the VIF was  $(1 + (2.9-1) \times 0.076) = 1.14$ .

Kastenbaum et al give tables that provide samples sizes for one-way classification designs with more than two groups (models of care). In their notation, the standardized range,  $\tau$ , equals the ratio of a clinically important difference in best practice scores between the group with the highest mean and the one with the lowest mean score, to the within site standard deviation:  $1.05/1.78 = 0.59$  Referencing Table 3 in Kastenbaum et al<sup>211</sup>, with  $\alpha = 0.05$ ,  $\beta = .2$ ,  $k = 4$  models of care, and  $\tau = 0.59$ , resulted in a sample size of 60 per group. Multiplying by the design effect gives a required sample size of 68.4 per group. There was some loss to follow-up in this study with the number of providers per site going from 2.9 at baseline to 2.1 at follow-up, a 28% reduction. To take this into account, the sample size needs to be increased to 87 per group. Dividing by an average of 2.9 providers per site gives a sample size of approximately 30 sites per model of care. Therefore, for the early RA case scenario, there may not have been a sufficient number of sites to detect differences in scores between providers from the Network and Federal models of care compared to other models.

#### 5.6.1.2 Late Rheumatoid Arthritis

Mean best practice scores for the late RA case scenario increased from 2.71(1.90) at baseline to 3.06(2.13) six months following the workshop ( $n=268$ ,  $P < .01$ ), representing a 13% improvement over baseline. At baseline, there was a significant effect of discipline on mean best practice scores, with nursing staff, rehabilitation staff and non-clinical staff/students scoring lower than physicians and NPs ( $P < 0.01$ ). Discipline and baseline best practice scores were therefore added as individual level predictor variables in the development of the final model. Satisfaction with ability to manage arthritis was also positively associated with best practice scores ( $P < 0.01$ ).

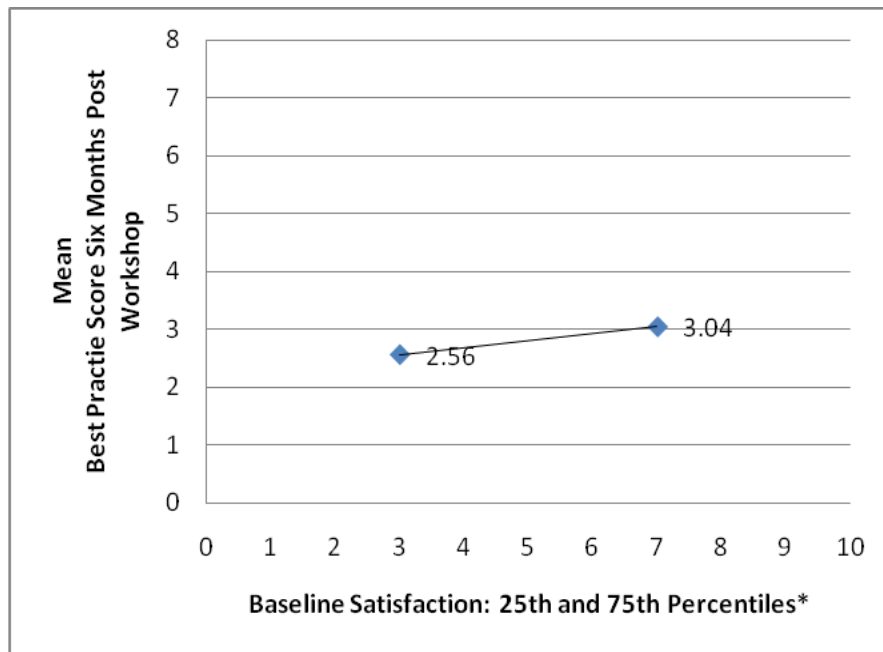
In the final model, there were significant differences in arthritis best practice scores between sites ( $P=0.04$ ). Model of care, discipline and satisfaction with ability to manage arthritis at baseline remained in the final model ( $P<0.09$ ), controlling for clustering of providers around sites (Figure 9). As in the early RA case, providers with higher best practices scores at baseline reported significantly higher best practices scores at six month follow-up ( $P<0.01$ ). The final statistical model for late RA is summarized in Appendix G.



**Figure 9: Final Model for the Conceptual Use of Arthritis Best Practices Six Months Post Workshops: Late RA**

Baseline satisfaction was a predictor of mean best practice scores six months following the workshops ( $P=0.04$ ), controlling for baseline best practice score, model of care, discipline and clustering of providers around sites. To illustrate, Figure 10 shows the expected difference in mean best

practice scores six months post workshops between the 25<sup>th</sup> and 75<sup>th</sup> percentile baseline satisfaction scores for physicians working in CHCs/CSSSs with a median baseline score of 5.



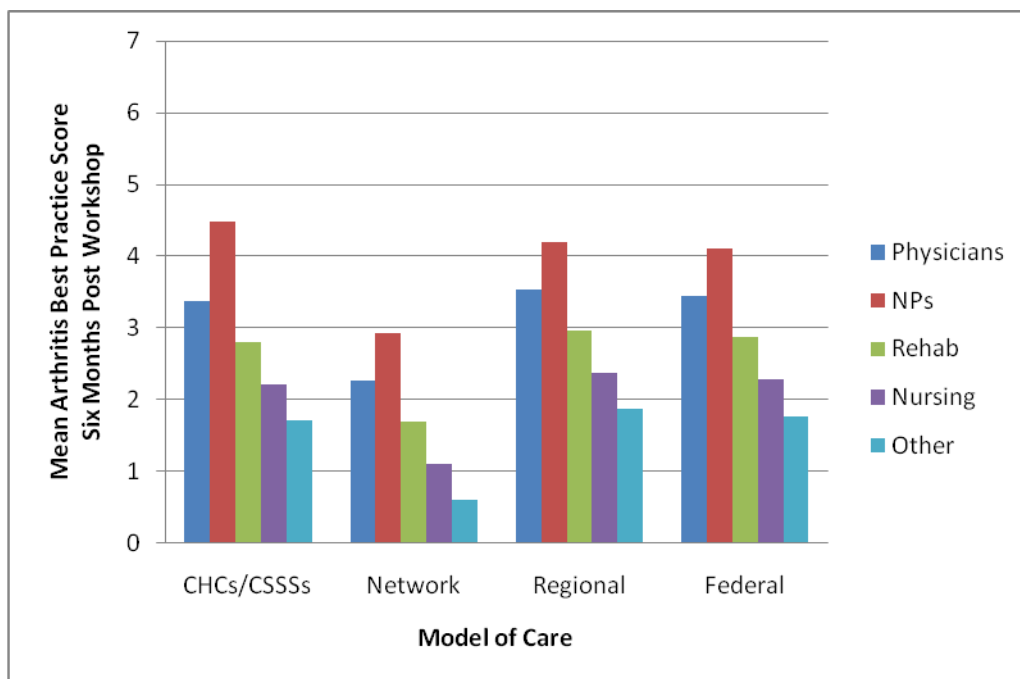
P=0.04

Controlling for mean baseline best practices scores and clustering of providers around sites; median baseline satisfaction = 5

**Figure 10: Baseline Satisfaction as a Predictor of Mean Best Practice Score Six Months Post Workshop for Physicians Working in CHCs/CSSSs: Late RA**

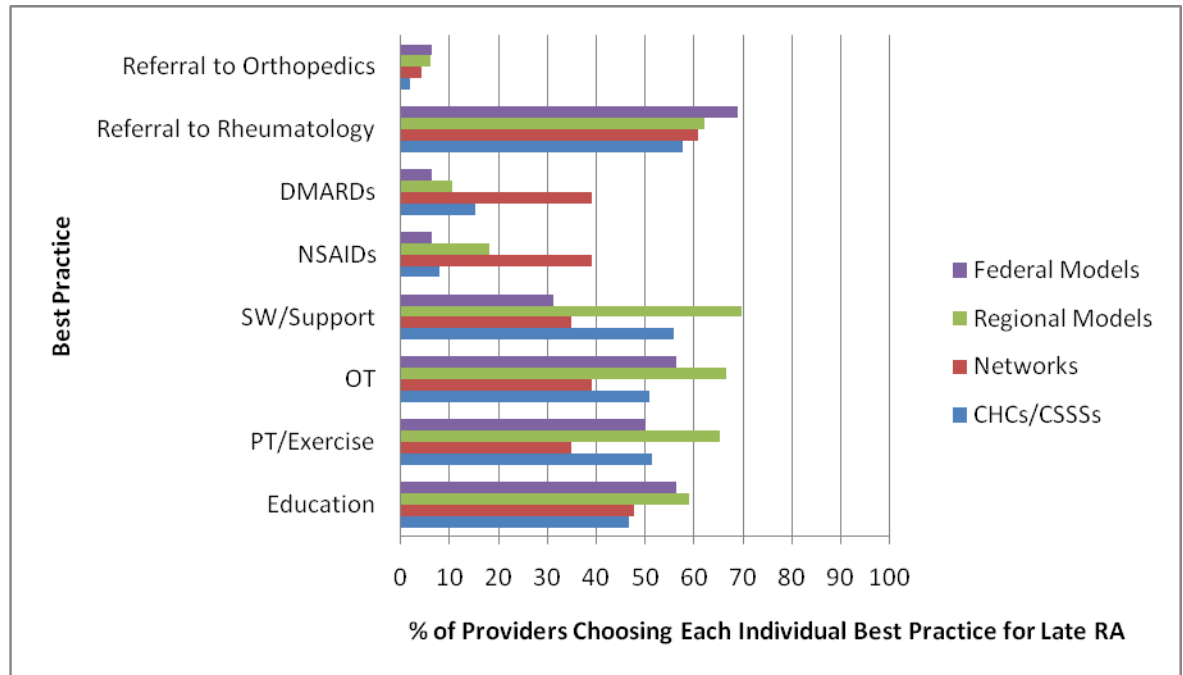
Figure 11 illustrates the mean best practice scores for late RA six months post workshops by model of care and discipline, holding constant baseline satisfaction and controlling for mean baseline best practice scores and clustering of providers around sites. As shown, providers from the Networks reported lower best practice scores than providers from other models of care

( $P=0.02$ ), adjusting for discipline. However, Figure 12 demonstrates that providers from the Networks were more likely to recommend anti-inflammatory and disease modifying medications than providers from other models of care (Chi-square test,  $P<0.01$ ). Providers from the CHCs/CSSSs and Regional models were more likely to recommend psychosocial support interventions than providers from other models of care ( $P<0.01$ ). Figure 11 also shows that nurses and other health care providers, non-clinical staff and students reported lower best practice scores than other disciplines ( $P<0.01$ ), controlling for model of care.



Controlling for mean baseline best practice scores; median baseline satisfaction = 5  
 NP=nurse practitioner  
 Rehab=physiotherapist or occupational therapist  
 Other=other health professional, non-clinical staff, students  
 CHCs=Community Health Centres  
 CSSSs=Centres de Sante et Services Sociaux

**Figure 11: Model of Care and Discipline as Predictors of Mean Best Practice Scores Six Months Post Workshop: Late RA**

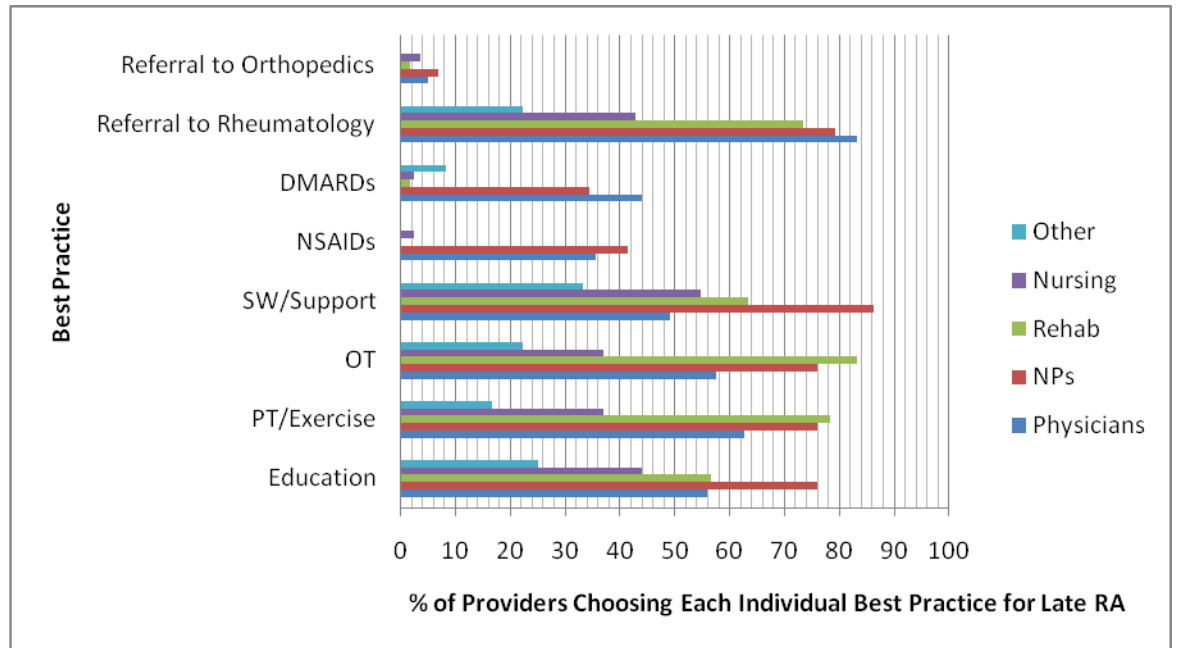


DMARDs=disease modifying anti-rheumatic drugs  
 NSAIDs=non-steroidal anti-inflammatory drugs  
 SW=social worker  
 OT=occupational therapy  
 PT=physiotherapy  
 CHCs=Community Health Centres  
 CSSSs=Centres de Sante et Services Sociaux

**Figure 12: Individual Best Practices by Model of Care: Late RA**

Figure 13 demonstrates that NPs were more likely to provide patient education and recommend psychosocial interventions than other disciplines (Chi-square test,  $P<0.05$ ). NPs and rehabilitation therapists were more likely to recommend exercise and OT interventions ( $P<0.01$ ), whereas, NPs and physicians were more likely to recommend NSAIDs and DMARDs ( $P<0.01$ ). NPs, physicians and rehabilitation therapists were more likely to refer to rheumatology ( $P<0.01$ ).





DMARDs=disease modifying anti-rheumatic drugs  
 NSAIDs=non-steroidal anti-inflammatory drugs  
 SW=social worker  
 OT=occupational therapy  
 PT=physiotherapy  
 Other=other health professional, non-clinical staff, students  
 Rehab=physiotherapist or occupational therapist  
 NP=nurse practitioner

**Figure 13: Individual Best Practices by Discipline: Late RA**

5.6.1.2.1 Post-hoc Power Calculation: Late RA

As for the early RA case scenario, a calculation was done to determine whether the sample size was adequate to detect a 15% difference in scores between models of care adjusting for clustering around sites. For this case scenario, the estimate of  $\sigma^2$  was 3.7 and the estimate for  $\sigma_5^2$  was 5.3 resulting in a  $\rho$  of .301, therefore the VIF was  $(1 + (3-1) \times 0.301) = 1.60$ .

The standardized range,  $\tau$ , equals the ratio of a clinically important difference in best practice scores between the group with the highest mean

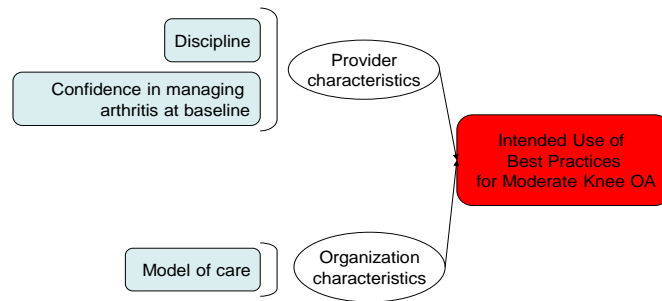
and the one with the lowest mean score, to the within site standard deviation:  $1.2/1.93 = 0.62$ . Referencing Table 3 in Kastenbaum et al<sup>211</sup>, with  $\alpha = 0.05$ ,  $\beta = .2$ ,  $k = 4$  models of care, and  $\tau = 0.62$ , resulted in a sample size of 60 per group. Multiplying by the design effect gives a required sample size of 96 per group. Adjusting for the loss to follow-up, the sample size needs to be increased to 123 per group. Dividing by an average of 2.9 providers per site gives a sample size of approximately 42 sites per model of care. Therefore, for the late RA case scenario, there may not have been a sufficient number of sites to detect differences in scores between providers from the Network and Federal models of care compared to other models.

#### 5.6.1.3 Moderate Knee Osteoarthritis

Mean best practice scores for the moderate knee OA case scenario increased from 2.11(1.65) at baseline to 2.47(1.95) six months following the workshop ( $n=270$ ,  $P < .01$ ), representing a 17% improvement over baseline. Controlling for all other variables in the model, mean baseline best practice scores were predicted by urban/rural status at the organizational level ( $P=0.08$ ) and provider discipline, satisfaction and language at the individual level ( $P < 0.05$ ). These differences were accounted for by entering these variables (urban/rural status, discipline, language) along with baseline best practice scores as additional predictor variables in the development of the final model.

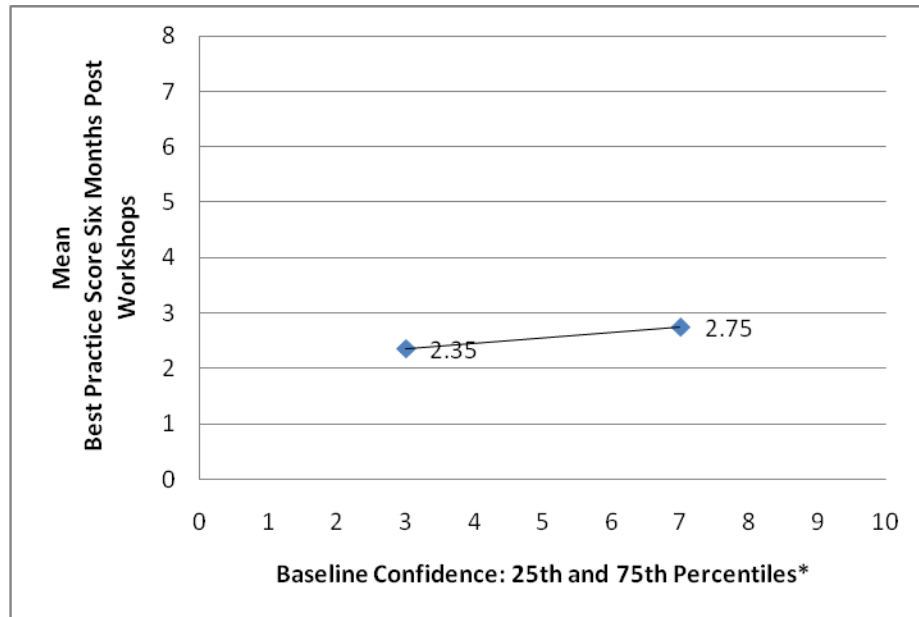
In the final model, there were no significant differences in arthritis best practice scores between sites ( $P=0.19$ ). Controlling for clustering around sites, mean best practice scores at six months post workshops were predicted by the model of care in which the providers worked, discipline of

the provider, their confidence in managing arthritis at baseline and their baseline best practice scores ( $P < 0.05$ ) (Figure 14). The final statistical model for knee OA is summarized in Appendix G.



**Figure 14: Final Model for the Conceptual Use of Arthritis Best Practices for Moderate Knee OA**

Baseline confidence in managing arthritis was a predictor of mean best practice scores at six months post workshop, controlling for baseline best practice score and clustering of providers around sites. To illustrate, Figure 15 shows the expected difference in mean best practice scores between the 25<sup>th</sup> and 75<sup>th</sup> percentiles baseline confidence scores for physicians working in CHCs/CSSSs ( $P = 0.05$ ).

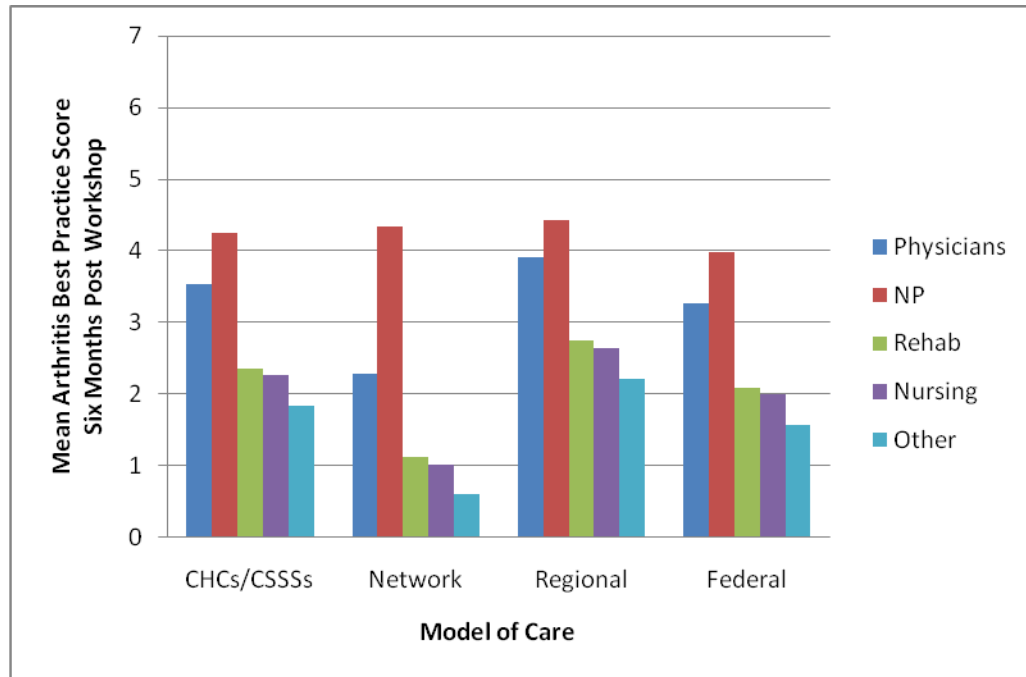


\*P=0.05

Controlling for mean baseline best practices scores and clustering of providers around sites;  
median baseline confidence = 7

**Figure 15: Baseline Confidence as a Predictor of Mean Best Practice Scores Six Months Post Workshop for Physicians Working in CHCs/CSSSs: Moderate Knee OA**

Figure 16 demonstrates that providers working in Networks scored significantly lower than those working in other models of care ( $P < 0.01$ ) holding constant baseline confidence scores and controlling for discipline, mean baseline best practice scores and clustering of providers around sites. It also shows that nurses, rehabilitation specialists and non-clinical staff/students scored significantly lower than physicians and NPs ( $P < 0.01$ ), after adjusting for model of care and that NPs scored significantly higher than physicians ( $P = 0.05$ ).



with mean baseline best practice score of 2.11 and median baseline confidence = 7

NP=nurse practitioner

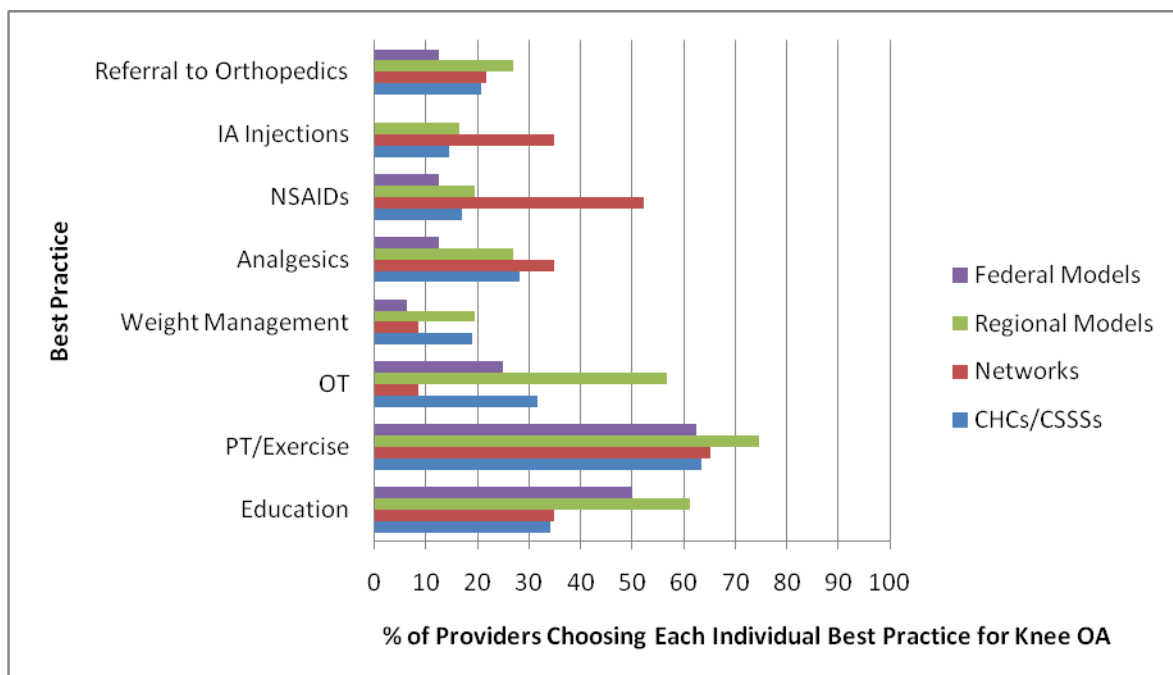
Rehab=physiotherapist or occupational therapist

Other=other health professional, non-clinical staff, students

CHCs=Community Health Centres; CSSSs=Centres de Sante et Services Sociaux

**Figure 16: Model of Care and Discipline as Predictors of Mean Best Practices Scores Six Months Post Workshop: Moderate Knee OA**

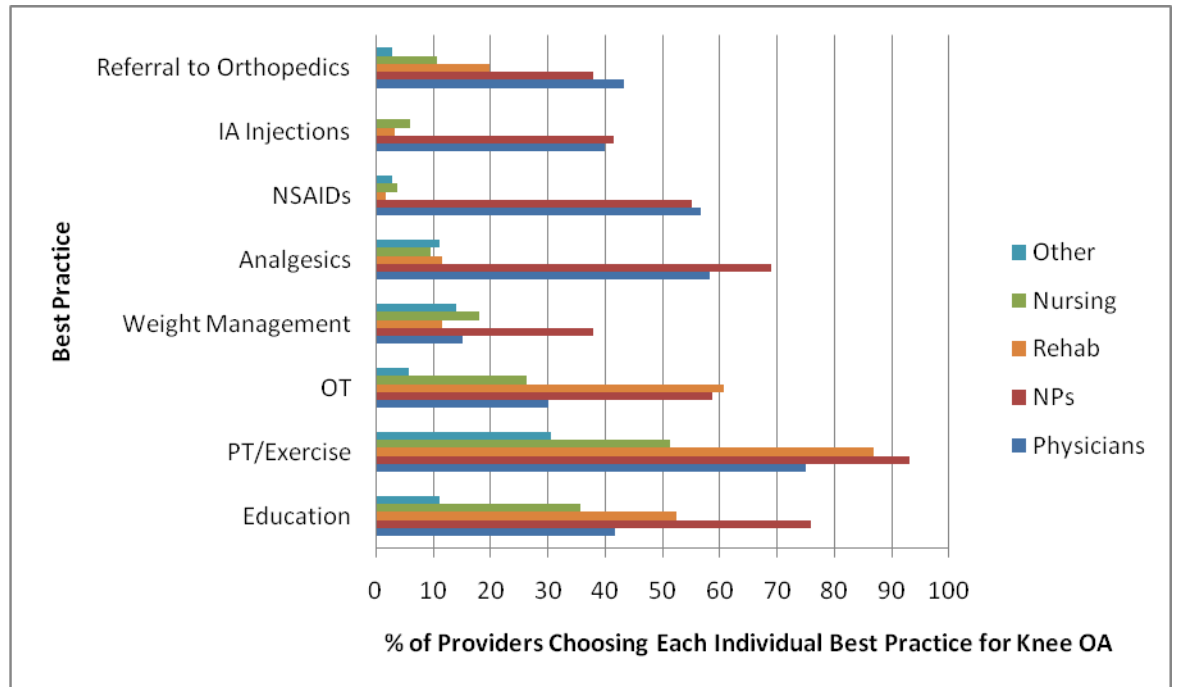
Figure 17 shows that providers from Regional models were more likely to recommend patient education and OT interventions (Chi-square test,  $P < 0.01$ ). Network providers were more likely to recommend NSAIDs and intra-articular injections ( $P < 0.02$ ).



DMARDs=disease modifying anti-rheumatic drugs  
 NSAIDs=non-steroidal anti-inflammatory drugs  
 SW=social worker  
 OT=occupational therapy  
 PT=physiotherapy  
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 CSSSs=Centres de Sante et Services Sociaux

**Figure 17: Individual Best Practices by Model of Care: Moderate Knee OA**

Figure 18 shows that physicians and NPs were more likely to recommend pharmacological interventions and referral to orthopedics than other disciplines (Chi square test,  $P<0.05$ ). NPs were more likely to provide education and recommend weight management, exercise and psychosocial interventions than other disciplines ( $P<0.05$ ). NPs and rehabilitation therapists were more likely to recommend OT interventions ( $P<0.01$ ).



DMARDs=disease modifying anti-rheumatic drugs  
 NSAIDs=non-steroidal anti-inflammatory drugs  
 SW=social worker  
 OT=occupational therapy  
 PT=physiotherapy  
 Other=other health professional, non-clinical staff, students  
 Rehab=physiotherapist or occupational therapist  
 NP=nurse practitioner

**Figure 18: Individual Best Practices by Discipline: Moderate Knee OA**

#### 5.6.1.4 Post-hoc Power Calculation

##### 5.6.1.4.1 Post-hoc Power Calculation: Moderate Knee OA

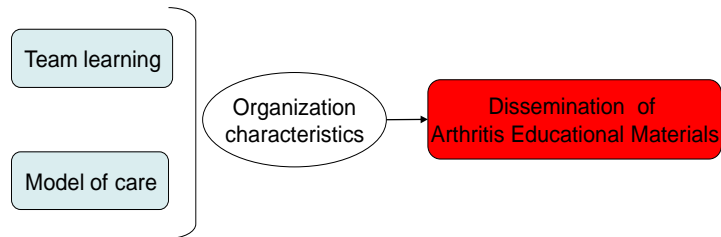
As in the other two cases, a calculation was done to determine whether the sample size was adequate to detect a 15% difference in scores between models of care adjusting for clustering around sites. For this case scenario, the estimate of  $\sigma^2$  was 3.3 and the estimate for  $\sigma_{\xi}^2$  was 4.1 resulting in a  $\rho$  of .075, therefore the VIF was  $(1 + (3-1) \times 0.075) = 1.15$ .

The standardized range,  $\tau$ , equals the ratio of a clinically important difference in best practice scores between the group with the highest mean and the one with the lowest mean score, to the within site standard deviation:  $1.2/1.82 = 0.66$ . Referencing Table 3 in Kastenbaum et al<sup>211</sup>, with  $\alpha = 0.05$ ,  $\beta = .2$ ,  $k = 4$  models of care, and  $\tau = 0.66$ , resulted in a sample size of 56 per group. Multiplying by the design effect gives a required sample size of 64 per group. To take into account the loss to follow-up, the sample size needs to be increased to 82 per group. Dividing by an average of 2.9 providers per site gives a sample size of approximately 28 sites per model of care. Therefore, there may not have been a sufficient number of sites to detect differences in scores between providers from the Network and Federal models of care compared to other models.

### **5.6.2 Model 2: Making the Effort to Use a Specific Best Practice, Patient Education**

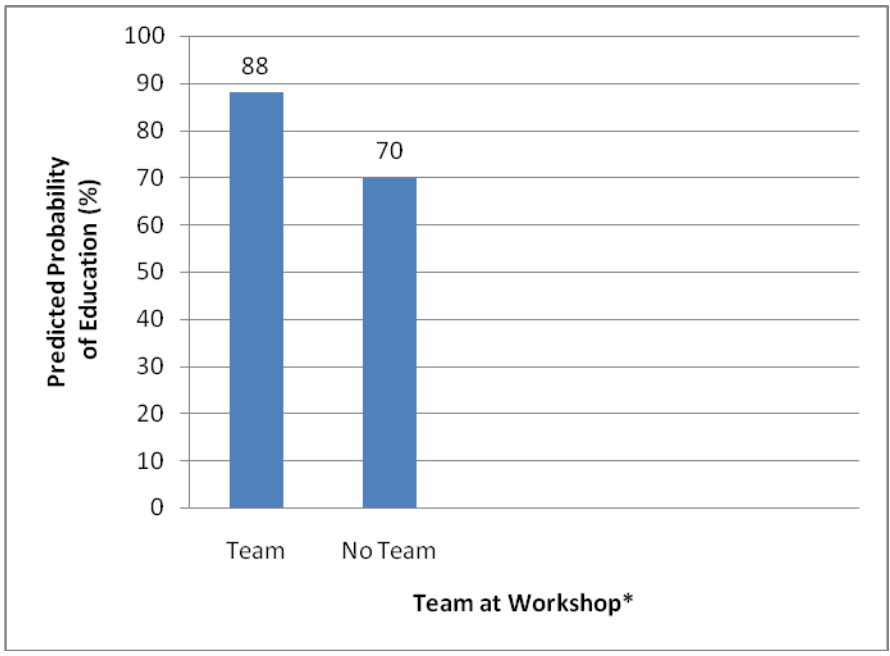
Making the effort to use arthritis best practices was defined as the dissemination of educational materials by participating sites in the six months post workshops. In the final model (Figure 19), there were no differences in the dissemination of patient educational materials between sites ( $P=0.94$ ). Model of care was a significant predictor of the dissemination of educational materials following the workshops ( $P<0.01$ ) and team learning was a marginally significant predictor ( $P=0.07$ ). The final statistical model is summarized in Appendix G.





**Figure 19: Final Model for Making the Effort to Use Arthritis Best Practices**

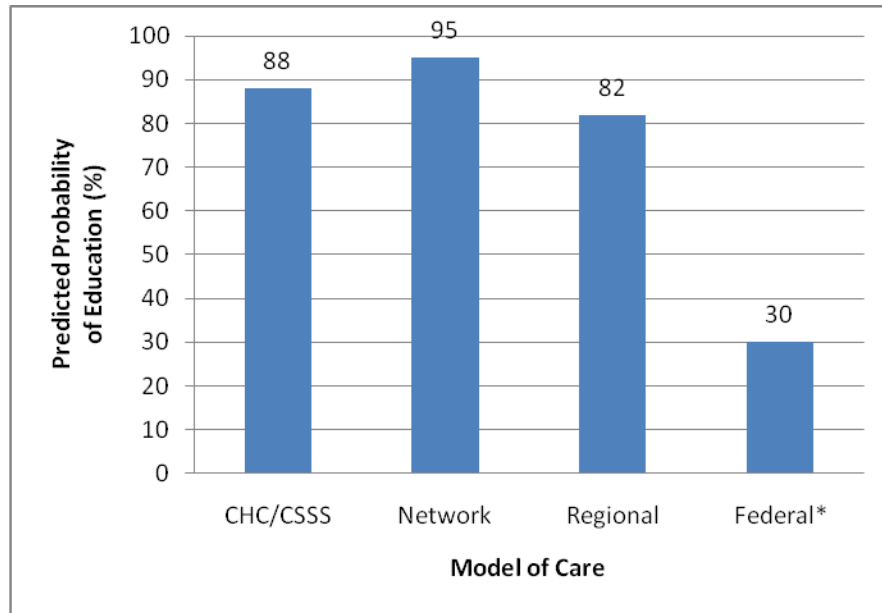
Figure 20 demonstrates that the estimated probability of the CHCs/CSSSs disseminating educational materials after the workshop was modestly better for those sites that sent a team to the workshop (88%) versus those that did not send a team (70%) (P=0.07). There was a significant difference in the number of sites that sent teams to the workshops with CHCs/CSSSs more likely to have sent a team compared to Networks, Federal sites, and Regional sites (72.9% versus 13.3%, 50.0% and 51.1% respectively; P<0.01). All sites reported having teams except for the Networks where 27% reported having physicians only.



\*P<0.01

**Figure 20: Team Learning as a Predictor of CHCs/CSSSs Disseminating Arthritis Educational Materials During the Six Months Post Workshop**

Figure 21 demonstrates that the estimated probability of sites disseminating arthritis educational materials following the workshop was significantly less for Federal sites compared to CHCs/CSSSs, Networks and Regional models of care (P<0.01).



\*P<0.01

CHC=Community Health Centre; CSSS=Centres de Sante et Service Sociaux

**Figure 21: Model of Care as a Predictor of the Dissemination of Arthritis Educational Materials During the Six Months Post Workshop**

## Chapter 6

### Discussion

The Getting a Grip on Arthritis educational intervention was implemented and evaluated in 131 primary care sites across Canada. Both organizational and provider level factors influenced arthritis best practice scores six months following the workshops. For all three hypothetical case scenarios, the total best practice score was predicted by the model of care in which the providers worked and their discipline. Recommendations for individual best practices also varied by model of care and discipline. One specific best practice, the dissemination of patient educational materials, was predicted by model of care, as well as whether providers attended the workshop as a multidisciplinary team.

In this study two definitions of knowledge utilization were used. This resulted in the development of two models to determine predictors of use of arthritis best practices six months following participation in the program. In Model 1, conceptual use, reflected by the best practice scores, improved significantly for all three case scenarios post workshops, but still remained low ( $\leq 3$ ). It is unclear whether this was due to limitations of the Getting a Grip on Arthritis program or a failure of the ACREU questionnaire to measure its full impact. It is also possible that providers were being strategic in their choice of interventions. For instance, referral to The Arthritis Society was considered education, yet this referral would have given patients in some provinces access to many other services such as support groups, community exercise programs and rehabilitation programs. Because of this, providers may have not recommended other referrals and interventions. In addition, the early RA and moderate knee OA cases did not mention a diagnosis. Providers may wait for test results before initiating

treatments and referrals. Providers may also have been taking into account their past experience, patient preferences and availability of resources in their own communities when choosing to select or not select an intervention. Future studies need to address the psychometric properties of the case scenario scoring, in particular, its ability to predict “actual” practice. Clinically important improvements in best practice scores defined as a change of  $\geq 15\%$  were seen for both the early RA and moderate knee OA cases (17% for both). This change could result in improved care for patients with these conditions in primary care.

There were differences in provider best practice scores between sites for the late RA case scenario at baseline. It’s unclear why this was the case for late RA and not for the early RA and OA case scenarios, however it may have been related to differences in perceived capacity to meet the range of services required for this more complex case. This difference was controlled for through the use of hierarchical linear regression and controlling for clustering within sites.

For all three case scenarios, providers from the CHCs/CSSSs, Regional and Federal models had higher best practices scores than providers in the Networks. Approximately one quarter of the Networks had no team and only a small percentage (13%) attended the workshops with one or more multidisciplinary team members. It is unclear to what extent these findings might explain the lower overall scores and fewer recommendations for non-pharmacological interventions. CHCs/CSSSs were more likely to recommend non-pharmacological interventions. The Getting a Grip on Arthritis program may have been more relevant for this group because it was developed originally through a collaborative effort with the CHCs in

Ontario<sup>49</sup> and the CHCs/CSSSs were represented by CACHCA<sup>t</sup> on the Partners' Group for the national roll out of the program. In the literature there is a paucity of research examining the relative benefits of different models of care; however Abelson et al<sup>212</sup> found that CHCs were more likely to deliver health promotion programming and were more likely to use non-physicians to deliver care than fee for service practices. This might be due to provider characteristics, the mix of disciplines employed in the CHC model or to the fact that the providers are salaried, giving them more time to address a broader range of issues with their patients. This has implications for policy makers in Canada in terms of funding and staffing of primary care models. The current Family Health Teams in Ontario, some of which grew out of the Networks involved in this project, now have designated funding for other disciplines on their teams.

In general, NPs and physicians had higher total scores than other disciplines and were more likely to recommend pharmacological interventions and to refer to specialists. These differences may reflect differences in scope of practice, since physicians and NPs are able to directly address the pharmaceutical management of patients with arthritis and also refer directly to specialists. Further, in all evaluations NPs scored higher than physicians, reflecting the more frequent use of non-pharmacological interventions. Additional educational interventions may be required or other strategies may be needed to clarify or support the potentially important roles of rehabilitation therapists and nurses in enhancing care for people with arthritis in primary care. Policy and decision makers, regulators, professional organizations and educators all have a role in exploring these scope of practice issues for all chronic diseases, not just arthritis. These results also demonstrate the importance of team care in the management of

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<sup>t</sup> Canadian Alliance of Community Health Centre Associations

arthritis since it may not be reasonable to expect physicians to deal with the broad range of issues for people with chronic diseases such as arthritis. Studies in the arthritis field have demonstrated that multidisciplinary team care can improve function, psychosocial outcomes and overall health and decrease pain and disability<sup>156, 160, 162, 163</sup>.

For late RA, baseline provider satisfaction with ability to manage arthritis was a predictor of mean best practice scores six months post workshops and for moderate knee OA, baseline provider confidence in ability to manage arthritis was a predictor. It is unclear why these factors were not common to all three models. However, it may be that for moderate knee OA, providers need greater confidence in managing the disease to take full advantage of the range of services required to implement best practices for this type of patient in their communities. And for late RA, providers with higher satisfaction may be well networked in their communities and find it easier to access the range of services needed for this more advanced and complex case. Further studies are needed to understand whether the improvements in provider satisfaction and/or confidence resulting from this program would contribute to better patient outcomes.

SCT<sup>149</sup> suggests that perceptions of barriers and reinforcement of learning are important factors in learning and behaviour change. Neither perceptions of barriers nor the type or costs of reinforcement activities following the workshops predicted the use of best practices six months later. Although some of the reinforcement activities were directed at individual providers and some were directed at their organizations, the data were collected and reported at the organization level only in this study. Future studies may want to collect this information for individual providers. As well, it may be important to ask providers directly during the design phase of future

programs which incentives or reinforcement strategies might influence their use of best practices. The definition of barriers in this study was complex and included perceived barriers to four different disciplines and issues around their availability, wait time, travel time, credibility and cost. Most providers (97.5%) perceived barriers at baseline. This lack of variability in the response may explain the failure of this variable to be a predictor.

Practice size, identified as a possible influential factor in implementation of CPGs in the literature, and defined as number of FTE clinical staff in this study, did not predict the use of best practices. This could be due to the definition used, missing data or the failure of respondents to provide accurate staffing information. As well, language and urban/rural status were not significant predictors of outcomes. Similarly, in a study of primary care physicians in Ontario, Glazier et al<sup>9</sup> reported no differences in the management of early and late RA due to practice location. The small number of French speaking sites may have limited our ability to detect differences based on language, however, all aspects of the Getting a Grip on Arthritis program were translated and delivered in French (Prendre en Main l'Arthrite) and program delivery was coordinated by a person with French as a first language.

In Model 2, making the effort to use knowledge was operationalized as the dissemination of educational materials during the six months post workshop. Those sites that sent a multidisciplinary team to the workshop were marginally more likely to disseminate materials after the workshop than those sites that did not send a team. Training health professionals to work in teams has been suggested as a possible method of improving the implementation of CPGs<sup>213</sup>. This changes the environment in which individual providers work and consequently may provide a collective



approach to delivering evidence-based care. Pilot study results<sup>49</sup> and qualitative feedback from this study reported previously<sup>175</sup> suggested that the Getting a Grip on Arthritis program supported collaborative team care.

CHCs/CSSSs, Networks and Regional models of care were more likely than Federal sites to disseminate educational materials. Federal sites included two special populations, aboriginal communities and military sites, and were not specifically targeted in this project therefore this finding might be due to the lack of relevance or cultural appropriateness of the materials or the lack of infrastructure to support the ordering and dissemination of materials. Also as mentioned previously, the number of Federal sites that participated was small making it possible that the study was underpowered to detect changes in this group.

### **6.1 Strengths of the Study**

This study had several strengths. The program was developed by a multidisciplinary team of researchers, funders, patients and primary care providers who adapted arthritis CPGs for the primary care environment and implementation was supported by a partnership of national arthritis stakeholder groups. This resulted in the successful implementation of the program across Canada.

This study was one of the first to evaluate an evidence-based educational program for the implementation of arthritis CPGs in primary care across Canada, building on the results of an Ontario pilot study that evaluated the program in CHCs only<sup>49</sup>. It involved a variety of models of care, including a relatively large sample of fee for service providers, thus extending the generalizability of the results. This adds to the sparse literature on the

evaluation of different funding and organizational models in primary care<sup>214, 215</sup>. It was also the first Canada-wide study to evaluate an inter-professional education program focusing on the use of arthritis best practices and to examine and describe the potential differences based on discipline. Inter-professional education (IPE) is seen as important for supporting team-based care and influencing behavior change<sup>167-171</sup>.

The study included data at both the organization and individual level allowing for the systematic evaluation of a range of characteristics of primary care models and providers that might influence the use of best practices. Future studies need to also consider other factors not available in this dataset such as provider beliefs and attitudes<sup>65</sup> or organizational structure<sup>29, 77</sup> as well as system<sup>52</sup> and patient level factors that might also influence these outcomes. For instance, Nutting et al<sup>82</sup> found that 75% of identified barriers to depression care were related to patient factors such as patient resistance, non-compliance and psychosocial factors. In other chronic diseases, factors such as patient beliefs and attitudes<sup>25, 83</sup> and patient preference<sup>66</sup> have been shown to influence providers' ability to implement best practices.

The intervention incorporated constructs from SCT<sup>173</sup> thought to influence behaviour change including credible role models (trained peer educators), skills training, incentives and reinforcement of learning, personal and team goal setting and opportunities for social interaction. These components of the intervention represented the observational learning, behavioural capability, reinforcement, self-control and environment constructs of SCT respectively<sup>173</sup>. In a review of interventions for knowledge transfer in general practice, Wensing et al<sup>37</sup> concluded that social influence was an

important component of the interventions. In a 2007 Cochrane Review, Doumit et al<sup>216</sup> reviewed 12 RCTs to assess the effectiveness of local opinion leaders in improving provider outcomes. The authors concluded that opinion leaders could improve provider behavioural outcomes by approximately 10%. Though not a behavioural outcome, best practice scores in this study improved from baseline by 17% and 13% for the RA and OA cases respectively. In the literature review for this thesis (Chapter 2), the three interventions graded as good<sup>142</sup> or fair<sup>49, 139</sup> also included opportunities for social interaction and credible peer models.

This is one of the few studies evaluating arthritis KU in a primary care environment. The success of the Getting a Grip on Arthritis program in transferring knowledge was measured using a method proposed by Kramer and Cole<sup>116</sup> which allowed for the evaluation of two types of KU, namely conceptual use evaluated at the individual level and making the effort to use, evaluated at the organization level. Making the effort to use knowledge equates to the instrumental use of knowledge described by Graham et al<sup>217</sup> and reflects behaviour change. Two other types of KU were proposed by Kramer and Cole, procedural use and structural use. Future studies need to incorporate these two additional types of KU in the planning stages in order to more fully capture the potential organization and system level outcomes of educational interventions. Patient health status is another important outcome to measure to determine the impact of provider educational interventions. In addition, there are other methods of evaluating KU<sup>77, 218, 219</sup>. For instance, Dobbins et al<sup>77</sup> suggest that a decision to adopt a research innovation might be captured on a continuum from no adoption to full adoption. Studies using multiple methods of KU evaluation might help identify important components of these complex interventions.

## 6.2 Study Limitations

Interpretation of the results of this study must be done cautiously. The definition of conceptual use of knowledge was based on providers' responses to hypothetical case scenarios and therefore may not reflect actual practice, underestimating or overestimating provider performance. Other authors have shown that providers chose more response options for written cases than with clinical encounters when there is a list of options provided<sup>220</sup>. This was not the case in this study; providers responded to open-ended questions on management and referral. Jones et al<sup>220</sup> identified 11 articles where written case scenarios were assessed for criterion validity; they concluded that it was unclear whether written case scenarios could be used as proxies for actual performance. However, in the Getting a Grip on Arthritis pilot study, case scenario scores were validated by assessing a subset of patients of providers who participated in the program<sup>49</sup>. These patients reported receiving more information about arthritis and more referrals were made to rehabilitation services in the community compared to a control group. And in this current study, there was evidence that providers from CHCs/CSSSs, Regional sites, and Networks acted on at least one best practice by ordering educational materials for dissemination to patients.

The reliability of the ACREU survey is also unknown making it possible that the changes over time were due to measurement error. However, using this survey may have been an advantage in that the three case scenarios were standardized and helped to control for variability in patient factors that might affect provider responses, e.g. comorbidity. As well, the provider survey was completed online by most participants. The reliability of completing the survey online versus on paper is unknown, though others have found no difference in reliability using these two methods and reported

less missing data with the online versions<sup>221-224</sup>. There may be concerns that speed of online survey completion might have affected the reliability of the responses, however Montag et al<sup>225</sup> did not find this to be the case when assessing the reliability of the Affective Neuroscience Personality Scales online.

The use of secondary data also has limitations including missing data, potential lack of power to answer the question of primary interest, predetermined variables and potentially unreliable data. In this study, data entry was verified and reliability was high ( $\geq 83\%$ ). Some data were not clearly defined and needed to be verified through other sources, for example urban/rural status. As well, no standard definition of team learning was available; therefore it was defined as having multidisciplinary providers from the same site at the workshop<sup>207</sup>. A standard definition of team learning and a validated measure to capture the success of the team learning experience would be useful adjuncts in the design of future studies. For example a quantitative measure such as the Team Decision Making Questionnaire<sup>226</sup> could be used to measure team function at baseline and immediately post workshop and then evaluate whether high team function following the workshop predicted better outcomes. More simply, workshop participants could be asked how they would rank the importance of the team learning experience immediately following the workshop and then evaluate this as a predictor of outcome. In addition, primary data collection would have allowed the collection of additional variables of interest such as provider attitudes towards the guidelines.

As seen in other studies evaluating educational interventions for the implementation of arthritis CPGs<sup>35, 139, 143</sup>, a large number of sites did not volunteer to participate in the program (46%) and 50% of the providers

were lost to follow-up at six months. It may be that this program is only effective for motivated providers from supportive organizations who participate fully in the program. The participation rate of organizations and providers was high in Ontario. This could have been due to the fact that the Ontario Family Health Network was a partner in the program and directly recruited their member organizations for the study. It has also been suggested that good communications, low burden placed on providers to collect data and financial incentives for completion of the data collection process might improve provider retention in studies<sup>227</sup>. Future studies need to collect the data prospectively and test these strategies to successfully recruit and retain providers.

Finally, Getting a Grip on Arthritis is a resource intensive program. There may be other more cost effective methods of obtaining similar or better results. For instance, in Diffusion Theory, Rogers proposes that there are stages of adoption of innovations (innovators, early adopters, early majority adopters, late majority adopters, and laggards)<sup>117</sup> and suggests that cognitively oriented interventions may be more appropriate for early adopters and that late adopters may require special efforts to overcome barriers. Integrated electronic health records, staff incentives and a change champion onsite might also be organization level facilitators to guideline implementation<sup>57,58</sup>.

### **6.3 Future Initiatives**

This program is currently being delivered two to three times a year by The Arthritis Society in Ontario and one recent workshop was held in Halifax. The Arthritis Society is able to make this happen by identifying local partnerships and sources of funding to support the implementation. Local

multidisciplinary arthritis specialists revise and update program content based on recent evidence and changes in practice. Passive reinforcement activities following the program have been discontinued. Future initiatives are being considered including the use of telehealth or online modules to deliver components of the program to make the information more easily available to rural and remote providers. As well, there have been preliminary discussions with aboriginal stakeholders to adapt the program for aboriginal communities.

#### **6.4 Conclusions**

Arthritis is estimated to impact over six million Canadians by the year 2020 and can result in pain, disability, loss of productivity and premature death. It is a highly prevalent condition in primary care practices and costs the health care system over four billion dollars annually. This study adds to the sparse literature on the implementation of arthritis best practices in primary care by identifying organization and provider level factors that influenced the use of arthritis CPGs. Participants in the Getting a Grip on Arthritis inter-professional education program reported modest improvements in best practice scores for RA and moderate knee OA at six months post workshop suggesting that this program might be an important strategy for improving arthritis care in the community.

Two models of knowledge use were developed and tested to determine the predictors of use of arthritis best practices. Conceptual knowledge use, operationalized as a best practice score, was predicted by both organizational (model of care) and individual level variables (discipline, provider satisfaction and confidence). Recommendations were made regarding future research into the staffing and design of different models of

care and the training of health care providers to enhance patient care. As well, further research is required to validate the arthritis best practice score against actual practice and its impact on patient outcomes.

The second type of knowledge use, making the effort to use arthritis best practices, was operationalized as the dissemination of patient education following the workshops and represented a behavioural outcome. This was predicted by two organization level factors, model of care and the team learning experience. Sites that sent multidisciplinary teams to the workshops were more likely to disseminate educational materials. Further research is needed to better understand and evaluate the team learning experience. Federal sites were less likely to disseminate materials. It will be important to better understand the specific learning needs of these special populations and to develop an intervention specific to their needs. These results could influence the design of future continuing health educational interventions and serve as a model for the dissemination of CPGs for other chronic diseases.



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## Appendix A: Critical Review Form – Quantitative Studies

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<b>CITATION</b>	Provide the full citation for this article in APA format:
<b>STUDY PURPOSE</b>  Was the purpose stated clearly?	Outline the purpose of the study. How does the study apply to your research question?



<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p><b>LITERATURE</b></p> <p>Was relevant background literature reviewed?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No	<p>Describe the justification of the need for this study:</p>
<p><b>DESIGN</b></p> <input type="checkbox"/> Randomized (RCT) <input type="checkbox"/> cohort <input type="checkbox"/> single case design	<p>Describe the study design. Was the design appropriate for the study question? (e.g., for knowledge level about this issue, outcomes, ethical issues, etc.):</p> <p>Specify any biases that may have been operating and the direction of their</p>

<input type="checkbox"/> before and after <input type="checkbox"/> case-control <input type="checkbox"/> cross-sectional <input type="checkbox"/> case study	influence on the results:
<p><b>SAMPLE</b></p> <p>N =</p> <p>Was the sample described in detail?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>Was sample size justified?</p> <input type="checkbox"/> Yes	<p>Sampling (who; characteristics; how many; how was sampling done?) If more than one group, was there similarity between the groups?:</p> <p>Describe ethics procedures. Was informed consent obtained?:</p>

<input type="checkbox"/> No <input type="checkbox"/> N/A	
---	--

<p><b>OUTCOMES</b></p> <p>Were the outcome measures reliable?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p> <p>Were the outcome measures valid?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p>	Specify the frequency of outcome measurement (i.e., pre, post, follow-up):	
	Outcome areas:	List measures used.:
<b>INTERVENTION</b>	Provide a short description of the intervention (focus, who delivered it, how	

<p>Intervention was described in detail?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p> <p>Contamination was avoided?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p> <p><input type="checkbox"/> N/A</p> <p>Cointervention was avoided?</p>	<p>often, setting). Could the intervention be replicated in practice?</p>
---	---

<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed <input type="checkbox"/> N/A	
<p><b>RESULTS</b></p> <p>Results were reported in terms of statistical significance?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Not addressed <p>Were the analysis</p>	<p>What were the results? Were they statistically significant (i.e., <math>p &lt; 0.05</math>)? If not statistically significant, was study big enough to show an important difference if it should occur? If there were multiple outcomes, was that taken into account for the statistical analysis?</p>

<p>method(s) appropriate?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p>	
<p>Clinical importance was reported?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p>	<p>What was the clinical importance of the results? Were differences between groups clinically meaningful? (if applicable)</p>
<p>Drop-outs were</p>	<p>Did any participants drop out from the study? Why? (Were reasons given and</p>

<p>reported?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	<p>were drop-outs handled appropriately?)</p>
<p><b>CONCLUSIONS AND IMPLICATIONS</b></p> <p>Conclusions were appropriate given study methods and results</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	<p>What did the study conclude? What are the implications of these results for practice? What were the main limitations or biases in the study?</p>



## Appendix B: Summary and Quality Assessment of Studies by Type of Intervention

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
<i>Educational Outreach</i>						
1. Ray et al, 2001; RCT; ACR guidelines for the management of hip and knee OA in the elderly	209 US solo physicians	<ul style="list-style-type: none"> <li>Academic detailing by one of four trained physician-educators; nurse follow-up to check if educational materials(laminated card with key messages; flow</li> </ul>	No intervention (n=106)	1 year follow-up <ul style="list-style-type: none"> <li>Patient days of prescribed NSAID medication use</li> <li>cessation of NSAID use</li> <li>patient days of acetaminophen use</li> <li>drug costs from a Medicaid pharmacy database</li> </ul>	<ul style="list-style-type: none"> <li>29% of patients stopped NSAIDs in intervention group compared to 22% in control group (P&lt;0.008)</li> <li>7% reduction in #days of prescribed NSAID use compared to control group (P&lt;0.001)</li> <li>For physicians who received the full intervention, including the nurse follow-up visit (n=75),</li> </ul>	Possible volunteer bias, attrition rate of 27%

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
		<ul style="list-style-type: none"> <li>chart; journal articles) had been placed in patients' charts</li> <li>n =103</li> </ul>			<ul style="list-style-type: none"> <li>there was a 15% increase in #days of acetaminophen use relative to the control group (P&lt;0.001)</li> <li>10% reduction in #days of NSAID use</li> </ul>	
2. EBOR Study (Freemantle et al, 1999); RCT; prescribing guidelines for non specific joint pain and three other conditions	162 GPs from 69 randomly selected practices in 12 health authorities in the UK	<ul style="list-style-type: none"> <li>Educational outreach visits to each practice by trained pharmacists</li> <li>Focused on four prescribing guidelines: ACE inhibitors for heart failure,</li> </ul>	Received published guidelines only	6 months post intervention <ul style="list-style-type: none"> <li>Number of patients being treated in accordance with guidelines</li> <li>Prescriptions from a pharmacy database used to identify a random sample of 25 patients in each</li> </ul>	<ul style="list-style-type: none"> <li>3% decrease in the number of patients with joint pain being managed according to the guidelines in intervention group compared to control group [OR=.73(95% CI=.56 to .94)]</li> </ul>	Inability to capture the use of over the counter medications recommended by the guidelines, joint pain was non

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
		aspirin for patients with raised vascular risk, antidepressants, and NSAIDs for joint pain		practice for chart review		specific
		<ul style="list-style-type: none"> <li>Two reinforcement visits over a 9 month period</li> </ul>				
<i>Peer-facilitated Workshops</i>						
3. Rosemann et al, 2007: 3 arm clustered RCT; EULAR guidelines for management of OA	75/503 GPs from 115 primary care practices in	<ul style="list-style-type: none"> <li>Group I: 2 interactive 8 hour peer group meetings on</li> </ul>	Not described	9 month follow-up Changes in: <ul style="list-style-type: none"> <li>#radiographs</li> <li>#referrals to</li> </ul>	Compared to control group: <i>Peer group meetings</i> <i>compared to control:</i>	Control intervention not described Training and reliability of chart assessors not

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
	Germany	evidence-based care for OA, self-management, motivational skills; written summary of evidence-based treatments; materials for patients		orthopedics	<ul style="list-style-type: none"> <li>7% decrease in the number of radiographs (P=0.05);</li> <li>9% increase in prescriptions for acetaminophen (P&lt;0.01);</li> </ul>	described Blinding of assessors not mentioned Possible lack of power Unclear who delivered the workshop content Possible seasonal bias Possible contamination if referrals or medications were prescribed by someone else
		<ul style="list-style-type: none"> <li>Group II: as above plus nurse case management</li> </ul>		<ul style="list-style-type: none"> <li>#prescriptions for analgesics and anti-inflammatory medications</li> <li>extracted from medical file</li> </ul>	<ul style="list-style-type: none"> <li>23% reduction in</li> </ul>	<i>Peer group meetings plus case management compared to control</i>

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
					orthopedic referrals (P=0.04); <ul style="list-style-type: none"> <li>• 9% decrease in radiographs (P=0.03)</li> <li>• 8% increase in prescriptions for acetaminoph en (P&lt;0.01);</li> <li>• 4% increase in prescriptions</li> </ul>	

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
					for NSAIDs (P=0.02); • 8% increase in prescriptions for opioids (P≤.01)	
4. GETTING A GRIP ON ARTHRITIS Study (Glazier et al, 2005); non-randomized trial using cross-sectional data at two time points; best practices based on OPOT guidelines for OA and RA	Seven Ontario CHCs	<ul style="list-style-type: none"> <li>Five CHCs with 21 multidisciplinary providers (8 GPs, 11 nurses or NPs, 1 OT, 1 PT)</li> <li>2 day inter-professional workshop</li> </ul>	2 CHCs - no intervention Number and type of providers not specified	1 year follow-up <ul style="list-style-type: none"> <li>Use of best practices (education, exercise, weight management, social support, acetaminophen for pain, NSAIDs,</li> </ul>	<ul style="list-style-type: none"> <li>At follow-up, 57.9% of intervention group reported increased confidence in performing a complete MSK exam compared to 12.5% in comparison group (P&lt;0.05)</li> <li>40% of intervention</li> </ul>	Non- randomized design Possible volunteer and attention bias Unique CHC environment (salaried providers) Only reported

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
		<ul style="list-style-type: none"> <li>Toolkit of educational materials for providers and their patients</li> <li>10 months of reinforcement activities for organizations, providers and the community</li> </ul>		<ul style="list-style-type: none"> <li>cyto-protection, joint injections, surgical referral, referral to rheumatology</li> <li>provider responses to three case scenarios (early and late RA, moderate knee OA)</li> <li>Confidence in the management of arthritis</li> <li>Perceived barriers to arthritis care</li> <li>Number of</li> </ul>	<ul style="list-style-type: none"> <li>group reported a decrease in perceived barriers, compared to 0% in the control group (P&lt;0.05)</li> <li>Referrals to community rehabilitation services increased from 0 to 60 in the intervention group compared to 0 to 2 in the control group (P&lt;0.01)</li> </ul>	<ul style="list-style-type: none"> <li>results for one best practice (referral to community rehab services)</li> </ul>

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
5. CURATA Study (Rahme et al, 2005); RCT; guidelines for prescribing NSAIDs or acetaminophen for OA	249 GPs in Quebec	<ul style="list-style-type: none"> <li>randomized by town</li> <li>Group 1: peer facilitated 90 minute workshop and decision tree (including non pharmacological management) (n=84)</li> <li>Group 2: workshop only</li> </ul>	No intervention (n=82)	5 month follow-up <ul style="list-style-type: none"> <li>Appropriate prescribing of (COX)-2 inhibitors, NSAIDs or acetaminophen</li> <li>based on review of Quebec provincial health insurance database with 1=according to guidelines; 0=not according to guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Improvement in all four groups</li> <li>Compared to baseline, 4% improvement in prescribing in those who participated in a peer-facilitated workshop (Groups 1 and 2 combined) [OR=1.8(1.3,2.4)]; 2.1% in the control group</li> </ul>	<ul style="list-style-type: none"> <li>Possible volunteer and attention bias</li> <li>Low attendance (20%) at workshop due to bad weather</li> </ul>



Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
		(n=29) <ul style="list-style-type: none"> <li>Group 3: decision tree only</li> </ul>			[OR=1.3(0.9,1.8)]	
		(n=54)			[OR=1.5 (1.0-2.3)]	<ul style="list-style-type: none"> <li>Larger practices benefited less</li> </ul>
6. Verstappen et al, 2003; multi-centre RCT; Dutch College of Primary Care Physicians guidelines for diagnostic test ordering, specifically X-rays for degenerative joint disease	26 practices (174 Dutch physicians)	<ul style="list-style-type: none"> <li>Feedback and social interaction in small group meetings led by medical coordinator</li> <li>13 practices addressed evidence-based</li> </ul>	13 practices addressed 3 other CPGs for cardiovascular topics, upper and lower abdominal complaints	6 month follow-up <ul style="list-style-type: none"> <li>Total number of tests ordered at a diagnostic centre per clinical problem</li> </ul>	<ul style="list-style-type: none"> <li>Total number of tests in the intervention group decreased by 8% compared to 3% in control group (P=0.22)</li> </ul>	<ul style="list-style-type: none"> <li>Possible volunteer bias</li> <li>Possible contamination since both groups received training on implementation of CPGs</li> <li>Possible lack of statistical power</li> <li>No long term follow-up</li> </ul>

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
		CPGs for degenerative joint complaints, chronic obstructive pulmonary disease and asthma			<ul style="list-style-type: none"> <li>no significant reduction in number of inappropriate tests (P=0.11)</li> <li>For degenerative joint complaints, 19% reduction in the mean number of X-rays ordered in the intervention group</li> </ul>	

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
					compared to 9% in the control group (P=0.34)	
<i>Audit and Feedback</i>						
7. Curtis et al 2005; cluster RCT; guidelines for monitoring and use of cyto-protective agents	101 US physicians who were prescribing one or more NSAIDs, stratified by physician type (internists, rheumatologists, family	<ul style="list-style-type: none"> <li>Intervention package containing personal audit and feedback on 3 indicators of safe NSAID prescribing practices. Package mailed to providers</li> </ul>	No intervention (n=51)	7 month follow-up <ul style="list-style-type: none"> <li>Adherence to guidelines for monitoring (CBC and creatinine testing) and use of cyto-protective agents</li> </ul>	<ul style="list-style-type: none"> <li>No significant difference in outcomes between groups at follow-up (P&gt;0.05)</li> <li>CBC testing increased 52% from baseline in the</li> </ul>	<ul style="list-style-type: none"> <li>High physician attrition rate (16%)</li> <li>Ceiling effect (some physicians were following guidelines at baseline; % not reported)</li> <li>Short term follow-up only</li> <li>Possible volunteer bias</li> <li>Unclear what percentage of patients had an arthritis diagnosis</li> </ul>

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
	physicians). Identified through an administrative pharmacy database.	(n=50). Feedback included a comparison with peer derived benchmarks; key articles with opportunity for CME credits; and a hyperlink to case-based educational website			intervention group compared to 25% in the control group • for creatinine testing, physicians in the control group increased the number of tests by 41% from baseline compared to 0% in the	Lack of program receipt in subsample of physicians (60%)

Citation/Design/Guideline	Sample/Location	Intervention	Control	Duration of follow-up and Outcome Measure	Results	Study Limitations
					intervention	
					group	

RCT=randomized controlled trial

CBC=complete blood count

ACR = American College of Rheumatology

EULAR= European League Against Rheumatism

CPG = clinical practice guideline

NSAID = non-steroidal anti-inflammatory drug

(COX)-2=cyclooxygenase-2

GPA = gastro-protective agent

CME=continuing medical education

OPOT Guidelines = Treatment Guidelines for Osteoarthritis, Rheumatoid Arthritis and Acute Musculoskeletal Injury, Ontario Program for Optimal Therapeutics

CHC=Community Health Centre

CURATA=Concertation pour une Utilisation Raisonnee des anti-inflammatoires dans le Traitement de l'Arthrose/An Integrated Approach to Improving the Appropriate Utilization of Anti-inflammatory/Analgesic Medications in the Treatment of Osteoarthritis in Quebec

EBOR = Evidence-Based OutReach

WOMAC = Western Ontario and McMaster Universities Osteoarthritis Index

NA=not available/not applicable

MSK = musculoskeletal

OA=osteoarthritis

RA=rheumatoid arthritis  
GP=general practitioner  
NP=nurse practitioner  
OT=occupational therapists  
PT=physiotherapist  
CME=continuing medical education

## Appendix C: Arthritis Best Practices and Scoring

Best Practices		Scoring		
		Moderate Knee OA	Early RA	Late RA
<b>Education</b>	<p>Provided education or educational materials or contacts for further information. (e.g., support groups, The Arthritis Society, Arthritis Society Help Line (1 800 line) or website, Arthritis Self Management Program [ASMP])</p> <p>SPSS Variable = Education: 1-8</p>	1	1	1
<b>Exercise &amp; Physiotherapy</b>	<p>Provided or recommended exercise or physical activity or referred to an exercise program or to a physiotherapist.</p> <p>SPSS variable = Exercise and PT: 20-26</p>	1	1	1
<b>Joint Protection &amp; Occupational Therapy/ Assistive Devices</b>	<p>Provided instruction in joint protection or energy conservation techniques or recommended or referred to an occupational therapist.</p> <p>Provided a device or recommended or referred to rehabilitation specialist for assistive devices (e.g., canes, crutches, or walkers to improve ambulation).</p> <p>SPSS variables = 30-35</p>	1	1	1
<b>Social Support</b>	<p>Inquired about or discussed social support and coping strategies, provided or recommended or referred to a social worker/psychologist, psychiatrist, or mental health worker/counselor.</p> <p>SPSS variables = 45-49</p>		1	1
<b>Weight</b>	<p>Provided information on maintaining a healthy</p>	1		

<b>Management</b>	weight, proper nutrition or assessed body mass index (BMI)/waist circumference/ weight.  SPSS variable = 40			
<b>Analgesics</b>	Prescribed or recommended or referred for analgesics (e.g., acetaminophen, glucosamine, capsaicin cream, acupuncture).  SPSS variable = 50-53	1		
<b>NSAIDs</b>	Considered, prescribed or referred for non-steroidal anti-inflammatory drugs (NSAIDs), advancing to higher doses as necessary.  SPSS variable = 57-59	1	1	1
<b>Intra-articular Injections</b>	Considered, prescribed or referred for intra-articular corticosteroids or hyaluronans.  SPSS variable = 61,62	1		
<b>Rheumatology Referral</b>	Discussed or considered or made a referral to an arthritis specialist (rheumatologist, internist).  SPSS variable = 80,81,85		1	1
<b>Disease modifying anti-rheumatic drugs (DMARDs)</b>	Discussed or recommended or prescribed or referred for a disease-modifying anti-rheumatic drug (DMARDs).  SPSS variable = 82		1	1
<b>Surgery</b>	Discussed or considered or made a referral to a surgeon.  SPSS variable = 70	1		1
<b>Total points</b>		<b>8</b>	<b>7</b>	<b>8</b>



## Appendix D: ACREU Primary Care Survey

Received	
Reviewed	
Entered	
Verified	



### Getting a Grip on Arthritis:

A National Primary Health Care

Community Initiative

Baseline Survey



## Primary Health Care Management of Arthritis

### CASE SCENARIOS

**We would like to better understand your management of common musculoskeletal disorders. Please read the following scenarios and answer the questions.**

**1.** A 45 year old woman, a beauty counselor separated from her husband and responsible for the care of three school-aged children, presents in your office with a 6 week history of pain, stiffness, and swelling of her hands and wrists. She also has some discomfort in her feet. She finds that she is worse in the morning with increased stiffness lasting about three hours. She has additional symptoms of fatigue and a 5 lb weight loss. She has been unable to work for the past week.

On examination, there is symmetrical swelling and tenderness of the small joints of the hands and wrists and tenderness of the metatarso-phalangeal joints. The remainder of the physical exam is normal.

There is no history of trauma. This patient has been previously well with no history of peptic ulcer disease or any other serious illness. A previous physician prescribed a three-week course of a NSAID without relief.

**You are seeing this patient for the first time. Please list the investigations/assessments, interventions/treatments and referrals (practitioners, organizations, or resources) that you would conduct during this visit as it applies to your scope of practice.**

*Please print.*

**A. Investigation(s) / Assessment(s):**

Not in scope of practice

**B. Interventions / Treatments:**

Not in scope of practice

**C. Referrals (practitioners, organizations, or resources):**

**D. Other:**

2. A 64 year old man, a married middle-level manager for a life insurance company, presents in your office with a 6 month history of right knee stiffness after prolonged sitting, as well as pain and difficulty with the right knee going up or down stairs. He reports mild intermittent swelling in the right knee. He has continued to work without any serious limitation but he has recently given up golf as a result of this problem.

On examination, there is moderate crepitus in the right knee and a small effusion. The remainder of the physical exam is normal.

There is no history of trauma. This patient has been previously well with no history of peptic ulcer disease or any other serious illness. A previous physician prescribed a three-week course of a NSAID without any relief.

**You are seeing this patient for the first time. Please list the investigations/assessments, interventions/treatments and referrals (practitioners, organizations, or resources) that you would conduct during this visit as it applies to your scope of practice.**

*Please print.*

**A. Investigation(s) / Assessment(s):**

Not in scope of practice

**B. Interventions / Treatments:**

Not in scope of practice

<b>C. Referrals (practitioners, organizations, or resources):</b>
<b>D. Other:</b>

3. A 42 year old woman, a married factory worker with two school-aged children, presents in your office with a 5 year history of symmetrical joint swelling and pain in her hands, wrists and feet. She stopped work two months ago and now finds it difficult to get out of the house. She and her family are having problems coping with her illness and their financial situation has become difficult.

On examination, she has obvious deformities in her hands, wrists and feet. There is marked swelling and tenderness over the metacarpophalangeal and metatarso-phalangeal joints and wrists. She has painful and restricted movement of her shoulders and nodules over her elbows.

This patient's only medications to date have been various NSAIDs. Notes from her previous physician reveal only the diagnosis of "arthritis"; you can find no evidence of prior investigations or referrals. There is no history of trauma. Other than this problem, she has been previously well with no history of peptic ulcer disease or any other serious illness.

**You are seeing this patient for the first time. Please list the investigations/assessments, interventions/treatments and referrals (practitioners, organizations, or resources) that you would conduct during this visit as it applies to your scope of practice.**

*Please print.*

**A. Investigation(s) / Assessment(s):**

Not in scope of practice

**B. Interventions / Treatments:**

Not in scope of practice

**C. Referrals (practitioners, organizations, or resources):**

**D. Other:**

## BARRIERS TO PRACTICE

**4 Are there any important barriers in your practice to obtaining the following care for your patients?**

*For each item, please check (✓) all that apply.*

	No barriers	Available, but waiting time unacceptably long	Available, but travel time unacceptably long	Available, but no confidence in service	Available, but funding barrier makes it inaccessible	Not available	Not sure if available	Not in scope of practice
A Nursing - ambulatory/ outpatient	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>99</sub>
B Nursing - home care	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>99</sub>
C Physiotherapy - ambulatory/ outpatient	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>99</sub>
D Physiotherapy - home therapy	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>99</sub>
E Occupational Therapy - ambulatory/outpatient	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>99</sub>
F Occupational Therapy	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>99</sub>



	- home therapy								
G	Social Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	- ambulatory/outpatient								
H	Social Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	- home therapy								
I	Rheumatology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J	Orthopaedic Surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	General Internal Medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L	Rehabilitation Medicine / Physiatry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	Other (please specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_____								

4N Please add any additional comments you would like to make regarding barriers to practice.

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**TRAINING & EDUCATION**

<b>P1 Please indicate how much training you have had in musculoskeletal disorders.</b>		
<i>Please circle a number after each of the following items.</i>		
		<b>None</b> <span style="float: right;"><b>A</b></span>
		<b>Lot</b>
A	During school	1 2 3 4 5 6 7 8 9 10
B	During your internship or residence	i. Rheumatology
		ii. Orthopaedic Surgery
		1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10

in:	iii. Rehabilitation Medicine / Physiatry	1	2	3	4	5	6	7	8	9	10
	iv. Sports Medicine	1	2	3	4	5	6	7	8	9	10
	v. Other Please specify: _____	1	2	3	4	5	6	7	8	9	10
C	Since you completed your training / Continuing Medical Education Please specify: _____	1	2	3	4	5	6	7	8	9	10

**P2 Primary care providers have had variable training and experience in the management of musculoskeletal and other chronic conditions. Please describe your level of confidence with each of the following aspects of management.**

*Please circle a number after each of the following items. If not within your scope of practice, please leave blank.*

	<b>Not at all Confident</b>	<b>Extremely Confident</b>
A Comprehensive musculoskeletal examination	1 2 3 4 5 6 7 8 9 10	
B Comprehensive neurological examination	1 2 3 4 5 6 7 8 9 10	
C Comprehensive cardiovascular examination	1 2 3 4 5 6 7 8 9 10	
D Joint aspiration of the knee	1 2 3 4 5 6 7 8 9 10	
E Joint injection of the knee	1 2 3 4 5 6 7 8 9 10	
F Joint injection of the shoulder	1 2 3 4 5 6 7 8 9 10	
G Initiating disease-modifying agents (DMARDs) for rheumatoid arthritis (imuran, methotrexate, etc.)	1 2 3 4 5 6 7 8 9 10	

		1	2	3	4	5	6	7	8	9	10
H	Use of non steroidal anti-inflammatory drugs (NSAIDs)										
I	Use of corticosteroids										
J	Deciding which serologic tests to perform (e.g. ANA, RF, complement)										
K	Managing common musculoskeletal conditions (e.g. tendinitis, bursitis, osteoarthritis)										

**P3 Primary care providers have different learning needs. Please describe your level of interest in continuing medical education for each of the following topics related to arthritis. Circle a number after each of the items listed below.**

		<b>Not at all</b>					<b>Extremely</b>				
		<b>Interested</b>									
A	Comprehensive musculoskeletal examination	1	2	3	4	5	6	7	8	9	10
B	Joint injection and aspiration	1	2	3	4	5	6	7	8	9	10

C	Monitoring of patients on DMARDs	1	2	3	4	5	6	7	8	9	10
D	Use of serologic tests	1	2	3	4	5	6	7	8	9	10
E	Use of systemic corticosteroids	1	2	3	4	5	6	7	8	9	10
F	Use of NSAIDs	1	2	3	4	5	6	7	8	9	10
G	Managing common musculoskeletal conditions (e.g. tendinitis, bursitis, osteoarthritis)	1	2	3	4	5	6	7	8	9	10
H	When to refer to specialist	1	2	3	4	5	6	7	8	9	10
I	Other arthritis learning needs Please specify: _____	1	2	3	4	5	6	7	8	9	10

**5 How satisfied are you with your ability to manage patients with arthritis?**

*Please circle one number.*

**Not**

**Extremely**

<b>Satisfied</b>										<b>Satisfied</b>
1	2	3	4	5	6	7	8	9	10	

**PROFESSIONAL PROFILE**

<b>P4 Are you?</b>	<input type="checkbox"/> <sub>1</sub> A Certificant of College of Family Physicians of Canada
	<input type="checkbox"/> <sub>2</sub> A Non-certificant of College of Family Physicians of Canada
<b>6 Year of completion of your professional training</b>	-----

<b>7 We would like to know about your clinical practice and affiliations.</b>	
<i>Please check ( ✓ ) the most appropriate box.</i>	
A <input type="checkbox"/> <sub>1</sub> Full-time ( ≥32 hrs/wk)	<input type="checkbox"/> <sub>2</sub> Part-time (<32 hrs/wk)
B <input type="checkbox"/> <sub>1</sub> University-affiliated	<input type="checkbox"/> <sub>2</sub> Non- University affiliated
C <input type="checkbox"/> <sub>1</sub> Urban	<input type="checkbox"/> <sub>2</sub> Rural

**DEMOGRAPHICS**

<b>8 Year of Birth</b>	19 __
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**9 Gender**

<sub>1</sub> Male <sub>2</sub> Female



## Appendix E: Best Practices Coding Scheme

<i>Best Practices Coding Scheme</i>	<i>Code</i>	<i>Best Practice</i>	<i>Examples</i>
<b>Education</b>	1	GRIP material code (any reference or referral to GRIP material)	Given Getting a Grip on Arthritis resource kit, book, prescription pad, poster, provider card
	2	Patients receive education about self-management strategies  (by provider, provider educating)	provide info, educational material, teach, educate, advise, discuss  General information on best practices (not specific)  Vague mention of ‘education’
	3	The Arthritis Society Code (Reference or Referral to TAS)	The Arthritis Society Help Line / TAS website, any reference to TAS
	4	Arthritis Self Management Program [ASMP]	Specific reference to this program  Arthritis self help book class; Kate Lorig
	5	Other contacts for further information (Not TAS)	e.g. March of Dimes, arthritis websites, proper names
	6	Other Education groups (referral or information) or self-help	Not TAS or ASMP; (Lupus Group, Living Well)

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	7	Referred to site library	Books and videos given by GRIP
	8	Referred to community library	Referred to library resources
<b>Exercise &amp; Physiotherapy</b>	20	Recommendation for exercise or physical activity (by provider)	exercise, fitness, quads strengthening, weight bearing exercise, ROM
	21	Provision of exercise by provider	Teach, instruct exercise program, home assessment or program, etc, one on one PT, group exercise
	22	Referral to an exercise program	Community or site exercise program, pool program, hydrotherapy, aquatics, aqua therapy, Tai chi
	23	Referral to physiotherapist	physiotherapy, rehab, exercise therapy
	24	Reference to PACE material or readiness for change	Specific reference to PACE exercise material or readiness for change
	25	Other physiotherapy modalities	Heat/cold, TENS, wax bath, ultrasound, cryotherapy, laser, RICE, interferential, pain control techniques, contrast baths
	26	Exercise material	Resource kit, book, exercise sheet, given video  (double code with GRIP)

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			material)
<b>Joint Protection &amp; Occupational Therapy</b>	30	Patients receive instruction in joint protection and energy conservation techniques (by provider)	Specific education on joint protection (e.g. splints, joint support, orthotics, proper footwear) or energy conservation (e.g. rest)
	31	Patient given educational material about joint protection and energy conservation	e.g. Think ahead booklet
	32	Referral to an occupational therapist	Referral to OT
<b>Assistive Devices</b>	33	Patients with functional limitations in performing activities of daily living receive information on assistive devices (by provider)	Assistive device information, footwear info (general)
	34	Assistive device – specified (Given an assistive device; Assistive device made)	Cane, gripper, splint, any device to help with walking or protect joints etc footwear (specific store or brand), orthotics
	35	Referral to rehabilitation specialist for assistive devices	Rehab for assistive devices, podiatry, orthotist
<b>Weight Management (OA)</b>	40	Reference to proper nutrition	Given counselling, Arthritis Cookbook, reference to nutrition section in resource kit (double code with GRIP material), weighs patient, calculates BMI

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	41	PACE material on nutrition	use of PACE nutrition material
	42	Patients with a body mass index (BMI) greater than 25 receive a recommendation for weight loss (by provider)	weight loss/reduction
	43	Referral to a weight loss group	Weight watchers etc.
	44	Referral to a weight loss professional	diet counselling, nutritionist, dietitian
<b>Social Support</b>	45	Social support and coping strategies are discussed with patients (providing information)  Vague mention of support (no details)	Disability info / claim, support, financial assistance, support group, family support, stress management, relaxation techniques
	46	Social support material	Given Getting a Grip resource booklet (double code with Grip material); financial resource booklet
	47	Referrals made as needed for social support	refer to social worker (SW), community care access centre (CCAC), home care, Employment insurance (EI), psychologist, mental health clinic
	48	Counselling (Social Support)	Psychologist, SW, or other mental health worker for counselling, family counselling
	49	Referral to [social] support group	

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		(not ASMP)	
<b>Analgesics (OA)</b>	50	Patients requiring pharmacologic treatment for pain receive a recommendation for analgesics (e.g., acetaminophen,).	Tylenol, acetaminophen (dosage not required) +/- codeine Amitriptyline (Elavil) Narcotics, opioids
	51	Prescription topical analgesics	capsaicin cream
	52	Glucosamine may be considered for mild to moderate OA of the knee.	Glucosamine or chondroitin
	53	Acupuncture may be considered for mild to moderate OA of the knee.	Acupuncture
<b>Non-steroidal anti-inflammatory (NSAID) Risk</b>	54	Patients with two or more of the following risk factors should avoid NSAID use: age > 75, history of peptic ulcer disease, history of GI bleeding, cardiovascular disease	Risk factors – assess or educate
	55	If NSAIDs cannot be avoided, patients should receive misoprostol, a proton pump inhibitor (PPI)	Misoprostol, cytoprotection
	56	If NSAIDs cannot be avoided, patients should receive a selective Cox-2 agent	Cox -2 (Bextra, Vioxx, Celebrex)  * note Vioxx removed from market after fall workshops –

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			still code
<b>NSAIDs</b>	57	Patients not responding to or not tolerating acetaminophen may progress to non-steroidal anti-inflammatory drugs (NSAIDs), advancing to higher doses as necessary.	any NSAID or ASA product, Arthrotec  Increase dose  Anti-inflammatory medication, OTC anti-inflammatory medications
	58	Topical NSAID, local NSAID	Pennsaid, Diclofenac, topical Voltaren
	59	Change NSAID , try another NSAID	* not appropriate in RA but code anyway
<b>Oral Corticosteroids</b>	60	Oral corticosteroids ( $\leq 15$ mg daily) or IM (80-120mg)	Oral Steroids, prednisone, glucocorticoids
<b>Intra-articular Injections (I/A)</b>	61	Intra-articular corticosteroids are considered for an OA painful knee. IA used as adjunctive therapy. Consideration or referral	Injection and/or aspiration
	62	Hyaluronans are considered for an OA painful knee – Consideration or referral	Hyaluronan, Hyalgan, hylan, Synvisc
<b>Orthopedic Surgery</b>	70	Surgical referral is discussed with appropriate patients who continue to experience significant pain and functional disability despite optimal medical therapy.	referral to orthopaedic surgeon, consult, arthroscopy
<b>Rheumatology Referral (RA)</b>	80	Delayed referral to rheumatologist	referral to rheumatologist ('rheum', ?rheumatologist,

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		(e.g. waiting for results/drugs/next visit etc before contacting rheumatologist,)	consider rheumatologist, rheumatologist (without time element), rheumatology clinic (assume rheumatologist present)
	81	Referral to other arthritis/ MSK specialist (not including a rheumatologist)	general internal medicine, physiatrist , arthritis specialist
	85	Providers initiate an IMMEDIATE /EARLY rheumatology consultation re: treatment for patients with suspected inflammatory arthritis	EARLY referral to rheumatologist or internist
<b>Disease modifying anti-rheumatic drugs (DMARDs)[RA]</b>	82	Disease-modifying anti-rheumatic drugs (DMARDs) are considered for treatment of early RA.	Methotrexate, Imuran, Plaquenil, Chloroquin etc Any DMARD – see list
<b>General Practitioner</b>	90	Reference to family physician, GP	Contact, phone, letter, consult...  Many HCPs will use this code
<b>Pharmacist</b>	91	Reference to pharmacist	
<b>Other Health Professional Referrals/ References or Therapies</b>	92	Nurse Practitioner, Massage therapist, chiropractor, naturopath etc  Clinics  Any reference to alternative therapies	Pain clinic, workplace or ergonomic assessment, reflexology, nurse, registered massage therapist (RMT), hand clinic  Antidepressants, biologics, antibiotics, vitamins, hypnotics
<b>Investigations</b>	93	X rays, blood work, lab test etc,	These items can be reviewed at

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<b>&amp; History Taking</b>		patient history, family history	a later date
<b>Comments</b>	95	Comments that cannot be captured in above codes, interesting comments Vague comments Nil – no referrals	* Note – many 95's need to be re-coded as 92's (i.e. vitamins)
<b>Blank / No data</b>	66		
<b>Not in scope of practice / NA</b>	99		

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## Appendix F: Primary Health Care Facility (PHCF) Profile

Note: If you are completing the profile electronically, click on text boxes (\_\_\_\_) or check box (). Text boxes will expand as you type.

<b>Date Completed</b>		(mm/dd/yyyy)
<b>Primary Health Care Facility Name</b>		
<b>Contact 1 (Name &amp; Title)</b>		
<b>Contact 2 (Name &amp; Title)</b>		
<b>Address</b>	<b>Street</b>	
	<b>City</b>	
	<b>Province</b>	Choose Province
	<b>Postal Code</b>	
<b>Phone</b>		
<b>Fax</b>		

<b>Email Address</b>	
<b>Website Address</b>	
<b>Alternate information</b>	

<b>Funding</b>	
1 Is your organization not-for-profit?	<input type="checkbox"/> No <input type="checkbox"/> Yes
2 Are your patients rostered / registered?	<input type="checkbox"/> No <input type="checkbox"/> Yes
3 Please indicate the type of funding received at your PHCF (check all that apply)	<input type="checkbox"/> 1. Program base funding <input type="checkbox"/> 2. Project funding <input type="checkbox"/> 3. Capitation <input type="checkbox"/> 4. Fee-For-Service <input type="checkbox"/> 5. Other – Please specify _____

<b>Client Involvement</b>	
4 Is your organization governed by a volunteer board of directors or	<input type="checkbox"/> Yes <input type="checkbox"/> No

<p>advisory committee whose members are largely either residents of a defined area or clients:</p>	
<p>5 Clients/ community members are involved in:</p>	<p><input type="checkbox"/> 1. Establishing the mission of the Centre <input type="checkbox"/> 2. Establishing the values and philosophy of the Centre <input type="checkbox"/> 3. Program planning <input type="checkbox"/> 4. Program evaluation</p>
<p>6 Excluding board representation, how are clients/community involved in determining local priorities at your organization: (please check all that apply)</p>	<p><input type="checkbox"/> 1. Surveys <input type="checkbox"/> 2. General Community meeting <input type="checkbox"/> 3. Focus groups <input type="checkbox"/> 4. Other (Please specify)</p>

<p><b>Client Population</b></p>
<p>6. Please specify your organization's mandate. _____</p>
<p>8. Please describe priority populations or communities targeted for service by your organization.</p>

A priority population is a group of persons who are at a higher risk than the general population for developing illnesses due to characteristics that traditionally impede their access to health care services:

- |   |   |
|---|---|
| <input type="checkbox"/> 1. Low income<br><input type="checkbox"/> 2. Unemployed<br><input type="checkbox"/> 3. Poor education<br><input type="checkbox"/> 4. Single Parent<br><input type="checkbox"/> 5. Seniors<br><input type="checkbox"/> 6. Youth<br><input type="checkbox"/> 7. Preexisting health condition(s)<br>Please specify _____<br><input type="checkbox"/> 8. Socially isolated<br><input type="checkbox"/> 9. Geographically isolated<br><input type="checkbox"/> 10. Homeless/street involved | <input type="checkbox"/> 11. Addictions<br><input type="checkbox"/> 12. Ethno-cultural (language, culture)<br><input type="checkbox"/> 13. Aboriginal health<br><input type="checkbox"/> 14. New immigrants refugees<br><input type="checkbox"/> 15. Specific cultural groups –<br>Please specify _____<br><input type="checkbox"/> 16. Other –<br>Please specify _____ |
|---|---|

9. How many patients does your organization serve?	a. _____ # patients OR b. _____ % of province's population
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9c What are the main languages spoken by your patient population?	<input type="checkbox"/> 1. English <input type="checkbox"/> 2. French <input type="checkbox"/> 3 Other -please specify _____
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**Location & Access**

10 Is your organization considered to	<input type="checkbox"/> 1. Rural
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be:	<input type="checkbox"/> 2. Urban <input type="checkbox"/> 3. Small Urban (<100,000) <input type="checkbox"/> 4. Isolated
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11 Organization site access and/or services (please check all that apply)	<input type="checkbox"/> 1. Central organization location <input type="checkbox"/> 2. Satellite Location(s) <input type="checkbox"/> 3. Client home visits <input type="checkbox"/> 4. Hospital <input type="checkbox"/> 5. Nursing home <input type="checkbox"/> 6. At other agency site <input type="checkbox"/> 7. Outreach (on the street etc.) <input type="checkbox"/> 8. Other - please specify _____
12 Do patients need a health card to access services?	<input type="checkbox"/> Yes <input type="checkbox"/> No
13 What is your catchment area?	Please specify (postal codes or cities/towns etc) _____

The World Health Organization defines primary health care as care which provides integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.

**Programs and Services**

14 With the above definition in mind, please identify	<input type="checkbox"/> 1. Primary health care <input type="checkbox"/> 2. Chronic care
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programs and services  
provided by your  
organization from all  
funding sources (check  
all that apply):

- 3. Homecare
- 4. Primary rehabilitation
- 5. Mental health chronic
- 6. Instrumental counseling
- 7. Community development
- 8. Primary reproductive care
- 9. Long term institutional
- 10. Case management
- 11. Palliative
- 12. Mental health transitory
- 13. Group health education
- 14. Advocacy to address determinants  
of health

**Primary Health Care Providers**

15 Please **indicate the number (i.e. FTEs – full time equivalents)** of the professional disciplines/provider types within your primary health care facility

_____ Family Physician	_____ Dietician / nutritionist
_____ Medical specialist	_____ Community organizer
_____ Podiatrist	_____ Health promoter
_____ Nurse	_____ Pharmacist
_____ Nurse practitioner	_____ Psychologist
_____ Public health nurse	_____ Chiropractor
_____ Social worker	_____ Chiropodist
_____ Occupational Therapist	_____ Homemaker
_____ Physiotherapist	_____ Other - Please specify _____

16 Physician Remuneration (Please check all that apply)

- 1. Salaried
- 2. Contract
- 3. Capitation (fee levied per person)
- 4. Sessional
- 5. Fee-for-service

17 Other Provider  
Remuneration  
(Please check all that  
apply)

- 1. Salaried
- 2. Contract
- 3. Capitation (fee levied per person)
- 4. Sessional
- 5. Fee-for-service

18 Do health care  
providers have  
internet and email  
access at the  
organization?

- Yes  No



**Model of Practice**

19 Please indicate the model(s) of practice your organization follows (check all that apply):

- 1. Providers at this organization have independent caseloads and refer to each other.
- 2. Clients have an identified provider who works at this organization and its providers cover each others' clients during absence.
- 3. Clients have an identified provider who works at this organization but can see any appropriate provider for urgent visits.
- 4. Clients see first available appropriate provider who works at this organization.
- 5. Clients have available to them a multi-disciplinary group of providers and a common health record
- 6. Clients have available to them an inter-disciplinary team of providers and with a common care plan.
- 7. Other - Please specify \_\_\_\_\_

**Comments**

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**Thank you for your time!**

**Instructions for returning profile are on front page.**

**Appendix G: Final Statistical Models**

<b>Effect</b>	<b>Model of Care</b>	<b>Discipline</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>DF</b>	<b>T Value</b>	<b>Pr &gt;  t </b>
<i>Early RA</i>							
Intercept			2.25	0.31	126	7.37	<.0001
Model of Care	CHC/CSSS		0	.	.	.	.
	Federal		0.10	0.43	136	0.23	0.8184
	Regional		0.10	0.25	136	0.40	0.6887
	Network		-0.96	0.41	136	-2.33	0.0213
Discipline		Physicians	0	.	.	.	.
		Nursing	-0.89	0.30	136	-2.97	0.0035
		Rehab	-0.12	0.31	136	-0.37	0.7085
		NP	0.51	0.37	136	1.38	0.1698
		Other	-1.59	0.36	136	-4.44	<.0001
Baseline Best Practice Score			0.42	0.06	136	7.02	<.0001
<i>Moderate Knee OA</i>							
Intercept			2.05	0.48	117	4.29	<.0001
Model of Care	CHC/CSSS		0	.	.	.	.
	Federal		-0.27	0.43	84	-0.63	0.5280
	Regional		0.38	0.24	84	1.58	0.1190
	Network		-1.24	0.40	84	-3.09	0.0027
Discipline		Physicians	0	.	.	.	.
		Nursing	-1.27	0.37	84	-3.41	<.0010

Effect	Model of Care	Discipline	Estimate	Standard Error	DF	T Value	Pr >  t
		Rehab	-1.17	0.32	84	-3.67	0.0004
		NP	0.72	0.36	84	1.98	0.0509
		Other	-1.69	0.47	84	-3.57	0.0006
Confidence in Managing Arthritis			0.10	0.05	84	2.00	0.0485
Baseline Best Practice Score			0.37	0.07	84	5.09	<.0001
<b>Late RA</b>							
Intercept			2.20	0.48	125	4.58	<.0001
Model of Care	CHC/CSSS		0	.	.	.	.
	Federal		0.06	0.47	115	0.14	0.8909
	Regional		0.16	0.28	115	0.60	0.5503
	Network		-1.11	0.46	115	-2.43	0.0167
Discipline		Physicians	0	.	.	.	
		Nursing	-1.16	0.37	115	-3.11	0.0023
		Rehab	-0.57	0.36	115	-1.57	0.1184
		NP	0.66	0.43	115	1.54	0.1261
		Other	-1.67	0.44	115	-3.80	0.0002
Satisfaction in Ability to Deliver Arthritis Care			0.12	0.06	115	2.11	0.0370
Baseline Best Practice Score			0.38	0.06	115	5.94	<.0001

<b>Effect</b>	<b>Model of Care</b>	<b>Discipline</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>DF</b>	<b>T Value</b>	<b>Pr &gt;  t </b>
<i>Dissemination of Patient Educational Materials</i>							
Intercept			2.57	0.44	126	5.82	<.0001
Model of Care	CHC/CSSS		0	.	.	.	.
	Federal		-2.84	1.02	144	-2.79	0.006
	Regional		-0.48	0.66	144	-1.80	0.074
	Network		0.91	1.15	144	0.80	0.426
Team Learning		No	-1.13	0.63	144	-1.80	0.074
		Yes	0	.	.	.	.