Systematic Review of Practice Facilitation and Evaluation of a Chronic Illness Care Management Tailored Outreach Facilitation Intervention for Rural Primary Care Physicians

by

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I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Nearly two decades of research on translating evidence-based care guidelines into practice has resulted in a considerable body of primary and secondary evidence about guideline implementation strategies and the individual, organizational and environmental challenges associated with closing the evidence to practice gap in primary care. Interventions to improve professional performance are complex and a disentangling of the various independent, intervening and constraining variables is required in order to be able to design and implement interventions that can improve primary care practice performance. The PRECEDE-PROCEED planning model (Green & Kreuter, 1999) provides a step-wise theoretical framework for understanding the complexity of causal relationships among the variables that affect the adoption of evidence-based practice and may assist in the design and implementation of practice-based interventions.

Knowledge of an evidence-based practice guideline is important, but a consensus has emerged that having knowledge is rarely sufficient to change practice behaviour. Didactic education or passive dissemination strategies are ineffective, whereas interactive education, reminder systems and multifaceted interventions tailored to the needs of the practice are effective. Outreach or practice facilitation is a proven effective multifaceted approach that involves skilled individuals who enable others, through a range of tailored interventions, to address the challenges in implementing evidence-based care guidelines within the primary care setting. The challenges to implementing evidence-based chronic illness care practice guidelines are thought to be similar to the other contextual, organizational and individual behavioural challenges associated with the uptake of research findings into practice. A multifaceted guideline implementation strategy such as practice facilitation may be well-suited to improving the adoption of these guidelines within rural primary care settings. However, research has not systematically reviewed, through meta-analysis, the published practice facilitation trials to determine overall effects and an implementation research study of practice

facilitation that has considered fidelity of implementation within the rural Ontario setting for a complex practice guideline such as chronic illness management has not been done.

The systematic review in the thesis incorporated an exploratory meta-analysis of randomized and non-randomized controlled trials of interventions targeted towards implementing evidence-based practice guidelines through practice facilitation, and was conducted to gain an understanding of the overall effect of practice facilitation and the factors that moderate implementation success. The results were the identification of an improvement overtime in the methodological rigour of practice facilitation implementation research based on a critical appraisal of methods, a significant moderate overall effect size of 0.54 (95% *CI* 0.43 – 0.65) for 19 good quality practice facilitation intervention studies and several significant effect size modifiers; notably, tailoring to the needs of the practice, using multiple intervention components, extending duration, and increasing the intensity of practice facilitation were associated with larger effect sizes. As more practices were assigned to the practice facilitator, the effect diminished. A significant positive association between the number of PRECEDE predisposing, enabling and reinforcing strategies employed by the facilitator and the effect size was detected.

The implementation research study utilized mixed methods for data collection as part of an embedded case study of four rural primary care practices to determine the implementation fidelity of the practice facilitation of chronic illness care planning and the factors that impeded and contributed to implementation success. The feasibility of and potential cost savings of practice facilitation via videoconferencing was also implemented for two of the practices. For those practices that successfully implemented care planning, fidelity was achieved for the implementation of care plans. On the other hand, the dosage, duration, component delivery of the practice facilitation intervention was low in comparison to other published studies, and tailoring of the intervention to the practice was inconsistent. Based on the qualitative analysis of physician interviews, the moderating factors for successful implementation were categorized into the broad themes of pessimism and tempered optimism. Pessimistic physicians were unsuccessful at implementation, lacked a willingness to

engage and were uncomfortable with the patient-centred approach to chronic illness care. Optimists were positive about the psychosocial, patient-centred assessment aspects of the chronic illness care protocol and provided anecdotes of success in resolving patient problems. However, this was tempered as both pessimists and optimists reflected on the time intensive aspect of the protocol and the unlikelihood of widespread implementation without additional supports. Participating physicians were satisfied with the facilitator and the videoconferencing experience, and the intervention cost analysis revealed opportunities for cost saving via the use of videoconferenced facilitation. Improvements to the intervention suggested by participants included integrating chronic illness management with medical information systems, involving other health disciplines, and forming networks of community health resources and support services for health providers and patients.

This work has demonstrated that although practice facilitation can successfully result in moderate significant improvements in practice behaviour, it is not necessarily singularly effective in all contexts or for all targeted behaviours. A complex practice guideline such as the chronic illness care management model is unlikely to be adopted in the current context of primary care in rural Ontario and as a consequence to have any impact on the health of chronically ill patients without further intervention supports, adaptation, and implementation research undertaken to demonstrate successful execution of chronic illness care management. Alternative care delivery models are required to address barriers and improve the delivery of chronic illness care management.

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Chapter 1
Introduction and Rationale

Physicians working in Ontario rural primary care settings face a host of daily challenges for providing the best possible service to their patients. During their day-to-day work it is not always possible for family physicians to deliver "best-practice-based" services. Many patients do not receive optimal care and a literature review of 48 articles on the quality of care provision showed that 50 to 70 per cent of patients in the U.S. were found to receive recommended care, while 20 to 30 per cent received unnecessary care (Schuster, McGlynn, & Brook, 1998). The reasons which account for the sub-optimal delivery of care are professional, organizational and environmental. For example, the type of medical training received, the lack of proper administrative systems within the practice, and the fragmentation of the overall health system have been cited as reasons (Goodwin et al., 2001; Martin, 2007; Luck, Parkerton, & Hagigi, 2007). Implementing new systems for care delivery involves widespread practice change. Modifying deeply rooted individual, group or regional clinical practice patterns is very difficult. Previous work (Dietrich et al., 1992; Lemelin, Hogg, & Baskerville, 2001; Goodwin et al., 2001; Frijling et al., 2002; Frijling et al., 2003a; Margolis et al., 2004; Nagykaldi, Mold, & Aspy, 2005; Grol, Wensing, & Eccles M, 2005) has shown that tailored facilitation in urban practice environments can be an effective intervention to overcome barriers and to assist doctors applying evidence-based guidelines by improving office systems and quality of care through a combination of interventions.

Approximately a quarter of Canada's population lives in rural communities. Recruitment and retention of physicians to serve these communities is a priority of the federal and provincial governments (Lyons & Gardner, 2001) as well as other developed countries such as the United States and Australia. A 2006 analysis of physician practice locations revealed that 9.4 per cent of physicians in Canada were located in rural areas whereas the 2006 Census identified 21.4 per cent of the general population residing in rural areas (Rourke, 2008). It is suggested that many personal,

community-based, continuing education, and practice-based factors need to improve to increase the number of rural physicians in Canada (Rourke, 2008). The professional development and practice-based support opportunities of tailored outreach facilitation (TOF) or practice facilitation may help to address some of the factors that contribute to an unequal physician-population ratio between rural and urban areas of Canada. Standard practice facilitation and facilitation delivered with the use of telehealth or videoconferencing equipment is an option of particular interest for educating rural primary care professionals on evidence-based practice guidelines and assisting in practice change. The videoconferencing facilitation approach has the potential to save some of the costs associated with delivering practice facilitation in rural communities and may help to address retention issues such as the lack of support and isolation that health professionals often experience in rural settings (Callas, Ricci, & Caputo, 2000).

The number of deaths worldwide from chronic disease is estimated to rise from 60 to 73 per cent by 2020, creating an increasing demand for care (Strong, Mathers, Leeder, & Beaglehole, 2005; Martin & Petersen, 2008). The World Health Organization estimates that chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 60% of all deaths. Out of the 35 million people who died from chronic disease in 2005, half were under 70 and half were women (World Health Organization, 2008). Many of these deaths are considered preventable through interventions which mitigate risk factors such as smoking, poor nutrition, and low levels of physical activity. In Canada, the increasing incidence and prevalence of chronic conditions as the overall population ages is a major issue for health policy formulation. For example, the incidence of diabetes has steadily increased as more males and females have developed diabetes (Type I & II) year after year with age-standardized incidence rates of 3 per 100,000 people in 1995 to 4.9 per 100,000 in 2005. Similarly, the age-standardized incidence rate for asthma has increased from 6.4 per 100,000 in 1995 to 8.2 per 100,000 in 2005 (Public Health Agency of Canada-Surveillance Division-Centre for Chronic Disease Prevention and Control, 2008). Other chronic conditions have shown similar increasing trends

(Bodenheimer, Wagner, & Grumbach, 2002). The direct and indirect costs associated with diabetes and respiratory diseases in Canada are estimated to be $9.9 billion and $9.5 billion (2005 dollars) respectively (Patra et al., 2007). Further, there is a gap between rural and urban Canadians with regard to health determinants and health status. Rural Canadians have elevated levels of smoking and obesity, poorer dietary practices, and less leisure time physical activity compared to urban Canadians. Rural Canadians have higher rates of mortality associated with circulatory diseases, respiratory disease, diabetes and arthritis compared to their urban counterparts (Canadian Population Health Initiative, 2006).

Chronic disease and chronic illness are often used interchangeably in the literature. In the context of a patient or person-centred approach to understanding the chronic condition experience, differentiation is recommended. Chronic disease is defined on the basis of the biomedical disease classification of long duration and lack of cure whereas chronic illness is the personal experience of living with the afflictions that often accompany chronic disease (Martin, 2007).

Another major issue that Canadians face today is health care funding. This is exemplified by major contemporary undertakings such as the Romanow and Kirby reports, which attempt to resolve how much funding the health care system should receive, and to whom such funds should be allocated. These reports have been prevalent in the media and have fueled Canadian concerns over health care spending and the sustainability of the health system for the past few years. As a consequence, economic analysis of health care programs has received increased importance. Resources such as time, people, facilities, and equipment are scarce and choices must be made concerning their deployment. Any decision should be based on getting the most desired outcome for the lowest cost, in other words, choosing the most cost-effective alternative. An increase in the delivery of recommended preventive services and an improvement in the delivery of chronic illness care by family physicians could have an important influence on the health of Ontarians in rural communities. These improvements and a reduction in the ordering of inappropriate tests can occur at no net cost and have the potential to save the Ontario Ministry of Health and Long Term Care money

(Hogg, Baskerville, & Lemelin, 2005). The dissertation includes an implementation research study that is an exploratory investigation into the potential for TOF as an effective intervention for implementing chronic illness care management within rural primary care practices. The results of the study will inform the development and comprehensive evaluation of chronic care management models within primary care.

The TOF intervention is set within the Ontario primary care system and it is important to distinguish the difference between "primary care" and "primary health care". The term "primary care" generally describes family doctor-type services provided to individuals (Starfield, 1998) and does not contain any reference to system-level functions, such as universal access, public participation, or appropriate use of resources. On the other hand, many of the definitions of "primary health care" describe an approach to health policy and services provision (World Health Organization, 1978) which has as a defining characteristic the relationship between patient care and public health functions. The definition of the World Health Organization contains an ideology which includes in its activities the functions of primary care but which is based on the principles of universal access to care, coverage on the basis of need, commitment to health equity, community participation, and intersectoral approaches to health. The terms are very similar but they refer to two different concepts. The thesis adopts a definition of primary care which refers to family doctor-type services to individuals. Population-level, public health-type functions contained within the definition of "primary health care" are important but not within the scope of the thesis. Terminology aside, many health policy researchers are testing new models and conceptual frameworks for primary care that integrate the various players such as family physicians and other health care providers, public health functions, health care organizations, and community support services into a complete system in order to address complex health issues such as chronic illness (Glasgow & Emmons, 2007; Leischow et al., 2008).

This study was nested within the larger Chronic Illness Care Management (CICM) outreach facilitation study by the Department of Family Medicine of the University of Ottawa. The thesis is

distinguished from the larger University of Ottawa project as it includes a systematic review of the practice facilitation literature and evaluates the TOF process of CICM implementation, associated costs, and immediate outcomes in an effort to explore the potential of TOF in Ontario rural primary care practices. The first chapter covers the existing literature on the challenges of getting evidence into practice and the effectiveness of interventions designed to address the challenges with changing professional behaviour to improve performance. To help clarify the underlying theoretical rationale for interventions, a brief review of theories of behaviour change is provided highlighting the PRECEDE-PROCEED planned model of behaviour change. This is followed by a review of practice facilitation and its effectiveness, the state of telehealth, and models for chronic illness care management. Lastly, the study rationale, research questions and TOF intervention description are provided. Chapter two outlines the methods for both the systematic review of practice facilitation literature using meta-analysis and the mixed-methods approach for the exploratory evaluation of the TOF implementation of chronic care plans within rural primary care practices. Chapters three and four present the findings from the systematic review and the evaluation followed by chapter five where the key findings, implications for practice, implications for science, and study limitations are presented.

1.1 Literature Review

Programs which stress physician knowledge alone, such as traditional continuing medical education courses, are insufficient to change practice behaviour (Grimshaw & Russell, 1993; Davis, Thomson, Oxman, & Haynes, 1995; Oxman, Thomson, Davis, & Haynes, 1995; Tamblyn & Battista, 1998). There is also agreement that interventions which attend to many guideline adoption factors and that use two or more strategies in an intensive combined fashion, such as tailored practice or outreach facilitation, are more likely to result in improvement of practice behaviour as compared to single strategy interventions (Lomas & Haynes, 1988; Wensing & Grol, 1994; Wensing, van der Weijden, &

Grol, 1998). There is also growing evidence that telehealth and interactive video-consultation is effective and efficient in rural and remote areas for enhancing access to patient care (Jennett, Hall, Morin, & Watanabe, 1995), but few studies have addressed the effectiveness of educating providers and none have evaluated telehealth facilitation for clinical practice guideline implementation (Jennett et al., 2003).

1.1.1 The Evidence-Practice Gap

The gap between what is recommended in evidence-based practice guidelines and the actual performance of primary care practices is apparent in almost all forms of care delivery. This is despite the availability of a large volume of research evidence and guidance through accessing resources such as the Cochrane Collaboration Library (Higgins & Green, 2008), the Canadian Task Force on Preventive Health Care (Canadian Task Force on Preventive Health Care, 2004), and the Ontario Guidelines Advisory Committee (Guidelines Advisory Committee, 2004). There is commitment among policy-makers and primary care practitioners in many countries to embrace an evidence-based approach for practice, yet in contrast to the paradigm of evidence-based medicine, the efforts to change practice behaviour have not been implemented systematically (Shojania & Grimshaw, 2005).

The assumption that when research information is made available to practitioners it is accessed, appraised, and then applied in practices is largely discredited (Oxman et al., 1995; Bero et al., 1998; Grimshaw et al., 2001). Knowledge of a practice guideline or a research-based recommendation is important, but having knowledge is rarely sufficient to change practice behaviour (Solberg, Brekke, & Kottke, 1997a). The health field abounds with examples of how "knowledge" in itself fails to prompt desired behavioural results. In this way the challenges to changing professional behaviour in the primary care practice setting, may have many similarities to the challenges in changing the behaviour of individuals to adopt healthier eating, self-care, or non-smoking practices. An informed and educated individual is not necessarily a behaviourally responsive individual. The distinction between interventions that increase awareness and knowledge and those that bring about

changes in behaviour is fundamental to behaviour change theory (Abrams, Emmons, & Linnan, 1997). This distinction is helpful in understanding that dissemination and implementation of practice guidelines is a continuum, where dissemination involves raising awareness of evidence-based research and implementation involves getting the findings of research adopted into practice. The thesis includes a systematic review of the evidence for and determines the overall effect of practice facilitation as one type of implementation research strategy for getting evidence into practice.

Data on the level of adequate care across various primary and secondary preventive manoeuvres shows considerable variation and performance gaps. Hutchison, Woordward, Norman, Abelson, & Brown (1998) assessed the provision of preventive care by 62 family physicians in the Hamilton, Ontario area to unannounced standardized patients. For primary preventive manoeuvres, 79 per cent of eligible patient visits involved smoking cessation counseling, 59 per cent of eligible patients received counseling on exercise and physical activity, 45 per cent received counseling on diet and nutrition, and only 30 per cent of eligible patients were offered a flu vaccination. For secondary prevention, 80 per cent of eligible women were recommended to receive a mammogram, 90 per cent were offered a PAP smear, and 90 per cent had their blood pressure checked to screen for hypertension. Similarly, Kottke, Solberg, Brekke, Cabrera, & Marquez (1997) found that in a study of 6,830 patients from 44 primary-care clinics in Minneapolis-St.Paul Minnesota who responded to a mailed questionnaire, 84 per cent of those eligible were up-to-date for Pap tests, 68 per cent were up-to-date for a mammogram, and 88 per cent were up-to-date for having had their blood pressure checked. In contrast, only 47 per cent of those eligible were up-to-date for having been advised to quit smoking.

There is a great deal of variation in the rates of performance of preventive and chronic care within and between studies. The variation in performance within studies can be explained by a constellation of factors that include attributes of the physicians, the practice environment, attributes of patients, the health system and the broader environment (Frame, 1992). Variations between studies are also attributable to a number of methodological factors including the measurement methods used

(Montano & Phillips, 1995; Stange et al., 1998b); the various definitions used for the preventive behaviour under study, for example what constitutes smoking cessation counseling as opposed to simply taking a smoking history; the use of different screening guidelines (Smith & Herbert, 1993; Austin, Valente, Hasse, & Kues, 1997); and different study populations, for example STD screening in maternity patients versus the general population (Bowman, Russel, Boekeloo, Rafi, & Rabin, 1992; Alary, Joly, Moutquin, & Labrecque, 1993). Despite this variation in preventive performance, there is evidence that delivery of certain preventive measures has improved overtime. For example, mammography for women 50 to 69 years was being performed on 20 per cent of eligible women in the mid-1980s (Lewis, 1988) and is now at levels above 50 per cent of eligible women (Hutchison B et al., 1998; Gupta, Roos, Walld, Traverse, & Dahl, 2003) whereas cervical cancer screening among Manitoba women has remained relatively unchanged at close to 50 per cent from 1992 to 1999 (Gupta et al., 2003). Lemelin, Hogg and Baskerville (2001) studied 46 Health Service Organization practices in Ontario and found that the proportion of eligible patients who received eight recommended preventive manoeuvres was 53 per cent, while the proportion of eligible patients who received five inappropriate manoeuvres was 21 per cent. This is comparable to the finding that for 38 preventive care quality indicators in the United States, only 55 per cent of patients received the recommended care (McGlynn et al., 2003). Recently, Hogg and colleagues (2008a) repeated the 2001 study of outreach facilitation with a voluntary sample of 54 fee-for-service practices in Eastern Ontario and found no improvement with overall preventive performance rates of 51 per cent for nine recommended manoeuvres and 42 per cent for three non-recommended preventive manoeuvres.

Primary care performance in managing chronic illness is not any better (Grumbach & Bodenheimer, 2002) with only 27 per cent of patients with hypertension treated adequately (National Institutes of Health., 1997), 54 per cent of diabetic patients with hemoglobin A1c levels above 7.0 per cent (Clark et al., 2000), 20 per cent of diabetics received no eye exam over two years despite the recommended guideline being a dilated eye examination annually (Brechner et al., 1993), only 14 per cent of patients with coronary heart disease reach levels of low-density lipoprotein cholesterol

recommended by national standards (McBride et al., 2000), and only 42 per cent of tobacco users are counseled about smoking cessation by their physician (Hogg et al., 2008a).

Schuster, McGlynn and Brook (1998) reviewed 48 studies that looked at primary care delivery of preventive, acute and chronic care and determined that on average 50 per cent of patients receive recommended preventive care, 70 per cent receive recommended acute care (30 per cent receive contraindicated care), and 60 per cent received recommended care for chronic conditions (20 per cent receive contraindicated care). This finding provides evidence that physicians can provide care that is not recommended and can possibly do more harm than good. For example, there is no evidence to support the use of chest x-rays for occult lung disease, yet studies have shown that 13 per cent to 20 per cent of patients may still have x-rays ordered by their physicians as a screening test (Hutchison et al., 1998). Other examples include 60 per cent of physicians filling a prescription for antibiotics for patients diagnosed with a cold despite antibiotics being inappropriate given that a cold is caused by a virus for which antibiotics are not effective (Mainous & Hueston, 1996).

A 2004 survey of primary care patient experiences among adults in Australia, Canada, New Zealand, the United Kingdom, and the United States reveals that primary care system performance shortfalls are not unique to North America (Schoen et al., 2004). The survey revealed a failure to routinely make sure patients are up-to-date with recommended preventive care. For example, the percentage of elderly receiving a flu shot fell short of guidelines with Canada and New Zealand having the lowest rates at 66 per cent and 67 per cent respectively. The survey also revealed that at least half of adults in each country said that their doctor does not send reminders, has not recently provided advice or counseling on weight or exercise, has not asked if there were any emotional issues affecting their health in an effort to detect depressive symptoms, or has not given a plan to manage a patient's chronic condition at home. Overall, the survey of five countries reinforces that getting evidence into practice is not easily done despite the health system and deficiencies in medical care as measured by such items as the failure to give patients plans to manage chronic conditions at home and gaps in receipt of recommended preventive tests are widespread. Interestingly, 27 per cent of

patients surveyed in Canada responded that they are not very or not at all satisfied with choice of physician – significantly more dissatisfied than Australia, New Zealand, the United Kingdom and even the United States.

1.1.2 Challenges to Changing Practice Behaviour

Understanding the barriers or challenges to changing practice or professional behaviour is an important precursor to the implementation of interventions to increase evidence-based practice. Numerous authors and several systematic reviews have identified barriers to the adoption of preventive and chronic care health services into the clinical practice of primary health care professionals (Hutchison, Abelson, Woodward, & Norman, 1996; Stange, 1996b; Hulscher, VanDrenth, Mokkink, VanderWouden, & Grol, 1997; Cabana et al., 1999; McKenna, Ashton, & Keeney, 2004; Grimshaw et al., 2005). The factors that facilitate adoption of evidence-based guidelines into practice are not usually emphasized, but several studies have done so (Saillour-Glenisson & Michel, 2003; Powell-Cope, Luther, Neugaard, Vara, & Nelson, 2004; Saleem et al., 2005). For example, older doctors generally have more problems with adopting new information and guidelines than younger doctors (Saillour-Glenisson & Michel, 2003). We can view being old as a barrier or view being young as a facilitator. However, characteristics such as age, personality and intelligence are not amenable to change, even though they may be important predictors of behaviour, and successful interventions are likely to focus on factors such as knowledge, skills, attitudes, and self-efficacy which can be influenced positively towards adoption of evidence-based practice (Walker et al., 2003).

Ferlie and Shortell (2001) have suggested four levels at which interventions to improve the quality of health care might operate: the individual health professional; health care groups or teams; organizations providing health care; and the larger environment in which individuals are embedded. Alternatively, the barriers and facilitators to implementation of evidence can also be summarized in

terms of the professional, organizational and broader social-environmental context (Grol & Grimshaw, 2003).

1.1.3 Individual Barriers and Change Facilitators (Professional Context)

Barriers to and facilitators for the adoption of evidence-based guidelines by the physician include competence, motivation, attitude, and personal characteristics. Competent physicians are familiar and up-to-date with the literature, can critically appraise evidence, follow continuing medical education (CME) programs, implement new information before forgetting it, are aware of the gaps in their performance, and have the opportunity to implement behaviour changes to address the gaps (Belcher, Berg, & Inui, 1988; Hutchison et al., 1996; Grol & Grimshaw, 1999; Grol & Grimshaw, 2003; McKenna et al., 2004). Physicians who are motivated to improve the quality of the care they deliver and value the provision of evidence-based care are also more likely to change (Grol, 1997). Physicians through their training can acquire normative beliefs and attitudes that hinder efforts to change such as the management of an established disease being a greater challenge than performing preventive care (Orlandi, 1987) or that preventive interventions such as counseling are not effective (Hutchison et al., 1996). Physicians can have unrealistic perceptions of their performance and therefore not see the need to change (Hutchison et al., 1996). On the other hand, a perceived gap between the level of quality care physicians want to provide and the level they do provide can provide motivation for change. Solberg and colleagues (1997a) have demonstrated that while favorable attitudes may be helpful, they are clearly insufficient to affect actual behaviour change in the delivery of services. Generally, professional groups welcome and support evidence-based practice, however there are clear differences in abilities to critically appraise evidence and perspectives on working inter-professionally (O'Donnell, 2004). Cabana et al. (1999) reviewed 76 studies describing at least one barrier to the adherence to clinical practice guidelines and identified lack of awareness or familiarity with the guidelines, lack of agreement, self-efficacy, outcome expectancies, and the inertia of previous practice as barriers to evidence-based practice across a majority of studies.

Personal characteristics such as age, training and experience can positively influence behaviour. For example, younger or female physicians may provide more preventive health services to patients than their older male counterparts (Osborne, Bird, McPhee, Rodnick, & Fordham, 1991). Membership in professional organizations or having a teaching affiliation has been shown to be related to being better informed and more inclined to accept innovations (Stange et al., 1992; Stange, 1996b). There is a constellation of individual attributes that can hinder or facilitate the adoption of new behaviours such as the implementation of evidence-based preventive or chronic illness care guidelines. Physicians generally agree that providing improved care for chronically ill patients is a good idea, but discrepancy between this positive attitude and their actual behaviour is probably accounted for by the lack of change facilitators in the practice-based environment or organizational context.

1.1.4 Practice-based Barriers and Change Facilitators (Organizational Context)

Practice-based facilitators include whether the practice is group or solo; patients' opinions, requirements, preferences and resistance; the views of colleagues and staff; logistic and organizational factors such as existing routines, time constraints, lack of administrative support systems such as reminder systems; and, inadequate reimbursement (Burack, 1989; Frame, 1992; Kottke, Brekke, & Solberg, 1993; Hutchison et al., 1996; Stange, 1996b; Cabana et al., 1999; Grol & Grimshaw, 2003). In fee-for-service settings, physicians in group practices appear to perform more preventive care and chronic care than those in solo practices (Kottke, Battista, Defriese, & Brekke, 1988; Tamblyn & Battista, 1998; Wagner, Davis, Schaefer, von Korgg, & Austin, 1999). In addition, group practices are likely to have more allied health personnel such as nurses and a high nurse to physician ratio has been shown to be significantly associated with preventive care performance (Patten, Baskerville, Lemelin, & Hogg, 1998).

The population of patients served by the practice appears to influence the approach to providing care. Infrequent exposure to specific types of patient problems and the age mix of the

patient population influences practice style with more conservative approaches to health problems being noted among physicians who have a greater proportion of elderly in the practice (Lomas & Haynes, 1988; Tamblyn & Battista, 1998). The opportunity for delivering preventive and chronic illness care is great with more than 80 per cent of Canadians reporting that they have had contact with a medical doctor in the last year (Statistics Canada, 2003; Schoen et al., 2004). However, the amount of prevention and other evidence-based practice that is delivered to patients may depend on the nature of patient-physician interaction and the expectations and preferences of both parties (Cabana et al., 1999).

Change can be facilitated when the proposed changes fit with the organization's priorities (Orlandi, 1987). In addition, colleagues, practice staff, managers or opinion leaders, and key persons within the physician's social network can facilitate practice changes (Grol, 1997; O'Donnell, 2004). The organization and structure of the practice can act as an impediment to change. A majority of physicians report that the lack of time and the lack of effective systems for such things as reminding physicians to perform preventive services are organizational problems (Hutchison et al., 1996). Proposed organizational changes can interfere with existing practice routines and require alterations in staff roles and practice management. The individuals within the practice can be reluctant to go through the tedious process of developing new skills or habits to support the required changes. Fee-for-service practices are less likely to have explicit policies on prevention and chronic care and the use of personnel to deliver care as compared to managed group settings such as Ontario Community Health Centres, for example, despite physicians in both environments equally recognizing the importance of providing preventive health services (Abelson & Lomas, 1990).

Time is the most frequently cited barrier regarding the implementation of evidence-based practice (Cabana et al., 1999; Young & Ward, 2001; Grol & Grimshaw, 2003; O'Donnell, 2004). This includes both protected time to learn and improve critical appraisal skills as well as the time needed to implement the recommended evidence. Yarnall, Pollak, Ostbye, Krause, & Michener (2003) raised the question of whether there is enough time to implement the list of recommended

services from the U.S. Preventive Services Task Force's "Guide to Clinical Preventive Services" and concluded that there was not. They determined that it would take 1,773 hours of a physician's time annually (or 7.4 hours per working day) to provide all the recommended preventive services to children, adults and pregnant women based on a practice population of 2,500 people – leaving no time to practice diagnosis and treatment of acute or chronic illnesses. Yarnall and colleagues (2003) suggest that better ways to both fund and pay for the delivery of primary care need to be explored such as having lower cost nurse practitioners and physician assistants provide preventive and wellness services.

Health Service Organizations (HSOs) in Ontario were a medical practice model where the physicians agreed to be reimbursed primarily on a capitated basis rather than by fee-for-service. This model has recently evolved to Primary Care and Family Health Networks as part of Ontario primary health care reform. HSOs have been found to deliver significantly more recommended preventive services than their fee-for-service counterparts based on data collected via simulated patient visits (Hutchison et al., 1998). Other research based on physician self-report has shown that alternative modes of delivery such as HSOs and Community Health Centres do not significantly improve the level of disease prevention and health promotion activity as compared to fee-for-service practices (Abelson & Lomas, 1990).

1.1.5 Social or Environmental Barriers and Change Facilitators (Environmental Context)

Physicians site patients' refusal of the clinical manoeuvre, patients' lack of motivation, patients' expectations and that within the limited amount of time for the office visit priority is given to the presenting problem as barriers (Attarian L, Fleming M, Barron P, & Strecher V, 1987; Abelson & Lomas, 1990; Hutchison et al., 1996). A study by Stange and colleagues (1998a) involved observing 4,454 patient visits and revealed that family practice is complex and that patients (58 per cent) generally visit their family doctor only when they are sick and not for primary or secondary preventive care even though they recognize the role of the family doctor in lifestyle counseling and

screening for disease or complications associated with chronic illness. As a consequence, the family physician has to remember the eligible preventive manoeuvres during a regular office visit and convince the patient that they should be performed or to come back for a follow-up visit. At the same time, patient knowledge generates informed demand which influences physician decision making to provide services whether the procedure being demanded is evidenced-based or not (Lomas & Haynes, 1988).

Environmentally driven economic factors coupled with physicians' expectations of income influence the physician's approach to delivery of preventive care. A survey of 480 fee-for-service Ontario family physicians revealed that not being reimbursed adequately for providing preventive services to patients was only an issue for 15 per cent of respondents (Hutchison et al., 1996). However, other research in the U.S. has shown that one reason for the poor application of preventive services for patients is the absence of any reasonable remuneration schedule for preventive services (Lurie, Manning, Peterson, & Goldberg, 1987). Adequate reimbursement may facilitate the delivery of both preventive care and chronic illness care management. Whether reimbursement should take the form of an increased fee for such items as care plans undertaken or the form of a salary for the physician is a point of contention. Salaried physicians in the Montreal area have been shown to be more likely than fee-for-service physicians to use interventions with low economic returns such as preventive services (Renaud, Beauchemin, Lalonde, Poirier, & Berthiaume, 1980). In the U.S., physicians who work in areas with a high density of doctors where the competition for "the buck" is greater and those who report incomes over $185,000 (adjusted for 2.5% inflation) tend to employ interventions with higher levels of remuneration (Hemenway & Fallon, 1985; Eisenberg, 2002). Different reimbursement plans from government and third-party payers create different incentives and give rise to different policies within the practice, with physicians' tendency to protect their economic self-interest as the mediating factor (Lomas & Haynes, 1988). Governments, rules, laws, third-party payers, and fear of litigation can also interfere with behaviour change (Grol & Grimshaw, 2003). Further, a preponderance of agencies in the environment putting forth recommendations for care

provision -- some evidence-based and some not -- can make knowing what recommendations to follow difficult (McKenna et al., 2004).

The interaction of the determinants of behaviour change between the physician, the organization of the practice, the patient and other exogenous environmental factors make the facilitation and delivery of evidence-based practice difficult and complex. The barriers include the guidelines themselves perceived as being of poor quality or too difficult to implement, patients' expectations, time constraints, insufficient staff or consultant support, poor reimbursement, organizational restrictions, and increased practice costs (Cabana et al., 1999; Grol & Grimshaw, 2003; McKenna et al., 2004). Implementing guidelines within a practice setting is a step by step process and each step may require the attendance of specific facilitators of behaviour change. Understanding the complexity of the professional, practice-based and environmental context (Miller, Crabtree, McDaniel, & Stange, 1998) and the tailoring of implementation strategies to address identified barriers and facilitate change appears to be fundamental in closing the evidence-practice gap and improving quality of care.

1.1.6 The PRECEDE-PROCEED Planning Model of Behaviour Change

The study of implementation research to promote the uptake of research findings and hence to reduce inappropriate and increase appropriate care has been subject to at least 50 systematic reviews covering various interventions to enable healthcare professionals to use research findings more effectively (Oxman et al., 1995; Bero et al., 1998; Grimshaw et al., 2001; Grol & Grimshaw, 2003; Grimshaw et al., 2004). Despite all of the research that has taken place on getting evidence into practice, there has been relatively little concern for the theoretical constructs behind the interventions that have been studied which would allow a view into the "black box" of understanding why an intervention has worked or has not worked. Theory-based studies or interventions which draw from theory a priori can provide practical insight into the causes of specific physician and practice behaviour excesses or deficits, specify intervention targets, and clarify the nature of interventions that

are more likely to have an impact on intended outcomes. Unfortunately, the review of 235 interventions by Grimshaw and colleagues (2004) revealed that only 10 per cent of the authors provided an underlying theoretical rationale for the particular intervention they had selected

Recently, Eccles et al. (2005) have made a strong case for the use of theory in promoting the uptake of research findings by health care professionals. They argue that it is time to raise implementation research to the level of other clinical sciences such as drug evaluation since much of the current position in implementation research is akin to exploring the clinical role of an antihypertensive drug without any understanding of the pharmacology of the drug, the physiology of blood pressure control, or the pathophysiology of hypertension. They argue that the majority of the implementation research trials that have taken place are an expensive version of trial-and-error, with no a priori reason to expect success or to have confidence of being able to replicate success if it is achieved (Eccles et al., 2005). Eccles et al. support a framework such as the UK Medical Research Council framework for the development and evaluation of complex interventions which has the following phases: (1) 'Pre-Clinical' or theoretical (2) Phase I or modeling (3) Phase II or exploratory trial (4) Phase III or definitive trial (5) Phase IV or long term program implementation (Campbell et al., 2000).

The first step in evaluating a complex intervention is to establish the theoretical basis that suggests that the intervention should have the effect(s) expected of it. This may be formal theory of individual or organizational behaviour or it may be informal evidence regarding organizational constraints or types of patients' or health professionals' beliefs that may promote or inhibit behavioural change. This phase of assessing theory and evidence may identify in preliminary form the kind of intervention needed and study design. Without a theoretical base, causal relationships among the various antecedent variables (the targeted behaviour, professional characteristics, constraints, and environmental factors) and the delivery of improved primary care health services are unspecified, making the planning of intervention approaches imprecise. Therefore, generalizing from

the existing published research is problematic since it provides little information to guide the choice or optimize the components of complex implementation research interventions. Health care resources are limited and decision-makers need to understand what will best achieve an intended effect, how it will happen, for how long, and at what cost.

Oxman et al. (2005) make an interesting counter point to the call from Eccles et al. to raise implementation research to the level of other clinical sciences by making it more theoretical. In the "OFF theory of research utilization" Oxman et al. make the argument that perhaps less theory is required given that there are already potentially over 100 theories with more than a 120 constructs to explain evidence-based practice and that shifting research resources away from applied research to basic theoretical research is unwarranted. They propose more collaborative work across disciplines, based on common sense (sound practical judgment that is independent of specialized knowledge or training), sound logic, and rigorous evidence to help decision-makers make informed choices. They believe that more rigorous empirical research evidence focused on outcomes and less theoretical work will advance the field of implementation research.

There are a number of theories that can be considered for interventions concerned with managing or facilitating behaviour change within primary care settings. Theory has been defined as a coherent and non-contradictory set of statements, concepts or ideas that organizes, predicts and explains phenomena, events, and behavior (Bem & Looren-de-Jong, 1997). As described earlier, theory can help decision-makers understand what strategies or interventions are likely to successfully overcome constraints and change behaviour. Theories can also provide a framework for interpreting a study's findings in its own setting and, depending on the generalizability of the findings, in other settings. Whether a theory is considered true or not depends on both its ability to withstand efforts to disprove it or show it to be false, as well as its usefulness to practitioners (Grol & Grimshaw, 1999). Theories can be classified according to those that focus primarily on intrapersonal or individual processes and those that focus on the interpersonal and external processes (Grol, 1997). Some

examples of theories that focus on intrapersonal processes include the Health Belief Model (Janz, Champion, & Strecher, 2002) which emphasize that change is driven by the desire to learn (value) and the expectation of being professionally competent (expectancy), the Theory of Planned Behaviour (Ajzen, 1991) which explains behaviour change according to motivation or behavioural intention (Walker et al., 2003), and the Transtheoretical Model of behavior change which integrates a number of principles across major theories of psychotherapy and describes behaviour change in terms of a dynamic series of stages (Prochaska, DiClemente, & Norcross, 1992; Gross et al., 2001). Examples of theories that focus on how individuals respond to external influences or are motivated to change include, for example, Social Cognitive Theory (Bandura, 1986) and social influence theories (Mittman, Tonesk, & Jacobson, 1992). Considerable overlap exists between the key concepts and constructs of many of the intra and interpersonal behaviour change theories. Theories which explain behavior change primarily in terms of the larger community or organization include Rogers' diffusion of innovation theory (Rogers, 1995) and theories of organizational change (Steckler, Goodman, & Kegler, 2002) which consider the importance of various societal and institutional factors (political climate, culture, capacity) in creating change.

In order to be able to apply the various behaviour change theories in such a manner as to successfully implement an important change in primary care practice such as chronic illness care management to improve quality of care, planned models of change are considered key. Planned models of change refer to deliberate efforts to engineer change within groups that vary in size and setting. Examples of planned change models are the Green and Kreuter (1999) PRECEDE-PROCEED model, social marketing models (Maibach, Rothschild, & Novelli, 2002), and the Ottawa Model of Research Use (Logan & Graham, 1998). Different groups of health professionals will experience different obstacles or may function at different levels of handling change. Implementing changes in the practice setting is usually not a single action but involves a well planned stepwise process, including a combination of interventions, linked to specific obstacles or barriers to change.

All the different approaches and theories for getting evidence into practice may be valid and effective, provided that they are adapted or tailored to the specific features of the change proposal, the target group, the setting, and the obstacles to change encountered (Grol, 1997). A stepwise planning model for change such as the PRECEDE-PROCEED model allows for an integrated and systematic approach to behaviour change within the practice setting.

The PRECEDE-PROCEED planning model does not attempt to predict or explain the relationship among factors thought to be associated with the outcome of interest. Instead, it provides a structure for applying theories so that the most appropriate intervention strategies can be identified and implemented (Gielen & McDonald, 2002). It has been used widely for the planning and evaluation of service programs delivered in practice settings since the 1970s (Thompson, Taplin, Mcafee, Mandelson, & Smith, 1995; Green, 2006b) with PRECEDE being an acronym for Predisposing, Reinforcing, and Enabling Constructs in Educational/Environmental Diagnosis and Evaluation. PROCEED (Policy, Regulatory and Organizational Constructs in Educational and Environmental Development) was added to the model in 1991 to recognize the importance of environmental factors as determinants of behaviour. The model leads the user through a series of phases or steps involving the planning, implementing, and evaluating of an intervention which makes it very appropriate for implementation research. A full graphical depiction of the PRECEDE-PROCEED framework can be found at http://lgreen.net/precede.htm. There a number of assessment phases to the framework including social, epidemiological, behavioural, environmental and organizational that are intended to guide the program developer and apply the relevant theories in order to increase the likelihood that the program or intervention will be relevant and effective. One phase, educational and organizational assessment, provides a framework for identifying potential factors that influence whether evidence is adopted or behaviour change takes place. In this phase the user considers three categories of factors that influence practice behaviour: 1) predisposing factors are the “knowledge, attitudes, beliefs, values, and perceptions that facilitate or hinder motivation for

change"; 2) enabling factors are the "skills, resources, or barriers that can help or hinder the desired behavioural changes as well as environmental changes"; and 3) reinforcing factors are the "rewards received and the feedback the learner receives from others following adoption of a behaviour"(Green & Kreuter, 1999, p. 40-41).

Practice environments are complex settings made of a number of individuals who interact with patients, other stakeholders, the policy and regulatory environment to achieve positive health outcomes. Therefore, a framework such as PRECEDE-PROCEED which applies the necessary intrapersonal, interpersonal and broader organizational and ecological theories as needed to affect change appears suitable for this complexity. By assessing the extent to which various practice facilitation interventions have developed strategies in a stepwise fashion to address the predisposing, enabling and reinforcing factors may allow for a better interpretation of the findings and help decision-makers better understand how and why practice facilitation is able to change practice behaviour and support the successful implementation of chronic illness care management in primary care.

1.2 Systematic Reviews of Professional Behaviour Change Interventions

The literature on implementing evidence-based practice in primary care is vast and there are a growing number of published systematic reviews on the effectiveness of different interventions to change clinical practice. In 2008, Prior, Guerin, & Grimmer-Somers (2008) conducted an overview of 33 systematic reviews of clinical guideline implementation strategies designed to assist practitioners in making clinical decisions informed by the best available evidence. Their overview included work published between 1987 and 2007 and determined using vote counting methods that implementation strategies involving decision support systems such as computer-based reminder systems and interactive educational outreach interventions were effective in the implementation of clinical guidelines. They also found convincing evidence for the using of multifaceted interventions. As would be expected for busy health practitioners, ineffective implementation strategies from the

overview included didactic education and passive dissemination strategies such as posting guidelines on a web site. Prior and colleagues (2008) found little research on neither the costs of guideline implementation nor the relative costs versus benefits.

In 2001, Grimshaw and colleagues (2001) provided an overview of 41 systematic reviews published between 1966 and 1998 on changing provider behaviour and improving quality of care. The interventions to promote behavioural change that were identified included provision of educational materials; conference participation; local consensus building; educational outreach visits; local opinion leaders; patient-mediated interventions such as direct mailings to patients; audit and feedback; manual or computerized reminder systems; marketing; and multifaceted interventions involving two or more of the above. This review found that most well-designed interventions had some effects (average of about 10 per cent for main targets) and that none of the interventions is superior for all changes in all settings. Promising interventions identified included educational outreach (for prescribing) and reminder systems. Grimshaw et al. (2001) also found that multifaceted interventions targeting different barriers to change are more likely to be effective than single interventions. However, they noted the difficulty to disentangle which components of multifaceted interventions are likely to be effective and complementary under different settings and that economic assessment of intervention strategies is scarce as is information on patient outcomes.

An earlier 1998 overview of 18 systematic reviews from the same team (Bero et al., 1998) found similar common themes in performance improvements through interventions. That is, computer decision support systems – including computerized reminders - improved doctors' performance, educational outreach visits were beneficial regarding prescribing decisions, and multiple interventions appeared to be more effective than single interventions. They also noted that none of the reviews addressed the cost effectiveness of interventions. Further they found a number of methodological difficulties associated with literature reviews. That is they generally failed to identify criteria for selecting articles; rarely addressed such errors as interclass correlation; followed vote-

counting review methods rather than effect size determination; they did not avoid bias; and did not report criteria that were used to assess validity.

Oxman et al. (1995) reviewed 102 trials which focused on one or more interventions aimed at improving health professionals' performance. These included the use of educational materials, conferences, outreach visits, academic detailing (Soumerai & Avorn, 1990), local opinion leaders, patient-mediated interventions and local consensus approaches. Their results were the same as later reviews and they also argue that "interventions to improve professional performance are complex, and any cogent interpretation of the results of these trials requires a disentangling of the variation in the characteristics of the targeted professionals, the interventions studied, the targeted behaviors and the study designs" (Oxman et al., 1995, p. 1425). Nonetheless they conclude that some interventions are available such as academic detailing and educational outreach that if used effectively could improve practice care delivery, based on the best evidence available. In addition, they point out that "closer collaboration of researchers in the area of health professional performance, health services and quality assurance appears to be both desirable and necessary" (Oxman et al., 1995, p. 1427).

The systematic review findings from over more than a decade demonstrate that there is a considerable body of primary and secondary evidence about guideline implementation strategies. However, methodological quality of the evidence is variable (Grimshaw, Eccles, Walker, & Thomas, 2002; Prior et al., 2008), more research on environmental, organizational and individual clinician factors associated with effective implementation is needed (Hogg, Rowan, Russell, Geneau, & Muldoon, 2008c), little evidence of the long-term effects of interventions on practice outcomes exists (Stange, Goodwin, Zyzanski, & Dietrich, 2003), and research into the costs and cost-benefit analysis of guideline implementation strategies is necessary (Grimshaw et al., 2004).

1.2.1 Single versus Multiple Intervention Strategies

Various interventions have been tried to overcome obstacles to implement clinical practice guidelines. Bero and coworkers (Bero et al., 1998) found in a systematic review of 18 selected

literature reviews that multiple interventions appeared to be more effective than single interventions. Ten years later, Prior and colleagues (2008) conducted their overview of 33 selected systematic reviews and also identified that multifaceted implementation strategies consistently result in significant improvements in guideline compliance and behaviour change.

Through their review of 102 trials, Oxman and his colleagues found that although many single interventions have modest or negligible practical effects when used alone, when coupled or combined with other intervention strategies the effects may be cumulative and significant in changing physician behavior and improving health outcomes (Oxman et al, 1995; Davis et al., 1995). Hulscher, Wensing, van der Weijden, & Grol (2001) confirmed that it is difficult to predict the effect of a single intervention on prevention outcomes, and that multifaceted interventions tend to be more effective. Wensing & Grol (1994) reviewed 61 randomized controlled trials. The interventions were classified into information transfer, information linked to performance, learning through social influence, and management support. They found that information transfer alone was only effective in 11 per cent of studies, whereas combinations of information transfer and learning through social influence or management support were effective in 50 per cent and 43 per cent of studies respectively. Information linked to performance was effective in 67 per cent of studies and 83 per cent of studies involving a combination of three or more interventions were effective. However, intervention effectiveness varies considerably and there is no theoretical base to explain why certain types of interventions work better than others (Wensing et al., 1998).

The research into multifaceted approaches for improving practice performance has demonstrated that single interventions are less likely to result in significant improvement of practice behavior as compared to interventions that attend to many guideline adoption factors and that use two or more strategies in an intensive combined intervention (Carney, Dietrich, Keller, & O'Connor, 1992; Grimshaw & Russell, 1993; Oxman et al., 1995; Leininger et al., 1996; Bero et al., 1998). Further, a convened panel of experts in clinical guideline implementation has concluded that guideline implementation efforts must use multiple strategies that take account of multiple

characteristics of the guideline, practice organization, and the external environment (Solberg, Brekke, Fazio, & Fowles, 2000). Programs that stress physician knowledge alone, such as traditional CME and dissemination of guidelines, are insufficient to change practice behavior (Davis et al., 1995; Tamblyn & Battista, 1998). O'Brien's et al. (1997) Cochrane review of 13 studies on the effect of educational outreach visits on professional practice concludes that visits are effective, particularly when combined with social marketing, while pointing out that the cost-effectiveness of the visits has not been properly evaluated. A recent update to the Cochrane educational outreach systematic review included 69 studies and found that educational outreach interventions alone and in combination with other interventions have effects that are relatively consistent and small, but potentially important (O'Brien et al., 2007). However, Grimshaw and colleagues systematically reviewed 235 randomized and controlled trials on implementing evidence-based guidelines and concluded that multifaceted interventions as a whole did not appear more effective than single interventions and that implementation research or quality improvement approaches in general still need a theoretical foundation to understand provider and organizational change and to better guide the choice of interventions (Grimshaw & Eccles, 2004; Grimshaw et al., 2005).

1.3 Select Interventions to Improve Evidence-Based Practice

To date systematic reviews have generally shown that interventions involving educational outreach or academic detailing, manual or computerized reminder systems, and multifaceted interventions such as practice facilitation are mostly effective for the implementation of practice guidelines covering such areas of primary care as prevention, drug prescribing, and chronic disease management (Grol & Grimshaw, 2003). For example, the research into multifaceted approaches for improving preventive care performance has demonstrated that an organized system consisting of a model or framework as well as appropriate sets of tools can increase preventive care that is delivered in a busy primary care practice (Carney et al., 1992; Dietrich, Woodruff, & Carney, 1994; McVea K et al., 1996; Palmer et al., 1996; Margolis et al., 2004). An example is the work of Carney et al.

(1992), where they provide evidence of how the use of a multifaceted "office system" intervention can be successfully adopted by primary care providers to improve cancer prevention. In their study, all the practices randomly assigned to the intervention group succeeded in adopting at least one of the office system tools (flow sheets); and between a third and three quarters of the practices also adopted other intervention tools (patient education materials, prevention posters, health maintenance diaries, prevention prescription pads, etc).

O'Brien's et al. (1997) Cochrane review of 13 studies using vote counting methods on the effect of educational outreach visits or academic detailing on professional practice concludes that visits are effective when combined with additional interventions to reduce inappropriate prescribing by physicians, while pointing out that the cost-effectiveness of the visits has not been properly evaluated. The 2004 Grimshaw et al. review also found that educational outreach interventions show positive effects, however they point out that educational outreach interventions that have additional intervention components are indiscernible from other multifaceted interventions. Hall, Eccles, Barton, Steen, & Campbell (2001) observed no effect of untargeted educational outreach whereas Freemantle, Nazareth, Eccles, Wood, & Haines (2002) did observe a positive effect on four areas of prescribing based on a randomized controlled trial evaluating the effect of community pharmacists as outreach visitors.

As with other tools, the effectiveness of reminder systems varies depending on factors such as reminder type (active, computerized, manual, etc.) and practice characteristics. Harris, O'Malley, Fletcher, & Knight (1990) studied the impact of different reminders systems (no reminder, manual and computerized) on the performance of seven preventive procedures (two types of immunizations, four cancer screening tests and tonometry for glaucoma). They found that preventive performance improved for all procedures regardless of the type of reminder system, but the increase was significantly higher (53 per cent) for computerized reminders systems compared to manual systems (43 per cent). They also identified that the improvement in performance varied depending on the

procedure, ranging from no change at all to a 47 per cent increase, pointing out the complexity of factors influencing preventive manoeuvres.

Tierney, Hui, & MacDonald (1986) reported from their randomized controlled trial that having immediate reminders increased physician compliance with preventive care protocols more so than delayed feedback. Frame (1990) argued that computerized systems for generating appropriate reminder systems that are simple, not time consuming or expensive and that have the correct data can be problematic for some practices. Frame, Zimmer, Werth, & Martens (1991) further maintain that many computerized tracking systems are inappropriate for small practices for the following reasons: they are linked to large data systems and are therefore quite expensive; data entry is slow; health maintenance data information is usually limited in content and application; and physician reminders are created only for patients with an appointment (Frame, Zimmer, Werth, & Martens, 1994). In another study, McDowell, Newell, & Rosser (1990) found that in encouraging cervical screening in family practice, reminders that were issued by a physician produced a more effective screening compliance than either the physician being issued with the names of those ready for screening, or by a reminder phone call being made by the practice nurse. The large systematic review conducted by Grimshaw and colleagues (2005) determined that reminder system interventions for implementing practice guidelines showed the strongest effects compared to other implementation research strategies.

McGinnis (1988) has noted the complex interrelationships among different independent, intervening and constraining variables to the adoption of clinical practice guidelines. These variables in combination make it difficult to achieve improvements in clinical performance. Further, given the diversity of practice environments it is unlikely that "one size fits all" approaches to improving preventive care will ever be able to address the needs of all providers and their patients (Stange, 1996a). This realization suggests that another important attribute of successful implementation efforts to get evidence into practice is the tailoring of the intervention to the unique circumstances of the particular guideline to be adopted and the practice environment. Stange et al. (2003) found that

there is evidence that an approach based on practice-individualization can result in beneficial effects of interventions after one year. In their report they attribute the sustainability of the intervention effect partly to the practice individualized approach during the intervention. For them, the tailoring of tools and approaches to the practices' unique motivations, structures and processes makes their adoption and institutionalization much more likely.

The value of tailoring change strategies in other clinical contexts and to specific aspects of service delivery, specific health conditions or to patients is also regarded positively by other researchers. For instance, Glasgow, Goldstein, Ockene, & Pronk (2004) consider that behavior change principles identified for individuals can also be applied at the clinic level to produce patient behaviour change, and that for those changes to crystallize it is central to customize change plans to meet the needs of the office setting: "Just as tailoring to an individual's risk, preferences and social environment enhance success at the individual level, customizing how a practice will implement the 5A's [assess, advise, agree, assist and arrange] is critical"(p. 94). Following this line of thought, a randomized trial is being conducted "…to evaluate the effects of a tailored intervention to support the implementation of systematically developed guidelines for the use of antihypertensive and cholesterol-lowering drugs for the primary prevention of cardiovascular disease" (Fretheim, Oxman, Treweek, & Bjorndal, 2003, p 1). Although the results from this trial have not been published yet, results from another study focusing on a tailored academic detailing intervention to promote physician delivered, smoking cessation treatment has demonstrated significant increases in patient quit rates for those physicians who participated in the tailored academic detailing intervention (Goldstein et al., 2003; Glasgow et al., 2004). A recent systematic review to assess the effectiveness of strategies tailored to address specific, identified barriers to change in professional performance found that interventions tailored to prospectively identify barriers may improve care and patient outcomes but the effectiveness of tailored interventions remains uncertain and more rigorous trials (including process evaluations) are needed (Cheater et al., 2005).

There has emerged an understanding that doctors' offices are complex systems which require internal organizational change of practice operation in order to successfully implement evidence-based guidelines (Committee on Quality of Health Care in America-Institute of Medicine, 2001; Margolis et al., 2004). However, there has been little research on how best to implement organizational change in primary care with a system of mainly individual practices with a range of different characteristics and needs (Cohen et al., 2004). There is little evidence of research in this area, although the National Health Service trusts and the Australian Divisions of General Practice are mandated to provide implementation support (Australian Divisions of General Practice, 2005), and in the United States the Agency for Healthcare Research and Quality (AHRQ) conducts work in this area. The AHRQ (2000) states that there is information indicating that applying a system, defined as "…a process that integrates staff roles, responsibilities, and tools for the routine delivery of preventive care" (p. 2), increases the delivery of preventive services in clinical settings. Leininger and coworkers (1996) argue that one of the main reasons why preventive services are not used as frequently as they should be is due to a lack of organized and systemic approaches in practices.

Several efforts have emerged to conceptualize and guide system implementation and change at the practice level. Miller and colleagues (1998) recommend complexity theory as a way of implementing change in family medicine. They argue that practices are complex systems made up of patients, office staff and physicians who generate income, undertake organizational operations and deliver patient care. According to Miller and coworkers, joining, as well as transforming and learning are required to change practice characteristics and the behavior of practitioners. Cohen et al. (2004) developed a practice change model from a quality improvement intervention that was successful in improving the use of preventive manoeuvres. They found that key ingredients of success included motivating key stakeholders to change; having resources for change that were personal, interactive and instrumental; having the community and healthcare environment as motivators; and providing opportunities for change. Elwyn and Hocking (2000) found that it wasn't possible to introduce professional and practice plans in publicly funded systems without focusing on management

structures and educational plans, the basis for providing support for introducing changes. Grol & Grimshaw (1999) maintain that implementing quality improvements in family medicine is a slow process resulting in a modest absolute improvement of about 10 per cent in process-of-care indicators, and that evidence-based implementation approaches should be used (Grimshaw & Eccles, 2004). McBride and coworkers (2000) maintain that improving prevention services is complex and requires further investigation. As presented earlier in the reviews of practice guideline implementation strategies, Grimshaw and colleagues (2004) and Shojania and Grimshaw (2005) conclude that quality improvement approaches still need a theoretical foundation to understand provider and organizational change and guide the choice of specific interventions.

This narrative review has summarized a number of the key attributes to improve evidence-base practice. They include the necessity of a tailored and systematic approach to change which considers the needs of a number of key stakeholders as well as the internal and external management structures of the organization. In addition, multifaceted interventions which involve outreach or other professionals working with providers within the practice environment and implementing solutions such as chronic care plans and reminder systems would appear to be important for successful change. Although Grimshaw et al. (2005) found that multifaceted interventions as a whole did not appear more effective than single interventions, their sub-analyses did show that multifaceted interventions employing educational outreach or organizational change strategies and reminder systems had large effects, however, there were only six studies out of 235 considered. More recent reviews have concluded that successful guidelines implementation strategies should be multifaceted and actively engage physicians throughout the process (Prior et al., 2008). Practice facilitation appears to be a multifaceted approach which incorporates key attributes to improving evidence-based practice.

1.4 Practice Facilitation

Kitson, Harvey, & McCormack (1998) described facilitation as “a technique by which one person makes things easier for others” (p. 152). Facilitation, according to the Oxford Dictionary

(1989), is defined as "... to make easier, to promote, to help forward; to lessen the labour of ..." At the center of both definitions rests the notion of providing support for a process to progress. In the general context of group work and dynamics, Bentley (1994) expands and sharpens this notion when stating that facilitation is the provision of opportunity, encouragement and support for a group to succeed in achieving its own objectives by enabling the individuals within the group to take control and responsibility for the way they proceed. The three salient elements of Bentley's perspective are: a) the clear indication of the need of various resources (opportunity, encouragement, support); b) the need for a group's clarity (and ideally commonly agreed-upon and thus resulting ownership) of its objectives; and c) the resulting control and responsibility of the individuals within the group over the change process.

Facilitation is a multifaceted intervention thought to be effective in terms of promoting individual and organizational change and for getting evidence into practice (Kitson et al., 1998). In the paper "Getting evidence into practice: the role and function of facilitation", Harvey and colleagues (2002) introduce a conceptual framework where facilitation refers to the process of enabling (making easier) the implementation of evidence into practice. Facilitation is one component of a three part framework where facilitation is achieved by an individual carrying out a specific role (a facilitator), which aims to help others. Facilitators are individuals with appropriate roles, skills, and knowledge to help individuals, teams and organizations apply evidence into practice. The research of Harvey et al. describes facilitation as a continuum of roles, from "doing for others" where the role is likely to be practical and task-driven to "enabling others" where the role as described by Bentley (1994) is more likely to be developmental in nature, seeking to help others gain new knowledge and skills for themselves (Harvey et al., 2002). Facilitators are change agents and although the body of literature on change agents is considered large, there are relatively few explicit or rigorous evaluations of the concept of facilitation. The distinguishing factors identified by Rycroft-Malone and coworkers (2004) derived from the literature through concept analysis that

separate facilitation from other change strategies such as opinion leaders, educational outreach or academic detailing are:

- It is an appointed role as opposed to that of, for example, an opinion leader who acts as a change agent through his/her own personal reputation and influence.
- The role may be internal or external (or encompass a combined internal/external approach) to the organization in which the change is being implemented.
- The role is about helping and enabling rather than telling or persuading.
- The focus of facilitation can encompass a broad spectrum of purposes and interventions, ranging from the provision of help to achieve a specific task to using methods which enable individuals and teams to review their attitudes, habits, skills, ways of thinking, and working.
- Given the broad focus of the facilitation concept, a wide range of facilitator roles is possible with corresponding skills and attributes needed to fulfill the role effectively (Rycroft-Malone et al., 2004, p. 177).

The other two components of the multidimensional framework for implementing research into practice as proposed by Kitson et al. (1998) and Harvey et al. (2002) are "evidence" and "context". Evidence, as taken from clinical research, clinical experience and patient preferences is located on a continuum of high to low, where high evidence would be presented as systematic reviews and randomized controlled trials and low evidence would be anecdotal or descriptive information. In order for change to take place within the practice setting, individuals and teams need to be able to critically appraise the evidence and most importantly agree on the results of the appraisal to reach a consensus before moving forward. Context refers to the environment or setting in which the proposed change is to be implemented. Within the context are characteristics such as organizational culture, leadership, and the existence of monitoring and feedback or evaluation mechanisms. Each of these is also located on a continuum of high to low, where a high context

would have clearly defined power and authority processes, transparent decision-making processes, teamwork, democratic inclusive decision-making from leaders, and multiple methods and sources of information used to affect change and evaluate performance. Low context would reflect the polar opposite of the high context characteristics (Rycroft-Malone et al., 2004). Kitson and colleagues (1998) surmise that successful implementation of evidence into practice can be expressed with the following equation: SI = f(E,C,F). They suggest that successful implementation (SI) is a function (f) of the relation between the nature of the research evidence (E), the context (C) in which the proposed change is to be implemented, and the mechanisms by which change is facilitated (F). They also propose that successful implementation is more likely to occur when evidence and context are located towards high and the appropriate form of facilitation has been instigated. There are a number of unanswered research questions regarding the multidimensional conceptual framework of facilitation. For example, it is unclear whether a task or "doing for others" approach of facilitation is as effective as a more holistic "enabling" approach and in what contexts. There does appear to be support for facilitation being distinct from educational outreach or academic detailing in that the role and methods of facilitation cover a much broader spectrum and that effective facilitators are more flexible and possess a range of skills which are employed according to the needs of the context or environment in which they are working (Harvey et al., 2002). The tailoring of the intervention to the needs of a given practice or specific environment means that facilitation is not carried-out in exactly the same manner but rather the implementation strategies will vary from one practice to the next depending on the context.

Unlike interventions such as educational outreach, reminder systems, and opinion leaders where there have been a number of systematic reviews (Grimshaw et al., 2001; Grol & Grimshaw, 2003), the author found only one systematic review that has been recently published specifically on practice facilitation. Nagykaldi et al. (2005) searched the published literature from 1966 to 2004 and identified 47 articles that met the inclusion criteria relating to practice facilitation. The systematic review describes how practice facilitation is financed, the background and training of facilitators, and

the various roles of and methods used by practice facilitators. Nagykaldi et al. found that of the 47 articles reviewed, 25 measured the effect of the practice facilitation interventions on implementation outcomes. Of those 25, only eight of the studies were randomized controlled trials (Dietrich et al., 1992; Bryce, Neville, Crombie, Clark, & Mckenzie, 1995; Modell et al., 1998; Kinsinger, Harris, Qaqish, Strecher, & Kaluzny, 1998; Lemelin et al., 2001; Goodwin et al., 2001; Frijling et al., 2002; Margolis et al., 2004). Nagykaldi et al. also found that practice facilitators are usually hired and trained by academic or government health care organizations for particular projects and work closely with a set of practices over an extended period of time. They also found through a narrative summary of effects that practice facilitators increased primary and secondary preventive service delivery rates, improved relationships and communication between providers, assisted clinicians with chronic disease management, provided professional education, and facilitated system level improvements using quality improvement methodologies. This review did not specifically look at the cost-effectiveness of practice facilitation, but did note a study by McCowan, Neville, Crombie, Clark, & Warner (1997) which demonstrated that net cost savings generated by a practice facilitator might justify the costs associated with the employment of the facilitator, depending on whether one considers short-term or long-term outcomes. Nagykaldi et al. (2005) noted that eleven primary care practice-based research networks in the United States are employing practice facilitation and much more research is necessary on the effects and cost-effectiveness of using practice facilitators.

In mid-1980s, multifaceted approaches using facilitation to improve prevention in primary care were first used in the United Kingdom where specially trained nurses known as facilitators organized preventive care in busy practitioners' offices using approaches such as academic detailing, chart audit and feedback for the prevention and early detection of cardiovascular disease (Fullard, Fowler, & Gray, 1984; Fullard, Fowler, & Gray, 1987). This early work has become known as the Oxford model of practice facilitation, the characteristics of which were summed up by Cook as an agent of change, coordinator, a cross-pollinator of good ideas, a resource-provider, an information-giver, a trainer, a researcher, advisor, and mentor (Cook, 1994). Dietrich et al. (1992) have found

that the practice facilitator model was efficacious in establishing office routines for providing needed preventive services and significantly improved provision of early cancer detection and preventive services. The study randomized practices into a 2x2 factorial design to receive one, two or none of the interventions, which were education to physicians and assistance from a facilitator to establish routines for providing cancer early detection and prevention services (system intervention). Whereas education was associated with the increase of only one preventive procedure (mammogram) of the 10 included in the study (Dietrich et al., 1992), the system intervention was associated with increases on six preventive procedures (mammography, recommendation for breast self-examination, clinical breast examination, faecal occult blood testing, advice to quit smoking, and the recommendation to decrease dietary fat).

Hulscher et al. (1997) have found that adapting the facilitator intervention to the practice and combining several effective methods is an important determinant of success. Other randomized controlled trials have also shown practice facilitation to be successful in improving delivery of preventive services (Cockburn et al., 1992; Manfredi et al., 1998). For example, Kottke, Solberg, & Brekke (1992) found in a randomized control trial of an intervention to encourage physicians to intervene in their patients' smoking, that the intervention had successful outcomes. With the introduction of training and support to organize a no smoking program, practices that used the program reported significant increases in patients reporting being asked if they smoked, being asked not to smoke, and being commended if they gave up smoking, by their physician. Through their randomized trial for comparing three approaches to introduce smoking cessation programs to general practitioners in Australia, Cockburn et al. reported results in line with those from Kottke and coworkers. Physicians who received the intervention through personal delivery and a presentation by a practice facilitator with a follow up visit, were more likely to have seen, understood and used the quit smoking intervention kit, compared to those physicians who received the kit through another person or through mail and had a phone call or mailed note as follow-up (Cockburn et al., 1992).

Lemelin and colleagues have demonstrated the efficacy of the practice facilitator intervention approach in providing management support to improve preventive care performance in a sample of Ontario Health Service Organizations (HSOs). Results show that the intervention group practices (n=22) significantly improved preventive performance by 36 per cent (relative difference) over an 18 month period as compared to the control group (n=23) which showed no improvement in preventive performance (Lemelin et al., 2001). Physicians involved in this study reported overall satisfaction ratings of 4.5 out of 5 with visits by a prevention facilitator once every two to three weeks and 90 per cent indicated that they would participate in such an intervention again if given the opportunity (Baskerville et al., 2001). This research also involved a cost-consequences analysis (Hogg et al., 2005) which took into account the estimated cost savings to the health system of reducing five inappropriate tests and increasing seven appropriate tests targeted by the intervention. The total cost of the intervention over 12 months was $238,388 and the cost of increasing the delivery of appropriate care was $192,912 for a total cost of $431,300. The savings from reduction in inappropriate testing were $148,568 and from avoiding treatment costs as a result of appropriate testing were $455,464 for a total savings of $604,032. On a yearly basis the net cost saving to the government was $191,733 per year (2003 $Can), an estimated return on intervention investment of 40 per cent. Other recent research has also shown that practice facilitation is effective in increasing preventive service delivery rates for adults (Goodwin et al., 2001) and children (Margolis et al., 2004), diabetic foot and eye examinations in general practices in the Netherlands (Frijling et al., 2002), and the quality of care for children with asthma (Bryce et al., 1995).

It is unknown how long the intervention effect from a multifaceted facilitator intervention for improving clinical preventive care lasts. McCowan et al. (1997) conducted a study to examine the long-term effect of an intervention by an audit facilitator on the management of children with asthma in the U.K. It was found that although the effect of the facilitator was significant, the effect lasted only for the period of the intervention. In contrast, Dietrich, Sox, Tosteson, & Woodruff (1994) found that some improvements in early detection of cancer performance were maintained one year

after the completion of an office system intervention which significantly affected cancer screening performance. Hogg, Baskerville, Nykiforuk, & Mallen (2002) also found evidence of long term sustainability in one practice facilitation qualitative follow-up study. Recently, sustainability of significant improvement in preventive guideline implementation due to practice facilitation was found to have extended nine months beyond the intervention period as part of a before-and-after study with 26 Ontario primary care practices (Hogg, Lemelin, Moroz, Soto, & Russell, 2008b). Determining the long-term sustainability of a facilitator intervention effect remains important for health policy decision-making.

Identification of the particular stage and challenges being faced within the overall adoption process that best characterizes the practice and then tailoring the specific interventions to the requirements of that stage has been proposed as important in supporting practice changes and in attaining more successful outcomes in preventive service performance (Cohen, Halvorson, & Gosselink, 1994; Main, Cohen, & DiClemente, 1995). Unfortunately, very few practices have the skill sets needed to carry out the process of change and quality improvement necessary to improve performance (Dietrich et al., 1994; Winkens et al., 1995) and recent assessments suggest that there is often a mismatch between the stage or the level of identified challenges faced by practices and the types of interventions selected for use (Bosch, van der Wiejden, Wensing, & Grol, 2007).

Very few evaluations of practice facilitation have studied the costs of delivering these interventions. The Cochrane Effective Practice and Organization of Care Group have concluded that outreach visits are effective, however, cost-effectiveness needs to be determined (O'Brien et al., 1997). Soumerai and Avorn have suggested that the savings from practice facilitation may outweigh the costs if the intervention is targeted at inappropriate and costly practice behaviour (Soumerai & Avorn, 1986; Soumerai & Avorn, 1990). Cockburn and colleagues (1992) concluded that educational practice facilitators do not appear to be cost effective strategies for distributing smoking interventions. In this randomized control trial of three approaches to marketing a quit smoking intervention kit to physicians, the actual use of the kit by the physicians for their smoking patients did

not differ significantly across groups. However, there was a trend toward higher use in the facilitation group for one of the components of the kit as compared to those who received the kit by courier or standard mail.

Conversely, McCowan et al. (1997) conducted a randomized controlled trial to examine the effect of a facilitator intervention on the management of children with asthma by family physicians. They found that the facilitator intervention reduced asthma care costs in the intervention group as compared to the control resulting in an overall net saving of 12,000 (U.K. 1991) pounds or one pound less per child per annum. The facilitator accomplished this by inserting guidelines for the management of asthma into intervention practices' case records. The authors estimate that the net savings to the health system would recoup the facilitator's salary at 1991 rates.

Hogg et al. (2005) conducted a cost-consequences analysis of an effective practice facilitation intervention in Southern Ontario and determined that on a yearly basis the net cost saving to the government is $191,733 per year (2003 $Can) equating to $3,687 per physician or $63,911 per facilitator, an estimated return on intervention investment and delivery of appropriate preventive care of 40 per cent. Similar to McCowan and colleagues, they conclude that practice facilitation is more expensive but more effective than other attempts to modify primary care practice and all of its costs can be offset through the reduction of inappropriate testing and increasing appropriate testing. They also note that potential for savings is likely considerably higher (Hogg et al., 2005).

Chirikos, Christman, Hunter, & Roetzheim (2004) also conducted a cost-effectiveness analysis of an effective practice facilitation intervention to increase cancer screening that involved calculating the marginal cost (difference between control and intervention study arms) of personnel time, patient time, overhead, and intervention materials and the marginal effectiveness on 12-month screening rates. Costs were determined from both a payer and societal perspective and life years saved with and without the intervention were also used in determining marginal effectiveness. This study found that the incremental cost-effectiveness ratio favoured the intervention and that the

effectiveness of the intervention more than outweighed the costs viewed from both a payer and societal perspective.

The systematic review by Nagykaldi et al. (2005) noted that the literature on the costs of practice facilitation is limited and that few comparisons of outreach facilitation to alternative interventions have been made. It can be argued that facilitation is a costly intervention (Cockburn et al., 1992). However, a costly intervention that achieves success may be preferred to a cheaper one that demonstrates very little or has no lasting effect. More research on the costs of successful facilitation and other effective alternative interventions for practice-guideline adoption such as videoconferenced outreach facilitation is necessary.

Practice facilitation is an intervention approach that appeals from the perspective of common sense; it incorporates key recommendations resulting from research on interventions for improving service delivery in primary care. The literature suggests that positive results in this area tend to spring from using multifaceted interventions such as facilitation, from focusing on organizational and systemic aspects of a practice's operation and from adapting systems and tools to the practice's reality. Granted that the concept of acceptance of the evidence from the provider and patient perspective is critical, practices require more than the dissemination of guidelines and educational materials to put evidence into practice. Despite the need to improve the theoretical base for evidence-based practice guideline adoption through further research on the contextual, organizational, and individual factors that influence the effectiveness of different interventions and the need to conduct additional practice guideline implementation research studies and randomized controlled trials (Grimshaw et al., 2002), the multifaceted approach of deploying facilitators into practices and providing management support is an intervention that appears to hold promise for improving performance in diverse practice environments.

1.5 Telehealth for Primary Care Health Professionals in Rural and Remote Settings

With the advent of communications technology, significant growth in telehealth applications has occurred during the last two decades in Canada. Allen, Sargeant, & MacDougall (2002) conducted an evaluation of practice-based, small-group CME by videoconferencing delivered by a facilitator to rural physicians in Nova Scotia using a one group pre and post test design. They found moderating by videoconference only slightly more difficult than face-to-face facilitation and evidence of knowledge gain and self-reported practice changes among participants. They determined that the costs per videoconferenced module were approximately $1,200 (Can.) (Allen, Sargeant, Mann, Fleming, & Premi, 2003). Curran, Hoekman, Gulliver, Landells, & Hatcher (2000) and colleagues also determined with a quasi-experimental pre-test to post-test control group design employing both qualitative and quantitative data collection methods that computer-mediated CME was an effective means of increasing knowledge and improving self-reported competency in dermatologic office procedures. However, a cost analysis was not conducted.

The Canada Health Infostructure Partnership Program (CHIPP) was a cost-shared incentive program launched in 2000 by the Federal government with $80.5 million over three years to promote the use of advanced information and communications technologies to address some of the issues confronting the health care system such as increasing costs, shortages of health professionals, and access to health services (Chatterton, 2005). The Program sought to address these issues through supporting 29 electronic health record and telehealth network projects across Canada. An evaluation of CHIPP concluded that the program had essentially achieved its objectives having made a significant contribution to the application of telehealth, helped create the necessary national infrastructure for telehealth, and succeeded in creating sustainable programs and partnerships. The evaluation could not conclude that CHIPP improved the quality, accessibility or efficiency of health service delivery as the period of evaluation was not sufficient to capture the impacts of the funded telehealth initiatives. A number of lessons learned resulted from the CHIPP evaluation findings

(Health Canada, 2004). For example, distance education emerged as perhaps the most significant demand from participating communities as physicians and other types of health professionals in rural environments are more likely to be underserved, in terms of access to continuing education, than their counterparts in remote northern regions of Canada where greater efforts have been made to put in place communications infrastructure.

Jennett et al. (2003) conducted a systematic review of 306 sources to determine the socio-economic impact of telehealth interventions. The review focused on nine areas of service delivery including rural and remote health services. They concluded that there is good evidence that interactive video-consultation is effective and efficient in rural and remote areas, but of the 35 studies analysed involving rural and remote settings only one dealt with continuing medical education. They also found that the quality of economic studies varied considerably and that cost-savings depend on the perspective of the study and such variable factors as distances involved. For example, if only those costs to be met by the health care system are included, the telehealth alternative is not always cheaper. In contrast, telehealth alternatives are more cost saving from a societal perspective. In other words, the perspective of only the health policy maker makes the case for telehealth harder to prove. Jennett and colleagues (2004) have also explored the policy implications of their research on the socio-economic impact of telehealth. Their recommendations include establishing an evaluation framework for the identification, definition, and consistent application of suitable outcome indicators, measures, and reliable and valid instruments for the evaluation of the socioeconomic benefit of telehealth. Aoki, Dunn, Johnson-Throop, & Turley (2003) have also conducted a review of 104 telemedicine evaluation articles and of those only three assessed clinical effectiveness and only nine assessed the cost of telemedicine (eight cost-minimization studies and one cost-effectiveness study). Sixty-nine percent of the studies were descriptive in nature and did not employ quasi-experimental or experimental designs to determine the impact of interventions. Their study did not distinguish between evaluation studies in urban versus rural settings, but did conclude that clinical effectiveness and cost-effectiveness are important parameters which have received limited attention.

The evaluation literature on telehealth for improving clinical practice in rural and remote settings is limited. In addition, there is a need to determine the overall effectiveness and cost-effectiveness of practice facilitation and ways to improve its efficiency in achieving successful practice-guideline implementation. Conducting a rigorous systematic review of the published practice facilitation intervention research and an exploratory evaluation to determine the feasibility of telehealth practice facilitation in rural practice settings would be an important contribution to the growing literature on improving practice performance.

1.6 Chronic Illness Care Management

Chronic conditions, not acute ailments, are now the most common problems in health care and most patients with chronic illness do not have a single condition, rather they have co-morbidities or the simultaneous presence of multiple chronic conditions (Grumbach, 2003). The majority of patients with hypertension, diabetes, hyperlipidemia, congestive heart failure, asthma, depression and other chronic conditions are inadequately treated within primary care (Bodenheimer et al., 2002). The gap in delivery of quality care for chronically ill patients is attributed to the increased demands being placed on medical care from the rapid increase in chronic disease prevalence, the complexity of the underlying science, and the inability of the health system to meet these demands due to poorly organized delivery systems, and constraints around the use of technology (Institute of Medicine, 2001). As a response to the care gap, the health professional community has proposed new models for care delivery such as the Chronic Care Model (CCM) which is internationally accepted as the main strategic response to the challenges of chronic disease (Martin, 2007).

CCM as developed by Wagner and colleagues describes chronic care as taking place within three overlapping galaxies: 1) the entire community, with its myriad resources and numerous public and private policies; 2) the health system, including its payment structures and information systems; and 3) the provider organization, whether an integrated delivery system, small clinic, or a loose network of physician practices (Bodenheimer et al., 2002). The model is designed to achieve

functional and clinical outcomes within this systems perspective through productive interactions between informed, activated patients and prepared, proactive health provider care teams. The six key elements of CCM are the following:

- Personnel and care processes to support proactive care, including planning care and care coordination, and scheduling or coordination of visits and follow-up;
- Decision support for providers, including disease management guidelines and protocols;
- Information systems to ensure access to timely and relevant information;
- Support for patient empowerment and self-management;
- Community resources to inform and support patients; and
- System support for chronic illness care among providers integrated into care networks (Wagner et al., 2001a).

A meta-analysis of 112 studies that contained one or more elements of CCM demonstrated the achievement of small to moderate effects in improving clinical outcomes and processes of care for interventions that contained at least one CCM element (Tsai, Morton, Mangione, & Emmett, 2005). The generalizability of the meta-analysis to CCM is limited given that the majority of the studies analysed were set in large managed care organizations in the United States and none of the studies incorporated the entire CCM package. Currently, the RAND/University of California-Berkeley Improving Chronic Illness Care Evaluation project is nearing completion, and it will be the first independent and controlled evaluation of the effects of implementing CCM as a whole (Cretin, Shortell, & Keeler, 2004).

An alternative model for chronic illness care has been introduced by the Australian Government under the Medicare system where family physicians are reimbursed to develop care plans for patients with chronic disease as part of the Enhanced Primary Care program. The number of Medicare funded care plans conducted by Australian family physicians under the program has

increased from 5,408 in 2000 to over 400,000 in 2005 (Australian Divisions of General Practice, 2005). Despite the remuneration offered under Medicare and some evidence of adoption, many Australian physicians find taking the time to do care plans for patients with complex health issues is at a cost of time with other patients and that broader health system and health provider issues make implementation of chronic illness care management difficult (Martin & Petersen, 2008).

The challenges to implementing chronic illness care practice guidelines within the primary care setting may be similar to the other contextual, organizational and individual behavioural challenges associated with the uptake of research findings into practice. Therefore, given the systematic review evidence, a multifaceted guideline implementation strategy such as practice or outreach facilitation may be well-suited to improving the adoption of chronic illness care management guidelines within rural primary care settings.

1.7 Primary Care Tailored Outreach Facilitation Project Description

The TOF study was nested within a larger CICM study. Thirty Ontario practices (members of Primary Care Networks or Family Health Networks) were recruited into the CICM study and four practices were purposively selected (two with telehealth and two without) and recruited into the TOF study. The overall long-term goal of the CICM study was to improve the health-related quality of life of chronically ill patients. This was to be achieved by improving the quality of chronic illness care offered by practices to patients through the use of: a) tailored outreach facilitation to assist in implementing care plans for chronically ill patients; and b) incentive payments to practices (to compensate them for the time and effort it takes to identify patients and to develop, implement, monitor and review care plans). The original short-term implementation goal of the TOF study was to determine if the facilitation of the implementation of care plans for chronically ill patients can be delivered effectively using videoconference facilitation. It was hypothesized that videoconference facilitation would be less costly than standard practice facilitation and equally effective. However, the evaluation revealed that videoconference facilitation was delivered with a limited duration and

low frequency. As a consequence, the goals of the study had to be revised and videoconference facilitation considered only as a proof-of-concept.

The primary goals of the dissertation were two-fold:

1. To provide an overall synopsis of the success of practice facilitation interventions in achieving implementation outcomes through a systematic review using meta-analysis to determine overall effect size and potential moderating factors.
2. To assess the extent to which TOF and care plans for chronically ill patients were implemented with fidelity for a small number of select rural practices along with a description of the challenges experienced.

Appendix B was the proposed logic model that outlined the key activities and the immediate, intermediate and long-term outcomes for the TOF intervention as derived from the literature on the challenges to implementing evidence-based care practice. It served as a theoretical or conceptual framework for understanding the relationship between resources, the intervention activities and the short-term and longer-term impacts associated with improving the delivery of chronic illness care services in rural primary care practices through TOF. It assisted in determining the key constructs or variables that need to be studied as part of the evaluation (Miles & Huberman, 1994; Yin, 2003) and highlights the intended audiences to be reached by the health research community. The TOF evaluation study did not measure long-term or ultimate outcomes such as improved quality of life; rather the more immediate implementation outcomes such as delivery of care plans and the opinions of the providers within the practices around chronic illness care management and videoconference facilitation were assessed.

The experience of TOF practices with videoconferencing equipment was assessed separately from those practices that experienced tailored outreach facilitation sessions without videoconferencing. TOF had two fundamental traits that set it apart from other chronic illness approaches. First, it focused on a subpopulation of chronically ill patients -- those deemed as the

most complex (suffering from more than one chronic condition and with a frequent use of primary care services). Second, it promoted system change at the practice level through tailored, outreach facilitation. At the center of the approach was the written care plan (see Appendix E). It contained a comprehensive evidence based action plan for the care of the patient. The patient had input into the creation of the plan and was responsible for certain aspects of the plan as part of self-care management. The plan described what was to be done, when and by whom. In addition to disease management, there were five components to each patient's plan to assure it was well informed and comprehensive: 1) a medication review; 2) patient education and self care; 3) community integration and social support; 4) psychological assessment; and 5) prevention. Once a care plan was written and the stakeholders agreed to the plan and their respective roles, the care plan was to be implemented and progress monitored. Through this process, patients and family physicians (FPs) could then set mutual goals, with plans for follow-up and scheduled visits.

Financial incentives were provided to the family physicians to encourage plan implementation and outreach facilitation provided to ensure the office systems were adapted to accommodate the new approach to care. FPs were compensated $300 for the completion of a care plan. The approach provided financial payment for any extra work the office staff had to take on such as calling to remind the patients of certain aspects of their care.

The CICM approach is unique in that it is a holistic, patient-centered approach at the practice system level that builds upon the strengths of Wagner, the World Health Organization and the Australian approaches (Wagner et al., 1999; Martin, 2001; World Health Organization., 2002). The CICM and the TOF nested study are based upon the premise that much can be achieved by reorienting the micro-level practice system. Tailored outreach facilitation and the five CICM components within participating rural practices were intended to deliver:

1. System and practice policy change to enable structured planning, implementation, monitoring and review within the office administration of Family Practice. Other models add a specialist to their staff such as a diabetic nurse; TOF used outreach facilitation through existing personnel to initiate and sustain this internal change in practice organization.

2. A person-centered goal orientated approach to chronic illness involving:
    i. Identification and recording of the patient's biopsychosocial needs and problems
    ii. "Tailoring" care plan to meet the needs/ goals of the patient. It also supported the coordination of their medical assessment, treatment and goals by their family physician since these patients were often seen by specialists and then ultimately handed back to the family physician.
    iii. Self-management support.
    iv. Medication review

3. Complex stage of illness and transitions rather than only disease-specific management using a more "holistic" approach to patient health care. The patient was not "labeled" with a specific chronic condition, thus only being "treated" for their disease. Instead, the patient-centered approach of the CICM model was intended to follow the chronically ill patient on the illness continuum from asymptomatic to complicated and co-morbid, through transitions between wellness and illness, from chronic to terminal, and between institutions and community to the advanced trajectory stage of complex chronic illness. However, due to time and research constraints, the TOF evaluation did not track patients through the entire illness continuum.

4. Multiple chronic condition patients are the most challenging and time consuming in family practice. The focus on patients with multiple chronic illnesses made the approach more applicable to generalist rather than specialist physician practice (Grumbach & Bodenheimer, 2002).

The key component of the exploratory TOF intervention was facilitation. The two facilitators each served two TOF practice sites. One facilitator and health professional staff in two selected practice sites had access to the telehealth videoconferencing equipment. The facilitators were trained in the critical appraisal of published research and practice-guideline implementation strategies, had backgrounds in community nursing with a Masters degree, and possessed strong management and facilitation skills.

The facilitators used a set of three standard intervention strategies for improving medical practice which have been adapted from the literature (Lomas & Haynes, 1988; Oxman et al., 1995) and demonstrated by earlier research as key for improving practice (Baskerville et al., 2001). They included audit and ongoing feedback, local consensus building (planning), and education on chronic illness guidelines based on critical appraisal of the literature and care plan development. Facilitators provided physicians with critically appraised research evidence since many physicians have not been trained to critically appraise research evidence nor do they have the time to read the growing

mountain of published primary research (Grimshaw et al., 2002). These core strategies could be supplemented if needed by opinion leaders and networking, patient-mediated activities, and patient education materials. The facilitator sought to stimulate evidence-based practice and tailor the intervention strategies to the practice environment and the needs of the physicians and staff. The facilitator worked with all physicians and staff in the practice. The practices were to be visited approximately every three weeks. However, with the introduction of videoconferencing equipment within a practice, it was expected that health professionals would want to meet more frequently via the new equipment. Appropriate strategies were selected for each practice that would likely be accepted in order to move the practice toward improved chronic illness care performance.

The facilitator intervention provided management support to practices and was intended to follow a quality improvement framework similar to that proposed by Leininger and colleagues (1996). The facilitators were to: 1) present baseline performance rates; 2) educate physicians on chronic illness care management and facilitate the development of a written practice policy for chronic illness care; 3) assist in the setting of goals and desirable levels of performance; 4) assist in the development of a written plan for implementing chronic illness care; 5) develop and adapt tools and strategies to carry out the plan; 6) facilitate meetings to assess progress and modify the plan if necessary; and 7) conduct chart audits to measure the impact on practice performance.

Finally, a recent meta-analysis of 112 chronic illness care management interventions for diabetes, asthma, depression, and heart failure has shown that interventions that utilize decision support, self-management support, or clinical information system components significantly improved clinical outcomes and processes of care for chronically ill patients (Tsai et al., 2005). Practice facilitation and the chronic illness care plan components of the intervention described above incorporate decision-supports such as guidelines and prompts, provider education as well as self-management support as part of the chronic illness care management plan.

Rural practices selected for the TOF were to make use of videoconferencing equipment for outreach facilitation in a manner similar to that described by Lanza (2002). The equipment included:

1) the Tandberg 770 MXP and a 61 inch plasma screen monitor video communication solution at the central Ottawa location; and 2) a Tandberg 1000 MXP completely integrated video communication solution at the remote practice sites. More information on the equipment can be found at www.tandberg.net. Facilitators were able to carry-out activity such as educating physicians, audit feedback, planning and consensus building using the equipment thus reducing the need for travel to rural communities and possibly increasing the frequency of contact with rural practices. Previous research on outreach facilitation has shown that facilitators spend on average 12 per cent of their time traveling in one year which equates to an estimated $8,000 of salary dollars and approximately $4,000 in mileage and expenses (Baskerville et al., 2001; Hogg et al., 2005).

1.8 Study Rationale and Research Objectives

A systematic review and exploratory mixed-methods implementation research study of TOF was conducted to contribute to the body of knowledge on interventions to implement guidelines and innovations in primary care practices. The systematic review is an exploratory meta-analysis of practice facilitation that investigates the potential of tailored outreach facilitation for primary care practices in improving the management of chronically ill patients. The review of the literature has revealed that there is no direct evidence on the effectiveness of an outreach or practice facilitation intervention which incorporates a telehealth component and that cost-effectiveness analysis for practice facilitation and telehealth interventions in general is limited (Jennett et al., 2003). In addition, previous research has shown that rural practices could greatly benefit from videoconferencing technology for improving evidence-based practice (Health Canada, 2004). Therefore, the primary significance of the contribution of this research is three-fold:

- a detailed description of an intervention that has never before been implemented via telehealth technology and the associated direct costs;
- the determination of implementation fidelity of practice facilitation and the adoption of chronic illness care management for rural primary care practices; and

- the identification of the factors that impede or contribute to the success of outreach facilitation and implementation of the chronic illness care management guidelines.

In addition, the systematic review incorporating a meta-analysis of practice facilitation interventions was conducted to gain understanding of the overall effect of practice facilitation and the factors that moderate implementation success.

The qualitative and quantitative evaluation study findings will be of practical significance to the growing number of primary care practice-based research networks that exist in Canada, the United States and elsewhere (Green & Hickner, 2006), external stakeholders such as the Ontario Ministry of Health and Long Term Care, as well as other provincial ministries in British Columbia and Newfoundland who either already have facilitator programs in place or are contemplating establishing programs. The potential outcomes and implementation success associated with the facilitation of chronic illness care management guidelines and telehealth will assist in decision-making and policy formulation concerning continuing medical education and improving evidence-based practice for primary care physicians in rural communities. The results of the evaluation will also prove invaluable in developing the case for additional research funding to evaluate TOF with a rigorous implementation research study design incorporating a larger representative sample of rural and remote primary care practices over a longer period of time. In the longer term, this research will contribute to the policy decision-making process concerning the possible establishment of outreach facilitation as a potential government funded health service delivery program alternative.

The systematic review of the randomized and non-randomized controlled trials of interventions targeted towards implementing evidence-based practice guidelines through practice facilitation, represents a continuation of the systematic review done by Nagykaldi and colleagues (2005) in 2004. However, the Nagykaldi review employed vote counting to demonstrate overall effects, whereas this systematic review is a meta-analysis. The lack of research into the theoretical constructs behind why certain interventions to improve primary care practice performance are more

successful than others is a hindrance to decision-making for practitioners and policy-makers (Grimshaw et al., 2001; Grimshaw et al., 2002; Shojania & Grimshaw, 2005). In addition, health care resources are limited and as a consequence policy-making choices have to be made among alternatives. A great deal of research has been undertaken on the dissemination and implementation of evidence-based guidelines and numerous systematic reviews have been done (Davis et al., 1995; Oxman et al., 1995; Bero et al., 1998; Grimshaw et al., 2001; Grimshaw et al., 2004; Prior et al., 2008). However, less attention has been given to facilitation as a strategy to change practice behaviour and a systematic review of the literature on the effectiveness and cost-effectiveness of practice facilitation to improve practice performance is therefore important. Applying the PRECEDE framework (Green & Kreuter, 1999) and the associated theoretical constructs to the literature reviewed provides some understanding as to why practice facilitation is successful.

To gain an understanding of how successfully practice facilitation can be implemented within a primary care setting, an embedded case study approach was undertaken. The case study employs multiple lines of evidence or data sources (a mix of quantitative and qualitative) as well as units of analysis such as the practice, the facilitators and the provider(s) into a single research study (Yin, 2003). Previous research has shown that changing office environments and health professional behaviour can be hampered by pre-existing conditions. Factors such as high staff turnover or a lack of physician engagement can impact the success of overall intervention outcomes (Crabtree, Miller, Aita, Flocke, & Stange, 1998; Miller et al., 1998; Goodson, Gottlieb, & Smith, 1999; Hogg et al., 2002). In addition to describing how TOF was implemented, the embedded case study evaluation included a qualitative research component to understand the challenges and the environment that rural practices operate within in order to elucidate factors such as context or pre-existing conditions that may impede delivery of successful outcomes.

1.8.1 Research Objectives

The nested TOF study has the two goals of conducting a systematic review using meta-analysis to determine overall effect size of practice facilitation and of evaluating the implementation of a tailored facilitation model for rural primary care practices in Ontario. The key research objectives for the systematic review and the nested exploratory TOF implementation research evaluation study are as follows:

Systematic Review

1. Critically appraise the published practice facilitation intervention studies in terms of methodological rigour/quality and effects.
2. Review the published evaluation results of selected studies to determine the overall implementation success or effect size of practice facilitation, possible moderating factors, and any economic outcomes.
3. Explain according to the PRECEDE theoretical planning framework why certain practice facilitation interventions are more successful than others according to effect size.

Mixed-Methods Implementation Research Study

4. Provide a description of the TOF intervention and determine the extent to which tailored practice facilitation for chronic illness care management was implemented with fidelity.
5. Determine what factors acted as impediments to successfully implementing CICM and identify opportunities for improvement within rural primary care practice.
6. Identify and describe the factors that contributed to implementation success.

Chapter 2
Methods

The methods section relates to the primary goals and research objectives for the systematic review and the TOF exploratory implementation research study. The methodological design to address the research objectives for the TOF study was two-fold:

1. A systematic review of the published practice facilitation literature and an exploratory meta-analysis to determine overall effect size.
2. An embedded case study of successful and unsuccessful TOF practices with and without videoconferencing equipment.

The methods for the systematic review will be presented first followed by the implementation research study methods.

2.1 Systematic Review Methods

Methods for the systematic review of the practice facilitation literature (Mulrow & Cook, 1998) were used to address the systematic review objectives of the thesis. The intent was not to replicate the work of Nagykaldi and colleagues (2005) but to extend it with additional research work published since 2004. The method included the following steps to address the three key review objectives: to critically appraise the published practice facilitation intervention studies in terms of methodological rigour/quality; to provide an overall synopsis of the success of interventions according to effect sizes (both primary and economic outcomes) and possible moderating factors; and, to apply the PRECEDE theoretical framework to the interventions to determine any relationship between theoretical constructs applied and implementation success.

The steps were as follows:

1. Research study identification and selection criteria
2. Review of the selected articles using a detailed protocol (see Appendix A)

3. Assessment of the methodological quality of selected research studies
4. Analysis of the measurement outcome and economic data to determine the outcome, cost-effectiveness, and effect size of practice facilitation interventions.

It is recognized that given the variation or heterogeneity that exists across studies in terms of research designs, targeted behaviours, settings, and outcome measures, traditional meta-analysis is likely to lead to potentially misleading results depending on the modifying effect of such factors (Gerber et al., 2007). Although deriving a weighted average effect across heterogeneous practice facilitation studies may be unhelpful, the quantitative analyses can be useful for describing the range and distribution of effects across studies and to explore probable explanations of the variation that is found (Grimshaw et al., 2003). The analysis methods employed for the thesis are based on the Cochrane Collaboration (Higgins & Green, 2008) and were used as techniques for demonstrating results quantitatively as compared to the vote counting and descriptive systematic reviews that have been done to-date on practice facilitation (Kitson et al., 1998; Nagykaldi et al., 2005). The potential for bias in this work exists given that the review, assessment of quality and data extraction were the work of only the author and not a panel or a minimum of two independent raters. The techniques employed and the results are a demonstration of what is possible and are not intended to be the final word on the effectiveness of practice facilitation in primary care settings.

2.1.1 Literature Search and Selection of Studies

The literature review focused solely on controlled trials or evaluations of facilitation within health care, where an explicit facilitator role was adopted to promote changes in clinical practice. The definition provided by Kitson and colleagues (1998) was used to determine study eligibility -- a facilitator is an individual carrying out a specific role either internal or external to the practice aimed at helping to get evidence into practice. In order to focus the scope of the literature review, the 25 studies identified by Nagykaldi et al. from 1966 to 2004 were supplemented using the following inclusion criteria for study selection: English language only peer-reviewed journals from December

2004 to June, 2006; and controlled trials. The literature search was conducted using the Thomson Scientific Web of Science database which contains the Science Citation Index, the Social Sciences Citation Index and the Arts and Humanities Citation Index. The following key word search was used: (primary care or family medicine or general practice or family physician or practice-based research or audit or prevent* or quality improvement or practice enhancement or practice-based education or evidence based or office system) and (facilitator or facilitation) and (controlled trial or clinical trial or evaluation). The references from the published systematic reviews of practice facilitation, the references from retrieved articles and other secondary sources that met the inclusion criteria were also consulted to supplement articles found through the initial literature search.

Initial screening of the identified articles was based on their titles and abstracts. First, each identified article was read to determine if the article was relevant and met the inclusion criteria. The primary reasons for unsuitability were documented. Second, the articles were reviewed using a detailed protocol for critically appraising the selected articles to address the objective of examining various attributes of the quality of the study methods.

2.1.2 Systematic Review Data Collection Protocol

Appendix A is the protocol used to collect the data to critically appraise the selected articles. Given that no "gold" standard critical appraisal tool exists (Katrak, Bialocerkowski, Massy-Westropp, Kumar, & Grimmer, 2004; Sanderson, Tatt, & Higgins, 2007), the Physiotherapy Evidence-Based Database (PEDro) method was used to develop the written protocol for collecting information and for assessing the methodological quality of practice facilitation studies. PEDro has been shown to provide a more comprehensive picture of methodological quality for studies where double-blinding is not possible due to the nature of the interventions (Bhogal, Teasell, Foley, & Speechley, 2005). Agreement between unit of randomization and unit of analysis was added to the scale since unit of analysis errors have been identified as a methodological problem in the implementation research literature (Grimshaw et al., 2003). The protocol includes a combination of check list items as well as

space for information on the intervention itself and covers the study characteristics considered key by the Cochrane Collaboration of methods, participants, interventions, outcome measures and results (Higgins & Green, 2008).

The protocol was completed for each selected article to collect information on the attributes and features of the intervention, followed by a series of items that address the methodological aspects of the study according to the modified version of the PEDro scale (Bhogal et al., 2005), and finally the effect sizes and measures of variation for the possible primary and secondary outcomes of the study and any economic results, if applicable, were recorded. The protocol was first piloted on two articles and necessary changes were made to ensure that all pertinent information was being collected. The protocol comprised 29 specific data collection items (see Appendix A). Economic results from selected articles were noted in the protocol.

2.1.3 Assessment of Quality

Despite there being little consensus regarding the most appropriate items that should be contained within a critical appraisal tool (Moher et al., 1995; Katrak et al., 2004), Nagykaldi et al. have employed the PEDro scale in a recent systematic review of practice facilitation (Nagykaldi et al., 2005). This scale has been shown to provide a more comprehensive measure of the methodological quality of studies where double-blinding is often impossible as compared to the Jadad assessment criteria (Bhogal et al., 2005) for systematic review. PEDro provides a greater breakdown of the levels of blinding and accounts for quality criteria such as concealment of allocation, intention-to-treat, and attrition. The PEDro tool contains 10 items and was the approach for assessing the methodological quality of the studies contained in the systematic review. Although critical appraisal tools with multiple items and complex scoring systems take more time to complete and have yet to demonstrate more reliable assessments of validity (Juni, Witschi, Bloch, & Egger, 1999) despite noticeable improvement in recent years (Gerber et al., 2007), the PEDro scale has demonstrated its

applicability in practice settings such as stroke rehabilitation and in the effort to replicate and extend the work of Nagykaldi and colleagues was deemed appropriate for this systematic review.

For methodological performance, the 10 quality items from the PEDro scale as well as two additional items for a total of 12 areas of interest were covered as follows: 1) description of intervention; 2) participants randomly allocated to groups; 3) allocation to groups was concealed; 4) units of randomization/allocation and analysis agree; 5) groups similar at baseline regarding key indicators; 6) blinding of all participants; 7) blinding of the facilitators; 8) blinding of data collectors, assessors or auditors; 9) greater than or equal to 85 per cent follow-up of participants; 10) analysis of data according to how participants should have been treated – intent-to-treat; 11) results of between group statistical tests are reported; and, 12) point estimates (mean difference between or odds ratio for the intervention and control groups) and measures of variability (confidence intervals or standard deviations). The two additional quality items not covered in the PEDro scale were the description of the intervention since this is an important criteria for determining fidelity of the practice facilitation intervention and whether the unit of randomization and analysis agree since the randomization of entire practices or clusters to either intervention or control arms is typical whereas data on outcomes is collected at the patient level. Evidence of determining and adjusting for intra-cluster correlation (ICC) among outcome measures was also coded (Donner & Klar, 2002). The ICC is a measure of the relatedness of clustered data. It accounts for the relatedness of clustered data by comparing the variance within clusters with the variance between clusters. Mathematically it is the between-cluster variability divided by the sum of the within-cluster and between-cluster variabilities. For example, a study with four physicians' offices enrolling 32 patients each, would equate to a sample of 128 subjects in total. If the ICC is greater than zero, effectively there are fewer subjects enrolled in the trial from a statistical perspective and the sample size needs to be corrected by applying an effective sample size calculation in order to avoid erosion of statistical power (Killip, Mahfoud, & Pearce, 2004).

The areas and points to be considered in the systematic review (see Appendix C) support the assessment of the internal validity of selected studies by considering four key threats to internal validity (Higgins & Green, 2008): selection bias (e.g. adequate concealment of randomization procedures); performance bias (e.g. Hawthorne effect); attrition bias (e.g. adequate follow-up of participants), and detection bias (e.g. blinding of subjects and/or investigators to intervention).

A high methodologic performance study is the extent to which its design and conduct are likely to prevent bias, as less rigorous studies are biased toward either overestimating or underestimating an intervention's effectiveness. When reviewing the practice facilitation intervention studies in light of the methodologic points to consider, each of the twelve areas were given a score of 0 or 1 based on the following observations:

0 = Relevant information was missing or given only minimal detail.

1 = Reasonable detail was provided.

Each study therefore had a possible maximum score of 12 for methodological performance. A written review protocol (see Appendix A) was used to assess each of the studies and apply the scoring criteria. The total score was then input into Microsoft Excel along with all of the key information contained within the written protocol for each study to facilitate analysis.

2.1.4 Analysis and Effect Size Determination

The analysis of the data was carried out to address the three objectives of the systematic review component of the dissertation: to assess the methodological quality of the selected studies; to determine the overall effect size of practice facilitation interventions and associated economic outcomes; and, determine the impact of factors such as the strategies employed according to the PRECEDE model, tailoring of the intervention, and intervention intensity.

The methodological quality variables were inserted into the Excel spreadsheet to address the first objective of assessing the methodological performance of each study. Twelve variables were used to capture the methodological performance characteristics of each of the studies. Total scores

were then determined by summarizing the twelve methodological performance characteristic scores for each study. The respective scores were summarized descriptively using the mean and frequency distributions and the Excel data were exported to SPSS Version 14.0 for additional univariate analysis and the creation of tables and graphs (SPSS Inc., 2006). Analysis of variance was conducted to compare the methodologic performance scores of the various study designs identified.

Selected quantitative continuous indicators such as participation rates, retention, attributes of participating practices and effect size were summarized across all studies descriptively using the mean and the Microsoft Excel 2002 software package. All other study data from the written data collection protocol such as binomial indicators of random assignment of subjects or not, rewards provided or not, concealment or not, blinding or not, intention to treat or not and the qualitative information such as descriptions of the intervention, settings, sampling methods, data collection tools, and outcome measure descriptions were input or linked to the Excel spreadsheet to facilitate analysis, summarization and interpretation. Binomial and categorical indicators were summarized into percentages. This approach facilitated describing and summarizing the types of practice facilitation interventions to address the third objective. In addition, to determine the effect size of each of the studies Review Manager 5.0 from the Cochrane Collaboration (Higgins & Green, 2008) was used. Given that other authors and evidence review panels have determined that a meta-analysis is inadvisable due to the variation in outcome measures and other methodologic weaknesses associated with implementation research (Grimshaw et al., 2001; Grimshaw et al., 2005), a strict meta-analysis has not been conducted using the Cochrane Collaboration software. Rather, Review Manager was used to compute the standardized mean difference (SMD), where possible, for the primary outcome of selected high methodologic performance studies in a manner similar to Grimshaw and colleagues (2005) as: (Post Intervention Mean – Post Control Mean)/ Pre Control Standard Deviation. When the primary outcome was unspecified or was more than one, the study outcomes were rank-ordered in terms of significance and the median outcome selected to calculate the SMD using Review Manager. Methods for determining standard deviations from confidence intervals and p-values were employed

when standard deviations were not provided (Higgins & Green, 2008). The means and standard deviations were entered into Review Manager as continuous variables and the SMD estimates and standard errors were calculated by Review Manager for each study and then entered into the generic inverse variance outcome model of Review Manager to determine the weighted effect of each study and the overall effect size. The DerSimonian and Laird (1986) random effects exploratory meta-analysis was conducted to determine the overall effect size of practice facilitation interventions and the presence of statistical heterogeneity since this method is based on the assumption that the effects being estimated in the different studies are not identical (heterogeneous) and it takes into account the lack of knowledge about why effects differ by considering differences as if they were random and adds this greater uncertainty to the method of estimation and calculation of the confidence interval. Ninety-five per cent confidence intervals were calculated for effect sizes. For studies that only provided results for primary outcomes as Odds Ratios, the formula proposed by Chinn (2000) was used to convert the Odds Ratio to a SMD and determine the standard error for entry into the generic inverse variance outcome model. The Z statistic was used to test for significance of the overall effect.

Unit of analysis errors do not affect point estimates for effect sizes, but they can have a spurious narrowing effect on the associated confidence interval, causing potentially false-positive trial results (Donner, Birkett, & Buck, 1981; Campbell, Mollison J, & Grimshaw, 2001; Donner & Klar, 2002). For those studies which have apparent unit of analysis errors, an effective sample size was calculated in order to avoid overly narrow confidence intervals for those studies in the exploratory meta-analysis using the formula proposed by Donner & Klar (1994) as: Effective N = (km) / (1+(m-1)r), where k is the number of clusters or practices and m is the number of observations per practice and r is the intra-cluster correlation coefficient (ICC). Where an ICC was not provided the value 1.15 was substituted since research has shown that ICCs usually vary between 1.10 and 1.20 in the practice setting (Simpson, Klar, & Donner, 1995). The recalculated sample sizes were then re-entered into Review Manager along with the SMD estimates and standard errors.

Review Manager was used to determine statistical heterogeneity as determined by the chi-squared test for heterogeneity (Cochran's Q statistic) and the I^2 statistic (Higgins & Green, 2008). If the differences in types of interventions and methodological diversity were as pronounced as reported (Grimshaw et al., 2004), then as a consequence the statistical heterogeneity (treatment effects across studies being more different from each other than one would expect from chance alone) would be deemed significant. If the Q statistic was not significant it is understood that study outcomes all represent a common population parameter. However, with inadequate statistical power a large but non-significant Q statistic can suggest variability in study outcomes. Therefore, a low p-value (<= .10) for the Q statistic was considered evidence of heterogeneity of treatment effects. The I^2 statistic describes the percentage of variation across studies that is due to heterogeneity rather than chance and is small when there is very little variation or heterogeneity between trials. The software was also used to generate Forest plots in order to graphically display the effect sizes and 95 per cent confidence intervals for each study and a Funnel plot to show any evidence of publication bias (Mulrow & Cook, 1998; Lau, Ioannidis, Terrin, Schmid, & Olkin, 2006). Finally, Comprehensive Meta-Analysis software (Biostat Inc., 2006) was used to generate scatter plots and test the significance of simple regression equations using the maximum likelihood method and the calculation of the Q statistic to determine if there were any potential effect modifiers such as tailoring of the intervention, intensity and duration of the intervention, and number of PRECEDE implementation strategies. Again, this analysis is an exploratory effort to summarize effects and gain an overall understanding of practice facilitation intervention efficacy.

2.2 Case Study Methods

The second goal of the dissertation was primarily to assess the implementation fidelity (Mowbray, Holter, Teague, & Bybee, 2003) of TOF with an embedded case study (Yin, 2003) using mixed qualitative and quantitative methods (Creswell, Plano Clark, Guttman, & Hanson, 2003) to describe the context and experience around implementing TOF within intervention practices in terms

of activities, direct costs and immediate outcomes (dependent variables such as provider satisfaction and care plans completed) and to address the research objective of describing the factors or reasons for TOF implementation success or failure. The case study method illuminated how the TOF process was implemented and at what direct cost, the extent to which care plans were implemented, provider satisfaction with the process, and why certain courses of action were taken. This qualitative approach was very important in understanding the potential of the TOF intervention in improving the quality of care and health outcomes of chronically ill patients. The period of evaluation was not sufficient to assess the long-term outcomes of practice improvement or improved quality of life for patients as a consequence of the TOF and implementation of care plans.

Several units of analysis, four different practices, different data collection and analysis techniques were involved in the embedded case study which is in contrast to a holistic case study method which would have involved only a global examination of the TOF intervention (Yin, 2003). Data collection for the embedded case study included administrative records such as meeting minutes, the monthly narrative reports that the practice facilitator maintained on the experiences with each practice, the activity logs which documented time and progress, the in person interviews with the participating health professionals in the practices, and a review of care plan completion. These different sources of data and units of analysis served as multiple lines of evidence triangulating on the primary research questions of determining how TOF was implemented and the factors that contributed to or impeded the success of the TOF intervention (Yin, 1999). The multiple lines of evidence contributed to the validity of the case study findings. Some of the tactics to ensure the validity and reliability proposed by Yin (2003) for the four social science methods tests were incorporated into the methodology. The tactics for the tests for the validity and reliability of the embedded case study design are summarized as follows:

Tests	**Proposed Case Study Methods Tactic**
Construct Validity	• Use multiple sources of evidence/data • Establish chain of evidence

	• Have interview participants review draft case study reports
Internal Validity	• Do pattern matching analysis methods • Address rival explanations • Use logic models or conceptual frameworks
External Validity	• Use theory in single case studies and replicate across multiple case studies
Reliability	• Use case study protocol • Build case study database

The embedded case study is a 2 x 2 design which allowed the determination of the factors which impeded or contributed to the successful attainment of the immediate outcome completion of care plans and other dependent variables such as the perceived benefits of CICM and videoconferenced facilitation as compared to standard facilitation. Table 2-1 describes the design and the independent variables of successful care plan completion and presence of videoconferencing equipment. Four rural primary care practices were purposively selected to represent a successful care plan implementation videoconference TOF practice and an unsuccessful videoconference TOF practice as well as a successful standard facilitation practice and an unsuccessful practice.

Table 2-1 Embedded Case Study Design

	Successful Care Plan Implementation	**Unsuccessful Care Plan Implementation**
Videoconference TOF Intervention	One successful videoconference case study: • Context • Embedded units of analysis/ multiple lines of evidence	One unsuccessful videoconference case study: • Context • Embedded units of analysis/ multiple lines of evidence
Standard TOF Intervention	One successful case study: • Context • Embedded units of analysis/ multiple lines of evidence	One unsuccessful case study: • Context • Embedded units of analysis/ multiple lines of evidence

The embedded case study followed a protocol that contained the instruments, questions, procedures and general rules to follow in conducting the research to support the reliability of the case study method. The protocol includes the theoretical framework for the study, data collection plan,

interview guides, questions asked and other procedures as outlined in the methods below. The theoretical or conceptual framework for the case study was the proposed logic model for TOF as provided in Appendix B.

2.2.1 Setting

The four practices involved in the TOF evaluation were participating in the CICM study and were purposively selected post-hoc based on their rural setting. They were members of Primary Care Networks (PCNs) or Family Health Networks (FHNs) operating in the province of Ontario. Physician network members are paid from a blended system primarily based on capitation. The two rural practices with videoconference equipment were located in Sharbot Lake and Carleton Place Ontario and the two rural practices without the equipment were located in Paris Ontario. Table 2-2 lists the characteristics of the practices. The practices were comparable with regard to physician year of graduation from medical school, physician gender, patients seen per day, roster size and community size. The practices differed in terms of being a group or solo practice and the presence of nurses. One of the group practices had a younger physician having graduated in 1995. The matching of the practices was intended to help rule out competing explanations of the effects of TOF.

Table 2-2 Practice Characteristics

	Practices			
Characteristic	**Sharbot Lake**	**Carleton Place**	**Paris 1**	**Paris 2**
Average Yr Graduation	1975	1983	1975	1973
Physician Gender	M	M	M	M
No. of Physicians	2	2	1	1
No. of Nurses	1 NP	None	None	3
Patients seen per day	20 per physician	20 per physician	20 per physician	NA
Practice size (roster)	2,500	2,000	2,000	2100
Pop'ln characteristics	Rural and 40+	Rural and 40 +	Rural	Rural
Population size	8,000 +/-	9,600	11,000	11,000

2.2.2 Study Population(s)

The case study practices were located in rural Ontario communities with similar characteristics (see Table 2-2) and the study patient population was comprised of complex patients with multiple chronic illnesses, recruited from the practices that were participating in the study. The patients were generally older than 60 years of age, suffered from two or more chronic conditions, and visited their physician or other practice members recurrently.

2.2.3 Recruitment

This nested study took place in practices already recruited for the larger CICM project. In the larger study, 30 practices were recruited and consented to be part of the research. Purposive sampling was used to identify the practices for the nested study of TOF in order to carry-out the analysis objective of contrasting successful and unsuccessful attempts at implementation. The sampling was based on the facilitator perceptions of physician satisfaction and engagement with CICM and substantiated through an initial review of facilitator narrative reports on interaction with the practices. Two rural practices were chosen as having successfully engaged with CICM (one with and one without videoconference equipment) and two others were selected as being unsuccessful (one with and one without videoconference equipment) for a total of four practices (see Table 2-2). Patient recruitment also involved purposive sampling. Each physician within the participating practices was instructed to select 30 chronically ill patients under their care that were the most chronic, complex, difficult-to-manage cases and who they judged would benefit the most from the intervention. Physicians sought consent from patients to participate in the study prior to care plans being developed or patient charts being audited.

2.2.4 Patient Inclusion/Exclusion Criteria

Inclusion criteria – Suffering from any two or more chronic conditions, 50 years of age or older, and seen in the practice at least six or seven times in the previous year. Exclusion criteria – Patients who suffer from dementia or a major psychiatric condition, are terminal, are not competent to

give informed consent, or that a physician believes will not benefit from the intervention, were screened out of the study.

2.2.5 Research Ethics

The TOF study was nested within the broader CICM randomized trial which has received a full ethics review and approval by the Ottawa Hospital Research Ethics Board. Given that interviews were conducted with participating physicians on the experience with TOF, separate consent was sought for these interviews. The University of Waterloo, Office of Research Ethics granted full ethics approval for the four participating practice physician interviews. All practitioner and patient data contained within care plans was treated confidentiality and anonymity guaranteed in the final data analysis and presentation of study findings. Practitioners were not compelled to alter their practice in any way and their patients provided voluntary consent to participate in completing the questionnaire at the end of the study period. The informed consent forms for the participating physicians are provided in Appendix D.

2.2.6 Measures

The primary outcome measures or dependent variables for the TOF study are outlined in the Logic Model (Appendix B) as immediate and intermediate results. They included qualitative measures around chronic illness care plan implementation, the adoption of chronic illness care service delivery, and provider satisfaction as measured through such questions as ease of use of the videoconferencing equipment and which of the supports provided by the facilitator was the most and least helpful (see Appendix E). Quantitative measures included hours of practice facilitation activity and patient care plan measures such as number of patient visits, number of follow-up visits booked, number of patient problems, delivery of patient education, medication review, and provision of preventive care, etc. The independent variables for this study include participation with videoconference facilitation and whether care plans were successfully implemented.

The ultimate results or outcomes from the intervention as indicated in the logic model such as improved quality of life and evidence of improved quality of care based on patient surveys and chart audit results were not within the scope of the study as these outcomes require a longer time frame to achieve. However, proxi-measures for these outcomes were tapped in the physician interviews with such questions as "what sort of impacts, if any, did the care planning part of the study have on your practice?" The table below describes each of the chronic conditions measured from the chronic illness care plans completed as evidence of chronic illness care delivery, the specific performance indicator associated with each condition, performance effectiveness results from previous studies (Cummings, Rubin, & Oster, 1989; McColl, Roderick, Gabbay, Smith, & Moore, 1998; CDC Diabetes Cost-Effectiveness Study Group, 1998; Boyko, Glick, & Schulman, 1999; Levy, Briggs, Demers, & O'Brien, 2001; The CDC Diabetes Cost-effectiveness Group, 2002; Weintraub, Cole, & Tooley, 2002; Schermer et al., 2002; Probstfield, 2003; Reed et al., 2004; Schleinitz & Heidenreich, 2005), and the grade of clinical research evidence supporting the use of the manoeuvre as identified by the Agency for Healthcare Research and Quality http://www.guideline.gov. It has been established that the five chronic conditions identified represent the majority of chronic illnesses that patients present with and are among the leading causes of death in Canada, cancer being the leading cause followed by diseases of the heart (Statistics Canada, 2003). Measures of medication review, prevention, psychosocial assessment, education on self-care management and linkages to community health and social services were also extracted from the completed chronic care plans.

Chronic Disease	**Indicator (Physicians' Performance from previous studies)**		**Grade of Guideline Recommendation**
Coronary Artery Disease (Angina)	-Aspirin Use	**(50-74%)**	**A**
	-B-Blockers Use	**(32-55%)**	**B**
	-Statins Use If Needed	**(25-33%)**	**A**
Diabetes	-HbA1c test	**(47%)**	**A**
	-Annual eye exam	**(14- 72%)**	**B**

Hypertension	-Patients with controlled hypertension **(20-63%)**	**A**
	-Life style modifications counseling **(25-40%)**	**A (Salt and Exercise)** **C (Diet-Obesity)**
Asthma	-Use of inhaled steroids **(43-77%)**	**A**
	- Action plan and record of daily, nocturnal, or activity limiting symptoms **(32-77%)**	**A**
Heart Failure	-ACE inhibitors use if LVEF<40% **(20-100%)**	**A**
	-Beta-blockers use **(32%)**	**A**

Grade Recommendations:

A	Strong research-based evidence	Multiple relevant, high-quality scientific studies with homogenous results
B	Moderate research-based evidence	At least one relevant, high-quality study or multiple adequate studies
C	Limited research-based evidence	At least one adequate scientific study
D	No scientific evidence	Expert panel evaluation of other information

2.2.7 Data Collection Instruments/Methods/Cost Data

The data collection instruments are provided in Appendix E. Provider satisfaction was determined qualitatively through the narrative logs of the facilitators and through in-person semi-structured interviews with open-ended questions on completion of care plans, the content of the care plans, the facilitation process, the impact of the chronic illness care management program, and barriers to care plan implementation. Specific questions on the experience with implementing chronic illness management, videoconferenced facilitation and standard facilitation were also asked through the in-person interviews of six participating family physicians. Practice and physician characteristics were gathered during the in-person interviews. The in-person semi-structured interviews were conducted by, taped and transcribed by the author. Each interview lasted approximately one hour. To ensure that the findings were as accurate as possible, member checking was done during interviews to ensure that information captured was correct. The extent to which patients with care plans received evidence-based care was assessed via the care plans as indicated in the above table.

Using criteria proposed by Mowbray, Holter, Teague and Bybee (2003), program implementation fidelity was assessed by using the minutes of meetings, the administrative narrative reports as well as the activity logs prepared by the facilitator from each of the participating practices. This information coupled with the insights of the facilitator allowed for a detailed description of the initial pilot of the intervention, the intervention activities, the time involved, the facilitator views on the participation of the practice staff, and the extent to which facilitators delivered the intervention as intended. To further assess program implementation fidelity, the completed care plan data were reviewed to determine the extent to which participating physicians adhered to the CICM model of delivery.

Methods provided by Drummond, O'Brien, Stoddart, & Torrance (1999) were used for conducting the cost analysis based on data extracted from the activity logs, administrative records and secondary sources. The direct fixed and variables costs of the TOF intervention as well as the videoconference component were determined from the administrative records maintained by the supervising program staff as well as the activity logs of the facilitators. The costs were determined over the nine-month period of the intervention and included both fixed costs such as the cost of the Tandberg equipment and other supporting equipment such as routers as well as variable costs such as the provider's time, the facilitator's time, travel expenses, connectivity and technical support fees. Connectively fees were determined from the telecommunications company Telus (Alberta Medical Association, 2008). Straight-line amortization was used assuming a market value of $0 at the end of the life of the equipment and fixed assets. The average annual costs for the Tandberg units (the video and other equipment used at the rural sites) were amortized over a 7-year lifetime. The estimated lifespan of the Tandberg equipment was obtained from a sales engineer at the manufacturing company (personal communication, E. Werner, March 2006).

2.2.8 Data Analysis

The embedded case study approach has multiple units of analysis (practice, provider and patient) and data sources embedded within each of the cases. First, quantitative data from activity logs and patient care plans were coded and entered into a statistical software program (SPSS Version 14.0). The quality of data entry was checked by conducting initial frequency runs on all data elements to ensure that responses were correct and consistent. The percentage of missing data for each item was computed. Frequency tables were generated for categorical and nominal data. Descriptive statistical procedures were used on continuous variables.

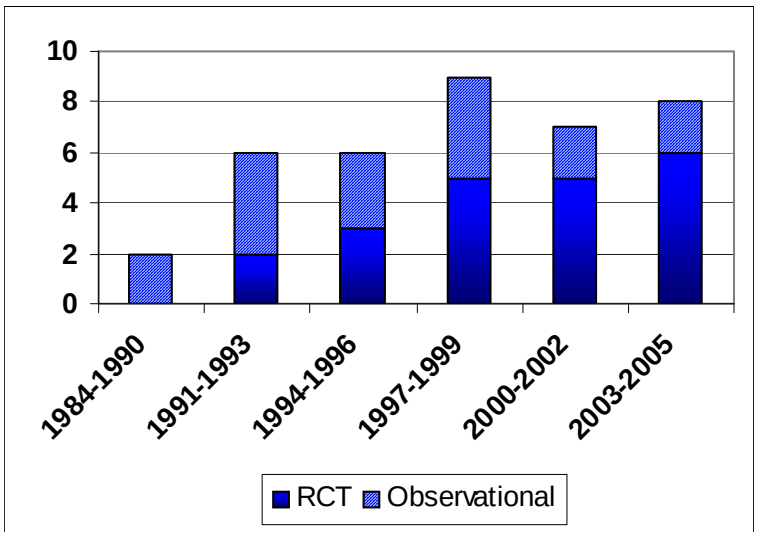
Second, all of the qualitative interview data collected from the practices were first transcribed and then organized and summarized using non-numerical unstructured data indexing, searching and theorizing (NVivo V 2.0) software using the inductive qualitative methodology of the constant comparison method developed by Glaser and Strauss (1967) and described by others(Crabtree & Miller, 1992; Yin, 2003). The goal of this analysis was to look for recurring regularities or thematic categories in the data (Patton, 1990) that relate to the variables under study such as satisfaction with and implementation of CICM. The initial categories had been previously determined from the interview guides. The words or phrases of the participants were used as much as possible to create the sub-categories which were entered into NVivo. The process involved reading each interview transcript individually and creating category names from the text using the technique of memoing-diagramming (Lofland & Lofland, 1995), proceeding to the next interview transcript and comparing text to the categories already identified, and determining new categories in an iterative fashion until nothing new emerged from the data. After careful scrutiny of the categories and combining of like categories, themes emerged from the data. The data categories were further reviewed and coded against the themes to better define them and address the research objectives. Thick descriptions were provided of participants' thoughts and feelings via quotations and examples to confirm themes and patterns and enhance the validity of the results. The themes that emerged allowed for an improved

understanding of practices that were successful and those that were not in implementing chronic illness management.

Chapter 3
Systematic Review

The literature search resulted in an additional 36 articles to the 25 outcome studies identified by Nagykaldi et al. (2005) for a total of 61 publications of which 46 were retrieved for closer inspection. From these, 38 papers were judged to meet the inclusion criteria and were included in the review (Fullard et al., 1987; Jones & Marsden, 1992; Carney et al., 1992; Cockburn et al., 1992; Dietrich et al., 1992; Kottke et al., 1992; Szczepura, Wilmot, Davies, & Fletcher, 1994; Hearnshaw, Baker, & Robertson, 1994; Bryce et al., 1995; Lawrence & Packwood, 1996; Horowitz et al., 1996; Rebelsky et al., 1996; Hulscher et al., 1997; McCowan et al., 1997; Modell et al., 1998; Kinsinger et al., 1998; Hearnshaw, Reddish, Carlyle, Baker, & Robertson, 1998; Goldberg et al., 1998; Solberg, Kottke, & Brekke, 1998; Cox, Wilcock, & Young, 1999; Geboers et al., 1999; McKenzie & Grylls, 1999; Bashir et al., 2000; McBride et al., 2000; Solberg et al., 2000; Lemelin et al., 2001; Goodwin et al., 2001; Bordley, Margolis, Stuart, Lannon, & Keyes, 2001; Lobo et al., 2002; Frijling et al., 2002; Nagykaldi & Mold, 2003; Stange et al., 2003; Frijling et al., 2003a; Frijling et al., 2003b; Crotty et al., 2004; Roetzheim et al., 2004; Chirikos et al., 2004; Margolis et al., 2004; Lobo et al., 2004; Roetzheim et al., 2005; Margalit, Glick, Benbassat, Cohen, & Katz, 2005).

Figure 3-1 Publication Frequency, 1984 to 2005 (n=38)



Upon inspection, the reasons for not including identified articles were because the intervention under study did not include an individual with the explicit role of

facilitator (Palmer et al., 1996; Manfredi et al., 1998; Gottlieb, Huang P.P., Blozis, Guo, & Murphy-Smith, 2001; O'Connor et al., 2005), was a study that had already been captured from the facilitation literature with no new information or outcome data (Fullard, 1987; Ruhe et al., 2005), and articles that were editorial or descriptive (Solberg et al., 1997b; Solberg et al., 1998). In the instance where research teams produced several outcome based studies from the same intervention, all published studies have been included if the outcomes being measured are different between studies (Frijling et al., 2002; Frijling et al., 2003b; Lobo et al., 2004) or if the follow-up time period is different between studies (Dietrich et al., 1992; Rebelsky et al., 1996).

Figure 3-1 demonstrates the dramatic increase in the amount of published research on the evaluation of practice facilitation interventions that has occurred from 1987 to 2005 as well as the interest in improving primary care practice. Fifteen of the 38 studies were published in the last 5 years and 57 per cent were randomized controlled trials (RCTs) with the other 43 per cent being observational studies such as non-equivalent comparison groups, cohort studies and case studies. There were only five RCTs prior to 1997. The additional 16 RCTs published since portends improved methodological quality and validity of the outcomes from this research. This represents 13 more RCT studies than the eight studies identified by Nagykaldi and colleagues (2005) for a total of 21 RCTs on practice facilitation. A total of 10 studies conducted some form of economic analysis on practice facilitation (Carney et al., 1992; Cockburn et al., 1992; Szczepura et al., 1994; Bryce et al., 1995; McCowan et al., 1997; Frijling et al., 2002; Frijling et al., 2003a; Frijling et al., 2003b; Chirikos et al., 2004; Hogg et al., 2005).

3.1 Intervention Descriptions

To briefly describe the interventions from the 38 studies that were included in the systematic review the following characteristics were considered: the country and setting where the intervention was delivered; the behaviors that were targeted; number of participants; the attributes of the participants in terms of age and gender; a description of interventions in terms of strategies and

whether they were tailored to the practice; the use of financial incentives or rewards; participation rate; and the intensity of interventions in terms of meetings, duration of meetings, and overall duration of the intervention. The objective is to give a high-level description of the interventions employed and not to replicate the more detailed and comprehensive description of practice facilitation as provided by other authors (Harvey et al., 2002; Nagykaldi et al., 2005).

Thirty-seven per cent (n=14) of the studies identified were conducted in the United States in settings such as Florida, Minnesota, Wisconsin, Vermont, New Hampshire, Ohio, Washington, North Carolina and Oklahoma. Another 32 per cent (n=12) of the studies were set in the United Kingdom, seven took place in the Netherlands, two in Australia, one in New Zealand, and one in Israel. Only one of the published studies had Canada as the setting (Lemelin et al., 2001).

Table 3-1 Practice Settings for Facilitation Interventions

Type of Setting	# of Papers
General Practices	20
Family Practices	7
Primary Care Practices	3
Health Maintenance Organization	3
Ambulatory Care Clinics	3
Pediatric Practices	2
Internal Medicine	1
Clinics for Uninsured Persons	1
Ontario Health Service Organizations	1
Total	41

Table 3-1 provides a listing of the practice settings mentioned in each of the 38 selected papers. The total was greater than 38 since three papers indicated multiple settings for the intervention (Kinsinger et al., 1998; Bordley et al., 2001; Margolis et al., 2004). As would be expected of interventions designed to help get evidence into practice in order to improve outcomes for

patients, the majority of the interventions (73 per cent) had general practices, family practices or primary care practices as the intervention setting. This was followed by Health Maintenance Organizations and clinics with a specialization such as pediatric practice. The settings such as Health Service Organizations or Health Maintenance Organizations are generally environments which are more multidisciplinary and where the practitioners have opted for alternatives to fee-for-service payment.

The total number of reported practices participating in either an intervention or control conditions across all 38 studies was 2,324. The number of participants in each study ranged from a minimum of only one practice to a maximum of 617. Two studies did not report the number of practices given that they had sampled either patients (McKenzie & Grylls, 1999) or physicians (Nagykaldi & Mold, 2003) directly and not the practice. The average number of practice participants per study was 64.6 (*SD*=108.7) but the distribution of study participant totals was highly skewed due a large number of small studies and two very large studies (Cockburn et al., 1992; Frijling et al., 2003a) with sample sizes of 264 and 617 respectively. Just over half (53 per cent) of studies have sample sizes between 25 and 125 practices and there was a cluster of 15 studies with less than 25 practices causing the overall skewness toward smaller sample size studies.

Fifty per cent of the published studies (n=19) provided enough detail to establish participation rates as determined from dividing the number of practices participating by the number of practices that were contacted for recruitment into the study. The participation rates varied widely from a low of just 4 per cent (Hearnshaw et al., 1998) to as high as 100 per cent (Bordley et al., 2001) with the average participation rate being 48 per cent (*SD*=33.7). Success in recruitment was generally associated with size of the population of practices that was being asked to participate with studies soliciting participation from entire regions being less successful (Lawrence & Packwood, 1996; Hearnshaw et al., 1998) as compared to smaller communities (Bordley et al., 2001) or studies that first randomly selected practices and then solicited participation (Kinsinger et al., 1998). Of course, other factors such as the recruitment methods and environmental context may also have impacted the

success of recruitment but these details were difficult to determine. For example, it has been shown that practicing family physicians are more likely to participate in research studies if recruitment is being done by another physician as compared to a non-physician (Borgeil et al., 1989).

Thirty-nine per cent of studies did not provide information on descriptive characteristics of the practices, of those that did the information provided varied. For example, thirteen studies described the proportion of the practices as solo or group with the range being as low as 30 per cent (Lemelin et al., 2001) to as high as 70 per cent (Frijling et al., 2003a) solo practices. Eleven studies indicated either the average age of the practice physicians, ranging from 40 to 48 years of age, or gave the proportion over 45 years of age which was 40 per cent across the four studies providing this information. Only seven studies mentioned the gender of the physicians in the practices and this varied from as low as only 4 per cent (Dietrich et al., 1992) of the physicians being female to as high as 45 per cent (Horowitz et al., 1996). Fourteen studies provided information on the patients that were the eventual target of the interventions and the characteristics of patients varied by the practice settings, type and objectives of interventions. All of these 14 studies provided data on the patient ages which ranged from children of 24 months of age (Margolis et al., 2004) to adults of 75 years (Roetzheim et al., 2004). Eight studies included information on the gender of the patients and the proportion ranged from a low of 42 per cent of patients being female (Horowitz et al., 1996) to a high of 66 per cent female (Crotty et al., 2004).

Forty-five per cent of the studies described the practice facilitation intervention as being tailored to meet the specific needs of the practice whereas the other 55 per cent sought to ensure that the intervention was administered the same way in each practice. The descriptions of the practice facilitation interventions corresponded to the following five categories: the Oxford model of audit facilitation from the UK; continuous quality improvement or total quality management interventions; multifaceted interventions where facilitators conduct audits and feedback performance, assist in developing plans, educate on the use of guidelines, and support the development of tools such as flow sheets and reminder systems; office system interventions where facilitators assisted in reorganizing

the practice and implementing new systems; and interventions where the facilitator played primarily an educational role. Sixty-eight per cent of studies provided information on the number of facilitator contacts with practices and/or duration of the interventions. Facilitators met with each of the practices an average of 11 times (range 1 to 33) over an average of 18 months (range 3 to 24 months) with the average contact lasting from as little as 12 minutes to as long as 5 hours for those 19 studies reporting the duration of contacts with the majority (n=12) indicating the contacts lasted between one and two hours.

Table 3-2 summarizes the behaviours that were targeted for improvement by the practice facilitation interventions. The majority of papers (84 per cent) targeted behaviours which involved the implementation of evidence-based guidelines to improve screening practices and care management in areas such as cardiovascular disease, overall preventive care, cancer, diabetes and depression. The total was greater than 38 since two papers targeted more than one category of guideline implementation using facilitated continuous quality improvement interventions; a paper by Horowitz and colleagues (1996) targeted both the improvement of guideline adoption for hypertension and depression and another paper by Lawrence and Packwood (1996) targeted improvement in the management of coronary heart disease and cancer. Six studies focused solely on improvements to practice management and not the implementation of specific guidelines for the benefit of patients (Szczepura et al., 1994; Hearnshaw et al., 1994; Hearnshaw et al., 1998; Geboers et al., 1999; Crotty et al., 2004; Margalit et al., 2005).

Only seven studies provided monetary compensation or other incentives such as CME credits to participants to either help compensate them for their time or to act as an incentive for data collection (Lawrence & Packwood, 1996; Kinsinger et al., 1998; McBride et al., 2000; Lemelin et al., 2001; Stange et al., 2003; Frijling et al., 2003a; Margolis et al., 2004). Of the papers that indicated a

Table 3-2 Targeted Behaviours of Practice Facilitation Interventions

Target Behaviour	# of Papers
Cardiovascular disease and hypertension screening and care	10
Cancer screening and care	6
Overall preventive screening and care	6
Practice management changes/ TQM	6
Diabetes care	4
Depression and psychiatric screening and care	2
Smoking cessation counseling	2
Childhood asthma management and care	2
Prescription practices	1
Haemoglobin disorders screening	1
Total	**40**

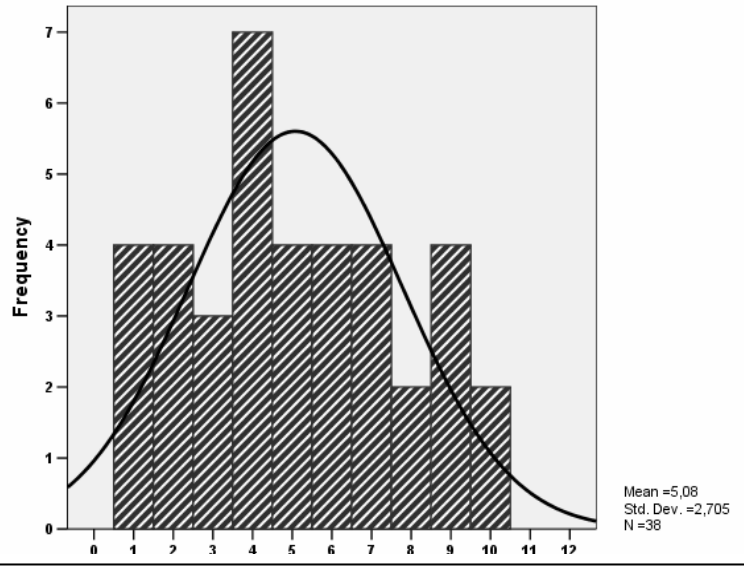
monetary incentive, the amount of incentive varied from $100 US for each physician upon completion of data collection (Kinsinger et al., 1998) to as much as 450 EUR per practice (Frijling et al., 2003a) as an incentive to participate and 2,500 GBP per practice to help offset the service and educational costs associated with a total quality management intervention (Lawrence & Packwood, 1996). Only two studies offered physicians CME credit as acknowledgement for their participation in practice facilitation and the educational aspects of practice guideline implementation (Lemelin et al., 2001; Margolis et al., 2004).

3.2 Quality of Research on Practice Facilitation

Of the 38 selected studies, 21 were RCTs of which three studies referenced specifically a cluster randomized controlled design, the remaining studies were observational with five controlled clinical trials (CCTs) with no randomization of comparison groups, six quasi-experimental before and after designs with no comparison groups, and another six qualitative case studies of the experiences of one or a select number of practices. Figure 3-2 shows the distribution of the performance scores

across the 38 selected studies. The overall mean performance score was 5.08 with the lowest score being one and the highest 10. The highest possible methodological performance score that could be attained was 12 and none of the studies achieved this primarily due to the methodological problems in controlling for bias caused by inadequate concealment of assignment to conditions or blinding of participants to the intervention being evaluated which is extremely difficult, if not impossible, with applied implementation research and the practice settings that the studies took place in.

Figure 3-2 Methodologic Performance Score Frequency Distribution (n=38)



As Figure 3-2 indicates there was a cluster of seven studies with a performance score of four (Fullard et al., 1987; Szczepura et al., 1994; Hearnshaw et al., 1994; Horowitz et al., 1996; McCowan et al., 1997; Bordley et al., 2001; Frijling et al., 2003a). Four of these studies were RCTs with poor or missing descriptions of the facilitation strategies (McCowan et al., 1997) and methodological problems such as a lack of adequate follow-up (McCowan et al., 1997) or units of randomization and analysis not agreeing with no mention of ICC or statistical adjustments to correct for error (Szczepura et al., 1994). Other problems with these RCTs included overall poor methodological reporting (Hearnshaw et al., 1994) and presenting results from a failed RCT qualitatively without any outcomes or statistical tests (Horowitz et al., 1996). The remaining three studies of the seven were observational, one before and after study (Bordley et al., 2001) and two controlled trials (Fullard et al., 1987; Frijling et al., 2003a) all of which had problems in methodological reporting. Eight studies

had performance scores of 8 or more indicating better methodological quality and greater validity (Bryce et al., 1995; Kinsinger et al., 1998; Solberg et al., 2000; Lemelin et al., 2001; Lobo et al., 2002; Frijling et al., 2002; Frijling et al., 2003b; Margolis et al., 2004).

Table 3-3 Methodological Quality Ratings for Selected Studies (n=38)

Rating Item	Percentage of Studies Reporting
P1 – Intervention Description	94.7%
P2 – Random Allocation	55.3%
P3 – Allocation Concealment	21.1%
P4 –Units of Randomization and Analysis Agree	52.6%
P5 – Groups Similar at Baseline	50.0%
P6 – Blinding of all Participants	10.5%
P7 – Blinding of Facilitators	-----
P8 – Blinding of Assessors	13.2%
P9 – Adequate Follow-up (> 85%)	68.4%
P10 – Intent-to-treat Analysis	23.7%
P11 – Statistical Tests	65.8%
P12 – Point Estimates	50.0%

The summary results for each of the methodological quality ratings contained within the modified PEDro scale (see Appendix C) that was developed for this systematic review are depicted in Table 3-3 to provide an overall assessment of the internal validity of the selected studies and how

adequately performance, detection, selection, attrition and other forms of bias and error were reportedly controlled for. Nearly all (95 per cent) of studies provided enough of a description of the facilitation intervention to be able to determine predisposing, enabling and reinforcing intervention strategies as identified in the PRECEDE framework.

To protect against performance bias such as unintended differences in treatment and placebo effects as well as detection bias or differences in the assessment of outcomes between comparison groups, it is recommended that those providing and receiving treatment be 'blinded' so that they do not know the group to which the recipients of the intervention have been allocated. This is nearly impossible to achieve with practice facilitation interventions involving the implementation of evidence-based guidelines; however, blinding of data collectors should be possible. Table 3-3 shows that only 11 per cent of participating practices were blinded, none of the facilitators were blinded and surprisingly only 13 per cent of data collectors were blinded as to the status of participating practices. In addition, selection bias can be avoided by using concealment when assessing a potential participant's eligibility for a study. Those who are recruiting participants and the participants themselves should remain unaware of which group they will be assigned to until after the decision about eligibility has been made. By separating the recruitment process from the process of randomizing participants to intervention or comparison groups, the possibility of bias is avoided, and should be achievable in implementation research. However, only 21 per cent of studies reported allocation concealment. It was not always clear if the person recruiting the participants was different from the person conducting the random assignment to groups.

3.3 Selection of High Methodologic Performance Studies

A higher performance score for a selected study indicates that there can be greater confidence in its results, supported both by the study design and the way in which it was carried out. In addition, studies of higher methodological quality help to reduce the potential for statistical heterogeneity

within meta-analysis (Grimshaw et al., 2003; Higgins & Green, 2008). Therefore, only studies which had performance scores greater than or equal to the overall mean performance score of five were chosen for further analysis. This resulted in 20 studies (see Appendix F for methodologic performance criteria scoring) or 53 per cent having higher methodologic performance and greater validity and 47 per cent of possibly limited validity. The performance score in the convention used here is made up of the twelve quality rating items contained in the modified PEDro scale described in Appendix C. As indicated in Figure 3-2, there was variation in the performance scores for the selected studies with studies scoring below five having limitations in the 12 areas of interest and in many cases relevant information was missing or given only minimal detail.

Table 3-4 Methodologic Performance Score by Type of Study Design

		Performance Score Data	
Study Design	**No. of Studies**	**Mean**	**Range (SD)**
Randomized Controlled Trial	21	6.90	4 – 10 (1.99)
Controlled Clinical Trial	5	4.60	4 – 5 (0.55)
Quasi-Experimental Before and After	6	2.17	1 – 4 (1.17)
Case Study	6	2.00	1--3 (0.89)
Overall	**38**	**5.08**	**1 –10(2.70)**

The data in Table 3-4 serve to illustrate the point that study design was not necessarily a good indication of overall study quality. For example, although the mean performance scores of RCTs and CCTs were significantly different from each other and other study design types, $F(3,34)= 22.08$, $p < .001$, the range of performance scores indicates that some non-randomized controlled clinical trials scored better than the RCTs. In fact, 15 per cent of the chosen studies with high methodologic performance were CCTs showing the quality in their reporting and methods, though confidence in their findings may be limited by potential selection bias as a result of non-randomization. The

performance ratings of case studies and before/after studies did not significantly differ from each other. However, the PEDro scale is weighted towards randomized controlled trials given the number of items relating to bias within the scale, so it is not unexpected that 85 per cent of the studies with high methodological performance are RCTs and that observational and qualitative studies fair poorly. All of the eight RCT studies identified by Nagykaldi and colleagues (2005) were also identified as having high methodologic performance in this systematic review (Dietrich et al., 1992; Bryce et al., 1995; Modell et al., 1998; Kinsinger et al., 1998; Lemelin et al., 2001; Goodwin et al., 2001; Frijling et al., 2002; Margolis et al., 2004). It is important to also note that of the 20 studies with high methodologic performance seven RCTs were not included in the Nagykaldi review but met their inclusion criteria of being published between 1966 and 2004 (Cockburn et al., 1992; McBride et al., 2000; Solberg et al., 2000; Lobo et al., 2002; Stange et al., 2003; Frijling et al., 2003b; Lobo et al., 2004). Table 3-5 provides details on the 20 selected studies with high methodologic performance.

3.4 Intervention Effects

The effect size for each of the intervention studies listed in Table 3-5 was determined by calculating the standardized mean difference (SMD) -- the difference between the mean primary outcome measure values of the intervention and control arms, divided by the pre intervention control arm standard deviation (Grimshaw et al., 2004; Higgins & Green, 2008). For the two studies (Bryce et al., 1995; Hulscher et al., 1997) that only reported outcomes as an Odds Ratio, the formula developed by Chinn (2000) was utilized to convert the Odds Ratio to a *SMD* and to establish the standard error. In determining the effect size, the longest follow-up period was chosen from each study and in each case the primary intervention outcome was compared to a no intervention control. By convention, an *SMD* of 0.80 indicates large intervention effects; 0.50, a moderate effect; and 0.20, a small effect (Cohen, 1988).

Table 3-5 Characteristics of Studies with High Methodologic Performance Scores (n=20)

		Design Characteristics				Intervention Characteristics					
Author, year	**Score**	**Design**	**ITT**	**Follow-up**	**Retention**	**Type**	**EBG**	**Duration**	**Mtgs@HrsPer**	**Tailor**	**Effect Size**
											SMD (SE) 95% CI
Bashir et al. (2000)	5	CCT	N	18 months	100%	Multi	Depress.	12 months	10 @ 1	N	0.71 (0.35) 0.02-1.40 [a]
Cockburn et al. (1992)	5	RCT	N	3 months	79%	Educ	Smoking	2 months	2 @ 0.25	N	0.24 (0.15) -0.06-0.54
Hulscher et al. (1997a)	5	CCT[bl]	N	18 months	100%	Multi	CVD	18 months	25 @1.25	Y	0.66 (0.26) 0.16-1.16 [a]
Kottke et al. (1992)	5	CCT[bl]	Y	19 months	83%	Multi	Smoking	18 months	30 @ 1	N	1.01 (0.52) 0.00-2.02 [a]
Goodwin et al. (2001)	6	RCT	N	12 months	NR	Multi	Preven.	12 months	4 @ 1.5	Y	0.60 (0.23) 0.15-1.05 [a]
Margalit et al. (2005)	6	RCT	N	3 months	100%	Educ	Mgmt.	3 months	12 @ 5	N	1.27 (0.46) 0.37-2.17 [a]
McBride et al. (2000)	6	RCT	N	18 months	100%	Multi	CVD	12 months	5 @ 1	Y	0.82 (0.46) -0.08-1.72
Stange et al. (2003)	6	RCT	N	24 months	NR	Multi	Preven.	12 months	4 @ 1.5	Y	0.60 (0.24) 0.14-1.06 [a]
Deitrich et al. (1992)	7	RCT	N	12 months	96%	Audit	Cancer	3 months	3 @ 1	Y	0.56 (0.29 -0.01-1.13 [a]
Lobo et al. (2004)	7	RCT[bl AC]	Y	21 months	57%	Multi	CVD	21 months	15 @ 1	N	0.44 (0.18) 0.09-0.79 [a]
Modell et al. (1998)	7	RCT[bl]	N	12 months	100%	Multi	HBG	12 months	3 @ 1	N	1.12 (0.43) 0.28-1.96 [a]
Roetzhiem et al. (2005)	7	C- RCT[bl]	N	24 months	100%	Office	Cancer	12 months	4 @ 1	N	0.84 (0.29) 0.27-1.41 [a]
Bryce et al.(1995)	8	RCT[bl AC]	Y	12 months	93.3%	Audit	Asthma	12 months	1 @ 15	N	0.62 (0.32) 0.00-1.24
Lemelin et al. (2001)	8	RCT[bl AC]	N	18 months	98%	Multi	Preven.	18 months	33 @ 1.75	Y	0.98 (0.32) 0.36-1.60 [a]
Kinsinger et al. (1998)	9	RCT[bl AC]	N	18 months	94%	Office	Cancer	12 months	10 @ .75	Y	0.47 (0.27) -0.05-0.99
Lobo et al. (2002)	9	RCT[bl AC]	Y	21 months	100%	Multi	CVD	21 months	15 @ 1	N	0.66 (0.19) 0.30-1.02 [a]
Margolis et al. (2004)	9	RCT [AC]	Y	30 months	100%	CQI	Preven.	24 months	9 @ 1	Y	0.60 (0.30) 0.00-1.20 [a]
Solberg et al. (1998)	9	RCT [AC]	Y	22 months	100%	CQI	Preven.	22 months	4 @ 3	Y	1.08 (0.32) 0.45-1.71 [a]
Frijling et al. (2002)	10	C-RCT[bl AC]	Y	21 months	95%	Multi	Diabetes	21 months	15 @ 1	N	0.26 (0.18) -0.09-0.61
Frijling et al. (2003a)	10	C-RCT[bl AC]	Y	21 months	95%	Multi	CVD	21 months	15 @ 1	N	0.39 (0.18) 0.05-0.74 [a]

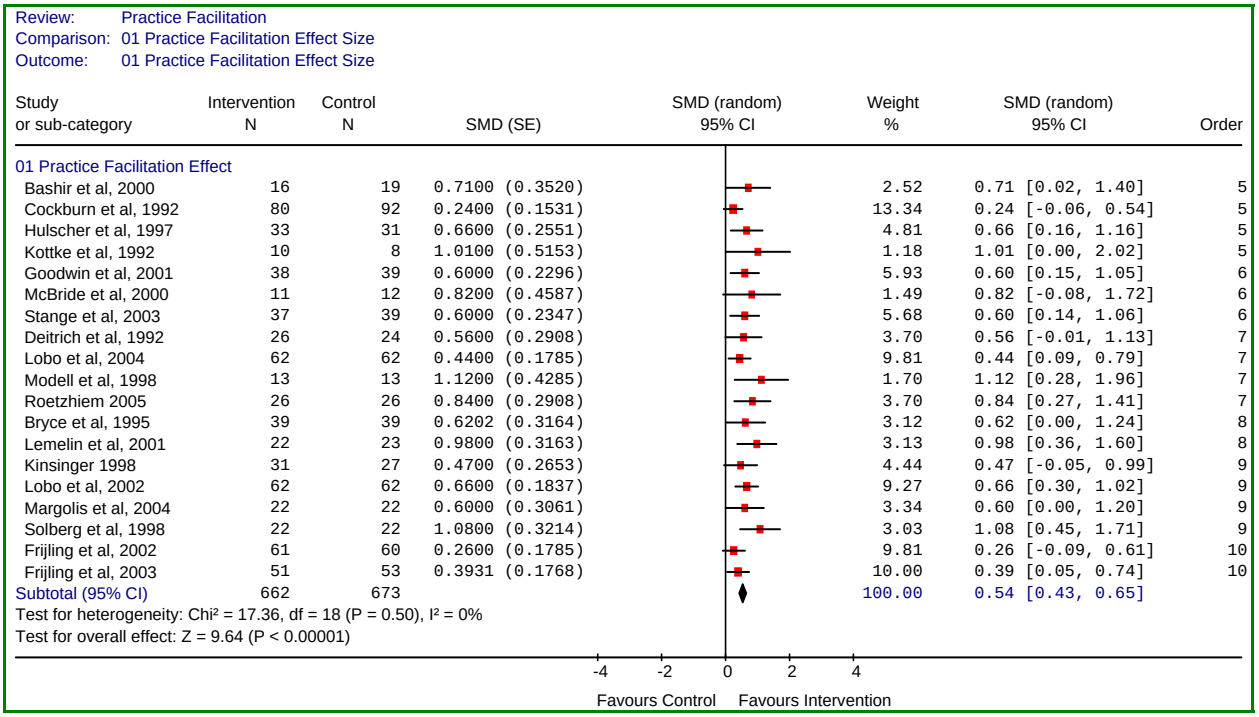
CCT = Controlled clinical trial; RCT=randomized controlled trial; C-RCT = cluster randomized controlled trial; ITT=intent-to-treat; EBG = evidence based guideline targeted; Mtgs = meetings; HrsPer = hours per meeting; Tailor = tailoring of intervention to practice; Multi = multiple intervention components; Educ = educational facilitated intervention; Office = facilitated office system intervention; CQI = continuous quality improvement facilitated intervention; Audit = facilitated audit intervention (Oxford model); Depress = Depressions; CVD = cardiovascular disease; Preven.= preventive care guidelines; HBG = hemoglobin screening guidelines; NR = not reported; [AC] = allocation concealed; [bl] = blinding, single or double; SMD = standardized mean difference; SE = standard error; CI = confidence interval; [a] = Z statistic, $p < .05$.

Seven of the 20 high methodologic performance studies had large intervention effect sizes greater than 0.80 (Kottke et al., 1992; Modell et al., 1998; Solberg et al., 1998; McBride et al., 2000; Lemelin et al., 2001; Roetzheim et al., 2005; Margalit et al., 2005). Five studies (Cockburn et al., 1992; Kinsinger et al., 1998; Frijling et al., 2002; Frijling et al., 2003b; Lobo et al., 2004) had small effect sizes of less than 0.50 and the remaining eight studies had moderate effect sizes of between 0.50 and 0.80 (Dietrich et al., 1992; Bryce et al., 1995; Hulscher et al., 1997; Bashir et al., 2000; Goodwin et al., 2001; Lobo et al., 2002; Stange et al., 2003; Margolis et al., 2004). A study by Margalit et al. (2005) had a very large effect size of 1.27 (95% CI, 0.37 - 2.17) and appeared as an outlier in comparison to the other studies. This study involved the use of a facilitator in an educational intervention to encourage participating physicians to adopt a biopsychosocial approach to patient care management and unlike the other studies did not focus on the implementation of any specific evidence-based guideline. Therefore, the Margalit study was removed from further analysis reducing the number of studies with an effect size greater than 0.80 to six.

Figure 3-3 is a Forest plot that shows the SMDs, 95 per cent confidence intervals, standard errors and sample sizes for each of the studies from lowest to highest methodologic performance. The graph shows that five studies had non-significant effects with confidence intervals that contain negative values due to larger standard errors, making it less certain that these interventions are effective. A non-significant but large study by Cockburn et al. (1992) involved a brief facilitated educational intervention on smoking cessation guidelines and accounted for 13.34 per cent of the weight in the overall effect size calculation. However, the majority of the studies show effect size point estimates that favour the intervention condition and the test for an overall effect across the 19 included studies is very significant (z=9.64, $p < .00001$) with an overall moderate effect size point estimate of 0.54 (95% *CI* 0.43-0.65) based on a random effects model. Although some statistical heterogeneity is expected given practice facilitation studies with differing intervention components, outcomes, and measures; the final random effects model was homogenous with the test for heterogeneity being non-significant, $Q(18) = 17.36$, p=.50. To further understand the percentage of

variability in effects due to heterogeneity rather than sampling error or chance the I^2 statistic (Higgins & Green, 2008) was calculated to determine a surprising 0 per cent heterogeneity across selected studies.

Figure 3-3 Forest Plot of Studies with High Methodologic Performance Scores (n=19)



To test the sensitivity of the overall effect size of .54 to any one of the 19 studies, a one study removed analysis was conducted to observe the impact on the overall effect size. Each study was removed in sequence, the meta-analysis re-run, and the impact on the overall *SMD* effect size point estimate was determined. The result of this analysis demonstrated that the observed impact of any one study on the overall point estimate was negligible with the effect varying to as high as 0.60 with the Cockburn et al. (1992) study removed to as low as 0.53 with the study by Solberg and colleagues (1998) removed.

Figure 3-4 Publication Bias Funnel Plot

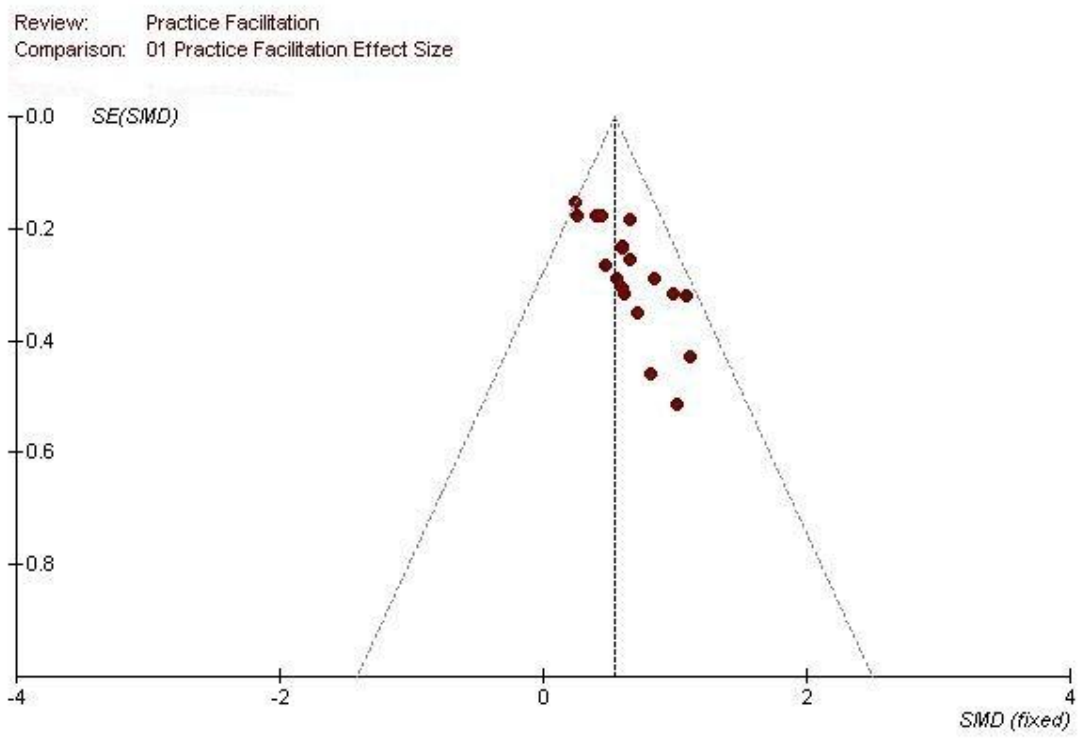


Figure 3-4 is a publication bias funnel plot of practice facilitation effect size as represented by the standardized mean difference (x-axis) and the standard error (y-axis) for each of the 19 high methodological practice facilitation studies. The middle line perpendicular to the x-axis represents the pooled estimate of practice facilitation effect size of 0.54. Larger studies in terms of sample size have a smaller standard error and cluster close to the pooled estimate whereas studies with fewer subjects will have larger standard errors and cluster farther away from the pooled estimate forming an inverse funnel as depicted in Figure 3-4. The funnel plot provides evidence of publication bias in the literature with regard to good quality practice facilitation trials with there being no small studies with small effects included in the meta-analysis. The smaller studies included in the meta-analysis tend to have larger effect sizes whereas the larger studies tend to have effect sizes lower than the pooled estimate as depicted in Figure 3-4. The three studies (Kottke et al., 1992; Modell et al., 1998; McBride et al., 2000) with standard errors greater than 0.43 and effect sizes greater than 1.0 were

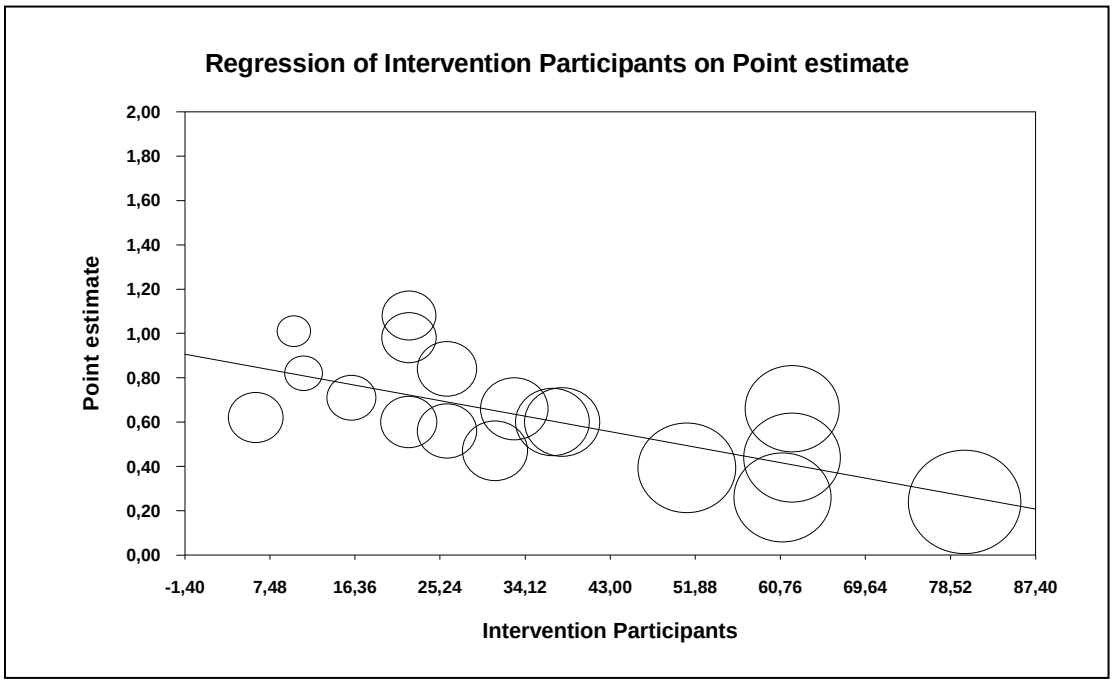
removed from the overall effect size calculation to test for sensitivity to publication bias. The overall pooled estimate of effect size for practice facilitation with the three studies removed was 0.52 (95% *CI* 0.41-0.63) indicating that any potential bias caused by the smaller studies was not apparent to any great extent.

3.4.1 Practice Facilitation Study Effect Size Moderators

Determining possible intervention attributes that serve as effect modifiers for the practice facilitation intervention effect was one of the objectives for the systematic review using exploratory sub-category analysis of the selected high methodologic performance studies. The following a priori characteristics were included in the sub-category analysis: 1) year of the study; 2) type of facilitation intervention (multi-component, CQI, educational or office system); 3) tailored to the needs of the practice (Y or N); 4) duration of the practice facilitation intervention; 5) number of intervention practices participating; 6) intensity of the intervention as determined from multiplying the average number of meetings per practice by the average duration of a practice meeting; and 7) the PRECEDE predisposing, enabling and reinforcing implementation strategies as determined by a score representing a count of the implementation strategies from each selected study (see Appendix G). There was no association between the methodological characteristics of studies as determined by the methodologic performance score and effect size based on a mixed effects regression with unrestricted maximum likelihood, $Q(19) = 0.29$, $p = .59$.

Studies published on or after 2001 had a smaller overall effect size (*SMD*=.53, 95% *CI* 0.39 – 0.67) as compared to studies published prior to 2001 (*SMD*=.59, 95% *CI* 0.40 – 0.78), but the difference was negligible. However, those practice facilitation intervention studies that reported that the intervention was tailored to the needs of the practice (Dietrich et al., 1992; Hulscher et al., 1997; Kinsinger et al., 1998; Solberg et al., 1998; McBride et al., 2000; Lemelin et al., 2001; Goodwin et al., 2001; Stange et al., 2003; Margolis et al., 2004) had an overall effect size of 0.67 (95% *CI* 0.49-0.86) as compared to studies which did not report tailoring (*SMD*=0.48, 95% *CI* 0.33 – 0.64), this

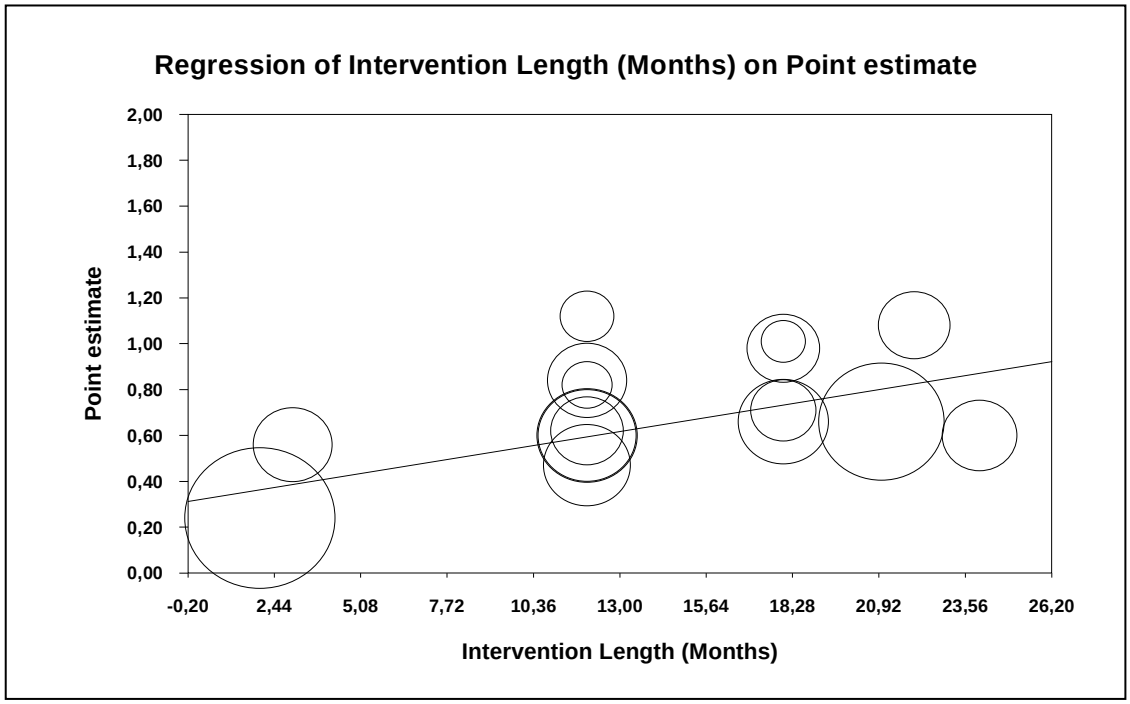
Figure 3-5 Number of Participating Practices and Effect Size



apparent difference did reach significance, $Q(19)=3.08$, $p=.08$. The overall effect sizes varied by the type of facilitation with the one educational intervention by Cockburn and colleagues (1992) having the lowest effect size of 0.24 (95% *CI* -0.06-0.54), followed by 12 multi-component interventions at 0.55 (95% *CI* 0.42-0.69), two audit based interventions at 0.59 (95% *CI* 0.17-1.01), two office system interventions at 0.64 (95% *CI* 0.25-1.02), and two CQI interventions at 0.83 (95% *CI* 0.36 – 1.30).

Figure 3-5 is a scatter plot depicting the relationship between the number of practices participating in the practice facilitation intervention by the point estimate effect size for each study. It shows the fitted regression line and a significant association between the number of intervention participants and effect size according to unrestricted maximum likelihood mixed effects regression, $Q(19)=10.1$, $p = .001$. Each selected study is shown on the graph as a bubble and the size of the bubble represents the amount of weight associated with the results of that study in the random effects model meta-analysis. The significant association between the number of participating practices and

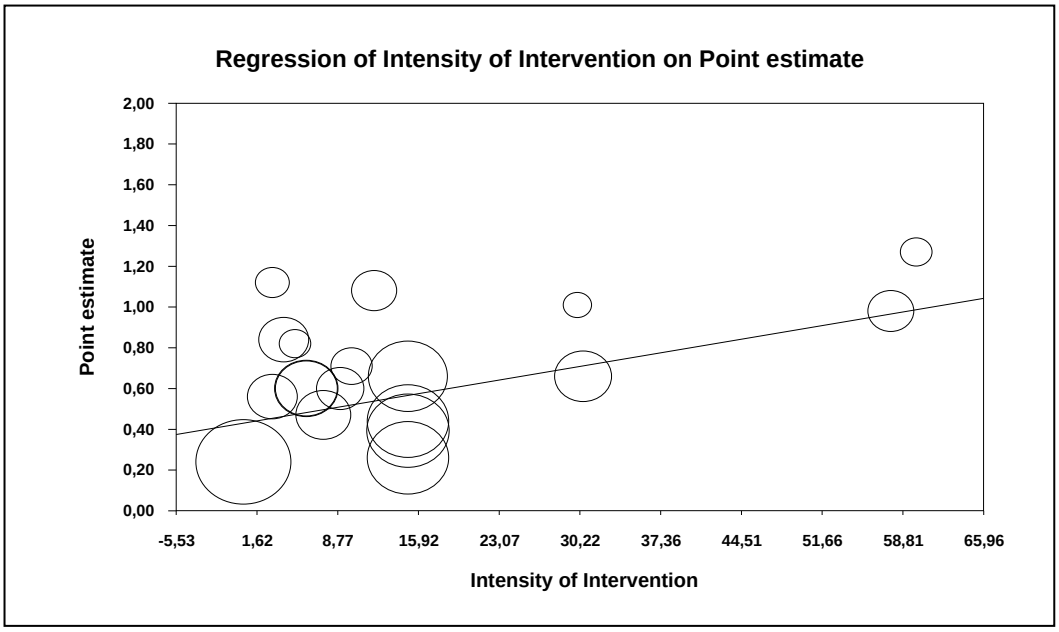
Figure 3-6 Duration of Intervention and Effect Size



effect size suggests that as more practices are involved the effect of practice facilitation decreases. A cluster of studies with twenty to thirty intervention practices and strong effect sizes is also apparent.

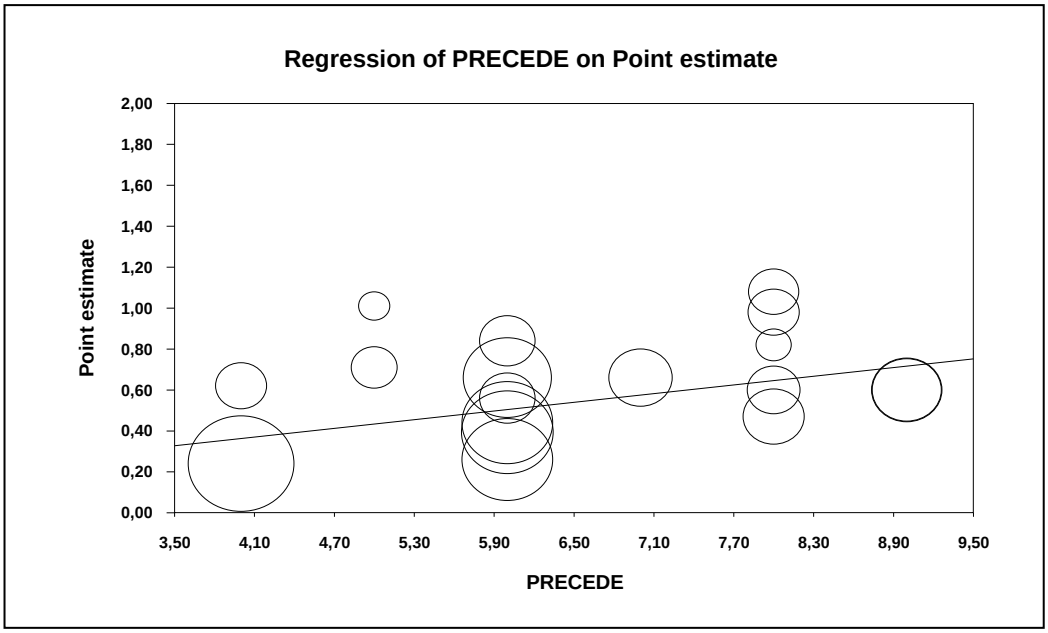
Figure 3-6 shows another intervention characteristic, duration of the intervention in months, plotted against the point estimate effect sizes of each selected study. Once again there is a significant slope for the regression equation showing that as the duration of the intervention or the length of time that the facilitator is in contact with the practices increases so does the effect size, $Q(19)=5{,}08$, $p=.03$. It should be noted that the large study of only two months duration by Cockburn and colleagues (1992) has the greatest weight within the random effects model using generic inverse variance and contributes to the slope of the line. Nonetheless, it is easy to see the relationship between duration and effect size as well as the cluster of studies with 12 months intervention duration.

Figure 3-7 Intensity of Intervention and Effect Size



Intensity of practice facilitation was calculated by multiplying the average number of contacts with a practice by the average meeting time in hours. Figure 3-7 depicts an apparent trend between the intensity of the intervention and the effect size. However, the association as determined by mixed effects regression did not reach significance, $Q(19)=2.77$, $p=.10$.

Figure 3-8 PRECEDE Score and Effect Size



Finally, Appendix G contains a description for each of the selected high methodologic performance studies and of the PRECEDE predisposing, enabling and reinforcing practice facilitation implementation strategies as taken from the intervention descriptions of each of the studies. A PRECEDE score was calculated simply by totaling the number of predisposing, enabling and reinforcing strategies indicated within each study (see Appendix G). The median PRECEDE score was six and the scores ranged from a minimum of four for studies that employed minimal enabling strategies such as simply providing a kit or guideline information with no ongoing or only minimal reinforcement (Cockburn et al., 1992; Bashir et al., 2000) to studies with scores of nine such as Goodwin and colleagues (2001) that conducted an initial practice environmental assessment, baseline audit and feedback of performance, and education as predisposing strategies; tailored-to-practice manuals, flowsheets, reminders, ongoing education as enabling strategies; and, follow-up audit and feedback of performance every six months along with ongoing support as reinforcing strategies. Figure 3-8 depicts the association between the PRECEDE total score and the effect size point estimate for each study. A significant positive trend is evident with larger PRECEDE scores generally being associated with larger effect sizes, $Q(19)=3.66$, $p=.05$. However, the Cockburn study, being so large with a minimal intervention and associated minimal effect size, acts as an anchor affecting the overall regression line. Each of the PRECEDE components, predisposing, enabling and reinforcing, was investigated in terms of effect sizes to further understand implementation strategies and outcome. There was little to no difference in effect sizes between studies regardless of the number of *predisposing* or *reinforcing* implementation strategies employed. However, the average effect size for those studies employing only one *enabling* strategy was 0.385 (95% *CI* 0.234-0.537) versus those that employed two, three and four enabling strategies with average effects sizes of 0.82 (95% *CI* 0.42-1.22), 0.632 (95% *CI* 0.36-0.90), and 0.723 (95% *CI* 0.49 – 0.95) respectively.

3.5 Economic Effects

Ten studies conducted some form of economic evaluation, either simple cost analyses of interventions (Carney et al., 1992; Cockburn et al., 1992; Bryce et al., 1995; McCowan et al., 1997; Frijling et al., 2002; Frijling et al., 2003a; Frijling et al., 2003b) or cost-effectiveness analyses (Szczepura et al., 1994; Roetzheim et al., 2004; Hogg et al., 2005). Given the limited number of complete economic evaluations of practice facilitation, no methodological assessment such as that proposed by Drummond (Drummond et al., 1999) was undertaken and the results of the economic studies are summarized as narrative.

The costing studies showed variation in the cost items included with some studies including not only the intervention costs to the practice but the associated downstream hospital costs (Bryce et al., 1995; McCowan et al., 1997) as well. Bryce et al. looked at the costs to the general practice, prescription costs, and the associated inpatient and outpatient costs of a facilitated audit intervention to improve the management of childhood asthma and found that the facilitated intervention cost 36.57 GBP per child in year two as compared to only 30.48 GBP per child for the control group. The cost of the facilitator intervention itself was not included in the analysis and although hospital costs did drop in the intervention group as compared to the control, this was offset by the increased cost in physician and nurse time as well as prescriptions (Bryce et al., 1995). Similarly, McCowan et al. (1997) looked at the practice costs and associated hospital costs of an another practice facilitation intervention on management of children with asthma and concluded that the reduction in hospital health service costs seen in the intervention group was equivalent to the cost of employing a facilitator but there were no savings.

Several studies did simple costing of the facilitator interventions and came to the following conclusions: a study by Carney and colleagues (Carney et al., 1992) concluded that a facilitated intervention to improve cancer screening in family practices cost $186 US per practice; and a series of facilitation intervention studies in the Netherlands by Frijiling and colleagues (2002) found that facilitation cost 375 Euro per practice for the implementation of guidelines to manage diabetic

patients, 1,500 Euro per practice for management of cardiovascular disease patients (Frijling et al., 2003b), and 6,000 Euro per practice for a large scale controlled trial to improve preventive cardiovascular care involving 800 practices (Frijling et al., 2003a). These four studies provided very little to allow for a determination of what cost elements were included in the overall calculations which may account for some of the variation in reporting.

Cockburn et al. (1992) collected data on the implementation costs of three alternatives to getting smoking cessation counseling guidelines adopted in Australian practices and found that the facilitator alternative cost a $142 AUS per practitioner as compared to courier at $14 AUS and mail post at $6 AUS. The authors conclude that practice facilitation is not a cost-effective strategy for distributing smoking interventions; however, the facilitator in this case only visited practices twice for an average of 12.8 minutes.

Of the studies that conducted a cost-effectiveness analysis, Szczepura et al. (1994) considered the costs of implementing three alternative strategies for feeding back performance on preventive care to general practitioners – graphical, graphical plus a visit by a facilitator, and tabular. The relative cost-effectiveness of the three strategies was measured on the basis of cost per effect for feedback provided routinely to all practices. Effect was determined from practitioners as feedback being perceived as helpful to the practice based on self-report. The cost-effectiveness was calculated to be 46.10 GBP per effect for graphical and tabular feedback and 132.50 GBP per effect for practices receiving a facilitator visit. It was concluded that feedback involving visits from a facilitator is less cost-effective given that other forms of feedback yielded equal amounts of self-reported organizational change.

Hogg et al. (2005) conducted a cost-consequences analysis of an effective practice facilitation intervention to improve preventive care that looked at not only the costs of the intervention and screening tests but at the associated hospital costs and savings from the improvement in preventive care between intervention and control conditions. This analysis included the total cost of the intervention, costs associated with the increased delivery of preventive care, and savings to the

government from provision of improved preventive services. This analysis determined net savings to the government of $8,715 Can. per practice or $2.08 per patient and the cost of the intervention was entirely recouped providing a 40 per cent return on the intervention investment.

Chirikos and colleagues (2004) conducted a cost-effectiveness analysis of an effective practice facilitation intervention (Roetzheim et al., 2005) to increase cancer screening that involved calculating the marginal cost (difference between control and intervention arms) of personnel time, patient time, overhead, and intervention materials and support and the marginal effectiveness on 12-month screening rates. Costs were determined from both a payer and societal perspective. The incremental cost-effectiveness ratios from the societal perspective were determined by dividing the cost estimate of selected tests by the corresponding changes in screening rates as $59.96 US for mammography, $14.99 U.S. for PAP tests, and $11.53 US for fecal occult blood tests. This study also considered life years saved with and without the intervention in determining marginal effectiveness and found that the incremental cost effectiveness ratio favoured the intervention and that the effectiveness of the practice facilitation intervention more than outweighed the costs viewed from both a payer or societal perspective.

Chapter 4
Evaluation Findings

The results of the implementation evaluation of practice facilitation for chronic illness care management are presented in this chapter. A mixed methods approach to data collection and analysis (Creswell et al., 2003) as outlined in the methods chapter was utilized to describe the implementation of the intervention and to address the research goal of assessing the extent to which TOF and care plans for chronically ill patients were implemented with fidelity along with a description of the challenges experienced and the reasons for successful or failed execution of chronic illness care management in four rural Ontario primary care practices. Quantitative data collection and analysis was carried out on the monthly activity logs of the practice facilitators and the completed care plans. The activity logs and narrative reports of the practice facilitators were analyzed for content. The semi-structured open-ended interviews of participating physicians were analyzed qualitatively to identify common themes and categories across the case study participants. The qualitative and the quantitative data were integrated to build a more complete analysis. The integration provided for triangulation of the different data sources and units of analysis to better address the research objectives.

First, the four case study practices are described using a number of attributes. Second, program implementation fidelity or the extent to which the CICM practice facilitation intervention was delivered across the four practices in accordance with the intended three component CICM protocol is presented along with the intervention costs. The activities and delivery methods of the facilitators, the materials used, the frequency and length of practice visits, and the extent of completion of care plans for successful practices were considered for program implementation fidelity. Third, the qualitative analysis of the physician interviews is presented according to emergent themes such as the perceived outcomes and benefits from CICM, physician experiences with the CICM protocol, the facilitator, and the videoconference equipment. Negative factors that

impeded and positive factors that promoted implementation as described by participating physicians are presented. Two key themes are presented to express the chronic care illness management experience of physicians – the optimists and the pessimists.

4.1 Case Study Description

The case study practices were all health service organizations or family health networks within rural Ontario communities ranging in population size from 8,000 to 11,000. Table 4-1 provides a comparison of characteristics of the practices that were purposively sampled and voluntarily consented to participate in the study. The practices are similar in terms of patient roster size, number of patients seen per half day, patient population characteristics, and size of community. All of the practices were 50 to 75 kilometers distant from any metropolitan area greater than 150,000 in population size according to the 2006 Census of Canada. The Rurality Index of Ontario (RIO) ranged from 33 to 50 for the four different case study practices -- the higher the ROI the more rural the community. The RIO ranges from 0 (least rural) to 100 (most rural) and incorporates elements such as the travel time to advanced referral centres, community population, population to GP ratio, presence of a hospital, availability of ambulance services, weather conditions, provision of selected services such as obstetrics and anesthesia by GPs, and social factors such as unemployment rates and presence of post-secondary educational institutions (Kralj, 2000). As a comparison, the ROI for the urban areas of Ottawa, Kingston and Hamilton is 6.4, 6.9 and 3.7 respectively.

Table 4-1 Practice Characteristics

Characteristic	Practices			
	A	**B**	**C**	**D**
No. of Physicians	2	2	1	1
Full-time Equivalent Nurses	0.2	None	3	None
Patients seen per half day	20	20	20	Missing
Computer System	Yes	Yes (billing only)	Yes	Yes
Practice size (roster)	2,500	2,000	2,000	2100
Pop'ln characteristics	Rural and 40+	Rural and 40 +	Rural	Rural hospital
Community size	8,000 +/-	9,600	11,000	11,000
Rurality Index	50.41	47.87	33.46	33.46

CICM Plans Completed	0	11	10	1
Videoconferencing	Yes	Yes	No	No
No. of Facilitator Visits	3	9	10	7

Two of the practices (A&B) had videoconferencing equipment installed during the months of August and September 2005 for the purposes of implementing practice facilitation via videoconference rather than having the facilitator travel and visit the practice. In addition, two of the practices (B&C) successfully completed chronic illness care management plans for 21 patients. During the fall of 2005, each of the practices were engaged in applying to become Family Health Teams under the Ontario Ministry of Health and Long Term Care program to form interdisciplinary teams of physicians and other providers such as nurse practitioners, nurses, social workers and dieticians across Ontario.

The characteristics of the six physicians within each of the case study practices were as follows: all physicians were male; graduated ten to 36 years ago; spent on average 10.5 minutes per patient consult; and the characteristics of the patients seen by the physicians were generally older adults (40 + years of age) with the exception of one younger male physician in practice B who had graduated in 1995 and taken over the practice of a female physician and as consequence had younger female patients and their families.

4.1.1 Program Implementation Fidelity

Implementation fidelity is "the degree to which … program providers implement programs as intended by the program developers" (Dusenbury, Brannigan, Falco, & Hansen, 2003). The Chronic Illness Care Management (CICM) intervention as intended to be delivered by the six participating family physicians to their competent patients over the age of fifty with multiple chronic diseases via a structured, written care plan is described in Figure 4-1. The outreach facilitation intervention to support the implementation of CICM in four rural family practices was delivered by two female

postgraduate educated registered nurses trained in outreach facilitation to assist with practice organization level change.

Figure 4-1 Chronic Illness Care Management (CICM): Model and Care Plan Components

The CICM was framed as a patient-centered model for primary care management of persons with multiple chronic illnesses. This was to be accomplished through an evaluation of a patient's care requirements via a written care plan (see Appendix E) prepared collaboratively between a patient and FP. Patient health goals and concerns were to be elicited, and five components reviewed:

1) Medication Review

2) Education and Self-Care

3) Psychological/Social Assessment

4) Community Integration/Social Support

5) Prevention

Through this process, patients and FPs could then set mutual goals, with plans for follow-up during planned, scheduled visits. FPs were compensated $300 for the completion of each care plan.

4.1.1.1 Chronic Illness Care Management Pilot

Outreach facilitation of CICM was piloted with two rural practices from September 2004 to February 2005. These pilot practices were excluded from the four practices described above. Based on a review of the minutes of meetings concerning the pilots, the key lessons learned from the six month pilot were the following:

- Physicians had difficulty conceptualizing the plan. Pilot participants indicated that it was not the way they work usually and commented on the difficulties in understanding and applying the psychosocial aspects of the care plan. It was commented that the care plan was a nursing concept and not easily accepted by physicians. It was recommended that the facilitator assist the physicians by

suggesting the planning visit(s) be broken down into more manageable chunks, and offering to those who feel they already have a good handle on the management of patients with long-term illnesses a "systematic approach that will help ensure that physicians don't forget anything". The systematic approach involved changing the name of the care plan to the Long Term Illness Management Schedule.

- Recruiting patients was a challenge and it involved a lot more work for the pilot practices than anticipated. One pilot site recruited 12 out of 20 patients and the other had recruited 10 out of 20. To address this challenge it was recommended that the facilitators need to reassure the physicians that they can help with recruitment processes, community resources for patients, guideline information, discussion and suggestions on how to break up the planning process.

- Physicians were overwhelmed by the amount of work and time involved in implementing the care plans with their patients. One pilot found that care planning for six patients was too overwhelming involving 45 minutes per patient visit and declined to continue with the pilot, the other pilot practice managed to develop care plans for all but two of the patients recruited. It was recommended that patient scheduling be set so that the first visit was only 30 minutes to make it more manageable. As an example for minimizing time, the first visit patients were asked to prepare a list of all medications for a subsequent appointment as opposed to doing it during the appointment. The facilitators were asked to encourage the physician to layer the visits with the first visit accomplishing at least the following items so that a visit did not exceed ½ hour: a)explanation/discussion with the patient ; b) begin to identify/update list of problems/issues; c)determine how many visits will probably be needed in the next 12 months; d)schedule the first several visits and decide which of

the five CICM components will be addressed in the first second and third visits; and

e) give the patient some homework for the next visit, for example, bring all pills.

4.1.1.2 Outreach Facilitation Intervention Implementation

The CICM intervention was delivered over a period of approximately nine months from mid-May 2005 until the end of February 2006. The two outreach facilitators each assigned to two of the four participating practices spent a total of 316 hours working from home and with the practices on chronic illness care management as determined by activity logs. It is important to note that the facilitators had in total between 8 and 10 practices to support as part of the larger trial including those in this study. Administrative activity involving such things as preparation for upcoming visits to practices, conducting analysis and research, telephone calls, emails, attending meetings, videoconferencing setup, etc. involved 195 hours of time. The facilitators spent a total of 95 hours traveling to the practices and drove a total of 6,872 kilometers. Outreach facilitation within the four participating practices was intended to involve three key activities: conducting practice performance audits and feeding back the results to participating physicians; educating on the chronic illness care management model and the use of the written care plan for chronically ill patients; and planning and building consensus around delivery of the CICM protocol. Facilitators spent a total of 27 hours visiting the practices or just under 10 percent of their total dedicated time. The majority of the time at the practices (52 percent) was spent on education and tailoring of the care plan with 14 hours of time, four hours or 15 percent of time was spent on planning activities, only two hours or seven percent of practice time was spent on conducting and feeding back audit results, and seven hours or 26 percent of time at the practice was spent waiting to meet with the physicians. Overall, the facilitators spent a total of 20 hours with physicians or 10 per cent of all activity on the CICM protocol. Total time spent on any activity specific to the practices was 186 hours. Table 4-2 provides a breakdown of hourly activity by participating practice. The 123 additional hours of administrative activity conducted from home and seven hours of associated administrative activity travel time for such things as driving to

non-practice based meetings and the airport are excluded from Table 4-2. A greater amount of time was spent at practices that successfully implemented care plans (B and C) as compared to the practices that had not (A and D). Success means having completed at least 10 care plans (see Table 4-1).

Table 4-2 Breakdown of Hours of Activity by Participating Practice

	PRACTICES				
Activity	A	B	C	D	**Total**
Administration	11.4 hrs	19.7 hrs	26 hrs	14.4 hrs	71.5 hrs
Travel time	11.3 hrs	18 hrs	36 hrs	23 hrs	88.3 hrs
Physician time (audit, CICM, planning)	1.9 hrs	4.75 hrs	9 hrs	3.9 hrs	19.55 hrs
Waiting time	1.8 hrs	1.8 hrs	1.25 hrs	2 hrs	6.85 hrs
Total	26.4 hrs	44.25 hrs	72.25 hrs	43.3 hrs	186.2 hrs

Narrative logs kept by the facilitators for each practice visit revealed details on the activity and observations made at each participating practice. Facilitators visited the practices a total of 29 times, an average of 7.25 visits per practice. The successful CICM implementation practices B and C were visited 9 and 10 times respectively whereas unsuccessful practices A and D were visited three and seven times respectively. Practices A and B experienced the videoconferencing component of facilitation and each received three facilitation sessions via videoconference.

The narrative logs of the facilitators described the successful practice participants as being initially apprehensive but interested and accepting of the CICM model, progressing through implementation, able to engage and adapt the protocol to the needs of their practice, and generally satisfied with the CICM experience. For practice C, the facilitator carried-out the initial planning and introduction of CICM where the physician indicated that the idea was a good one but at first felt that the approach seemed “nebulous”. There were no problems or significant delays with this practice in selecting patients which chronic conditions over 50 years of age and seeking informed patient consent

to participate in the study. The facilitator met with the physician on several occasions to discuss the generic care plan and care planning approach in detail, to review all five components of the care planning protocol, and to follow-up on recently completed chronic care planning visits with patients. The facilitator also assessed the completion of the patient care plans and provided feedback to the physician and staff on how to better utilize the patient follow-up component of the care plan. The physician for practice C was very satisfied with the facilitation experience and was generally satisfied with the CICM protocol, was pleased with the tool, and was able to navigate through it.

For practice B the facilitator encountered apprehension toward implementing the new CICM approach after the initial planning session. Physicians were concerned that they may not be able to accomplish the chronic care planning task required due to their habit of allowing the patient to control the agenda during the patient visit. They were also hesitant and expressed concern about selecting the worst chronically ill patients for the protocol as it may appear when the charts are reviewed that they were not able to enhance patient well-being. The physicians in this practice were very open to participating and were committed to being involved with the CICM program. It was viewed as a benefit to their practice. They were also interested in tailoring the CICM protocol to their needs and the needs of patients. This practice was experiencing practice changes such as new computer systems as well as renovations to the office which competed with patient selection.

The facilitator conducted the initial planning sessions with the physicians at practice B covering the five components of the care plan, consulted on the patient selection process, followed-up on care planning progress, assisted in revising the care plan template, and oversaw the installation of videoconferencing equipment at the practice. Despite some delays, this practice was able to complete the care plans with chronically ill patients and extensively tailored the care plan to include more patient input as well as revisions to the visit scheduling, current health status, medication, and prevention areas of the protocol. This practice was positive and expressed pleasure in using the CICM care plan approach with their chronically ill patients. One facilitator documented in the

narrative report what one physician expressed, “I have known these patients for many years and I thought that I knew them very well but I was still able to uncover information that had been missed – especially in the psychosocial areas.” The physicians had learned that asking chronically ill patients what their greatest life challenges were served as a touchstone to identifying patient problems and patient goal setting. The practice had also used the protocol to make patient referrals to physiotherapy and occupational therapy providers in the community. Both physicians (Practice B) were very satisfied with the CICM program and with the facilitator. Despite the practice finding the CICM protocol useful and the process providing valuable patient information, the facilitator narrative log reflected that the physicians felt that in “real-life” practice it would probably not be used as it is too time consuming and difficult to carry-out in terms of patient follow-up visits.

The facilitators described in the narratives the unsuccessful practice participants as being a challenge to engage with the CICM protocol, too busy to take the time to implement the care planning process with patients, and questioning of the benefits of the care planning process for chronically ill patients. Practice A expressed interest in the care planning process and understood the potential value for their patients but were hesitant to commit since they were too busy formulating a proposal to become a Family Health Team under the new Ontario Ministry of Health and Long-Term Care program. The physicians did not want to select 30 chronically-ill patients each for implementing CICM as it was viewed to be a great deal of extra time and effort. However, the Nurse Practitioner in the practice indicated willingness to participate with the stable chronically ill patients under her care. This was not supported by the practice physicians. The physicians in the practice agreed to have a videoconference link set up for facilitation purposes. They commented that it would probably be beneficial for more remote practices.

The facilitator oversaw the installation of videoconferencing equipment at practice A and conducted education sessions with the physicians on chronic illness care practice guidelines for heart failure, hypertension, diabetes, and coronary artery disease. These sessions were conducted in

person and via videoconference link. Tools such as a coronary artery disease flow sheet were provided to the practice. The physicians were satisfied with the best practice guideline education sessions as they viewed them as integral to their Family Health Team proposal submission. They were also satisfied with the videoconferencing experience as they used the technology for their own purposes allowing them to link to multiple sites for information sharing.

The facilitator for practice D found that engaging the physician with the CICM protocol to be a challenge. The physician was originally receptive to participating in implementing the care planning process with chronically patients. However, the physician was only able to complete one care planning visit despite repeated assistance and follow-up from the facilitator. The physician was busy with other activities including completing a proposal to become a Family Health Team, wanted to be compensated for patient recruitment time, and questioned the benefits of the care planning process. The facilitator reviewed the CICM process, care plan, and components of the planning visit with patients on several occasions, carried-out patient selection, supported the printing of labels and recruitment letters to patients, and discussed medication review as part of the care planning process for patients. Considerable support and encouragement was provided by the facilitator. This physician was satisfied with other aspects of the primary care facilitation experience but reflected dissatisfaction with the CICM intervention itself.

4.1.1.3 Videoconference Implementation

Based on the activity logs from August 2005 to February 2006 completed by one facilitator, a total of 37 hours was spent on telehealth videoconferencing related activity. The majority of this time (30 hours in total) was spent on technical issues such as delivering equipment, testing equipment, helping to resolve technical problems, and training. The facilitator spent the months of September, October and most of November working on technical related activity before the first videoconference facilitated session took place in December. The technical activity included coordinating installation of the Tandberg videoconference equipment and working with the distance

education service provider at the University of Ottawa as well as with representatives from the communications companies Telus and Rogers to resolve technical problems. A total of 4 hours was spent on administrative related activity such as preparing instruction material for the practices, booking videoconference time and arranging videoconference appointments with practices. Only 3 hours was spent actually videoconferencing with the practice site participants – 1 hour with practice A and 2 hours with practice B. Each practice had three separate instances of videoconferencing for a total of six. Given the level of exposure to using the videoconferencing equipment and facilitated videoconference sessions, the videoconferencing experience for facilitating chronic illness care planning can only be considered a pilot or proof-of-concept.

Practice B experienced technical difficulties with the teleconference link in the initial dry-run stages prior to using the videoconferencing system for facilitating CICM. The facilitator carried-out the tasks necessary to coordinate the installation of the videoconferencing equipment by communicating with the installers and the practice, booking times for installation, testing of the equipment, and conducting initial trial tests of the videoconference link. Practice B experienced no technical problems during the facilitated videoconference sessions. However, Practice A experienced problems with the videoconferencing system during the videoconference facilitation sessions. There was one occasion where the link was of poor quality and the connection was lost. This turned out to be a scheduling problem from the videoconference service provider. On another occasion the link for the videoconference dropped twice during the facilitation session. In addition, there were two occasions where the facilitator had to rebook the videoconference sessions for the practices due to the room in the Ottawa location for videoconferencing having already been booked for other activities.

4.1.1.4 Chronic Care Plan Implementation

The 21 completed patient care plans from successful practices B and C were reviewed to determine the extent to which participating physicians adhered to the CICM model of care delivery.

Adherence is defined as the extent to which participating physicians delivered the intervention according to the intended intervention program content as determined from a review of the completed patient care plans. The patient care plans were coded to determine the following evidence of content delivery: documentation of the number of and type of patient health problems; follow-up visits booked, undertaken and number of visits; an identified patient health issue addressed; a medication review undertaken; patient education on self-care management provided; social support and integration with community services provided; a psychological and social assessment undertaken; and, preventive care provided.

Fifty-seven per cent of the chronically ill patients were female and 43 per cent were male. The average age of the patients was 69 years with a range from 52 to 86 years of age. The average number of chronic conditions that patients lived with was 5.1 with a range of two to as many as 12 chronic conditions. The various conditions included asthma, diabetes, hypertension, ischemic heart disease, stroke, arthritis, hiatus hernia, hyperlipidemia, prostate cancer, irritable bowel syndrome, colitis, neuropathy, retinopathy, chronic obstructive pulmonary disease, restless leg syndrome, cirrhosis, depression, renal disease, gastro esophageal reflux disease and osteoporosis.

Table 4-3 contains the results of the review of care plans. The successful implementation practices documented patient health problems and addressed these problems during initial and subsequent follow-up visits 86 per cent of the time. There was an average of five health problems per patient indicating that the patients indeed suffered from the effects of having multiple chronic illnesses. Further, an average of 3.3 follow-up visits had been scheduled per patient. The practices also carried out medication reviews with 100 per cent of patients, provided preventive care to 90 per cent of patients, psychological and social assessments to 95 per cent of patients, and documented referrals to other social supports and community services for 95 per cent of patients. Patient education on self-care management was documented in the care plan at only 67 per cent. In addition, both the scheduling and completion of follow-up visits for chronically ill patients was only

documented in 43 per cent and 48 percent of patient care plans respectively. The findings from the review of care plans indicate that practices B and C were thorough in the delivery of the care plan components of the CICM model with the exception of being able to schedule and complete follow-up visits with patients during the nine-month intervention and in carrying-out patient education on self-care management.

Table 4-3 Chronic Care Plan Delivery Review

Review Item	Practice B (n=11)	Practice C (n=10)	TOTAL (n=21)
Percentage of care plans with patient health problems listed	91%	80%	86%
Average no. of health problems	6.3	3.6	5.1
Percentage of care plans with follow-up visits scheduled	55%	30%	43%
Average no. of follow-up visits scheduled	3.7	2.7	3.3
Percentage of care plans with at least one follow-up visit completed	46%	50%	48%
Percentage of care plans with patient health issue identified in the care plan being addressed	91%	80%	86%
Percentage of care plans with a medication review	100%	100%	100%
Percentage of care plans with patient education on self-care	64%	70%	67%
Percentage of care plans with social support/community integration referrals documented	100%	90%	95%
Percentage of care plans with a patient psychological and social assessment	100%	90%	95%
Percentage of care plans with preventive care provided	82%	100%	90%

4.1.1.5 Intervention Costs

The activity logs of the facilitators along with project administrative records were used to determine direct intervention costs. Table 4-4 provides data on the costs of the CICM facilitator intervention in 2006 dollars for the four case study practices. The 9-month intervention cost a total of $36,010 for the two nurse facilitators including all travel, telephone, supplies and physician reimbursement for completed care plans. Salary costs are calculated based on the time spent with

four participating practices at 20 percent of the $72,150 yearly salary plus 22 percent benefits for each facilitator over the nine month period of the intervention. Supplies totaled $354 for the four practices and included telephone charges, photocopying, paper, and other office supplies. Telephone costs include the cost of a cellular phone as well as the long distance costs of a home telephone. Supply costs include the costs of home-office supplies as well as the cost of materials for intervention purposes in the practices. A total of 6,872 kilometers were driven to conduct practice facilitation and nurse facilitators were reimbursed 42.7 cents per kilometer plus parking costs ($14) for a total of $2,949 for four participating practices. Included in the costs is the $300 reimbursement to physicians for each of the 21 patients that had a completed care plan.

Table 4-4 Direct Intervention Costs

Cost Item	9 Months (2006 Dollars)
Salaries & Benefits	$26,407
Supplies and Telephone	$354
Car Mileage	$2,949
Physician reimbursement	$6,300
TOTAL	**$36,010**

The estimated cost of the intervention on a yearly basis equates to $12,003 per practice or $1,091 per visit based on an average of 11 visits to the practice per year. Over 12 months the intervention would cost a total of $48,014 for four practices. The direct costing is not complete in that any patient costs or additional costs to the physicians and practices are not included. In addition, overall program administration costs are not covered.

The videoconferencing equipment included: 1) the Tandberg 770 MXP and a 60 inch plasma screen monitor video communication solution at the central Ottawa location; and 2) a Tandberg 1000 MXP completely integrated video communication solution at the remote practice sites. The cost of

the equipment at each of the practice sites was $7,578 for a total of $15,156.00. The cost of the equipment at the central Ottawa location was $23,418.13 (including a $9,000 60 inch monitor and $5,000 in cabinets). Additional shipping and installation costs were $3,893.74. The total fixed cost to implement the videoconference facilitation was $42,467 -- $6,067 per year amortized over seven years. Variable connection costs are based on Telus Canada's 2006 rates for accessing a videoconferencing bridge as published by the Alberta Medical Association (Alberta Medical Association, 2008). The estimated total connection cost for the six sessions that were held with the practices is $1,206 or $201 per session based on a minimum one hour session and associated bridge costs of $120 per session, $36 in long distance charges and $45 for one hour of facilitation time. Variable costs for physician time are not included.

The cost of travel averaged $98 per visit for mileage and travel time averaged 3.2 hours per visit for a total of $143 of facilitator time. Travel costs and facilitator time combined were $241. Ignoring the fixed costs of the videoconferencing equipment, the direct variable cost of travel of the facilitator is approximately 20 per cent or $40 greater than the operating cost associated with a videoconference session. Looking at the total seven year amortized fixed costs of $6,067 for the videoconferencing equipment separately, the facilitators would need to have at least three videoconferencing sessions per week in order to offset the fixed cost of equipment with the $40 per visit savings accrued from not having to travel. Direct cost savings from the use of videoconferencing equipment exist and the opportunity cost of time spent traveling by facilitators rather than working with more primary care practices is apparent. Further savings may be possible by looking at cost reduction scenarios through least cost path analyses and reviewing such things as connectivity options, whether or not to bridge, reducing connection time and acquiring less expensive but as effective equipment.

Table 4-5 Qualitative Analysis Coding Results by Thematic Area

Thematic Area	Coding	Number of Passages Coded	Coding	Number of Passages Coded
Chronic Care Illness Management Experience				
	Positive			
	CICM is enabling for patients	3	Negative perceptions and anecdotes	9
	Combined with similar studies	2	Priorities must be set for care delivery	3
	Some motivation to try in the future	3	Physician versus patient control over care/ Patient agenda	4
	Physician describes role as care facilitator	7	Dissatisfaction with CICM	22
	Positive feedback on CICM	6	Office environment negative influences	14
	Different from traditional approach to care	14	CICM is difficult with certain patients	11
	CICM satisfaction	4	Patient receptiveness to CICM is a problem	12
	Negative		Patient time for CICM is a problem	3
	First time difficulties in using CICM	4	Estimate of physician time for CICM is large	14
	Not MD role/change delivery from MD	2		
	CICM protocol is a flow sheet	2		
	No or weak intentions to continue	5		
	Lack of implementation	14		
	Lack of understanding of CICM	9		
	CICM is a medical model	3		
Facilitation Experience	Facilitator made no difference	1	Facilitator did not tailor the approach	1

Thematic Area	Coding	Number of Passages Coded	Coding	Number of Passages Coded
	Facilitator tailored the approach	4	Physician frustration with facilitator and CICM	3
	Facilitator satisfaction	14		
Telehealth/ Videoconferencing Experience	Expand the telehealth service	2	No direct costs to practice associated with telehealth	2
	Telehealth experience positive	5	Telehealth satisfaction	7
	Preference for facilitator in-person versus telehealth	6		
Outcomes/Benefits	Holistic approach is beneficial	2	Modifications to practice due to CICM	2
	MD gains understanding of patient perspective	9	Psychosocial benefits of CICM	3
	Positive patient anecdotes	6	Too early to say	2
Costs	MD did not know the costs	1	No practice costs associated with CICM	5
Improvements	CICM to improve capitated practice	3	More staff resources needed	3
	More communication on CICM	2	Performance to be monitored	3
	Computer database/computerization	17	Rewrite CICM protocol	1
	Educate patients on CICM	2	Reduce the time involved	4
	Improvements to protocol suggested	24		

4.2 Case Study Qualitative Interviews

An inductive approach (Miles & Huberman, 1994) to qualitative data analysis based on grounded theory (Glaser & Strauss, 1967) was conducted utilizing the qualitative data analysis software QSR NVIVO 2.0 as described in the methods chapter. This approach comprised a rigorous and systematic reading and coding of the family practitioner interview transcripts from the four case study primary care practices. The coding allowed six major themes to emerge from the data (see Table 4-5). Segments of interview text totaling 678 passages were further coded enabling an analysis of interview segments on a particular theme and 50 code categories emerged across the themes. Within the thematic categories related to the CICM experience, two key themes emerged relating to optimism and pessimism toward chronic illness management. This coding allowed for an understanding of the relationships between themes as well as those important to participants. Similarities and differences across sub-groups, for example, those that fully implemented chronic illness care management and those that did not, were explored.

Appendix H provides examples or representative physician interview excerpts by thematic areas giving the typical text associated with each of the coded thematic categories. The results of the qualitative analysis of the physician interviews are presented below under the headings of conceptualizing the benefits of care planning, tempered optimism and pessimism toward CICM, suggested improvements to the CICM protocol, positive experiences with practice facilitation, and the use of videoconference equipment.

4.2.1 Conceptualizing the benefits of care planning

Few participating physicians embraced broader concepts of the chronic illness care plan. Individual care planning was time consuming and conflicted with the practitioners' perceptions of their role and of their patients' capacities to be partners in care. The intervention's patient-centered principles and collaborative approach were at times inconsistent with several FPs' biomedical models

of chronic disease management. Those who were successful at implementing the care planning with patients had experienced benefits and were positively affected by the experience whereas those that were unsuccessful or who did not attempt implementation viewed the chronic illness care plan as conflicting with how they perceived their role.

FP participants who were successful at implementation viewed the CICM approach to planning care as having the following: a comprehensive framework or system for chronic illness care management; the enablement of patients to be active in their care; and a focus on the psychosocial or holistic aspects of chronic illness care management. However, not all FPs articulated all three. FPs conceptualized the CICM care plan as having a patient enablement philosophy: "... the core idea from my perspective and where I participated with the patients was about looking at ... them taking charge and being fully involved in the care path with any of their chronic diseases. And more importantly, the complexity of the multiple chronic diseases in which they are involved. So looking at their real life in the context of their real diseases and implementing a real health strategy. ...So I think that's really super, that's the core, that's golden, that's the Holy Grail right?"(D6)

Several welcomed the fact that the care plan cleared a path towards the holistic and psychosocial aspects of care: "... you want to talk holistic... a far better experience with this [Chronic Illness Care Plan] than I would have in a regular office visit ... I thought I knew these people pretty well ... and it was finding out from them how they perceived their health and illness as opposed to just my assumption which I have not really asked people on a regular basis ... so that was the difference with this thing is that you got the patient's perspective on their illness and that tells you how to react to them and what you can then do with them based on what they expect ... and that's huge ... I mean that was a tool that I really tried to incorporate into my regular office visits ... but this [Chronic Illness Care Plan] provides a better structure for it"(Dl) and "very beneficial psychosocially." (D2)

Other FPs viewed the process as a comprehensive systematic framework to ensure the completion of a series of tasks: "We were ... given flow protocols to review with randomized patients who had numerous disease conditions and complex medical problems and asked to explain to the patients their medical conditions and management of those conditions and the appropriate follow-up of those conditions. " (D5) This practitioner also reported having made systematic practice changes: "… we integrated some of the ... risk factor questionnaires into our general software program ... and we expanded the list of homeopathic products that people were taking." (D5)

Several FPs reflected on the benefits of being able to better understand the needs of their chronically ill patients and building stronger doctor-patient relationships. For example, one rural practitioner expressed that "... still comes back to the idea that you need to know .. that part of the patient and physician relationship ... because they need to know that you know and you need to know as well. So it's part of the therapeutic bond that occurs ... you get them ... and you can't defer that to somebody else. You still have to be the one asking that question, you still have to be the one getting that information out, because that's part of that connection that occurs that actually allows you to treat them to make them better, allow them to cope, or whatever ." (Dl)

Practitioners acknowledged that patients appreciated and enjoyed the opportunity of being a major part of their own care plan. Another practitioner identified the chronic illness care management process as important for patient enablement at the same time questioning if health outcomes can be achieved: "...Well I think it gives the patient more ownership of their health and their management of their health problems and so it's a valuable tool. I think it remains to be seen if it improves, you know, medical outcomes." (D5) Others expressed "... in terms of medical quantifiable improvement for diabetics, I am not sure, but in terms of function I can say that [CICM] has had a benefit". (D2)

4.2.2 Tempered Optimists

It was clear that two of the participating primary care practices based on the interviews with FPs embraced CICM and were successful in administering the process. These physicians were generally optimistic and described the contrast between CICM and the usual approach to patient care, the experiences of following the CICM process with their patients, and the lessons learned from those experiences. However, their optimism was counterbalanced or tempered with reflections on the impractical aspects and barriers to implementing a comprehensive, patient-centered, planning approach to caring for their chronically ill patients.

The CICM protocol was in stark contrast to their usual medical approach to providing care and required adaptation. “The first time I did it I must say I had to take a step a back because what I found when I identified problems [with a patient] it was very difficult with my training which was to delve into the problem as opposed to trying to list all the problems and go with the more formatted approach to it ... I thought the system was quite good ... I just had to adapt myself to it.” (D1) Another family physician reflected that the CICM protocol contradicted usual physician behaviour and was at times uncomfortable: “ [CICM] more for people that ... are non-physician based in their mindset probably ... patient care plan beyond just physicians perspectives, which is good but isn’t the way to do it from my perspective. It’s not very comfortable.” (D6)

Optimistic physicians indicated that even though they found it difficult to describe the comprehensive approach to other colleagues, they would nonetheless recommend it. “Hard to explain what you’re actually doing but we did recommend to colleagues at the hospital.”(D2) These physicians also reflected on the new understanding of their patients that was developed as a consequence of following the protocol and how this new understanding allowed them to approach patients differently in order to achieve success in managing chronic conditions. "It’s [CICM] different in that respect, if that makes any sense. It allows the patient to have more input than they normally have during a visit." (Dl) One FP spoke of a patient's response when he asked her to describe her

biggest health challenge: “I’ll give you an example... I have a lady whose only goal is to remain in her house ... it wasn’t necessarily to be managing her illness any better, but her function did matter to her and therefore managing her illness made sense ... things like getting her a better walker, getting her a scooter, and getting her an OT assessment in her home all came out of these discussions. These things would never have come up because she wouldn’t have brought this up other wise ... so a few weeks later .. after she got the equipment ... she was delighted ... to me that was a very good thing ... that was her goal … it wasn’t necessarily to watch her diabetes any better which was my goal … it was to remain at home ... so you need to know what perspective she is coming from. That’s how you approach her now ... you need to keep your blood sugars better because that will keep you healthy and at home." (D1)

The CICM protocol covers patient prescription medications and one physician spoke of the importance of this element of the protocol: “I was just thinking you know that list of drugs that they take and why they take it ... their explanation is often different than what you think it is and in trying to perceive what they really mean... like some of the weird things that people have in their house ... I was surprised ... like my lady who never took drugs ... didn’t want to take anything .. she had a pile of drugs at home ... some of them she didn’t take but a lot of them she did. And then to try and figure out why she took them and everything else...” (D2)

Another anecdote reflected on the importance of asking the right questions and the resulting patient insights gained. A rural practitioner reflected: “... the first lady I asked ‘It’s my husband’ that threw me, I would never have guessed that. She complained about everything ... she never really complained about her husband ... and yet that was her biggest stressor. Because he had retired and he doesn’t leave her alone. He just follows her around like a puppy dog and he’s driving her crazy. And, there’s all of these medical issues that come out of that because of the stressors. It’s not something that we would have thought to ask you know what is the biggest challenge to your health. Just phrasing it that way ... I would have never asked that. ‘What’s your biggest problem ... what’s

your biggest concern?' That's different than what's the biggest problem with your health as apposed to the biggest challenge in your life. I mean the phraseology is really critical." (D1)

The same physician reflected that the CICM protocol did not work with patients with cognitive impairment. For example: "... for your average [patient] this is a great thing and most patients fall into that category ... for the guy who is able to cope it was very easy to do. But for people who have sub-standard coping or sub-standard cognitive abilities this is a challenge because you end up doing what you always do which is ... taking the agenda yourself as opposed to the patient which is part of this whole concept which is that it is a collaborative process ... and with the patient I've been talking about it is very hard to collaborate ... she wants me to fix things." (D1)

Participating physicians provided information on the amount of time per patient required to typically administer the CICM protocol: "The follow-up [visit] would take around 20 minutes, but the original visit when I was doing problem identification ... it was hard for me to keep that to one half hour because it was hard not to get a list of problems ... it was very much in my nature and that of the patients to try and solve some of the problems ... to come up with a solution ... because my nature is to ... I'd want to try and solve ... sometimes there would be a solution presenting itself to the problem right then and there and I want to do that right off the bat instead of waiting a few weeks for them to come back and talk about it ... for me it ended up being half an hour to 45 minutes. For the patient who was pretty functional it ran at one half-hour but most of the time it ran over one half-hour." (D1) A second physician responded that: "On the average I felt it took about two visits about one half-hour each, total about an hour ... follow-up visits the length of time is comparable to an ordinary visit ... Yeah, 15 to 20 minutes." (D2) Another practitioner reflected: "Now the first appointment we took about a half-hour. Specifically for the form but subsequent appointments would be like ten minutes and you'd pull out the form and wouldn't have time to do the whole thing for the follow up. "(D5)

Despite the success that two of the participating practices had in implementing the CICM protocol, the family physician optimism was tempered. The counterbalance to the success and optimism was the realization that physicians did not intend on continuing with the CICM protocol after completion of the study, for example: "If I tried to do it with every patient, I would have to cut my practice in half I think ... I don't know if I can do it ... again, if I was working in some sort of a clinic where they saw 8 patients a day and you really wanted to be comprehensive you could certainly do that ... but with the shortage of doctors ... even if you wanted to do that ... you can't ... it would be too much work ... too much time consumption for the [family physician]."(D1) And, "... you know, it's just the fact that we've had experience with it. Will I use it in my daily practice? No." (D6)

4.2.3 The Pessimists

In contrast to the optimistic participants, the unsuccessful FP participants did not perceive comprehensive chronic illness care management to be their role. They spoke about the challenges and barriers to care planning for chronically ill patients and were generally pessimistic about the possibility of comprehensive patient-centered care planning for the chronically ill patients in their practice. Challenges included: the lack of understanding of the protocol; its overwhelming nature; being uncomfortable with the psychosocial assessment role; the preponderance of clinical care guidelines and other practice-based factors such as patient demand; and, patient inability to engage with the care planning process as well as the impractical aspects of the protocol itself.

One FP clearly stated that CICM approach to providing care was not his role: "What I would do is it wouldn't be a doctor-developed care plan ... I need a care planner functionality in the practice." (D6) This FP confirmed that "I think somebody else could have done it just as well....It's not my training.... it was interesting but I think obviously somebody else could have done better." (D6) And, "... typically a nurse would be able to go through it. I don't think that a physician would be able to fill one of those [care plans] out" and "I had, um, my pharmacist ... he did the meds part so I, he did them all. I mean, for each of the plans he did a med interview." (D6)

Several of the pessimistic FPs were more comfortable with the biomedical components of the care plan such as medication reviews and gave less priority to the psychosocial aspects of the care planning process. While several optimistic physicians tailored the tool based on their experiences with patients and formed deeper understandings of the life and health challenges of patients, the pessimistic FPs found the tool to be unnatural and difficult to work with: "… it didn't seem to be natural in how people function … it's a contrived tool which we, as health planner[s] and providers, are anticipating as possibly useful in prevention, promotion and self-care maintenance … "(D6)

One FP also reflected on the difficulty in understanding the purpose of the CICM protocol in comparison to the usual approach to providing care. For example, "Chronic disease management was trying to remember [from the patient's perspective] ... well what was wrong with me? Oh did I have that? And, so that got into diversions rather than focusing on what you really wanted and that was the current ongoing plan of, like for example, osteoarthritis or diabetes or ischemic heart disease. That was my perception and all the elements of care, including physician-base care ... that many may perceive that they need or want or projected in the future I guess ... I don't know. It was very unclear." (D6) Another rural physician viewed his role as simply following a flow sheet: "I think the main difference was, um, having a flow sheet in writing that you would follow with the patient from visit to visit." (D5)

Lack of implementation of the CICM protocol by pessimistic physicians was related to indifference to the protocol itself, the overwhelming nature of it, the preponderance of clinical care guidelines, and other practice-based factors and changes that were occurring. One rural practice did not implement the chronic illness care management protocol based on the belief that they already understood chronic disease management: "We aren't using the care management plans specifically .... cause the guidelines for most chronic diseases are fairly well established ... such as the consensus report on lipids which gives guidelines for lipid levels, risk categories, and the diabetic guidelines which are pretty well established. There has been a lot more of that in last few years than we used to

ever have ... we [already] have guidelines and established targets for managing a lot of these chronic problems" and "we have chronic care illness management plans that are mostly in our heads." (D3)

The perceived overwhelming nature of the CICM protocol was attributed by one physician as a reason for lack of implementation despite the repeated implementation support and encouragement of the facilitator: "... the whole introduction of the CICM piece, some how it dropped, it sort of was a bit heavy and so, it was like, here, here it is again. There's no, there's no easy way. [The facilitator] did lots of things. Well you can do, [the facilitator] suggested over more than one visit, [the facilitator] said 'Well, you know, just do what you can of it and see what happens', you know, [the facilitator] was very supportive in that aspect." (D6) This physician described his failed attempt at implementation: "I've had basically three discussions with people on it. One I've really done, one is partially done, and I don't think, I'm just gonna ignore it, and the third one, I'm not going to have the conversation."(D6)

Several physicians commented on environmental factors as having impacted their ability to implement the CICM protocol such as patient demand for care limiting the amount of time that can be given to any one patient even within the capitated or rostered practice setting – "We have the same number of patients before and after we were rostered ... it never changed ... the demand is there." (D1) In addition, several physicians spoke of the systemic environmental changes that were happening in Ontario for primary care. The new government policy for the creation of Family Health Teams or Networks was discussed in relation to chronic illness care management as potentially providing the ability to do more for patients through a broader team of other health professionals. For example, "The system is going to be changing ... We're a Family Health Team now ... [Bringing in a team of] ... just about everybody we can! (Laughter) Oh, well we, we anticipate, uh, an enriched general practice nurse. We hope to get more nurse practitioners, pharmacy, mental health worker, and nutritionist. We hope to get a physical therapist, chiropractor, optometrist, um, what else? We have a list." (D6) Another physician said specifically, "Well if you're in a Family Health Team the

government is providing additional resources so those are the groups, the Family Health Teams that would be the most likely able to institute a program like [CICM] for every patient in their enrolled roster." (D5)

One physician reflected that lack of implementation was due in part to the large number of clinical care guidelines that exist and the need to be able to prioritize: "One of the problems is that there are so many things that could be done in any practice to improve the standard of quality of care such as following the consensus management guidelines, but it's not possible to do even a quarter of them ... need to know which of these things we should be doing because we can't do them all." (D4)

In the beginning of a chronic illness care visit, physicians struggled with maintaining the agenda of the CICM protocol versus focusing solely on the patient agenda, as would be typical during a regular office visit. For example, "People who couldn't quite get their head around the fact that it was different than a regular visit ... still wanted me to look at their rash ... still wanted me to look at their knee ... they still wanted me to have it run like a regular visit. It was challenging in that respect. That would be the difficulty for me." (D2)

Some physicians noted that the care plans' involved patient role in collaborative care and integration was not doable for some patients. In addition, the concept of integrating with other health and support services within the community was not understood by some patients and that the CICM protocol did not assist with integration. "For people who got the concept it worked beautifully. So for the patient who was open enough to the concept ... it went fine. There's a homework aspect to it and they have to have input into it on the spot as well as regular take home things to do. For my regular patients I am thinking of this Engineer who is quite a bit smarter than I am and who is extraordinary and got a lot out of it ... him and I. But my lady who's not the smartest lady she's had real battles." (D1) Another physician commented that "community integration is a bit nebulous for most patients" and that the protocol "didn't provide any encouragement to integrate the person into a community program ... just having a list of resources was not always that helpful." (D5)

Patient attributes were key to being able to administer the protocol. “I’ve got a lady that I’ve done the initial assessment, problem management with ... two or three months ago ... and I’ve still really been unable to do the next three sessions with her. Because I can not keep her from coming in with her regular complaints, I just can’t get her on track despite my best efforts. And, I’ve got other people where this worked absolutely beautifully because they’re people that I normally have no trouble explaining things to and they would be the people of average intelligence whereas the people that I have the most difficulty with are those of lower intelligence ... it’s more effective in my opinion to have somebody who can work with you ... what do you do when you have someone who can’t fill out the forms, who can’t read ... I don’t know how you answer that but they fall through the cracks everywhere ... and that’s still my challenge ... I’ve got this one patient that I can’t seem to get through with“ (D1) And, “ Um, I identified my enablement philosophy and I build that into every single encounter, where I can unless they’re extremely demented then I build it into the caregiver.” (D5)

The length of time for visits with chronically ill patients was a perceived challenge for several physicians. “Unfortunately it comes down to the same issue we have with regular visits which is a patient who is of average intelligence is no problem ... the folks you normally have psychosocial issues with because they have trouble understanding things ... that takes a long time. “ (D1) One physician conveyed that there was no incentive for rostered practices to be reducing patient visit time, yet the extra time involved with chronically ill patients was a concern. “Because we are a capitated practice, no fee for service, the more time we spend with each patient the less the cost to us, we don’t get fee-for-service by seeing them often, but always the geriatric patient with chronic disease takes more time than a healthy person with one complaint, these people come in with multiple complaints ... so there is much more time involved with them.” (D3)

For several FP participants the CICM protocol was too time consuming making its implementation impractical in the context of small rural practices with few staff and full patient loads. Despite the $300.00 per patient reimbursement associated with completion of care plans, as already

discussed, it was difficult for them to schedule the time necessary for carrying-out chronic illness care plans with their patients. Once the care planning process had been started, there was the experience that follow-up visits still required substantial time. “Time was, time was a little bit troubled” (D6) and “subsequent appointments would be like ten minutes and you’d pull out the form and wouldn’t have time to do the whole thing for the follow up.” (D5) Further, dissatisfied FP participants expressed the need to make substantial changes to the protocol: “You know it is a great idea but probably I would have tried to tease out from my usual process or a semblance of usual processes ... the chronic disease management elements piece the study wanted to achieve, how they wanted to achieve that and be a little more influential on the design that way. So it flowed into a natural patient encounter rather than a trumped up $300 big deal visit with, uh, a major health plan as an outcome ...” (D6)

FPs reflected on the future need for more allied health professionals to help with implementing a comprehensive approach to managing patients with chronic illness having recognized that with physicians alone it can not work. "‘cuz the doctors can’t, you know, do all of this stuff; so if you have access to all of those service providers and you have a program that those service providers together can implement for every patient in the whole province, then that would be, you know, the ideal." (D5) A number also remarked on what they felt to be a lack of community based resources to complement patient care as well as questioning the concept that patients can fully participate in care planning. “[Patients] don’t function by making a care plan for themselves. It’s an unnatural occurrence, it’s a contrived tool which we, as health planner and providers, are anticipating as possibly useful in prevention, promotion and self-care maintenance or whatever right?” (D6)

Finally, participating FPs also indicated that their existing computer information systems were not being utilized for the CICM protocol or they perceived that the paper-based protocol did not provide value as compared to existing computer information systems. “I don’t think that the paper system that the program study used really added that much to the information technology we presently use.” (D5) And, “We are sick and tired of care plans that are not part of our electronic

record ... or paper flow charts ... if they're not integrated into the electronic record it does not work for us ... we keep an electronic record ..." (D4)

4.2.4 Improvements to the Chronic Illness Care Management Protocol

Participating FPs offered suggestions and ideas for improving a number of the CICM protocol elements. One FP believed that better training and communication was required: "Probably physicians work better when they understand what the end point is. So if the end point is a care plan for the next two years, you did say something like that, but then the tool seemed to weigh that down, get it off track. This is too bad eh? So, for example, you could have given people a little course in care planning and let 'em figure it out. Give 'em a try and then refine their own implementations, as an example." (D6) One participating physician reflected on first-time difficulties with the protocol and suggested that "... getting almost like a mock version to try out beforehand because I almost felt like I was making it up the first time I used it. " (D1)

Several physicians suggested that the paper-based protocol should be replaced by or integrated with the computer medical information systems within their offices. For example, "... I think that was a disadvantage of your University of Ottawa program that it was not provided in an electronic format ... I think with a computer system it would be better 'cuz those patients would be flagged and the secretary would know every time they'd come in, give them, you know, twenty minutes, because you know that their 'gonna' need a longer appointment. I think the problem is that it would be really nice to have this type of study, this sort of program on a software tool in a slightly simplified version that you could utilize with patients and give them printouts at the visits." (D5) One participating FP described the electronic medical record as the way of the future and its potential for improving the delivery of evidence-based care. "I think there is huge potential for an electronic record system to help you to follow evidence-based care plans ... because eventually we are all going to be electronic and eventually all Ontario patients will be rostered ... I think we should be developing the potential monitoring that will work for those rostered populations with electronic records." (D4)

Improvements to engaging patients in the care planning process as part of protocol implementation were recommended including: “I would like as well patients to have the opportunity to be educated about care planning. So there’s an alignment between the providers and encounters with patients.” (D6) And, “Well I think there should have been a piece of the protocol that the patient could take home rather than looking at it just in the office ... And make it, sort of, part of your regular appointment visits and I think that would have more impact on the health of the patients and giving them, um, ownership of their medical issues more than using the paper form where they never got a copy ... planned actions for each medical condition are great, um, but there’s got to be a way to communicate that to the patient on an ongoing basis ... so that they, you know, take ownership for it and do something about it. “ (D5) One participating FP commented that further work was needed to determine the suitability of the CICM protocol for more challenging patients. “I’d like to hear what people have to say about trying to work with more challenging patients ... in my case the patient has a grade eight education and it’s a real challenge to do [CICM] ... it’s more effective in my opinion to have somebody who can work with you ... what you do when you have someone who can’t fill out the forms, who can’t read ... I don’t know how you answer that but they fall through the cracks everywhere ... and that’s still my challenge ... I’ve got this one patient that I can’t seem to get through with.” (D1)

Participating FPs remarked on difficulties in using the forms provided and pointed to improvements to be made for that element of the CICM protocol. They found that there wasn’t enough space on the form to accommodate all of the patient information and that certain parts of the form were more difficult than others. For example, “The difficult part of it was the last page which was planned encounters and the subject and reasons for the visit ... difficult to subdivide the planned actions into the five separate categories of disease management, social support, community integration, medication review, psychological and education self care.” (D5) Another participating FP recommended including questions in the paper-based protocol that allowed for quicker identification of patient problems. “What’s your biggest challenge? ...and something I’d like to add

to this is what's your most important goal for your health? ... so many times you've been treating a person for years with something and you actually didn't know one of the most important variables why do they perceive their illness the way they do? And so, getting a few of those things right off the bat would be helpful." (D1). One pessimistic participant suggested a complete rewrite of the protocol.

Participating physicians noted that the success of the protocol would be improved if additional interdisciplinary staffing resources could be provided as well as greater linkages to other community health and support services. "Like if you, the government, is working with Family Health Groups and Family Health Teams and Primary Care Networks to sponsor nurse practitioners and registered nurses and other health-care providers, um, to increase the basket of services that a patient can receive … so if you have access to all of those service providers and you have a program that those service providers together can implement for every patient in the whole province, then that would be, you know, the ideal. The problem is how much support, um, is available." (D5) And, "[CICM] didn't provide any encouragement to integrate the person into a community program.... Just having a list of resources is not always that helpful." (D5)

Finally, one participating FP commented that having the CICM study follow or tied to another study "I Care for Primary Care" was problematic in that the CICM protocol was very different from ensuring that preventive care guidelines were being implemented within the practice.

4.2.5 Positive Facilitation Experience

FP participants were positive about the supports provided by the facilitator. When asked about the types of support the facilitator provided, one FP's response was typical of the participants' experience: "I think it was quite good ... whenever there was a problem or whenever we wanted something restructured [the facilitator] did it quite happily ... I think that is the reason we probably do it ... the facilitator has been so great ... she could talk me into doing anything" (D2) and "I thought the support was fantastic ... [the facilitator] visited quite frequently and ... reviewed the forms with myself

and the nurse and the nurse practitioner and ... came back a couple of times to see that everything was going well and to review any ... issues or problems and ... helped us with the ... implementation of the risk management part of the program and computer programming to find the patients who needed the interventions and discussed ways of increasing our compliance with those measures ... she was ...terrific". (D5)

FP participants who did not implement the CICM protocol also reported a positive experience with facilitation. For example, "The facilitator made a huge effort into helping us to do that and we attempted to do it, but with the limitations of the system and with more effort ... we could have made it work better" (D4) and "... [the facilitator] was very supportive in that aspect." (D6) The responses from the participants who did not implement the CICM protocol indicate that it was the protocol itself that they were dissatisfied or frustrated with, not the work of the facilitator: "[The facilitator] re-emphasized where we were and, reflect on where I was and remind me of 'have I thought further about this or that or the other?' and, you know, that's how it worked. With the care planning, she probably was as frustrated as I was I think ... Maybe I thought it was just because I hadn't really gone any farther with it ...[the facilitator] tried to re-explain it and, obviously I didn't pick up the fact that I could modify it. [The facilitator] said she could work with it a bit or whatever, I said, 'Well', I think I ran out of time for her a bit."(D6) The frustration that one practitioner experienced with the CICM protocol was expressed to the facilitator: "This is crap!" (D6).

Tailoring of the CICM protocol by the facilitator to the needs of the practice was a key aspect of the intervention. Participants reflected differently on the facilitator's tailoring efforts depending on the degree to which they had implemented the CICM protocol. For example, "... the [facilitator] tailored mine quite differently and she brought it back to me in a few short days so ... it was very helpful."(D1) In contrast, one practitioner who was frustrated by the CICM experience reflected that it may have been beneficial had he been aware of the option to tailor the protocol: "I don't think that happened ... the modification piece ... that would have been nice."(D6)

One FP participant indicated that facilitation was a useful process and appreciated the feedback received on performance. However, concern about the cost of facilitation was raised and the need to explore alternatives: “I think that’s a really useful process ... but at the same time there’s a huge amount of energy and cost in doing that kind of facilitation so I think it should be built into the electronic record system so that it can just be done routinely and ongoing, no sampling of charts needed. These modern tools need to be incorporated into the system and that’s where the facilitators can be most effective in helping us do that kind of process, because I think the days of paper charts are over.”(D4)

4.2.6 The Videoconference Experience

For the FP participants that participated in the telehealth arm of the CICM study, the experience with the use of the telehealth equipment was very positive. When asked if there had been any problems or issues with the equipment in any way, one FP participant expressed: “Piece of cake! Sometimes when we use it you get that pause … a little 3 second thing ... then the pause stops and you go on.” (D2) Participants described the system as being very easy to work and requiring very little, if any, training: “It’s like turning on your computer or picking up a phone ... it’s easy.” (D1) The following was typical of the responses when FPs were asked if they would recommend the telehealth system to other colleagues: “Absolutely. I wouldn’t have any second thoughts on that”. (D2)

FP participants reflected on the differences between the facilitator visiting the practice in-person as compared to interacting with the facilitator via the telehealth equipment. One practitioner summarized that “having people in person is more cordial but it depends on timing so if you really want to cut to the chase .. this [telehealth] is a better way to do it.”(D1) Another indicated: “If you’re asking about video and the quality of the ... it’s not a real body ... that sort of thing. But otherwise [telehealth] worked really well.”(D2) Participants reflected “In terms of office flow you can’t really pick the thing up and carry-it around the room and show somebody what you’ve got ... that’s the only

thing if we are really trying to show issues with some sort of set-up as opposed to a piece of paper which you can hold up in front of the screen but if you wanted to bring a camera up to show them something you can't do it. I mean I don't even know what circumstance that would come in ... I can't fathom that but if you needed to reorganize the office or something you really couldn't do that without being here in person. The facilitator could really only understand the practice by communicating over the equipment ... they may not really understand what's going on."(D2) Participants justified not having the facilitator in-person by considering the time and travel costs associated with the facilitator visit: "It's much better to have an in person meeting ... but the cost of that is so high when you factor in the amount of travel for a one hour meeting ... the idea of going to rounds at the family medical centre is just out for us ... there's two hours traveling for a one hour meeting." (D4)

The FP participants could recognize advantages and future potential expansion for the system despite some of the technical problems: "I think when you consider the visiting and the amount of time involved for the facilitator to come up here it would certainly justify using the videoconferencing for most of those visits ... It has worked in the past for us and I see lots of potential use for it for teaching and participating in rounds and things like that once everybody is using it and once it's broadly available ... when the university is presenting their rounds it should be available in videoconferencing so we can participate." (D4) This practice had experienced some poor sound and video quality issues, but they were so infrequent that the participants did not see it as a large problem. "... we've used it other times without any technical problems so I'm not sure ... why we've had problems with it ... it's only been recently that we've had some problems. But the shortcoming is that not enough people have it at the moment to be able to make use of it. What I see in the future is all the teaching practices for Queen's with residents ... will probably have videoconferencing for rounds ... and be able to participate in some of the core program activities remotely." (D4)

Both videoconferencing practices expressed that there was no cost to them for use of the videoconferencing equipment. “No [costs involved] .... I would much rather be in a meeting room with people than doing it from a distance … but there’s so much traveling involved and cost associated with travel.”(D4) The videoconferencing equipment and all associated costs were covered by the research study. As a consequence participants did not indicate that having videoconferencing equipment resulted in any additional costs to their practice. Participants also expressed positive views on the potential for telehealth to save costs and fill personal practice gaps: “If somebody else wants to travel and meet with us well that’s ok ... that’s their cost. We have so much trouble keeping up ... I don’t have the time to get through the notes on my desk this morning and so on ... problems with paper work ... but I didn’t get through it ... we’re always just trying to tread water ... keep our heads above water ... and take on extra things ... I’m sure I could work longer hours but I don’t want to.”(D3) In contrast to the experience with the CICM protocol, the participating practices were very positive about the use and potential of videoconferencing equipment.

Chapter 5

Discussion and Concluding Remarks

The dissertation sought to accomplish two goals -- to systematically review published practice facilitation research using meta-analysis to determine overall effect size and to test its limits by assessing the extent to which tailored outreach facilitation and care plans for chronically ill patients were implemented with fidelity for a small number of select rural Ontario practices. The research yielded insights into an area that is the focus of much health policy, the translation of knowledge into practice for improving health (Glasgow & Emmons, 2007). Important moderating factors for achieving successful practice facilitation implementation outcomes were identified that can benefit future research and policy-making endeavours and, most importantly, despite a proven successful practice facilitation intervention approach, a complex practice guideline such as the chronic illness care management model is not practical nor sustainable within the current context of primary care in rural Ontario without further intervention supports, adaptation, and implementation research undertaken to demonstrate successful execution of chronic illness care management. Chapter 5 summarizes the key findings, presents implications for practice and science, study limitations, and concluding remarks.

5.1 Key Findings

The systematic review of the published research literature of practice facilitation trials revealed that practice facilitation has a significant but moderate overall effect in getting evidence-based guidelines implemented within primary care. In addition, the qualitative assessment of the factors that impacted the implementation of chronic care illness management within rural primary care practices revealed that the key factors impeding implementation such as a lack of time and allied

health professional support are intrinsic to the traditional primary care setting suggesting that new primary care delivery models may be necessary in order to be able to provide comprehensive chronic illness management to patients.

5.1.1 Systematic Review

Compared to the review conducted by Nagykaldi and colleagues (2005) which identified 25 studies which measured the outcomes of practice facilitation and identified eight randomized controlled trials, the systematic review has identified 38 outcome based practice facilitation studies of which 21 were RCTs. Similar search and inclusion criteria to the Nagykaldi review were utilized in this review and the discrepancy can only be understood by the difficulty in recognizing and interpreting the intervention studies as having employed practice facilitation. The results of this systematic review of the methods and effects of practice facilitation intervention research have shown that 19 good quality controlled and randomized trials have been undertaken as of the end of 2005. Overall, practice facilitation has a significant but moderate effect on changing primary care practice behaviour.

Practice facilitation intervention studies were set in a number of countries around the world and covered the spectrum of primary care settings with the majority being set within the general practitioner or family medicine setting. However, only 39 per cent of intervention descriptions provided specific details on the practices in terms of physician and patient characteristics. The literature suggests that positive results in the area of implementation of evidence-based guidelines tend to spring from using multifaceted interventions such as facilitation and the intervention studies in this review described approaches as distinct from educational outreach or academic detailing in that the role and methods of facilitation covered a much broader range of intervention strategies and that in 45 per cent of the studies facilitators were described as being flexible and tailored the intervention to the needs of the practice environment. Interventions employed multifaceted audit strategies, continuous quality improvement, office systems, and education and were targeted at a variety of

evidence-based guideline behaviours such as preventive care, cancer screening, cardiovascular care, management of diabetics, and depression. Facilitation would appear to be distinct from interventions such as educational outreach or academic detailing, however, interpretation of interventions is problematic and more clarity and standardization of practice facilitation is warranted (Harvey et al., 2002; Rycroft-Malone et al., 2004; Nagykaldi et al., 2005).

The estimate of methodologic performance or study quality showed that there was considerable variation in the overall performance score (*M*=5.08, *SD*=2.70, Range1 – 10), indicating that it is very important to consider how competently a study has been performed and reported. The author found, for example, RCTs with relatively low performance scores and controlled trials with high performance scores. Despite there being no standard protocol for critically appraising research (Gerber et al., 2007), the advantage of using the modified PEDro (Bhogal et al., 2005) system as proposed in this systematic review is that it provided a simple way to get an idea of the quality of the practice facilitation outcome studies. It also incorporated an assessment of how the study dealt with unit of analysis errors (Grimshaw et al., 2003). A key disadvantage of the performance scoring approach taken in this review is that it was based substantially on subjective judgment and there was no panel or inter-rater reliability check between at least two reviewers. It is possible that the author has been too generous with some scores and perhaps has assessed some studies too harshly. The review should be replicated with at least two reviewers to ensure that the scoring method is reliable.

Other than the 19 selected studies with reasonably high methodological quality, the review has revealed that the overall methodological quality of the 38 intervention studies identified in the literature search is poor in terms of adequate controls for selection, performance, detection and attrition bias. It is understandable that controlling for performance bias through the blinding of practice facilitators and participants to the intervention is very difficult and as a consequence only 11 per cent of studies blinded practices to the intervention and none of the studies blinded the facilitators. However, in conducting randomized controlled trials allocation concealment is quite achievable, yet only 21 per cent of the 38 intervention studies and 47 per cent of the 19 high quality studies reported

having conducted allocation concealment to control for selection bias. Similarly, controlling for detection bias by having data collected by individuals who are blind to the intervention status of participants was only reported by 13 per cent of the studies. In contrast, controlling for attrition bias through adequate follow-up (determined as 85 per cent or more of participants being accounted for at the end of the study) was achieved by 68 per cent of the intervention studies and by 78 percent of the 19 high methodological quality studies. Only twenty-four percent of the 38 studies identified through the literature search reported conducting an intent-to-treat analysis, whereas 42 per cent of the 19 high quality studies reported having conducted an intent-to-treat analysis. Analysis of data according to how participants were treated, instead of according to how participants should have been treated can produce biased results (Bhogal et al., 2005). Conducting an intent-to-treat analysis can help safeguard the provisions made by randomization and blinding.

Finally, this review considered the issue of intra-class correlation which can occur when units of randomization and analysis do not agree. Similar to the review conducted by Grimshaw and colleagues (2004) that identified many studies with unit of analysis errors, only 53 per cent of studies in this review reported that the unit of randomization and analysis were the same. In addition, only five studies reported intra-class correlations or adjustments for intra-class correlation in the analysis. Intra-class correlation can cause errors in the statistical reporting of intervention effects and the lack of adjustment for intra-class correlation when units of analysis and randomization are not the same can result in falsely low p-values and overly precise confidence intervals (Donner & Klar, 2002). The analysis of effect sizes in this review corrected for this by adjusting the sample size of those studies that reported unit of analysis errors. More rigorous trials are necessary to rule out competing explanations for results and improve the overall internal validity of practice facilitation intervention studies.

The appraisal of methodologic performance resulted in 50 per cent or 19 studies from original 38 selected as having high performance and suitable for further exploratory analysis of the effects of practice facilitation. Heterogeneity is a key consideration in conducting a meta-analysis, exploratory

or not, and this was expected given the differences in outcome measures and evidence-based guidelines being targeted by practice facilitation. However, statistical heterogeneity was not significant (I^2 equal to zero) for this review. Statistical heterogeneity is a consequence of program and/or methodological diversity and manifests itself when the observed effects across studies are more different from one another than one would expect due to chance alone. It has been argued that formal meta-analysis is not advisable with implementation research due to the diversity of program designs and methods used to evaluate them expecting to result in heterogeneity (Grimshaw et al., 2004). In order to have a meaningful overall result from a meta-analysis the group of studies should be sufficiently homogenous in terms of methods, measures, and program content. This review has demonstrated that statistical heterogeneity is not evident and that studies are more homogenous than one would normally expect, however, caution is still warranted in interpreting overall effect sizes given the obvious differences that exist across the high performance studies (see Table 3-5). It is recommended that other reviews conduct similar quantitative analyses to either demonstrate homogeneity or to elucidate what factors may be accounting for differences in effects.

The exploratory meta-analysis revealed after having removed one study whose intervention was not targeted to evidence-based guideline implementation, the overall effect or standardized mean difference between the 662 intervention practices and the 673 control practices was moderate at 0.54 (95% *CI* 0.43 – 0.65) and this effect did not vary dramatically as each study was removed in sequence from the 19 included studies, the analysis rerun, and the study replaced. This review calculated the effect size for continuous variables in a similar manner to Grimshaw and colleagues (2004) who conducted a systematic review of the effectiveness and efficiency of guideline dissemination and implementation strategies to promote improved professional practice that involved 235 studies and 309 separate comparisons using the standardized mean difference or the difference between dichotomous outcomes post-intervention. It should be noted that Grimshaw and co-workers used dichotomous effect size measures primarily in reporting their results indicating that they were reported considerably more frequently in studies. Grimshaw and colleagues found median effect

sizes of 8.1 per cent for educational interventions, 7.0 per cent for audit and feedback, and 14.1 per cent for reminder systems all of which are considered to be modest to moderate in size. They also analysed 85 comparisons that evaluated 58 different combinations of multifaceted interventions against a control group and found no association between the number of components and effect size with an overall modest median effect size of approximately 6.0 per cent for multifaceted interventions. Another systematic review of 58 diabetes management intervention studies conducted by the AHRQ (Shojania, McDonald, Wachter, & Owens, 2004) also calculated the standardized mean difference for each included study and found a median overall improvement in clinician adherence to guidelines of 4.9 per cent. The overall effect of practice facilitation is noteworthy compared to these large scale systematic reviews.

A key objective of the systematic review was addressed through sub-category analysis to look at effect modifiers in order to determine why certain practice facilitation interventions may be more successful. This analysis of the 19 practice facilitation studies with high methodologic performance revealed that several intervention attributes were associated with larger effects. Several of these attributes are described in the literature as being unique to practice facilitation (Harvey et al., 2002). For example, those interventions that were tailored to the needs of the practice as well as those that involved multiple components appeared to be associated with larger effects. In addition, it appears that as the number of participating practices increases, the overall effect of facilitation diminishes, whereas the duration and intensity of the intervention (in terms of number and length of contacts) is associated with larger effects. These findings should prove important to health policy-makers in designing programs, for example, such as deciding how many practices any one facilitator can affect.

An interesting finding was the association between the number of PRECEDE predisposing, enabling, reinforcing implementation strategies that were employed by practice facilitation interventions and overall effects. It appears that a significant positive trend exists between the level of implementation of PRECEDE strategies and effect size. Caution is warranted given the impact of outlying studies on the overall significance of the association between the PRECEDE score and

effects. It was also determined that those practice facilitation interventions that employed at least two enabling strategies appear to have greater overall effects. This provides some support to the theory proposed by Kitson and colleagues (1998) that successful implementation is not only a function of the evidence and the environmental context but is also a function of enabling mechanisms by which practice change is facilitated. The PRECEDE model was also used as a framework in a meta-analysis of mammography screening promotions by Ratner, Bottorff, Johnson, Cook, & Lovato (2001) that employed meta-regression analysis to determine if predisposing, enabling and reinforcing strategies predicted screening rates. Unlike the analysis conducted in this review, the Ratner study did not find that screening rates differed significantly according to intensity of the interventions or to whether the interventions employed predisposing, enabling or reinforcing implementation strategies.

Since the systematic review included only studies up to June 2006, the same literature search criteria were used to identify six additional good, quality controlled trials published from July 2006 to December 2008 (Engels et al., 2006; Mold, Aspy, & Nagykaldi, 2008; van Bruggen, Gorter, Stolk, Verhoeven, & Rutten, 2008; Aspy et al., 2008; Hogg et al., 2008a; Hogg et al., 2008b). A U.S. study by Mold et al. (2008) evaluated whether a multifaceted intervention that included feedback, benchmarking and practice facilitation could affect 24 practices to implement evidence-based preventive services to a greater extent than a control group of 24 practices that experienced only feedback and benchmarking. Findings were mixed in that of the six preventive guidelines to be implemented only mammography rates increased significantly with an effect size or standardized mean difference of 0.82 (95% *CI*, -0.02-1.66). The duration of the intervention was only six months and the authors concluded that the multi-faceted intervention strategy increased the implementation of preventive services to a greater extent than performance feedback alone. In contrast, a recent match-paired, cluster-randomized controlled trial by Hogg et al. (2008a) to test the effectiveness of outreach facilitation in promoting the uptake of evidence-based preventive care guidelines did not yield any significant differences between 27 intervention and 27 control Eastern Ontario fee-for-service primary care practices(*SMD* = 0.16, 95% *CI*, -0.37-0.70). This study targeted 54 preventive

manoeuvres, blinded the facilitators and physicians as to which manoeuvres were being measured for performance, had 14 practices assigned to each facilitator, and was implemented during a time when the primary care service model was under stress and physicians were no longer accepting patients. The trial highlighted several areas for further investigation and supports the meta-regression findings from the systematic review of 19 practice facilitation studies, most notably the dilution of the intervention effect through the large number of guidelines covered and the negative relationship between effect size and large numbers of practices per facilitator. Finally, a before-and-after study conducted by Hogg et al. (2008b) tested the sustainability of improved preventive care delivery in Ontario primary care and family health networks through a 12-month, tailored outreach facilitation intervention after purposefully redirecting the focus of physicians and staff away from prevention and toward a new content area in need of improvement – chronic illness management. The three to nine-month follow-up after the end of the preventive performance improvement intervention revealed sustained significant improvements in preventive performance.

The quality of the economic evaluations that have been conducted on practice facilitation are generally very poor according to the criteria for critical assessment of economic evaluation proposed by Drummond et al. (1999). Most of the assessments did not consider all of the relevant costs for the alternatives being evaluated and issues such as discounting and incremental analysis of costs and consequences were not addressed. Only one study by Hogg and colleagues (2005) conducted a sensitivity analysis to measure uncertainty in the estimates of costs and consequences associated with practice facilitation. The Hogg et al. (2005) and Chirikos et al. (2004) studies provided more complete economic evaluations and both of these studies concluded that the effectiveness of practice facilitation more than outweighed the costs involved. The finding of two out of 38 studies (5 per cent) having conducted complete economic evaluations is similar to the findings of Grimshaw and colleagues (2004) that looked at 235 studies on guideline implementation where only 5 per cent had conducted economic evaluations that involved cost-effectiveness or cost-benefit analyses. In a recent Cochrane Collaboration review of educational outreach visit interventions it was found that the

interventions are reported to be costly and that savings may outweigh costs if targeted at inappropriate practice behaviours and the effects are enduring (O'Brien et al., 2007). A recent review of 33 systematic reviews of clinical guideline implementation strategies found that the cost-effectiveness of guideline implementation was infrequently reported (Prior et al., 2008). Additional high quality economic evaluations of outreach facilitation and alternatives to getting evidence into practice are necessary to assist decision-makers in the allocation of limited health resources.

5.1.2 Tailored Outreach Facilitation for Chronic Illness Care Management

The aims of the descriptive mixed methods evaluation research study that incorporated both quantitative and qualitative analysis for an embedded case study of four rural Ontario primary care practices were to determine the implementation fidelity, the factors or moderators that contribute to and impede implementation of the CICM tailored outreach facilitation intervention, and the perceived success associated with implementation. Assessing the overall impact of CICM quantitatively from a patient outcome perspective was not possible given the duration of the intervention (nine months) and the small sample of chronically ill patients who participated within the case study practices. Similarly, determining the overall success of the videoconferencing facilitation experience as compared to facilitation without videoconferencing was not possible given the limited use of the videoconferencing equipment by the practice facilitator and participating practices during the period of study.

5.1.2.1 Implementation Fidelity

Determining implementation fidelity is important because research tells us that the way a program is implemented influences the eventual outcome(s) of a program—whether it is effective or not. Poor implementation or lack of implementation fidelity can, and often does, change or diminish impact (Mowbray et al., 2003; Griner Hill, Maucione, & Hood, 2007; Carroll et al., 2007). The extent to which the intervention has been delivered as intended can be influenced by contextual factors that either promote or suppress implementation fidelity including the coverage of material, level of

participation, and dosage or degree of exposure to the intervention components (Griner Hill et al., 2007). In addition, provider factors or characteristics such as knowledge and skills acquired, level of enthusiasm and self-efficacy, as well as practice or organizational attributes such as supportive systems, culture, and leadership commitment can also affect implementation fidelity (Dusenbury et al., 2003; Grimshaw & Eccles, 2004; McKenna et al., 2004; Grol et al., 2005; Pearson et al., 2005; Carroll et al., 2007).

The evaluation findings on implementation assessed fidelity or the extent to which the intended content, frequency, duration and dosage of the intervention was implemented (Carroll et al., 2007). Fidelity is understood to be the extent to which the facilitators delivered the content as well as how often and for how long they met or intervened with the practices (Dusenbury et al., 2003; Pearson et al., 2005). The findings from the analysis of practice facilitator activity logs, narrative descriptions on delivery of the CICM protocol by facilitators, care plan completion, and semi-structured physician interviews revealed the fidelity of implementation for case study practices. The level of fidelity achieved was influenced by the barriers to implementation and other moderators such as the complexity of the intervention, participant responsiveness or enthusiasm, and other organizational and environmental factors (Carroll et al., 2007).

The implementation evaluation found that for the two practices that experienced practice facilitation and successfully carried out the care plans, fidelity to the CICM protocol was achieved for the intervention components medication review, psychological assessment, community integration/social support, and prevention. However, scheduling of follow-up visits with patients was only documented in 43 per cent of the care plans and patient education on self-care was done with 67 per cent of patients. The difficulties in scheduling and conducting follow-up visits with patients puts into question the likelihood that eventual patient health outcomes can be attributed to the CICM intervention. Follow-up with chronically ill patients and patient self-care are both key elements of the patient-centred CICM model and the findings from the physician interviews confirm

the difficulties encountered in arranging follow-up visits with patients and physician ability to engage and educate patients on self-care management as well as community integration. Pearson and colleagues (2005) assessed the implementation of a six component chronic care model in 42 health care organizations in the United States and also found that although overall fidelity to the chronic illness care model was high, variation in the intensity of implementation among the six chronic illness care components and between organizations existed.

Despite the fidelity in adhering to the care plan, the intensity or dosage and duration of practice facilitation and physician exposure to the CICM model for the two successful practices was low in comparison to other published practice facilitation studies (Hulscher et al., 1997; Bashir et al., 2000; Lobo et al., 2004). The duration of the CICM practice facilitation intervention was nine months and the dosage involved nine to ten visits by the practice facilitator with each of these visits lasting between 30 and 60 minutes. In comparison, the systematic review of the 20 high methodologic practice facilitation studies found that the average length of intervention to be 14 months and that on average facilitators met with physicians eleven times with an average visit length of one hour. Reviews of practice facilitation literature (Nagykaldi et al., 2005) and research on the fidelity of program implementation (Mowbray et al., 2003; Griner Hill et al., 2007) have demonstrated that when participants do not receive the intended adequate dosage or duration of program content effectiveness is diminished.

The delivery of the facilitation intervention components – education on CICM, planning or consensus building, and feeding back results on performance – was uneven and as a consequence the predisposing, enabling, and reinforcing theoretical constructs of the PRECEDE framework were compromised. Only seven percent of practice facilitation activity was dedicated to providing feedback on implementation performance, 15 percent was dedicated to planning and/or tailoring the care plan, and 52 percent was dedicated to education on chronic illness care management. The feedback on performance facilitation activity was not a comparative analysis of practice performance

against a standard. It was the review of completed care plans by the facilitator and discussion with the physicians on any needed process improvements. As stated earlier, uneven implementation can impact the effectiveness of the intervention in changing practice behaviour. Several systematic reviews (O'Brien et al., 1997; Hulscher, Wensing, Grol, van der Weijden, & van Weel, 1999; Grimshaw et al., 2001; Prior et al., 2008) of the literature have demonstrated that multi-faceted interventions such as practice facilitation are more effective than single interventions for improving physician practice. Although combined strategies such as the CICM outreach facilitation intervention are predominately more effective in the literature, the relationship between the number of intervention components and effects is not understood and other reviews have challenged the effectiveness of multifaceted interventions (Grimshaw et al., 2004). Successful practice facilitation as a multifaceted intervention is thought to be achieved through the tailoring or adaptation of different combinations of intervention components to address the identified barriers to change and needs of the practice (Grol et al., 2005). Education of participating physicians on a new method of caring for chronically ill patients was an important element of the facilitation intervention as evidenced by the amount of time facilitators spent on meeting physician education needs. However, education only addresses the predisposing construct of lack of knowledge and not the enabling and reinforcing constructs for behaviour change that the planning and performance feedback components of the intervention can address. Program implementation can be flexible as long as there is fidelity to the essential elements of the intervention as absence of the essential elements compromises the achievement of the intervention goals (Carroll et al., 2007). Further research is needed to determine which of the facilitation components for the CICM guideline implementation can be attributed to successful implementation and eventually outcomes.

The videoconferencing component of practice facilitation was limited in implementation. The participating physician experience with facilitation via videoconferencing was positive and implementation can be considered a success from the stand point of being a proof-of-concept despite

the technical difficulties associated with installation and operation. However, duration was limited to three months and each practice experienced a dosage of only three instances of videoconferenced facilitation at a total of three hours for both practices. As a result, a more comprehensive assessment of the videoconferencing component was not possible. However, considerable research on telehealth implementation success in rural settings and provider satisfaction exists (Jennett et al., 1995; Kroeker et al., 2000; Hailey, 2001; Health Canada, 2004; Jennett et al., 2005). Further, cost-savings have been demonstrated with certain telehealth interventions (Rumberger & Dansky, 2006) and Jennett and colleagues (2003) through a systematic review of 306 telehealth studies, which included videoconferencing training, showed that multiple benefits were derived from the technology, including improved accessibility, quality of care, and quality of life. Implementation success and outcomes from facilitated videoconferencing in rural primary care settings may be achievable with the adoption of the technology. The feedback from participating physicians for the proof-of-concept videoconferencing indicated that they had successfully adopted the technology and it was easy-to-use. Future research is required to determine if facilitation via videoconferencing can result in outcomes equal to or better than standard practice facilitation, perhaps with a less complex practice guideline to be implemented.

The value of tailoring practice change strategies to the clinical context or local needs and to specific aspects of service delivery, specific health conditions or to patients is regarded positively as contributing to implementation effectiveness in the research literature (Stange, 1996a; Goldstein et al., 2003; Glasgow et al., 2004; Fretheim, Oxman, & Flottorp, 2004). From the perspective of implementation fidelity there is case study evidence that practice facilitators tailored the chronic illness care plan to the needs of the practice, in some cases extensively so. At the same time there is evidence that participating physicians were unaware or had not attempted to engage in tailoring of the CICM intervention to the context of their practice. As was found with the uneven delivery of intervention components, the option to tailor the CICM intervention to the context of the practice was

also inconsistent across case study participants. One successful implementation practice extensively tailored the care plan to include more patient input as well as revisions to the scheduling visit components, current health status, medication, and prevention areas of the protocol. It has been argued that tailoring or program adaptation can contribute to successful implementation, however, program providers need to be aware that extensive tailoring or adaptation of the intended intervention due to facilitator attributes, beliefs about effectiveness, organizational or time constraints potentially lessens the quality of implementation and overall intervention effectiveness (Griner Hill et al., 2007). The meta-analysis of 19 high methodological studies of practice facilitation interventions revealed a greater effect for those that described tailoring, individualizing or adapting the intervention to the needs of the practice as compared to those studies that did not. To demonstrate the benefits of tailoring to practice needs further research is necessary to compare implementation success and outcomes between practice groups that have implemented CICM as provided and those that have extensively tailored the CICM intervention but at the same time have maintained the essential components of it. Cheater and colleagues (2005) also found through a meta-analysis that interventions tailored to prospectively identify barriers may improve care and patient outcomes, however, they concluded that the evidence on the effectiveness of tailored interventions remains uncertain and more rigorous trials (including process evaluations) are needed.

5.1.2.2 Impediments to Implementation Success

The literature is replete with factors that contribute to and impede implementation success. Successful implementation depends on multiple factors including physician knowledge and openness to guideline implementation, the guidelines themselves perceived as being of poor quality or too difficult to implement, limited time for implementation, patient expectations and capacity, insufficient staff or allied health support, poor reimbursement or increased practice costs, organizational restrictions, broader environmental context, and the method of facilitation itself (Kitson et al., 1998; Cabana et al., 1999; Grol & Grimshaw, 2003; McKenna et al., 2004; Glasgow & Emmons, 2007).

The level of adherence to the CICM intervention was moderated by several factors including the level of responsiveness or acceptance that participating physicians expressed for the CICM model and the intensive time demands. The moderating factors were categorized into the broad themes of optimism and pessimism.

Despite the education and CICM planning support provided by facilitators, both the optimistic and pessimistic CICM case study practice physicians experienced a number of barriers to implementation. The first of these barriers was the lack of willingness to engage or accept the need for changing the provision of care for chronically ill patients. Physician, staff and the overall practice culture not being supportive of desired change has been reported elsewhere (Hroscikoski et al., 2006) as well as how primary care providers are sometimes convinced that they already provide optimal chronic illness care and do not need to change (Wagner et al., 2001b). Some physicians were initially uncomfortable with the CICM protocol and the bio-psychosocial and patient-centered approach to providing care but learned to move beyond the traditional physical disease biomedical approach with their chronically ill patients, others could not. This is not unexpected given that medical education does not always prepare physicians for the demands of patient-centered collaborative care (Stewart et al., 2003; Holman, 2004) and that the predominant model for providing care is based on a biomedical acute care framework. There is ambivalence and ambiguity as to which health professions are responsible for care planning of chronically ill patients within the health system (Martin, 2007).

Further, both successful and unsuccessful care plan implementing physicians expressed concerns about the ability of some patients to be able to actively participate as a partner in the management of their illness and to practice self-care – particularly those patients perceived as having low cognitive ability. In the context of chronic illness emerging as the central issue facing the health system, research strongly supports the need for systematic efforts to increase patient knowledge, skills and confidence or self-efficacy towards managing their illness as key to improving the effectiveness

of care (Von Korff, Gruman, Schaefer, Curry, & Wagner, 1997; Holman & Loric, 2004). In a systematic review of 41 studies for improving the management of diabetes mellitus in primary care, multifaceted interventions that included a patient education, self-management component were found to have favourable effects on patients' health outcomes (Renders et al., 2000). For those patients with low self-efficacy and/or complex conditions, a chronic illness model of care comprised of allied health team members to provide case-management services for patients has been proposed (Martin, 2007).

Physician self-efficacy in working with complex patients must also be addressed. This intervention involved patients with complex chronic illness conditions as evidenced by the average of over five chronic conditions per patient. Physician self-efficacy or confidence in working with complex patients was an influencing factor with regard to perceived pessimism or optimism toward chronic illness management. Physician self-efficacy in being able to successfully work with such complex patients may have been improved if less complex cases had been introduced first in order to build physician confidence in being able to engage in chronic illness care management moving from less complex cases where the probability for success is greater to the more complex patients. For example, research has shown that communication skills workshops are a useful modality to improve self-efficacy and physician confidence in stressful aspects of the physician-patient relationship such as in breaking bad news and managing patient reaction to illness (Baile et al., 1999). This research finding supports the participating physician observation in this study that a training course on implementing the CICM protocol with complex patients prior to implementation would have been perceived as being beneficial.

The CICM intervention lacked the component for auditing the performance of physicians in delivering patient-centered, collaborative chronic illness care. This made it difficult to be able to assess the quality of the delivery of chronic illness care by physicians in order to highlight gaps and act as a potential motivator for changing chronic illness care practice. Auditing practice performance

on delivering evidence-based guidelines and feeding back the results has been shown to be effective in changing practice behaviour (Wensing et al., 1998) and even more so if the feedback is intensive (Jamtvedt, Young, Kristoffersen, O'Brien, & Oxman, 2006). Several chronic illness care performance assessment tools exist in the literature, such as the Assessment of Chronic Illness Care (Pearson et al., 2005) and the Patient Assessment of Chronic Illness Care (Schmittdiel et al., 2008) protocols, allowing future facilitation-based chronic illness care interventions in Canada the opportunity to implement a performance feedback component in order to motivate practice behaviour change.

The key barriers expressed by both physicians who were pessimistic about CICM and physicians who optimistically carried-out implementing care plans with 21 chronically ill patients were the time intensive aspect of the protocol and the unlikelihood of widespread implementation within the current Ontario primary care context. Both the successful and unsuccessful physicians reflected on the lack of time necessary for patient-centered, collaborative care within the context of their small, busy rural practices. They were overwhelmed by competing patient care demands associated with daily practice and the preponderance of recommended evidence-based practice guidelines. Ostbye and colleagues (2005) estimated the amount of time required to implement practice guidelines for chronic disease care in a similar manner as they had done for the delivery of preventive service guidelines (Yarnall et al., 2003). Using conservative estimates for the time required to look after 10 different chronic diseases for patients who were assumed to be stable and in good control and allowing only 10 minutes per chronic disease recommended visit, they estimated the time required for management of the diseases within a typical practice of 2,500 patients to be 42 percent of available clinical time (Ostbye et al., 2005). When taken together, the time required to meet preventive, chronic, and acute care patient requirements vastly exceeded the total time physicians had available for patient care. Ostbye and colleagues did not include any time for patient education and counseling on psychosocial issues. These findings support the time intensive

challenges associated with chronic illness care management (30 minutes for initial visits and 10 minutes for follow-up visits) identified by the rural case study physicians and provide credence to the feelings of being overwhelmed and having no time for providing comprehensive chronic illness care. The underlying problem of a lack time for evidence-based guidelines implementation is consistently reported in the literature (Cabana et al., 1999; Young & Ward, 2001; Grol & Grimshaw, 2003; O'Donnell, 2004; Martin & Petersen, 2008) and makes widespread implementation of CICM impractical in the current context of primary care in rural Ontario.

Russell, Thille, Hogg, & Lemelin (2008) conducted a qualitative study of a larger sample of urban and rural Ontario family practices to assess the experience of 13 family physicians and 20 patients exposed to the same chronic illness care management practice facilitation initiative that this study examined. They found that pervasive individual physician barriers combined with a lack of health system based support made it unlikely that the CICM initiative would have any impact in the Ontario health care system as currently implemented. Physicians from the four case study practices in this study made several references to the need for allied health professional support. Perhaps the recently created Family Health Teams as part of the Ontario government's primary health care renewal plan can help to meet this need in the future. Family Health Teams are locally driven primary health care delivery organizations which may include family physicians, nurse practitioners, nurses and a range of other health professionals who are committed to working together collaboratively to provide comprehensive, accessible, coordinated primary health care service, including chronic disease management, to a defined population (Ontario Ministry of Health and Long Term Care, 2008).

The CICM model intervention described in this study is similar to the Australian Enhanced Primary Care Medicare Benefits model introduced in November 1999 for reimbursing Australian physicians to create management plans for their chronically ill patients and to collaborate with other health service providers (Wilkinson et al., 2002). Three years of experience with the care planning

strategy in Australia revealed that only 10 percent of the general practice workforce was responsible for completing 80 percent of all care plans (Wilkinson et al., 2002) and that these practices tended to be larger and used the increased payments received to bring in nurses to support implementation of chronic illness care (Oldroyd et al., 2003).

The Wagner et al. (2001a) chronic care model (CCM) is an integrative multi-faceted approach to chronic care delivery built around six elements deemed essential for providing high-quality care: delivery system design; self-management support; decision support; clinical information systems; community resources; and healthcare organization. This model has 'delivery system design' which involves changing the structure of the practice, involving teams of health professionals and support personnel, and redefining the roles of team members so that physicians do more acute and same-day care of patients thus freeing advanced practice clinical and other staff to provide more chronic care (Glasgow & Emmons, 2007).

A meta-analysis of 112 studies that incorporated at least one element of CCM revealed significant overall effects for clinical outcomes and processes of care for patients with chronic illnesses and further the meta-regression analyses found that delivery system design, self-management support, decision support, and clinical information systems were associated with better outcomes and processes (Tsai et al., 2005). CCM has been implemented principally by managed care organizations in the US with any number of physicians, nurse practitioners and ancillary care providers exposed to a variety of strategies to change practice behaviour. Chronic illness management is complex, time and resource intensive and demands an integrated health systems approach that is beyond what practice or outreach facilitation can provide alone. The recently created FHTs in Ontario represent a new delivery system design with similar attributes to the types of health organizations that have implemented CCM in the US that potentially can address some of the key barriers identified by case study physicians in providing chronic illness care management to patients.

5.1.2.3 Potential for Implementation Success

The CICM barriers encountered by the case study practices reinforces that implementing chronic illness care guidelines within a practice setting is a difficult step by step process where the potential for implementation success is dependent on addressing the barriers. Each of the steps towards success requires the attendance of specific facilitators of behaviour change. In addition, the complexity of meeting the care needs of chronically ill patients requires a delivery system design that has connectedness across different levels of the health system, advanced nursing and allied health professional support, medical information systems, as well as other elements. The solely family physician implemented CICM model of medication review, preventive care, patient education on self-care, psychosocial assessment, and community integration with other external support service agencies has been reported as unsuccessful elsewhere (Russell et al., 2008). Based on the experience of the physicians in the four rural primary care practices and the existing evidence on successful chronic illness care management interventions, the lack of success may be attributed to missing important chronic care elements such as delivery system design. Although practice facilitation is reported to be a successful multifaceted approach to changing care processes in primary care (Nagykaldi et al., 2005), it may not be singularly effective for all types of practice guideline implementation attempts, such as chronic illness care management, which is time intensive for rural primary care physicians. Facilitation may have an important role to play as part of a more comprehensive approach to providing care management to chronically ill patients within primary care practice settings.

Despite only partial practice facilitation implementation of the chronic illness care model, there was success in terms of the positive patient anecdotes provided by physicians who implemented CICM, the general satisfaction with practice facilitation, as well as with the use of videoconferencing. Optimistic and engaged physicians reported on the positive aspects of the CICM protocol such as the psychosocial assessment and the deeper understanding gained of their chronically ill patients through counseling and the associated successes achieved in being able to resolve a variety of patient

problems, not only the medical. In a descriptive study assessing the implementation of a chronic care model in larger collaborative practices, Pearson and colleagues (2005) found implementation fidelity of the chronic care guidelines to be high but the intensity of changes within practices varied. Similar to the optimistic physicians in this study they also found that some practice organizations deemphasized patient education and counseling. In contrast, Hroscikoski and colleagues (2006) conducted a qualitative, comparative case study and found many barriers, including little engagement of physicians, to implementing the Chronic Care Model in one large U.S. health care organization. Similarly, a qualitative study involving focus groups of Australian GPs who had experienced the chronic care management component of the Australian government's Enhanced Primary Care package found many negative themes associated with chronic-disease management including the complexity of chronic disease, tension between physicians' and patients' goals, the time-consuming aspects of providing care, and conflicting pressures that prevented physicians from engaging in structured multidisciplinary care (Oldroyd et al., 2003).

Case study physicians were satisfied with their facilitator. This was reinforced by the fact that the physicians had a relationship with their facilitator prior to implementing chronic illness care management as they had participated in a 12-month tailored outreach facilitation project to improve overall preventive performance through the adoption of preventive care guidelines (Hogg et al., 2008b) before taking on the complexity of chronic illness care management. Practices had successfully improved their performance of preventive manoeuvres after receiving the facilitation activities of audit and feedback, planning or consensus building, and reminder systems. The overall positive facilitation experience from improving prevention may have compensated for the failure of chronic illness care management and poor implementation fidelity, specifically the lack of practice audit for patient-centered, collaborative chronic care. Other studies that have employed practice or outreach facilitation to improve the quality of primary care have found high levels of facilitator satisfaction with 95 per cent of family physicians who participated in an intervention to improve

respiratory infection reporting satisfaction (Huston, Hogg, Martin, Soto, & Newbury, 2006) and 95 per cent of family physicians participating in the evaluation of a tailored multifaceted facilitation intervention for changing practice patterns and improving preventive care being either satisfied or very satisfied with facilitation (Baskerville et al., 2001). However, research on practice facilitation has demonstrated that the personal characteristics of facilitators were essential to their relationships with the staff at the practices, and therefore essential to the practices' outcomes (Hogg, Baskerville, Nykiforuk & Mallen, 2002). Despite high levels of facilitator satisfaction, there is the possibility that variation in chronic illness care plan delivery was partly due to the attributes of the practice facilitator.

The cost of the facilitation intervention for CICM based on the costing data for only the four case study practices was found to be $12,003 per practice. This is comparable to the intervention cost of $10,835 per practice reported in a similar facilitation intervention that successfully improved physician implementation of preventive care guidelines involving 22 Ontario primary care practices (Hogg et al., 2005). The lower cost per practice found in the earlier study may be due to inflation, a greater number of participating practices, the lack of physician reimbursement, or any number of factors. In this study it was noted that outreach facilitation is more costly than other interventions designed to modify primary care practice. Participating physicians were satisfied with facilitation and also recognized that facilitation was a costly intervention. They suggested methods for helping to reduce costs such as greater computerization and networking across primary care practices to allow for automated performance reporting and benchmarked feedback rather than the intensive on-site auditing that was part of facilitation.

Although the two primary care practices participating with the videoconferencing facilitation experience only received a total of six videoconference sessions, the participating family physicians were satisfied with the videoconference experience despite expressing a preference for having the facilitator visit the practice in-person. Videoconferencing is more economical in the case of the two

participating practices. Direct cost savings of 20 per cent from the use of videoconferencing equipment as compared to traveling to visit the practice were found and the opportunity cost of time spent traveling by facilitators rather than working with more practices is apparent. Other research has found that tele-education technologies have an important role to play in addressing the professional isolation which is experienced by rural and remote health-care professionals (Curran, 2006). Davis and McCracken (2002) found that 95 per cent of rural physicians in Alberta reported that videoconferencing met their expectations and expressed satisfaction with the technology. These authors also found that videoconferencing was significantly more economical than having a regional conference largely due to the savings in travel. Similarly, Allen, Sargeant, MacDougall, & Proctor-Simms (2002) found that videoconferencing has been well accepted by faculty staff and by learners of the Dalhousie University Office of Continuing Medical Education, as it enables them to provide and receive education without traveling long distances. Harris, Smith, & Armfield (2007) also found that the education of regional health professionals in Australia using mobile videoconferencing to be very positive: 88 per cent of participants agreed or strongly agreed that the videoconferencing sessions were relevant, 82 per cent agreed that audio was acceptable, 91 per cent agreed that video quality was acceptable, and 97 per cent of staff agreed or strongly agreed that the sessions should be continued routinely. Finally, Jennett and colleagues (2003) have determined through a systematic review of 306 sources that cost-effectiveness is one of the identified main benefits of telehealth technology.

5.2 Study Limitations

The limitations of the systematic review are several. Only the author conducted the review and the methodologic performance rating of each of the 38 selected studies and as a consequence some error and bias may have been introduced by the one reviewer in the critical appraisal of the studies. In addition, in an effort to focus and limit the scope of work involved, only the published journal literature was included in the review and no contact was made with any authors to confirm issues around the implementation of practice facilitation or methods employed in assessing effects.

Unpublished interventions may be more likely to have negative findings and in this review only five of the studies reported null effects with regard to the primary outcome measure and as a consequence publication bias may be an issue. Study statistical heterogeneity was not a problem, which lends support to combining study findings. However, as with other systematic reviews that did not utilize meta-analysis, missing information, methodological limitations, differing outcome measures, and diversity of interventions are very apparent. Finally, not all of the study characteristics were analyzed in terms of the relationship to effects and further research and a multiple meta-regression analysis may show which characteristics account for the variance in effect sizes while controlling for confounding or co-linearity among other characteristics (Higgins & Green, 2008).

A series of published studies were generated by the same team of researchers evaluating the effect of practice facilitation in the Netherlands (Lobo et al., 2002; Frijling et al., 2002; Frijling et al., 2003b; Lobo et al., 2004) and rather than combining or selecting the most representative, they have been selected and included in the analysis individually. Each of the papers addressed different outcomes from practice facilitation; however the overall findings may be biased from the over representation of the effects from the practice facilitation work of Frijling, Hulscher, Grol and Lobo.

Compared to the eleven systematic review quality assessment criteria proposed by Shea and colleagues (2007), the systematic review of practice facilitation covered eight: 'a priori' design provided; a comprehensive literature search conducted; included and excluded studies listed; documented the characteristics of included studies; assessed and documented the scientific quality of studies; appropriately formulated conclusions; appropriately combined studies; and, assessed publication bias. For the remaining criteria, a second independent reviewer to select studies and extract data was not possible, the selected articles were not up-to-date, and a conflict of interest statement was not applicable for this review.

The qualitative assessment of implementation fidelity incorporated several elements to support the integrity of the analysis as summarized by Patton (1999). The embedded case study

included the variation of cases by having both successful and unsuccessful or negative cases as a test of rival or alternative explanations of the interpretation of data and the triangulation of data via multiple lines of evidence in the form of several different data sources and units of analysis (Flyvbjerg, 2006). In addition, as part of the mixed-methods approach some reconciliation of the quantitative and the qualitative data was carried-out to complement the findings about implementation fidelity. Other factors that support the credibility of the results include the detailed description of the setting and methods, the presentation of thematic coding of qualitative data from interviews, and the direct quotations from original qualitative data (Greenhalgh & Taylor, 1997).

Nonetheless, several apparent limitations are noted. First, only the author was responsible for conducting the review and coding of the qualitative data. At least one other independent reviewer to assess the data and interpret it would improve reliability and validity of the results. Second, generalizing the findings from the implementation assessment of TOF and chronic illness care management within the primary care practices is cautioned given that only the experience of four purposively sampled practices, six physicians and 21 patients were studied. These were small capitated rural practices that had already participated in two other studies designed to investigate new methods of delivering primary care and as a consequence were predisposed to incorporating changes to practice such as those associated with CICM. The capitated practices selected for this study are therefore not representative of general primary care practice in Ontario. Although the sampling technique included an awareness of the need to search for rival explanations, not all disconfirming cases could be included and as a consequence additional perspectives from practitioners not sampled are not represented. A larger sample and more representative sample would likely have yielded additional insights, such as more recent medical graduates or larger practices with interdisciplinary staff having more supportive views and greater success. A third and related study limitation is the lack of theme saturation. Although the data were coded to identify all themes, it is possible that saturation was not achieved due to the small number of participating practices and physician

interviews conducted. It is likely that greater insights may have been attained with the opportunity to conduct more interviews and adjust lines of questioning using the constant comparative analysis method of grounded theory (Glaser & Strauss, 1967). Fourth, relying on facilitator narrative logs and time reporting may not be as reliable as observer ratings to assess implementation fidelity (Griner Hill et al., 2007). Finally, embedded case study types of analyses are a challenge to conduct because the multitude of factors that are associated with the phenomena under study are often too numerous to disentangle. However, commonalities across multiple instances of a phenomenon as determined from the interviews in this study contribute to generalizations (Miles & Huberman, 1994).

5.3 Implications for Practice

The lack of implementation success of chronic illness care management via practice facilitation in rural primary care practices should be of practical significance to health care professionals and external stakeholders such as the Ontario Ministry of Health and Long Term Care as well as other provincial ministries in British Columbia and Newfoundland who have recently adopted the outreach facilitation program model. The systematic review of practice facilitation and the mixed-methods assessment of practice facilitation implementation for chronic illness management revealed that although practice facilitation can have a moderate effect for certain targeted practice behaviours, it may not work with complex targeted behaviours such as chronic illness management in the primary care setting as conveyed in the identified themes of tempered optimism and pessimism toward chronic illness management by rural family physicians. Not all practice guidelines may be amenable to the practice facilitation intervention alone and given the complexity of chronic illness management a more systematic approach with additional patient supports, physician education and personnel appears warranted.

Fidelity of intervention implementation is critical for ensuring the longer-term patient outcomes can be reached (Mowbray et al., 2003) and implementation also has to take into consideration the need for flexibility or tailoring of the intended intervention to the context of the

practice (Cohen et al., 2008). Both the systematic review and the mixed methods evaluation of implementation fidelity highlighted a number of important variables for improving implementation fidelity that are important for decision-makers and program providers. The duration of the intervention, the number of practices per facilitator, the frequency of or intensity of the intervention, tailoring to the needs of the practice, the personal attributes of the facilitator, the attributes of the patients, and the number of intervention components designed to affect behaviour change are important considerations for implementation in practice (O'Brien et al., 2007; Hogg et al., 2008a). In addition, consideration of the predisposing, enabling and reinforcing intervention strategies of PRECEDE as a conceptual framework when designing interventions was highlighted in the systematic review and these theoretical constructs appeared to underpin the design of practice facilitation interventions – the more closely aligned the design of the intervention to the PRECEDE model the greater the effect. Although it is difficult to disentangle the relationship of intervention components to effects, providing performance feedback to physicians has been found to be effective in changing practice behaviour (Jamtvedt et al., 2006) and should be better integrated into chronic illness management delivery to identify gaps in quality of care that can be acted upon as a reinforcing strategy for change (Pearson et al., 2005; Green, 2006b).

Several improvements for future consideration were raised by the participating case study physicians, beyond simply modifying the content of the chronic illness care management forms, that are also covered in the literature including: the integration of chronic illness management of patients with computerized medical information systems to improve the effectiveness and efficiency in organizing, informing, supporting, and managing the intervention (Glasgow & Emmons, 2007); the need for additional training on chronic illness management and care planning to build self-efficacy or confidence as the traditional medical education system does not prepare physicians for the demands of a complex, collaborative health care environment involving chronically ill patients (Holman, 2004); the modification of the chronic illness management model to include more patient self-

management support and ownership of health-related problems as well as acknowledging that more challenging patients require additional personal and community-based, case-management support (Glasgow, Davis, Funnell, & Beck, 2003; Holman & Loric, 2004); and the need for additional interdisciplinary staff, redefining the roles of physicians, and stronger linkages to a network of community health resources and support services for health providers and patients (Glasgow & Emmons, 2007) .

The chronic illness management intervention as described in this implementation research study and delivered to four rural primary care practices is unlikely to be adopted and as a consequence to have any impact on the health of chronically ill patients in rural Ontario communities. Despite the optimistic physicians willingness to explore the patient-centred, collaborative approach to caring for chronically patients, additional research is needed to address the pervasive individual and practice-based barriers as well as test new models of care delivery that can tackle the lack of system-based support for chronic illness care management. The study originally intended on comparing the chronic illness care management implementation success of practices that received facilitation through videoconferencing as compared to those practices that did not. However, videoconferencing was not fully implemented for an adequate length of time to carry-out such a comparison. Nonetheless, practice facilitation was successfully conducted with videoconferencing and the receptiveness of both the successful and unsuccessful practices to videoconferencing as well as the associated opportunity costs demands the attention of decision-makers in considering videoconferencing as a tool for implementing evidence-based guidelines and worthy of more support and careful evaluation. A lesson for program providers is to ensure through implementation research that the guideline can be successfully implemented in the primary care setting before such expensive tools as videoconferencing are put to use to avoid wasting resources.

The consistency with which the barriers of a lack of time and available supports for both family physicians and patients arose from the feedback of participating physicians points to the need

for a more systematic approach to delivering chronic illness care management. The five component model of chronic illness care management as delivered by family physicians in collaboration with their patients can not successfully be implemented within the current context of small rural primary care practices. In contrast, the Wagner chronic care model (Wagner et al., 2001a) has successfully been implemented (Tsai et al., 2005) and emphasizes six elements including the connectedness across different providers and levels within and outside of the health system through the restructuring of the practice to optimize behavioural and health outcomes. This has meant redefining the roles of practice team members in order to free up advanced practice clinicians, nurse practitioners, and other staff to provide more chronic care. The practice implications of the new Ontario Family Health Teams as a model for restructuring primary care with additional primary care team members to address the barriers to chronic illness care plan implementation need to be assessed. Family Health Teams may hold promise for improving chronic illness management under Ontario primary health care reform.

There is the potential for long-term reductions in overall health costs if complex, high demand patients with chronic illness are better managed. The Family Health Team approach may result in successful implementation of chronic illness care management and an associated reduction in demand for hospitalization services. The improvements to patient quality of life and the associated reduction in utilization of costly hospital services could potentially result in overall cost savings for the health system. The costs and cost-effectiveness of the Family Health Teams approach must be considered within a comprehensive primary care framework and will depend upon factors such as health system funding, the practice context, the organization of the practice itself and team member dynamics, the quality of service delivery, the targeted practice behaviours, and the extent of integration with public health and social services (Hogg et al., 2008c). The role of the practice or outreach facilitator within a new model of chronic illness care management will need to be revisited. Practice facilitation has been shown to be cost saving and to provide a return on investment for such

targeted physician behaviours as implementing preventive care guidelines for adult patients (Hogg, Baskerville & Lemelin, 2005). However, Luck and colleagues (2007) conducted a review of published systematic reviews on the cost-effectiveness of interventions to improve care for patients with complex conditions and found that only three of 11 reviews explicitly addressed cost-effectiveness. Although some evidence was found for cost-savings associated with interventions, more data about the effectiveness, costs and benefits of programs to improve care for patients with multiple chronic conditions are required to provide clearer evidence that current interventions are cost saving (Luck, Parkerton & Hagigi, 2007). In addition to addressing the methodological shortcomings associated with published studies, economic evaluations of possibly more effective, efficient and sustainable intervention alternatives to practice facilitation are needed to assist in important public policy and administrative decision-making on the management of populations suffering from complex chronic conditions.

5.4 Implications for Science

There are five broad areas in which further research could help our understanding of practice facilitation as an intervention to improve the implementation of evidence-based guidelines within primary care settings. First, meta-analysis in this area is possible and the systematic review of practice facilitation should be replicated with at least one other independent reviewer to improve reliability and expanded to include additional good quality research studies published since June 2006. The systematic review has revealed that although a good number of studies were of high quality there is still room to improve the internal validity of research findings through consistent methods such as the blinding of data collectors and concealment of allocation. Another noteworthy systematic review finding is that of the four high methodologic performance studies where the unit of randomization and analysis were not the same, three of the four reportedly carried out an adjustment for intra-class correlation. Adjusting for intra-class correlation, when necessary, should be in the methods of any large RCT that has randomized by practice but presents results at the level of the

patient in order to avoid statistical error resulting in the possible inflation of the significance of the effects. Future meta-analyses as well as independent research studies should investigate ways of increasing the effectiveness of practice facilitation through comparisons of different practice facilitation intervention components, including the type of facilitator, the length of time, frequency and content of the visits, tailoring to the needs of the practice, the overall duration of the intervention, as well as the number of practice behaviours or guidelines being targeted. All of these factors warrant further investigation to understand the efficiency and effectiveness of practice facilitation. Other noteworthy areas to pursue in support of better quality systematic reviews include investigators reporting on each of the components of practice facilitation in detail and given the complexity of practice facilitation, process evaluations that are embedded into trials could shed some light on implementation fidelity and the variable effectiveness of practice facilitation as was done in a process evaluation conducted by Baskerville et al. (2001) for the practice facilitation randomized controlled trial of Lemelin and colleagues (2001). Only one study from Canada was identified as part of the systematic review, although two additional studies have been published since (Hogg et al., 2008a; Hogg et al., 2008b), and evaluation researchers from countries other than the United States and the United Kingdom such as Canada must be further supported and encouraged to publish their findings on practice facilitation interventions in order to gain a better understanding of the generalizability of interventions.

Second, a number of specific areas for future research are highlighted based on the systematic review findings. One that should be stressed as the cumulative evidence on the effectiveness of practice facilitation builds and decision-maker concerns about allocating limited health resources come to the fore is conducting more comprehensive economic evaluation studies to determine the cost-effectiveness of practice facilitation against other alternatives to changing primary care practice behaviour. The systematic review revealed very few cost analysis or cost-effectiveness studies on practice facilitation and this is typical for other intervention strategies for improving primary care

practice performance (O'Brien et al., 2007). In addition, further research on the sustainability of effects and practice facilitation with and without theoretical constructs such as the PRECEDE predisposing, enabling and reinforcing strategies would further elucidate not only the power of these theoretical constructs but their incremental effects and for how long they can be maintained. Strong arguments have been made for theoretical frameworks (Eccles et al., 2005) to assist in the design of knowledge translation interventions as part of implementation research and the systematic review of this study has demonstrated that the PRECEDE framework has utility in understanding intervention design and effects. Research that translates identified barriers into tailor-made intervention strategies is necessary and researchers should document the adaptations made and link the intervention components to the identified barriers in order to deepen understanding of organizational behaviour change within primary care (Bosch et al., 2007; Cohen et al., 2008). Further, investigators should carefully consider the number and nature of behaviours that are targeted for improvement and carry-out research to disentangle the cumulative effects or lack of them. In many trials, interventions were targeted at a large number of behaviours or behaviours that appeared to be complex or ill suited to the practice context such as the intervention processes required for successfully implementing CICM. Without careful implementation research and supporting descriptions of the complexity of improving primary care performance in certain trials the results are often difficult to interpret. In future, research investigators should clearly indicate a primary outcome that is to be measured and should be cautious about targeting a large number of complex behaviours and testing for significance without adequate controls or implementation research in place to identify what has accounted for any changes realized (Hogg et al., 2008a) to avoid potentially capitalizing on chance fluctuations that threaten internal validity.

Third, future research on implementing chronic illness care management within rural primary care settings needs to be undertaken once new programs such as Family Health Teams are fully in place. The implementation research study identified the lack of integrated, multidisciplinary primary

health care teams to carry-out the complex steps required for implementing care plans for chronically ill patients as a key barrier to implementing a complex practice behaviour such as chronic illness care management. Family Health Teams as described by participating physicians and by the Ministry of Health and Long Term Care include additional health professionals such as nurse practitioners who may be more capable and better able to take the time to carry-out chronic illness care planning with patients. For Canada, the chronic illness care model in primary care settings is still theoretical and more research is needed on practice-based interventions that can translate the theoretical concepts such as systems integration, computer-based decision supports, and patient self-care management into practice. Until a chronic care illness model can be implemented with fidelity in a Canadian primary care setting and patient outcomes attributed to the implementation effort, conducting a comprehensive study of the cost-effectiveness of chronic illness management in primary care will need to wait.

Fourth, the implementation evaluation of the videoconference facilitation experience was primarily an assessment of the feasibility of this form of facilitation in rural Ontario primary care practices – a proof-of-concept. This study has demonstrated that videoconference facilitation is feasible, providers are satisfied with the technology and the potential for cost-savings exists. Although this technology has proven to work satisfactorily, what is not clear is whether or not it is more cost-effective than standard practice facilitation or other alternative interventions for improving practice behaviour. The videoconference component did not last long enough to assess sustainability or the impact on evidence-based primary care decision-making nor changes in patient outcomes in the longer-term. A more definitive and comprehensive research study of videoconference and standard facilitation targeted at a practice guideline which can be successfully implemented using a larger representative sample of rural primary care practices to determine whether it is the most cost-effective alternative is recommended.

Fifth, despite the factors that have been identified as deviations from the intended practice facilitation CICM model, the universe of potential deviations from fidelity to the intended structure

and content of interventions is huge. It is not known how many of these deviations occur on a regular basis and which are more important in terms of achieving outcomes. It is not clear what the relative importance of intervention modifications is, how they interact to create change or how external factors such as government policy influence the lack of effects. Implementation research is important since without successful implementation, practice guidelines are not adopted, and patient outcomes are not achieved. There is opportunity for future research on methods for measuring implementation fidelity, for testing intervention traits individually, for identifying which factors are the most associated with achieving both implementation and patient outcomes, and for transferring the knowledge acquired on methods development and the key factors associated with best-practice implementation. Lawrence Green (2008) has commented that to address the performance gap between clinical evidence and practice, research results that are more relevant, more actionable, more tailored, more particular to the patient population and to the circumstances of practice and with more immediate feedback to the practitioners themselves are required. "If we want more evidence-based practice, we need more practice-based evidence" (Green, 2008, p. 23) and implementation research is a practice-based approach that can help understand and address the performance gap.

5.5 Conclusion

It is estimated that almost half of all North Americans live with a chronic condition and world wide chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 60% of all deaths (World Health Organization, 2008). That number of people living with chronic illness is projected to increase by more than one percent per year by 2030. Canadians living in rural areas are health disadvantaged compared to their urban counterparts for many health-related measures including circulatory disease, respiratory disease, and diabetes (Canadian Population Health Initiative, 2006). New strategies for implementing effective approaches to managing chronic illness and preventing mortality within rural communities are a part of the solution. Existing models of care delivery can not respond effectively

to the challenge of chronic illness. Research into new models for responding to the challenge is critical in order to improve chronic illness management and patient outcomes.

This thesis has explored the possibility of conducting a meta-analysis of 19 selected studies with high methodologic performance and in so doing has added to the body of knowledge on the overall effectiveness of practice facilitation interventions. It has found that there has been improvement overtime in the methodological rigour of practice facilitation evaluation research with an increasing proportion of RCTs having been published year after year. Meta-analysis of practice facilitation for the purposes of getting a variety of evidence-based guidelines into practice is possible despite the diversity that exists across interventions and methods. Systematic reviews and meta-analyses are considered the flagships of evidence-based health care and are considered the most rigorous source of evidence for the purposes of population-based health policy, despite being prone to bias (Guyatt & Rennie, 2002). It is hoped that the systematic review has provided researchers and policy-makers with information on the empirical effects of practice facilitation that can be used to adjust expectation for what is realistic based on the current evidence. The systematic review represents not only an update to the work of Nagykaldi and colleagues (2005) but is the only other systematic review of practice facilitation that the author is aware of that incorporates a meta-analysis and a determination of the overall effect of practice facilitation.

The review has shown that practice facilitation can achieve significant but moderate effects in implementing primary care practice changes. Even though caution is warranted in interpreting the effect size of 0.54 given the limitations of this review, the comparison of magnitude of effect to other systematic reviews that have been conducted on evidence-based guideline implementation research supports practice facilitation as being unique and an important intervention that requires the attention of stakeholders and policy-makers. However, the professional, organizational and broad environmental barriers to getting evidence into practice are significant and complex. Practice facilitation is an intervention that based on the findings of the systematic review can achieve success

but it may not be able to successfully change every type of targeted behaviour in all contextual settings.

This dissertation has explored the possibility of practice facilitation as an intervention for implementing chronic illness care management within primary care settings. The evaluation of implementation fidelity has not only reaffirmed the importance of assessing the fidelity of interventions to understand factors that contribute to success, it has revealed that the conceptual framework or logic model that was developed for the tailored outreach facilitation of chronic illness management in primary care is incomplete. Despite the capitated practices involved in the embedded case study possibly being predisposed to incorporating chronic illness care management into practice more so than fee-for-service general practices – it was not sustainable. Those practices that successfully implemented care planning had developed some capacity but were not prepared to move to the full adoption stage due principally to the lack of available supports and time constraints. A more comprehensive framework for chronic illness care management is needed building from the systems perspective of Wagner and colleagues (2001a). The challenges to implementing chronic illness care management are more encompassing than the ability of small rural practices to respond. As the implementation evaluation of facilitated chronic illness care management highlighted, more research is needed on the limits of practice facilitation as an intervention on to itself. The results of the evaluation will also prove invaluable in developing the case for additional research funding to evaluate TOF with a larger representative sample of rural and remote primary care practices over a longer period of time. In the longer term, this implementation research will contribute to a better understanding of the limits of practice facilitation as a knowledge-translation intervention and the possibility of establishing it as a government funded program and a part of ongoing health service delivery.

The translation of research into practice is complex as evidenced by the published reports and research that speak loudly of the gap between research and practice in many areas of health care and public health (Lenfant, 2003). A global overview of the wide variety of intervention strategies to

implement guidelines or new procedures such as chronic illness care management into primary care practice suggests that none is superior for all circumstances (Grimshaw et al., 2002; Grol, Wensing & Eccles, 2005). Research has demonstrated that the practice facilitation model can achieve sustainable improvements in the delivery of preventive care guidelines in selected primary care settings (Dietrich et al., 1994; Hogg et al., 2008b). However, the case study findings reveal that the sustainability of a complex guideline such as chronic illness care management based on practice facilitation as an intervention is unlikely within the context of rural primary care practice. Evidence suggests that multidisciplinary teams in primary care and public health – rather than care provided principally by primary care physicians – are best suited to deliver higher quality and lower cost chronic care (Bodenheimer, Chen & Bennett, 2009). Given the resource constraints facing the health system, alternative intervention models need to be advanced to address the issue of sustainability of chronic illness care management. Alternatives include: the medical training of physicians incorporating a greater emphasis on patient self-management support and patient-centered care; integrating allied health support to allow patients better access to care; implementing blended payment systems that are principally capitation-based and which allow for shared care models; greater use of information technology to provide evidence-based information and tools to track care delivery and feedback performance; assessing and remunerating providers based on performance; and, integrating primary care with surrounding community health and social services. As primary care evolves through demonstration projects and reformed delivery models, it will be important to evaluate how these changes impact the performance of chronic illness care management. If the dominant model of care delivery continues, improved outcomes for chronically ill patients will not be realized because of the reality that without alternative care delivery models the lone physician is incapable of providing good chronic care due to overwhelming patient demands and time constraints (Bodenheimer, Chen & Bennett, 2009).

This systematic review of practice facilitation and the associated implementation research study has highlighted the barriers to implementing a complex guideline such as chronic illness

management in the rural Ontario practice setting. In addition, this study has executed a practice-based practical research approach to understanding implementation success, has provided practice-based evidence derived from the experience of participants rather than evidence derived from an artificially controlled trial, and has identified a number of potential areas for further investigation. In so doing it has elucidated that the intervention context and the connectedness of program components, providers and patients is important. A social-ecological or whole systems thinking approach to understanding the delivery of primary care within the context of the larger system offers potential for being better able to translate research into practice and expanding the existing linear models of research into more dynamic models that better capture the relationships between process and outcome. As policy-makers and researchers contend with crises that are present and emerging in the health system, new integrated system models are being proposed that will need to be assessed (Leischow et al., 2008; Hogg et al., 2008c). A systems approach to solving complex health care delivery and public health issues such as chronic illness care management offers promise: "Public health asks of system science, as it did of sociology 40 years ago, that it help us unravel the complexities of causal forces in our varied populations and the ecologically layered community and social circumstances of public health practice."(Green, 2006a, p. 406). The challenge of translating clinical research evidence into practice can be addressed through the development of a better theoretical base that incorporates a systems approach to identifying the multiple individual, organizational, and broad environmental factors resulting in the design of integrated interventions that can be tested through practice-based implementation research in order to close the gap between discovery and practice implementation.

Appendix A

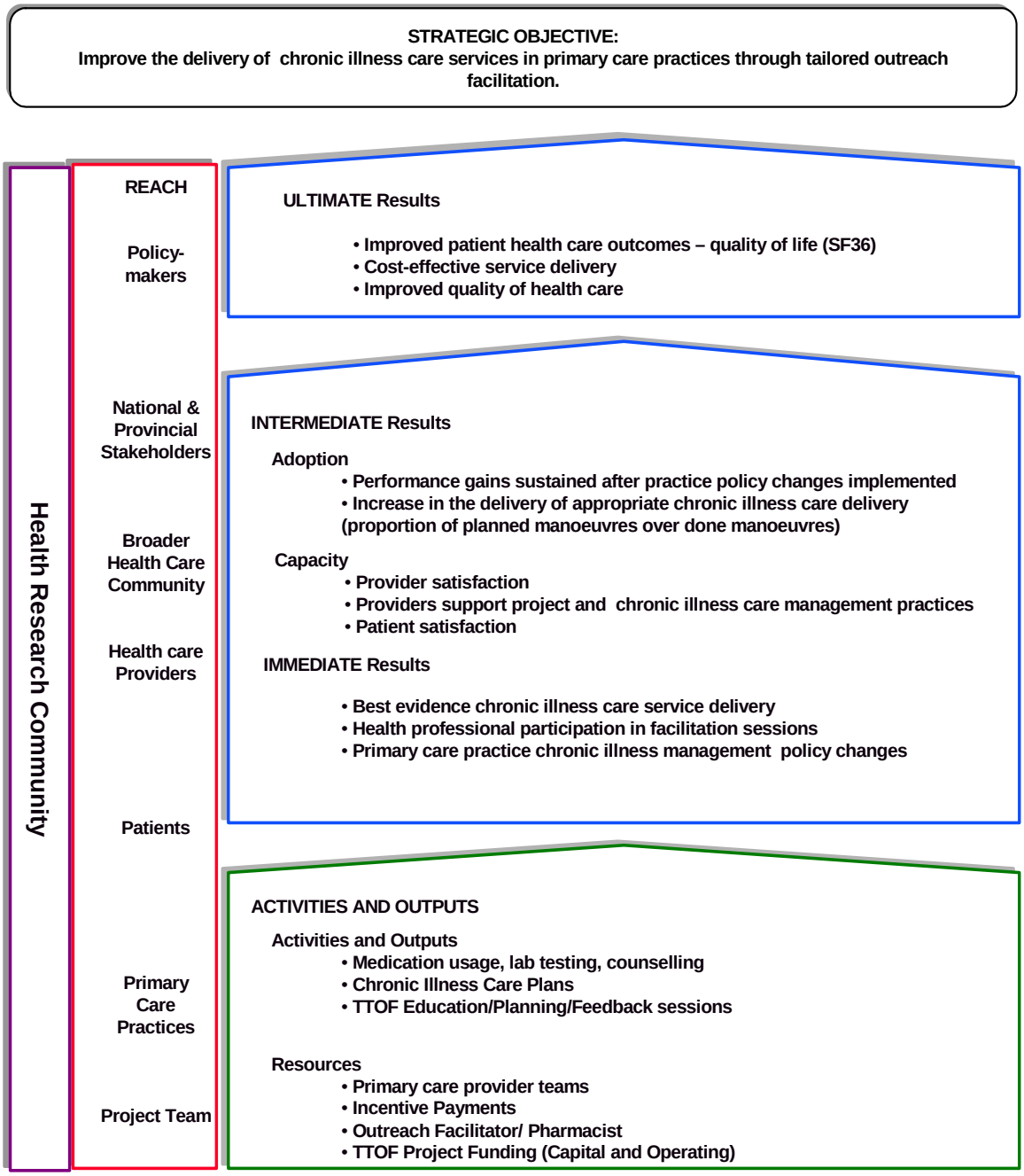
Systematic Review Data Collection Protocol

First Author	
Year of Publication	
Source (Journal Name, Volume, Pages)	
Country	
1. Intervention Description	
- intervention program components/contents - setting - research objectives	
2. Targeted behaviour:	
3. Tailored	O Yes O No
4. Financial or other incentives	
5. Participant descriptions/Patient descriptions	
6. No. of practices/participants	
7. Participation rate(# participants/# contacted)	
8. Intervention time period/intensity	# of meetings

	Duration per contact Length of intervention months
Research characteristics:	
9. Randomization	O Yes O No Describe:
10. Design	O RCT O CCT O QED-before and after (cohort study) O Case study
11. Units of allocation/randomization and analysis agree	O Yes O No Describe: Intra-class correlation adjustment/appropriate statistical analysis describe:
12. Concealment	O Yes O No Describe:
13. Groups equal at baseline	O Yes O No
14. Blinding of participants	O Yes O No Describe:
15. Blinding of facilitators	O Yes O No Describe:
16. Blinding of data collectors/auditors	O Yes O No Describe:
17. Attrition/Drop-out rate at follow-up	
18. Length of follow-up in months	
19. Total Number of subjects:	
20. Sampling strategy (e.g. simple random, stratified, cluster, voluntary or convenience)	
21. Primary outcome measures	Define:

22. Secondary outcome measures	Define:
23. Data collection tools/measurement	
24. Statistical power analysis	O Yes O No
25. Analysis procedures (e.g. Intention to treat analysis)	
EFFECTS	**Describe** **Δ Size**
26. Primary outcomes - Intervention group No. and Control group No.	Intervention Results Control group Results Variation
27. Secondary outcomes	
28. Economic results	
29. Other notable effects	

Appendix B Tailored Outreach Facilitation for Chronic Illness Care Management Logic Model



Appendix C Classification of Study Methodologic Performance

Areas of Interest	Points to Consider
P1 - Intervention Description	Adequate description of the intervention, recruitment methods and reach, subject attributes, intervention setting, time period, number and duration of meetings, internal or external facilitation, strategies and tools employed to change behaviour, and outcome measures.
P2 – Random Allocation	Adequate description of how subjects were recruited and randomized or not to intervention or control groups to ensure comparability of groups.
P3 – Allocation Concealment	To avoid systematic bias in selection of participants (*selection bias*), a description of how allocation to groups was carried-out and whether project or research staff were unaware of which groups participants would be allocated to.
P4 – Agreement between Units	A description of the randomization procedure as by practice or cluster and units of analysis being the same as the randomization unit. Description of adjustments for ICC.
P5 – Groups Similar at Baseline	Description of the key attributes including baseline outcome measurement as being substantially the same between groups to avoid biasing the results.
P6 – Blinding of all Participants	To control for *performance bias* a description of how participants were blinded so that they were unable to discriminate as to having received or not received a facilitation intervention.
P7 – Blinding of Facilitators	To control for *performance bias* a description of how the facilitators were unable to discriminate as to which participants received the intervention.
P8 – Blinding of Assessors	A description of how the data collectors were unable to discriminate whether participants had received the intervention or not to avoid *detection bias*.
P9 – Adequate Follow-up	A description of participant follow-up of 85% or greater to minimize the *attrition bias* that can occur as the magnitude of the proportion of subjects not followed increases.
P10 – Intent- to-treat Analysis	A description of an intent-to-treat analysis having been performed as evidence that participants received the intervention or control condition as planned to minimize bias.
P11 – Statistical Tests	Appropriate between group statistical methods used and results reported.
P12 – Point Estimates	A description of the intervention effect as a mean difference between groups along with measures of variability (standard deviations or confidence intervals. For binomial or categorical outcomes, an odds ratio or relative risk ratio along with the numbers in each group.

Appendix D

Consent Form(s)

University of Waterloo Office of Research Ethics

- Information Letter and Consent Form

Ottawa Hospital Research Ethics Board

- Approved Physician Consent Form

University of Waterloo Office of Research Ethics

Date

Dear ***(insert participant's name):***

This letter is an invitation to consider participating in a study I am conducting as part of my Doctorate degree in the Department of Health Studies and Gerontology at the University of Waterloo under the supervision of Professor Roy Cameron and with the participation of Dr. William Hogg, Department of Family Medicine, University of Ottawa. I would like to provide you with more information about this project and what your involvement would entail if you decide to take part.

Getting the latest evidence-based guidelines into practice is a challenge faced by all family physicians. The overall purpose of this study, therefore, is to assist family physicians in implementing proven, yet practical, chronic disease management strategies for their chronically ill patients through the facilitation outreach program that you are participating in. An important component of the overall study is the implementation of videoconferencing to support rural practices in undertaking care plans for their chronically ill patients and demonstrating the cost-effectiveness of videoconferencing as compared to visits by a facilitator.

This component of the study will focus on the experience of the practice with facilitation, the use of the videoconferencing equipment, and the care plans for chronically ill patients. I am interested in gaining understanding of the reasons that contribute to or impede the success of facilitation through videoconferencing. I believe that because you are actively involved in working with the facilitator and in the management of your chronically ill patients, you are best suited to speak to the various issues, such as satisfaction in the use of the equipment, costs to the practice, and experience with the facilitator and implementing chronic illness care management plans.

Participation in this study is voluntary. It will involve an interview of approximately 45 minutes in length to take place in a mutually agreed upon location. You may decline to answer any of the interview questions if you so wish. Further, you may decide to withdraw from this study at any time without any negative consequences by advising the researcher. With your permission, the interview will be tape-recorded to facilitate collection of information, and later transcribed for analysis. Shortly after the interview has been completed, I will send you a copy of the summary of the interview to give you an opportunity to review, add or clarify any points that you wish. All information you provide is considered completely confidential. Your name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used. Data collected during this study will be retained for 5 years in a locked office in my supervisor's lab. Only researchers associated with this project will have access. There are no known or anticipated risks to you as a participant in this study.

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at (819) 685-0497 or by email at nbbasker@ahsmail.uwaterloo.ca. You can also contact my supervisor, Professor Roy Cameron at (519) 888-4503 or email Cameron@healthy.uwaterloo.ca.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes of this office at (519) 888-4567 Ext. 6005.

I hope that the results of my study will be of benefit to those organizations directly involved in the study, government decision-makers, as well as to the broader research community.

I will be contacting you in the next two to three days to arrange an interview time. I very much look forward to speaking with you and thank you in advance for your assistance in this project.

Yours Sincerely,

Ottawa Hospital Research Ethics Board
ADDENDUM TO THE: CONSENT FORM TO PARTICIPATE IN PROGRAM ENTITLED:

"I Care for Primary Care: "Improved Care through Facilitation Outreach in Primary Care"

The purpose of this phase of the program is to test the introduction through facilitation of greater support for Family Physicians to manage the care of patients with complex chronic illness. This phase is entitled "Chronic Illness Care Management" (CICM).

The evaluation is a randomized controlled trial. Ten of my patients will be allocated to the control group and 10 of my patients will be allocated to the intervention group. By agreeing to participate in this phase of the program, I agree to enroll up to 30 patients with complex care needs into the study.

The facilitator will visit my practice every three weeks to work to introduce the CICM component of the program. She will continue to work with the practice to sustain its efforts to improve preventive service delivery. I will not be compelled to alter my method of practice in any way.

In order to compensate for my extra workload, I understand that I will receive $300.00 for each of the 10 patients who successfully complete the program. Part of this remuneration is to supplement my practice resources.

I voluntarily consent to take part in the CICM phase of the program entitled "I Care FOR Primary Care: Improved Care through Facilitation Outreach in Primary Care. If I have any questions during the study, I may call the Chairman of the Ottawa Hospital Research Ethics Board, at 1-613-798-5555 ex 14902.

Physician's	**Investigator's/Delegate's**
NAME: _____	**Name: _____**
(please print)	(please print)
Physician's	**Investigator's/Delegate's**
Signature: _____	**Signature : _____**
Date : _____	**Date : _____**

Appendix E

Case Study Data Collection Protocol/ Instruments

- Administrative Narrative reports
- Administrative Time/Mileage Activity Logs
- Interview Guides (Physician)
- Chronic Illness Care Plan (Example)

PF Narrative Report

1. Date: **2. Reporting Period: 2005** **3. Visit Number:** **4. PF Name:**	**5. Practice # (name):** **6. Long-term goal:** •
7. Visit Objectives/Benchmarks (Short-term objectives on manoeuvres[1]): • **Encourage booking 1st planning visit for CICM intervention patients** • **Monitor CICM response rate and recruit CICM patients as needed**	
8. Activities (e.g., see footnote)/Visits/Participants: •	
9. Next Steps: **a) With Respect To: Long Term Goal:** **b) With Respect To: Short-term Visits:** **Next visit:** •	
10. Factors that facilitate (intervention and change) the transformation of good intentions into action (e.g., practice plans):	
11. Challenges and barriers to change (e.g., time, remuneration, other staff to undertake preventive manoeuvres, lack of counseling skills, lack of clear evidence):	
12. Lessons Learned (re reaching goals):	
13. Items to Share :	
14. Upcoming Events :	
15. Concerns/Discussion Items:	
16. Resources:	
17. Other (e.g., observations/perceptions of the practice):	

[1] The intervention techniques to be used by the PFs within the practices are: a) audit and ongoing feedback, b) reminder systems and c) planning and consensus building.

Prevention Facilitator Time/Mileage Log

I Care FOR Primary Care

NAME:

		Travel					Administration		Implementing Site Services								Totals		
	Practice #								Prevention			Chronic Disease					Costs	Time	Notes
DATE	Note: P# STAT SD VAC VC OOT WE Other Home	Km's travelled	Cost for travel Kms x 0.42?	Parking (with receipts) $	Total Cost For: mileage and parking	Time	Cost For: telephone charges, photocopy, etc. (with receipts)	Time	Time For: Audit and Ongoing Feedback	Time For: Reminder Systems	Time For: Planning and Consensus Building	Time For: Audit and Ongoing Feedback	Time For: Care Plans	Time For: Planning and Consensus Building	Waiting Time	Length of time Physician Present during visit	Total Costs For: travel & admin.	Total Time (hrs.)	
1		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
2		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
3		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
4		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
5		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
6		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
7		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
8		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
9		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
10		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
11		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
12		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
13		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
14		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
15		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
16		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
17		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
18		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
19		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
20		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
21		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
22		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
23		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
24		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
25		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
26		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
27		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
28		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
29		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
30		0.00	0.00	0.00	0.00		0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
31		0.00	0.00	0.00	0.00	0	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00	
TOTAL		0.00	$0.00	$0.00	$0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$0.00	0.00	

Legend:	P# - Practice #	**Office USE:**	Stat. Holiday		Travel		OOT Car		**MONTH/YEAR:**
	STAT - Statutory Holiday		Vacation		Admin		OOT Air		
	VAC - Vacation		Sick Time		Implementation		OOT Hotel		
	SD - Sick Day		Lieu Time		Time				
	VC - Visit Cancelled								
	OOT - Out Of Town	**Administration Time:**	filing, photocopying, meetings, reports, writing, making/collecting, reviewing materials, rehersal, etc.						

Note: Enter time in minutes, the total column will calculate to hours

Physician Interview Questions

As part of the case study method for the evaluation of TOF, the interview questions are intended to illuminate the factors that contribute to or impede the success of the TOF intervention.

Telehealth Technology (TOF Intervention Sites Only)

1. Did you encounter any difficulties or practical problems with the installation of the Videoconferencing equipment (Tandberg, communications service, etc.)? If "yes", what were the problems? Did you get the support needed to solve the problems?
2. Did you require any training on the use of the system, and if so, was the training adequate?
3. Were you satisfied with the installation of the Videoconferencing equipment?
4. Did you encounter any problems with the use of the Videoconferencing equipment (consider reliability, functionality, scheduling, physical limitations etc.)? If "yes", what were the problems and were they resolved? Did you get the support needed to solve any difficulties?
5. Was the videoconferencing equipment easy to use? Did the equipment ever break down?
6. Are you satisfied with the videoconferencing equipment? If not, what would you recommend be done differently?
7. Were there any costs associated with the use of videoconferencing equipment to the practice? If yes, please describe them.
8. Would you recommend the use of the videoconferencing equipment to your colleagues?
9. Did you feel that your experience with the facilitator over videoconference was as good as if the facilitator was at your practice? If not, what are the issues that prevented the experience from being better?
10. Do you have any other comments regarding your experience with the intervention and the Videoconferencing equipment (Positive or negative)?

Facilitation Intervention (TOF and Facilitation Comparison Sites)

1. Describe your experience with implementing chronic illness care management? How much time was involved?
2. How well do you believe the objectives set for the practice have been achieved? (policy changes, care plans implemented, etc.)
3. What were the difficulties encountered in achieving the objectives, if any?
4. Can you describe some examples of benefits to chronically ill patients?
5. How well has the facilitation of chronic illness care management met your expectations?
6. Were there any problems with the facilitator (rapport, availability, scheduling of visits, etc.)?
7. Are you satisfied with your experience in implementing chronic illness care management within your practice? If not, what are the issues that prevented the experience from being better?
8. Are you satisfied with your facilitator?
9. Were there any costs to the practice associated with the facilitation of chronic illness care service delivery? If yes, please describe them.

10. Would you recommend this facilitated chronic illness care management experience to your colleagues?
11. If given the opportunity, would you continue to participate in the chronic illness care management intervention? If not, please describe the reasons why not?
12. Do you have any other comments regarding your experience with the chronic illness care management intervention (Positive or negative)?
13. Do you have any recommendations to enhance or improve the delivery of this intervention in a rural practice setting?

Would you be willing to review a brief written copy of the interview to ensure that your comments have been recorded correctly?

Thank you.

Typical Example Chronic Illness Care Management Plan

The fact that the patient has a Health Care Plan may be disclosed to other health care providers if patients give informed consent.

Patient Details

Surname:

Given Names:

Date of Birth: Sex

Residential Status (*please circle one*)

House
Unit, flat or retirement village
Residential Care (previously hostel)
Residential Care (previously nursing home).

Living:

Alone/As a couple/With others (*please circle one*).

Self Rated Health (Ask patient the following questions)

In general, would you say your health is: (please tick one)
(1) Excellent
(2) Very Good
(3) Good
(4) Fair
(5) Poor

How much bodily pain have you had during the past 4 weeks? (please tick one)

(1) None
(2) Very Mild
(3) Mild
(4) Moderate
(5) Severe
(6) Very Severe

How much did your health interfere with your normal activities (outside and/or inside the home) during the past 4 weeks? (please tick one)

(1) Not at all
(2) Slightly
(3) Moderately
(4) Quite a bit
(5) Extremely

Current Health Status
Please list in **order of significance** active diagnoses and health problems. If more than six, please add another page.

Diagnosis/Problem 1:

Current treatment/medication including recent hospitalisation, specialist, GP and provider care:

Impact(s) of diagnosis, treatment and medications on the patient's quality of life:

Doctor's notes/planned action:

Diagnosis/Problem 2:

Current treatment/medication including recent hospitalisation, specialist, GP and provider care:

Impact(s) of diagnosis, treatment and medications on the patient's quality of life:

Doctor's notes/planned action:

Diagnosis/Problem 3:

Current treatment/medication including recent hospitalisation, specialist, GP and provider care:

Impact(s) of diagnosis, treatment and medications on the patient's quality of life:

Doctor's notes/planned action:

Diagnosis/Problem 4:

Current treatment/medication including recent hospitalisation, specialist, GP and provider care:

Impact(s) of diagnosis, treatment and medications on the patient's quality of life:

Doctor's notes/planned action:

Diagnosis/Problem 5:

Current treatment/medication including recent hospitalisation, specialist, GP and provider care:

Impact(s) of diagnosis, treatment and medications on the patient's quality of life:

Doctor's notes/planned action:

Diagnosis/Problem 6:

Current treatment/medication including recent hospitalisation, specialist, GP and provider care:

Impact(s) of diagnosis, treatment and medications on the patient's quality of life:

Doctor's notes/planned action:

Medication Management

Other Substance Use
(Alcohol, tobacco and any other drugs not previously recorded including prescription, and over-the-counter medicines): [describe]

Medication Screening
Consider the following (*please tick if further action required*):

- Polypharmacy — Result/comment for each:
- Drug interactions
- Duplicated therapy (Consider other prescribers)
- Medication not related to active problems
- Medication side effects
- Non-prescription medicines
- Alternative medicines
- Compliance
- Other (*please describe)*:

Medication Plan
Write details of future action:

Health Screening

(*Health Screening and/or systems review are discretionary.)*

Systems Review
Write details of future action (*please tick if further action required*):

Result/comment for each:

- Exercise/fitness check
- Weight/Nutrition
- Mobility
- Vision
- Hearing
- Teeth, gums, dentures
- Pap smear/Breast check
- Prostate examination
- Sexual function
- Incontinence
- Skin malignancy
- PTSD/Depression/Other mental health disorders
- Dementia

- Immunisation
  - Flu — Date:
  - Tetanus — Date:
  - Pneumococcal — Date:

Psychological and Social Assessment

(Life events, stressors and resources, patient coping, primary care giver coping, support network, physical support, financial support, social activities.)

Education and self management

Specialist and other Review and Referrals

Specialist [name]	Write details of future action	Needs review

Health Services Checklist/Referral

Details of future action and list providers participating in the plan (*please tick services required*):

Services	Service required	Name of provider/team memebers	Needs review
Imaging/Pathology			
Pharmacist Medication Review			
Community nursing review/referral			
Occupational therapy			
Activities of daily living/Hazards in the home			
Physiotherapy			
Day care			
Speech therapy			
Dietitian			
Psychologist Social Work Counselling Service			
Respite care/Hospice			
GAT assessment referral			
CCAC - Home Help/Meals on Wheels			
Other - (transport, chiropractor, day care etc)			

Future planned actions/goals of patient and care giver and FP team

State dates of planned visits in the next 12 months

Patient Signature and Declaration

I agree with this plan

FP's Signature			Date / /
Patient Signature			Date / /

Follow-up Monitoring, Support, Education

Appendix F Systematic Review Critical Appraisal

Author	Methodological Performance Criteria (PEDro)												
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	Quality Score
Bryce et al. (1995)	1	1	1	1	0	1	0	0	0	1	1	1	8
Hulscher et al. (1997a)	1	0	0	1	1	0	0	0	0	0	1	0	4
Stange et al.(2003)	1	1	0	1	0	0	0	0	1	0	1	1	6
Goodwin et al.(2001)	1	1	0	1	0	0	0	0	1	0	1	1	6
Modell et al.(1998)	1	1	0	1	1	0	0	0	0	0	1	1	6
Kinsinger et al.(1998)	1	1	1	1	1	0	0	1	1	0	1	1	9
Frijling et al.(2003a)	1	1	1	1	1	0	0	1	1	1	1	1	10
Frijling et al.(2002)	1	1	1	1	1	0	0	1	1	1	1	1	10
Lobo et al.(2002)	1	1	1	1	1	0	0	0	1	1	1	1	9
Margolis et al.(2004)	1	1	1	1	1	0	0	0	0	1	1	1	8
Dietrich et al.(1992)	1	1	0	1	1	0	0	0	1	0	1	1	7
Kottke et al.(1992)	1	0	0	0	1	1	0	0	0	1	1	0	5
Lemelin et al.(2001)	1	1	1	1	1	0	0	1	1	0	1	1	9
McBride et al.(2000)	1	1	0	1	1	0	0	0	0	0	1	0	5
Solberg et al.(1998)	1	1	1	1	1	0	0	0	0	1	1	1	8
Roetzhiem et al. (2005)	1	1	0	0	0	1	0	1	0	0	1	1	6
Cockburn et al. (1992)	1	1	0	1	1	0	0	0	0	0	1	0	5
Margalit et al. (2005)	1	1	0	1	1	0	0	0	0	0	0	1	5
Bashir et al. (2000)	1	0	0	0	1	0	0	0	0	0	1	1	4
Lobo et al.(2004)	1	1	1	0	1	0	0	0	0	1	1	1	7

Appendix G

PRECEDE - Predisposing, Enabling and Reinforcing Facilitation Intervention Strategies (n=20)

Author(s),Year PRECEDE Score	Description	Predisposing Strategies	Enabling Strategies	Reinforcing Strategies	SMD
Kottke et al.,1992 **5**	Clinic wide intervention system to support physicians and other staff with an environment that encouraged the provision of smoking cessation advice. Nurse facilitators assisted clinic personnel to develop a systematic approach.	Training workshops provided Onsite visit by opinion leader physician.	Assistance with system development, problem solving help, assessment of program progress.	Ongoing feedback and reinforcement. Telephone consultative assistance.	1.01
Dietrich et al.,1992 **6**	An intervention to improve cancer screening based on the Oxford Model of facilitation where trained facilitators assisted in the development of office systems to establish routines, assign responsibilities for providing service, and set up flow sheets.	Day long education session on National Cancer Institute service recommendations. Initial baseline audit to assess performance.	Developed a plan to share responsibilities for services. Integrated flow sheets into charts and other tools into operations (chart stickers, posters, patient diaries).	Ongoing support and assistance.	.56
Cockburn et al.,1992	Three different approaches were compared to get smoking	Rationale for the smoking intervention kit was	Smoking intervention kit Personalized letter from	One visit 6 wks later to encourage use and deal	.24

Author(s),Year PRECEDE Score	Description	Predisposing Strategies	Enabling Strategies	Reinforcing Strategies	SMD
4	cessation guidelines to GPs: Educational facilitator; Volunteer courier; and postal service.	explained. Efforts were made to identify and overcome reservations.	an opinion leader encouraging the use of the kit.	with problems.	
Bryce et al.,1995 **4**	Based on the Oxford Model, facilitator audited and flagged charts to assist the management of childhood asthma.	Practice Commitment	Chart reminders (kite sticker/logo) Physician guideline material in chart. Patient Education materials. Asthma Assessment Equipment.	No contact with physicians or patients.	.62
Hulscher et al.,1997 **7**	Study was designed to test the effects of facilitation visits by trained nurse facilitators compared to feedback only method on the implementation of guidelines for cardiovascular disease.	Informed practice about the Dutch CVD guidelines. Gathered data about the organization of the practice. Data were presented back to the practices and team discussed the results.	Plan of action was developed. Education was provided to improve knowledge, skills etc. Tools were developed for medical histories, leaflets on diet and smoking, appt. cards, etc.	Regularly discussed progress and barriers to change. Practices were given tools to self-assess. E.g. Logbook to register prevention activities.	.66
Modell et al, 1998	Facilitator assisted a multidisciplinary team to	Education sessions to staff, slides, video.	Patient-mediated information material -		1.12

Author(s),Year PRECEDE Score	Description	Predisposing Strategies	Enabling Strategies	Reinforcing Strategies	SMD
6	promote screening of HBG disorders.	Review communication between lab and practice.	posters, leaflets Practice reference material Reminder card for ethnic groups		
Solberg et al, 1998 **8**	IMPROVE trial involved facilitators promoting an agenda for preventive services and working through an iterative process of planned organizational change (CQI) in an HMO setting to stimulate primary care clinics to develop and maintain systems.	Practice commitment. Training on CQI. Modular process improvement manual for prevention.	Adoption of 10 prevention system processes. Consultation by phone and visit every 3-4 months	Encouragement and quarterly newsletter for staff at each clinic.	1.08
Kinsinger, 1998 **8**	Outreach facilitation to implement an office system in community primary care practices for cancer screening.	Baseline audit of performance and feedback to staff. Education materials. In-service education programs.	Consensus and planning sessions on office policy. Implementation support provided. Different tools tailored to the practice - flow sheets, chart prompts, stickers, posters, etc. Patient education.	Ongoing support and assistance.	.47

Author(s),Year PRECEDE Score	Description	Predisposing Strategies	Enabling Strategies	Reinforcing Strategies	SMD
Bashir et al, 2000 **4**	Trained non-specialist facilitators were given six months training and employed a range of strategies to improve psychiatric care in general practice.	Initial baseline audit of performance and presentation to staff. Education materials	Provision of guidelines and organization of training initiatives.	Ongoing support.	.71
McBride et al., 2000 **8**	A factorial design RCT which tested 4 different interventions to improve primary care practice systems for heart disease prevention services (conference, consultation, prevention coordinator-facilitator, and combined intervention). The combined intervention was hypothesized to have the most impact	Attendance at educational conference. Materials on improving preventive services in practices. Baseline performance data presented to practices.	Practice consensus on setting of goals and plans for improvement Selection of a physician leader and staff member to lead meetings. Ongoing development and modification of implementation strategies: medical record tools, flow sheets, patient questionnaires, problem lists, chart labels, etc.	Ongoing support and monitoring Two meetings with leaders to review progress on goals, barriers or problems, advice and resources.	.82
Lemelin et al. 2001 **8**	Multifaceted intervention employing trained nurse facilitators to assist in the implementation of adult preventive care guidelines.	Initial baseline audit of performance and presentation to staff. Education materials.	Consensus and development of practice policy for prevention Assisted in the setting of goals and desirable levels	Meetings to assess progress and modify the plan if needed. Performance feedback to measure the effect of	.98

Author(s),Year PRECEDE Score	Description	Predisposing Strategies	Enabling Strategies	Reinforcing Strategies	SMD
			of performance/ and a written plan for preventive care. Implementation support. Different tools tailored to the practice - flow sheets, chart prompts, stickers, posters, etc. Patient education	changes made.	
Goodwin et al. 2001 **9**	Tailored STEPUP facilitation program with an initial assessment and multiple strategies for promoting adult preventive care guidelines.	Environmental assessment. Audit and feedback of baseline performance. Physician and staff adopt tools for change.	Prevention-improvement manual/guidelines. Flowsheets, reminders, posters, post-it notes Practice tailors intervention to their needs based on assessment. Patient education materials.	Audit and feedback every six months. Ongoing support.	.60
Frijling et al.,2002 **7**	Multifaceted intervention employing trained facilitators targeted at various aspects of clinical decision-making for implementing Dutch College of GP guidelines for diabetes care.	Initial baseline performance feedback to GPs only Worked with GP to priorize aspects of decision-making for improvement and made change plans	Selection of one or more methods to achieve change: educational materials, advice, knowledge tests, audits, reorganization.	Ongoing provision of support, advice and follow-up on plans. Reminder to the physician in the form of a written report on the plans and	.26

Author(s),Year PRECEDE Score	Description	Predisposing Strategies	Enabling Strategies	Reinforcing Strategies	SMD
		Guidance, support and educational materials		progress.	
Lobo et al.,2002				See Frijling et al 2003	.66
Frijling et al.,2003 **7**	Multifaceted intervention employing trained facilitators and targeted at various aspects of clinical decision-making for implementing Dutch College of GP guidelines for cardiovascular care.	Initial baseline performance feedback to GPs only Worked with GP to priorize aspects of decision-making for improvement and made change plans Guidance, support and educational materials	Selection of one or more methods to achieve change: educational materials, advice, knowledge tests, audits, reorganization.	Ongoing provision of support, advice and follow-up on plans. Reminder to the physician in the form of a written report on the plans and progress.	.39
Stange et al, 2003				See Goodwin et al. 2002	.60
Lobo et al., 2004 **7**	Study of long-term patient outcomes for a multifaceted intervention employing trained facilitators and targeted at various aspects of clinical decision-making for implementing Dutch College of GP guidelines for cardiovascular and diabetes care.			See Frijling et al 2002	.44

Author(s),Year PRECEDE Score	Description	Predisposing Strategies	Enabling Strategies	Reinforcing Strategies	SMD
Margolis et al., 2004 **8**	Facilitators used a combination of education and process improvement methods to implement office systems based on the PDSA (Plan, Do, Study, Act) cycle for childhood preventive care services.	Baseline chart audit of performance. Practice team participation Education	Information on effective delivery systems Practice staff select performance improvement goals and strategies Preventive care flow sheets and chart stickers provided	Practices reviewed performance and followed the PDSA cycle to assess that changes were having an impact. Ongoing monthly support and encouragement to assess what progress was being made.	.60
Margalit et al.,2005 **3**	Family physician facilitated education, not guideline specific and targeted patient care management.	Education.	Role playing.	Videotaped feedback was given.	1.27
Roetzhiem et al., 2005 **6**	Cancer Screening Office System intervention (SOS) where facilitators worked with primary care clinics in disadvantaged populations to improve cancer screening.	Training session of all clinic staff	Cancer screening check list completed by patients Chart stickers indicated whether recommended tests had been ordered or completed.	Unannounced audits at 1 month, 2 months and 3 month intervals to determine compliance with system. Formal feedback sessions to staff occurred at 6 and 12 months to indicate progress, problems and potential solutions.	.84

Appendix H Representative Physician Interview Excerpts by Coded Theme Definitions

Thematic Category	Theme (definition)	Representative Physician Interview Excerpts	Number of Passages coded
Positive CICM Experience	Enabling for patients	*"… [patients] taking charge and being fully involved in the care path with any of their chronic diseases."*	3
	Different from traditional approach to care	*" … when I identified problems with [patient] it was very difficult with my training which was to delve into the problem as opposed to trying to list all the problems and go with the more formatted approach to it. But otherwise I thought the system was quite [Gooood]! I just had to adapt myself to it. "*	14
	Physician role	*"I was the facilitator … it's a role that we usually play all the time but in small pieces. This was like a [patient] consultation plus … tell me your story, tell me your life, get it on, get it over with, get the plan, bye." " …given flow protocols to review with randomized patients who had numerous disease conditions and complex medical problems and asked to explain to the patients their medical conditions and management of those conditions and the appropriate follow up of those conditions."*	7

Thematic Category	Theme (definition)	Representative Physician Interview Excerpts	Number of Passages coded
	Motivation to try in future	*"[CICM] probably didn't influence, except for maybe one [patient], uh, I wish I could have, I'd like to have tried something you know, so may be it's planted a curiosity seed."*	3
	Combined with other initiatives/programs	*"University of Toronto study with pharmacists' integration at our office, so we selected all the patients for the University of Toronto and the University of Ottawa studies to all be seen by pharmacists."*	2
	Positive feedback for CICM protocol	*"I think that the data items that were, um, covered were all very good so that you didn't miss something." "I thought it was very clear and sensible …the nurse or the nurse practitioner filled in most of the data."*	6
	CICM satisfaction	*"Yes … I think I know my patients pretty well but for everyone of these people I got something ought of it I didn't expect." "I didn't mind talking about care planning and the patients loved the extra time you took with them, as they usually do. They really appreciate it" "It's not something that we would have thought to*	4

Thematic Category	Theme (definition)	Representative Physician Interview Excerpts	Number of Passages coded
		ask you know what is the biggest challenge to your health. Just phrasing it that way ... I would have never asked that. What's your biggest problem .. what's your biggest concern. That's different than what's the biggest problem with your health as apposed to the biggest challenge in your life. I mean the phraseology is really critical."	
Negative CICM Experience	First time difficulties using CICM	*"I didn't quite know how to follow it. I didn't quite know what I wanted perhaps getting almost like a mock version to try out beforehand because I almost felt like I was making it up the first time I used it." " … the chronic disease management part, um, wasn't a natural jumping off point to, from I Care Primary Care at all."*	4
	Not MD role	*"I don't know, I think somebody else could have done it just as well. It's not my training." "… more for people that, um, are non-physician based in their mindset probably."*	2
	Lack of understanding	*"Chronic disease management … got into diversions rather than focusing on what you really wanted … that was my perception and*	9

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		all the elements of care, including physician-base care, uh, that many may perceive that they need or want or projected in the future I guess. I don't know. It was very unclear." " What's not clear to me at all yet is 'What are you doing? What are you actually studying? That's not clear at all'."	
	CICM is a medical model	*"We aren't using the care management plans specifically 'cause the guidelines for most chronic diseases are fairly well established ... such as the consensus report on lipids which gives guidelines for lipid levels, risk categories, the diabetic guidelines which are pretty well established …we have guidelines and established targets for managing a lot of these chronic problems."*	3
	Lack of implementation	*"We are continuing to do our thing as we always have been. I try to keep up on the literature and things, but the care plans and so on might make it easier, but we have not been making any use of them." "I mean I've had basically three discussions with people on it. One I've really done, one is partially done and I don't think, I'm just gonna ignore it and the third one I'm not going to have the conversation."*	14

Thematic Category	Theme (definition)	Representative Physician Interview Excerpts	Number of Passages coded
	No or weak intensions to continue CICM	*"I don't know if I can do it … again if I was working in some sort of a clinic where they saw 8 patients a day and you really wanted to be comprehensive you could certainly do that .. but with the shortage of doctors .. even if you wanted to do that .. you can't." "Will I use it in my daily practice? No."*	5
	CICM protocol is a flow sheet	*"I think the main difference was, um, having a flow sheet in writing that you would follow with the patient from visit to visit."*	2
	Priorities must be set for care delivery	*"One of the problems is that there are so many things that could be done in any practice to improve the standard of quality of care such as following the consensus management guidelines, but it's not possible to do even a quarter of them ... need to know which of these things we should be doing because we can't do them all."*	3
	Physician versus patient control over care	*"You want to ... in a typical office visit ... while your patient has an agenda ... you're trying to have control ... with this your focused on the patient ... it's different in that respect .. if that makes any sense. It allows the patient to have more input than*	4

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		they normally have during a visit." "People who couldn't quite get their head around the fact that it was different than a regular visit ... still wanted me to look at their rash ... still wanted me to look at their knee ... they still wanted me to have it run like a regular visit. It was challenging in that respect. That would be the difficulty for me."	
	Negative perceptions/anecdotes	*"I'd like to hear what people have to say about trying to work with more challenging patients ... I'm not just talking about people with personality disorders ... I'm talking about people who don't cope very well, have a lot of problems and I come back to the idea of cognitive status ... people who aren't demented mind you but still have a grade 5 education ..." "cause you go like 'Let's talk about what's really important right now, let's not talk about all the nastiness of your life, you know'. So that was a really bad part but … it focused on the illness issue rather than the health issue."*	9
	CICM dissatisfaction	*"It got into diversions rather than focusing on what you really wanted and that was the current ongoing plan of, like for example, osteoarthritis or diabetes or ischemic heart disease. You know,*	22

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		any way I ran out of time and because it was such an annoying, so annoying I said 'Whatever happens, it's not going to do anything to me'." "This is crap! That's how I felt cuz it was. Anyway, and the patients, you know, took me two visits to help them recover!" "I thought that some of the questions for follow up were a bit nebulous or hard to give a specific answer. I thought the support was fantastic but, um, I thought the difficulty with filling out pages 3 and 4 was, sort of, intrinsic to the program. Like no matter how much you explained it, it was still a limitation of the forms."	
	Office environment negative influences	*"I don't know how to get around that either ... except for fewer patients per practice but that's not going to happen any time soon. We have the same number of patients before and after we were rostered ... it never changed ... the demand is there." "Our group has been selected for Family Health Team and that will start in April 2006 … a Family Health Team should be able to, um, realize that improvement so it's like one centre, for one-stop shopping more or less." "We are a capitated practice, no fee for service, the more time we spend with each patient the less the cost to us,*	14

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		we don't get fee-for-service by seeing them often…"	
	CICM difficult with certain patients	*"I cannot keep her from coming in with her regular complaints, I just can't get her on track despite my best efforts. And, I've got other people where this worked absolutely beautifully because their people that I normally have no trouble explaining things to and they would be the people of average intelligence whereas the people that I have the most difficulty with are those of lower intelligence." "I identified my enablement philosophy and I build that into every single encounter, where I can unless they're extremely demented then I build it into the caregiver." "…for people who have sub-standard coping or sub-standard cognitive abilities this is a challenge because you end up doing what you always do which is … taking the agenda yourself as opposed to the patient which is part of this whole concept which is that it is a collaborative process."*	11
	Patient receptiveness problem	*"It also depends on how well they were with their disease ... if they were not content with their disease ... that you can see an outlook in your disease and you understand the treatment of your disease*	12

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		... trying to get someone to plan an outcome [was difficult]. Ok, people who weren't coping with it ... couldn't see where you're aiming for when you're looking for the outcome." "Patients said 'Like what the [hell]?' and said 'What do you mean?'; all these questions. 'What do you mean by that?', 'Well, okay, like I know my number, I know some of my diagnoses but I'm not quite sure about them all' So, that, it was interesting, you know, to go over, like the diagnoses but it made them feel really sick! Uh, so that was really not a super part of this whole thing." "Community integration is a bit nebulous for most patients."	
	Patient time for CICM is a problem	*"… the folks you normally have psychosocial issues with because they have trouble understanding things ... that takes a long time." "… the geriatric patient with chronic disease takes more time than a healthy person with one complaint, these people come in with multiple complaints ... so there is much more time involved with them."*	3
	Estimate for physician time for CICM large	First visit: "*For me it ended up being half an hour to 45 minutes. For the [patient] who was pretty functional it ran at one half-hour*	14

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		but most of the time it ran over one half hour." Follow-up visits: *"Yeah, 15 to 20 minutes." "More like 30 minutes for me." "Time was, time was a little bit troubled."*	
Facilitation Experience	Facilitator satisfaction	*"I think that is the reason why we probably do it ... the facilitator has been so great ... she could talk me into doing anything." "I think it was quite good ... whenever there was a problem or when ever we wanted something restructured the [PF] did it quite happily." "Yah, she was terrific."*	14
	Facilitator tailored the approach	*"… the [PF] tailored mine quite differently and the [PF] brought it back to me in a few short days so ... it was helpful."*	4
	Facilitator made no difference	*"I can't actually say that I've seen much difference there ... we are continuing to do our thing as we always have been."*	1
	Facilitator did not tailor the approach	*I: So, for whatever reason that step didn't seem to be all that clear. " No, the modification piece, oh, that would have been nice."*	1
	Physician reflection on non-	*"She, uh, she'd re-emphasize where we were and, reflect on where*	3

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	compliance with facilitation	*I was and remind me of, 'have I thought further about this or that or the other?' and, you know, that's how it worked. With the care planning, she probably was as frustrated as I was I think … maybe I thought it was just because I hadn't really gone any farther with it … she tried to re-explain it and, obviously I didn't pick up the fact that I could modify it. She said she could work with it a bit or whatever, I said, 'Well' … I think I ran out of time for her a bit."*	
Videoconferencing Experience	Videoconferencing satisfaction	*"Piece of cake! Sometimes when we use it you get that pause .. a little 3 second thing .. then the pause stops and you go on." "Fabulous. It's sort of like having a fax and a phone .. you tell them what you want and faxes come through." "It was easy to use." I: Would you recommend a tool like this to other colleagues? "Absolutely, I wouldn't have any second thoughts on that."*	7
	Videoconferencing experience positive	*"It's easy to work ... the facilitator came in once/twice with some guy to set it up ... It's like turning on your computer or picking up a phone. It's easy." "[line cutting out] I'm not sure how big a problem that is ... it did happen at the last meeting and once at a*	5

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		previous meeting ... but we've participated in other meetings with no problems."	
	Expand the service	*"… they have teaching practices around the country side, they should all be hooked up and I think they will be in the future. Especially with the increased number of residents that there going to be sending to communities for their education to maintain a core program."*	2
	Preference for facilitator in-person	*"Having people in person is more cordial but it depends on timing so if you really want to cut to the chase .. this is a better way to do it. The facilitator is faster using the equipment, sticks to the agenda, and she's never as long as she says she's going to be. She's very efficient." "I think when you consider the visiting and the amount of time involved for the facilitator to come down here it would certainly justify using the videoconferencing for most of those visits."*	6
	No direct costs to practice	*I: Were there any costs to the practice associated with the videoconferencing equipment? "Nothing."*	2

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CICM Outcomes/Benefits	Holistic approach is beneficial	*"Their family stress or their financial, um, worries, um, or sort of holistic issues would affect their general wellbeing. I think the patients liked it but the, it was difficult to follow up, um, consistently with those issues because of the length of time of each appointment." "…you want to talk holistic ...I had a FAR better experience with this than I would have in a regular office visit ... I thought I knew these people pretty well …one single question ... what was their biggest challenge?"*	2
	Gain in understanding of patient perspective	*"Well I think it gives the patient more ownership of their health and their management of their health problems and so it's a valuable tool."* *"… she appreciated the opportunity to talk about her own care plan which is not unexpected I would think. You know, uh, because people, people enjoy the fact that they are a major part of their own health care and I think it's great."*	9
	Modifications to practice due to CICM	"*We integrated some of the risk factor questionnaires into our general software program. And, um, we expanded the lists of*	2

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		homeopathic products that people were taking on to our software."	
	Positive patient outcome anecdotes	*"I have a lady whose only goal is to remain in her house it wasn't necessarily to be managing her illness any better but her function did matter to her and therefore managing her illness made sense ... things like getting her a better walker, getting her a scooter, and getting her an OT assessment in her home all came out of these discussions. These things would never have come up because she wouldn't have brought this up other wise ... so a few weeks later ... after she got the equipment ... she was delighted ... to me that was a very good thing ... that was her goal ... it wasn't necessarily to watch her diabetes any better which was my goal ... it was to remain at home ... so you need to know what perspective she is coming from. That's how you approach her now ... you need to keep your blood sugars better because that will keep you healthy and at home."*	6
	Psychosocial benefits	*"Very beneficial psychosocially … yes, huge benefit that way. Even if your looking for it ... some of the questions ... I found it a*	3

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		lot more best case than I ever expected ..."	
		"… once you're in with somebody and you're having a good visit and getting lots of information out of it you can't stop ... particularly with the psychosocial stuff you kind of let it go."	
	Too early to say	*"In terms of medical, I am not sure I can say that ... in terms of medical quantifiable improvement for diabetics I am not sure but in terms of function I can say that it has had a benefit." "I think it remains to be seen if it improves, you know, medical outcomes."*	2
Costs	MD did not know the costs	"*Facilitation time, periodic rethinking, rereading 'I'd think what's this really all about?'. Um, I don't really know, I can't tell you that." I: Any other costs that you can think of to your practice, other than time? "Not really."*	1
	Direct costs to the practice	*"Just standard office stuff … forms and phone calls for contacting homecare ... things like that." "… it should be a compensated special time because it's unclear how that fits into the greater scheme of things under a capitated model." "Well there were the*	5

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		meetings, um, with the facilitator and there were the prolonged appointments with the patients. And there was some, um, secretarial time in setting up the appointments and filling in the demographics."	
Improvements	More communication on CICM	*"I think somehow the communication about what you really wanted to achieve needs to be rethought."*	2
	Computer data base/computerization	*"And I think that was a disadvantage of your University of Ottawa program that it was not provided on a electronic format." "I think with a computer system it would be better 'cuz those patients would be flagged and the secretary would know every time they'd come in, give them, you know, twenty minutes, because you know that they're gonna need a longer appointment." "I think there is huge potential for an electronic record system to help you to follow evidence-based care plans."*	17
	Educate patients on CICM	*"I think there should have been a piece of the protocol that the patient could take home rather than looking at it just in the office." "I would like as well patients to have the opportunity to*	2

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		be educated about care planning."	
	Suggested improvements to the CICM protocol	*"That's something we could do there ask the question like what's your greatest stressor ... What's your biggest challenge ...and something I'd like to add to this is what's your most important goal for your health."* *"System navigation can't exist as an acute service only. It has to be like a plan, a care-plan based implementation. So that's, in fact, we have, we're in the development process of a, idea we've had for about ten years. We called it access of care team which is really the navigation implementation aspect. So you have system navigator but everybody that's involved in the care of the person creates the same philosophy and hands off and, and so it, you hand it off sometimes to the patient." "… all the form asked was to record what the present context was but it didn't provide any encouragement to integrate the person into a community program." "… you need a sub-office of the health unit or CCAC or VON or a mental health worker in your community or in your office that you can easily refer people to. Just having a list of resources is not always that helpful." "I thought that some of the*	24

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		questions for follow up were a bit nebulous or hard to give a specific answer."	
	More staff resources needed	*"cuz the doctors can't, you know, do all of this stuff; so if you have access to all of those service providers and you have a program that those service providers together can implement for every patient in the whole province, then that would be, you know, the ideal. The problem is how much support, um, is available."* *"The government is working with Family Health Groups and Family Health Teams and Primary Care Networks to sponsor nurse practitioners and registered nurses and other health-care providers, um, to increase the basket of services that a patient can receive."*	3
	Monitor performance	*" … employ medical records technicians to extract the data like they do in hospitals ... the quality of care in primary care is certainly pretty variable ... the hospitals have had this for many years with the accreditation system and so on ... it improves hospital quality but there's nothing comparable in primary care."*	3

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	Rewrite the CICM protocol	*"I'd do a pretty good rewrite."*	1
	Reduce the time involved	*"The idea is that they list some of these things and that cuts down on the time ... you're not doing it while they are sitting there with a bag of pills. You're actually having them listed and that's how it worked for me once I got them doing some of the homework ..."*	4

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