Development and Evaluation of a Leadership Intervention to Influence Nurses' Use of Clinical Guideline Recommendations

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What you can do, or dream you can do, begin it;
Boldness has genius, power and magic in it.

Goethe

Abstract

Leadership is important to quality improvement initiatives in healthcare. However, few studies have evaluated leadership interventions to enhance nurses' use of guideline recommendations in the field of knowledge translation.

Purpose: To develop and evaluate an intervention designed to operationalize a leadership strategy composed of relations, change, and task-orientated leadership behaviours, and to examine its influence on nurses' use of guideline recommendations in home-care nursing.

Design: Sequential mixed methods pilot study with post-only cluster randomized controlled trial.

Methods

Phase I: Intervention Development

1. A participatory approach was used at a community healthcare organization with 23 units across the province of Ontario, Canada. The guideline selected was developed by the Registered Nurses' Association of Ontario for the assessment and management of foot ulcers for people with diabetes.
2. Integrative literature review, qualitative interviews, and baseline chart audits were conducted.
3. Four units were randomized to control or experimental groups.
4. Clinical and management leadership teams participated in a 12-week intervention consisting of printed materials, interactive workshop, and teleconferences. Participants received summarized chart audit data, identified priority indicators for change, and created a team leadership action plan to address barriers and influence guideline use.

Phase II: Evaluation

5. Chart audits compared differences in nursing process and patient outcomes. Primary outcome: eight-item nursing assessment score.
6. Qualitative interviews evaluated the intervention and leadership behaviours.

Results: No significant difference was found in the primary outcome. A significant difference was observed in nurses' documentation of five priority indicators chosen by the experimental groups (p=.02). Gaps in care included: 53%, 76%, and 94% of patients not assessed for ulcer depth, foot

circulation, or neuropathy (respectively); 75% and 93% did not receive wound debridement or hydrogel dressings.

Receiving data to identify priority indicators for change and developing a leadership action plan were reported as useful to guideline implementation. The experimental group described using more relations-oriented leadership behaviours conducting audit and feedback, and sending reminders.

Conclusion: Findings from this pilot study suggest that leadership is a team process involving relations, change, and task-oriented behaviours enacted by managers and clinical leaders. A leadership model is proposed as a beginning taxonomy to inform future leadership intervention studies.

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List of Key Terms and Definitions

Audit and feedback: any summary of clinical performance over a specified period of time, given in a written, electronic, or verbal format to an individual professional or team (Foy & Eccles, 2009).

Guideline recommendations: systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific circumstances, developed through a process of synthesizing research findings with clinical expertise and patient preferences (Field & Lohr, 1990; Grol, Wensing & Eccles, 2005).

Guideline use: the concrete application of guideline recommendations into practice decisions or actions (Estabrooks, 1999).

Implementation: the introduction of an innovation into the routines of healthcare practitioners (Grol et al., 2005).

Innovation: an idea, practice, or object that is perceived as new by an individual or unit of adoption (Rogers, 2003).

Knowledge translation: a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians. (Canadian Institute of Health Research [CIHR], 2010).

Leadership: the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives (Yukl, 2006, p. 8).

Leadership team: a group of people representing management and clinical roles with a shared purpose and responsibility.

Linkage and exchange: a category of knowledge translation strategies that uses interpersonal relationships to influence the acceptance and adoption of research knowledge. Linkage and exchange can include “face-to-face” visits to provide messages about specific practice change, providing feedback to practitioners, and being socially accessible to communicate with potential adopters (Eccles & Foy, 2009).

Practice environment: factors that influence research use including: structural factors (physical structures, policies, workload); cultural and social factors (belief systems, local politics, peer influences, leadership); and economic considerations (resources, supplies, remuneration systems) (Graham et al., 2004).

Reminders: information that is intended to prompt or remind a healthcare professional to perform a specific clinical action (Grol et al., 2005).

Research use/Research utilization: terms that describe the process of putting knowledge that has been derived from research evidence into action (Straus, Tetroe & Graham, 2009).

Preface and Organization of Thesis

This paper-based thesis conforms to guidelines provided by the PhD in Nursing program and the Faculty of Graduate and Postdoctoral Studies (FGPS) at the University of Ottawa. The thesis is presented as a series of chapters. Three published manuscripts are included in the thesis, two as chapters and one as an appendix.

In chapter one I pose the problem, study objectives, research context, and clinical topic of the thesis project. The first manuscript, an integrative review of the literature published in *Worldviews on Evidence-Based Nursing*, constitutes chapter two (Gifford, Davies, Edwards, Griffin, & Lybanon, 2007). In chapter three I present current knowledge regarding the factors that influence guideline use in healthcare and the theoretical framework that guided the study.

Chapter four outlines the study's research methods, citing the study protocol published in *Implementation Science* (Gifford, Davies, Graham, Lefebre, & Woodend, 2008) (Manuscript 2, Appendix A). The third manuscript published in the *Journal of Nursing Management*, comprises chapter five and describes the development, execution, and evaluation of the intervention (Gifford, Davies, Tourangeau, & Lefebre, 2011). Chapter five concludes with details about the intervention that were not included in the manuscript because of space restrictions of the journal.

Results related to primary and secondary outcomes and qualitative findings are presented in chapter six. In chapter seven I summarize the study's main findings, discuss limitations and strengths, then present an integrative discussion of the findings in relation to future research. I conclude with contributions this thesis project makes to nursing science in the areas of leadership and knowledge translation.

Chapter 1: Introduction

In chapter one I introduce the problem, purpose and objectives of the study, research context, and clinical topic.

Problem Statement: Guideline Use in Nursing

Despite national and international policy imperatives for nurses to use research evidence in their decision-making (Canadian Nurses Association, 2007; International Council of Nurses, 2007), the use of research findings in clinical practice remains unpredictable and inconsistent (Agency for Healthcare Research and Quality (AHRQ), 2001; Grimshaw et al., 2004; Grol, Bosch, Hulscher, Eccles, & Wensing, 2007; Grol & Grimshaw, 2003). It can take decades for research results to lead to improvements in the quality of patient care and health outcomes. Clinical practice guidelines can help bridge the research-practice gap by translating research findings and other forms of evidence into recommendations for practice (Ciliska, Pinelli, DiCenso, & Cullum, 2001; Davies, 2002; Grol, 2001; Grol, Wensing, & Eccles, 2005; Thomas, McColl, Cullum, Rousseau, & Soutter, 1999).

The Institute of Medicine defines clinical practice guidelines as "systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances" (Field & Lohr, 1990, p.38). Guidelines translate research findings into recommendations for practice (Nutley, Walter & Davies, 2007). Recent definitions include the integration of research findings with clinical expertise and patient preferences (Grol et al., 2005). These widely accepted definitions emphasize that guidelines are research-based tools to aid healthcare professionals in daily practice. However, the use of guideline recommendations in clinical decision-making remains fragmented, inconsistent, and fraught with barriers (Browman, Snider, & Ellis, 2003; Grimshaw et al., 2004; Grol, 2001; Legare, 2009).

Using guideline recommendations to inform clinical practice is a form of knowledge translation, defined by the Canadian Institute of Health Research (CIHR, 2010) as "a dynamic and

iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians…" The key elements of knowledge translation are described in a knowledge-to-action cycle that is based on an analysis of 31 planned action theories and adopted by CIHR for promoting knowledge translation (Straus, Tetroe, & Graham, 2009). The knowledge-to-action cycle concerns both the creation and application of knowledge as stakeholders exchange, apply, and refine knowledge in complex and iterative ways.

The action part of the cycle represents the activities that may be needed for knowledge application and begins with recognition of a practice gap or problem, followed by a synthesis of relevant evidence (CIHR, 2010). Knowledge is selected and adapted to the local context where barriers to use are identified. Intervention strategies are selected, tailored, and implemented to address barriers and influence knowledge use. Finally, knowledge use is monitored, outcomes evaluated, and strategies to sustain knowledge use are identified (Straus et al., 2009).

This study focuses on a leadership intervention to influence the knowledge-to-action cycle. The "knowledge" is derived from the RNAO clinical practice guideline for diabetic foot ulcers; the "action" is nurses' use of the guideline recommendations when caring for patients with diabetic foot ulcers. While many terms have been used to describe knowledge translation, such as research utilization, research use, dissemination, diffusion of innovation, or knowledge transfer, the term "guideline use" is used here to reflect the knowledge-to-action process, unless it was necessary to differentiate terms to describe the cited literature accurately.

The Registered Nurses' Association of Ontario (RNAO) has developed, disseminated, and evaluated the use of nursing best practice guidelines (BPGs) in Ontario since 1999 (Grinspun, Virani, & Bajnok, 2001; Nursing Best Practice Research Unit (NBPRU), 2006). With funding from the Ministry of Health and Long Term Care of Ontario 45 clinical and seven healthy work environment guidelines have been developed to date and are accessible for free on the World Wide Web. A

Guideline Development Review Team uses a rigorous and transparent methodology to ensure that recommendations constitute a high standard of nursing care based on research evidence and expert opinion (NBPRU, 2006).

The relationship between leadership and the acceptance and use of innovations has been demonstrated outside and within healthcare settings (Damanpour, 1991; Elenkov & Manev, 2005; Greenhalgh et al., 2004; Iles & Sutherland, 2001; Leatt & Porter, 2003; Vance & Larson, 2002). In nursing, descriptive research reveals that leadership can have either a positive or a negative influence on nurses' use of research findings (Angus, Hodnett, & O'Brien-Pallas, 2003; Davies et al., 2002; Hutchinson & Johnston, 2006; Newhouse, 2007; Stetler, 2003). Little is known, however, about how this occurs and an evidence-based approach to leadership development for knowledge translation is lacking.

Although much has been written about the importance of leadership, how to develop nursing leaders to bring about change is less understood (Kent & McCormack, 2010). The Canadian Health Services Research Foundation (CHSRF) includes the role of leadership in change management as a priority theme for research funding (CHSRF, 2010). A report commissioned by the Canadian Nurses Association identified that leadership development programs for nurses in Canada were offered through: a) colleges and universities; b) leadership centres, institutes, or special projects; c) professional nursing associations; d) unions and collective bargaining bodies; and e) organizations employing nurses (Kilty, 2003). However, most nurses have had little formal leadership education or training and have learned to be leaders on the job (Tourangeau, 2003).

The Toronto-based Dorothy M. Wiley Nursing Leadership Institute (Tourangeau, Lemonde, Luba, Dakers, & Alksnis, 2003) and the Vancouver-based British Columbia Nursing Administrative Leadership Institute (MacPhee & Bouthillette, 2008) are two residential leadership development programs that have published evaluations. Although each has shown positive and significant short-

term outcomes, they both require nurses to leave their workplace to attend, and they do not focus specifically on developing leadership to influence guideline use.

Most research investigating leadership and guideline use in nursing has been in the form of descriptive, retrospective evaluations that have taken place in acute care settings. Little experimental work has been done and little is known about what kinds of interventions help leaders to influence guideline use in home care settings successfully.

Purpose and Objectives of this Study

The overall purpose of this pilot study was to determine the acceptability and feasibility of developing, delivering, and evaluating a leadership intervention to influence nurses' use of guideline recommendations in home care nursing practice. The recommendations were selected from the RNAO clinical guideline for assessing and managing foot ulcers for people with diabetes (2005). Mixed methods were used to address specific research objectives listed in Table 1.1.

A pilot study was undertaken because there is little information regarding interventions to develop leadership for guideline use in nursing and there was a need to assess the acceptability and feasibility of the research plan including the design, procedures, and the intervention (Feeley et al., 2009). There was an additional need to determine an intraclass correlation coefficient (ICC) to inform sample-size calculations for a future trial. Using multiple methods provided more information to interpret findings while helping to counteract biases associated with any single method (McEvoy & Richards, 2006; Tashakkori & Teddlie, 2003).

Table 1.1
Research Objectives, Methods of Inquiry, and Location in Thesis Where Results are Discussed.

Research objective	Methods	Location of results in thesis
1. To identify barriers and develop a tailored leadership intervention for home care nurse managers, supervisors, resource nurses, and clinical staff designed to influence nurses' use of recommendations from an RNAO guideline for people with diabetes and foot ulcers.	Integrative literature review Descriptive interviews Baseline chart audit	**Chapter 2**: Integrative Literature Review **Chapter 5**: The Intervention
2. To determine the impact of the intervention on patient, nurse, and system outcomes.	Post-only chart audit with comparison group	**Chapter 6**: Results • Primary & secondary outcomes
3. To understand the acceptability and feasibility of influencing leadership behaviours through the intervention.	Workshop evaluation Descriptive interviews	**Chapter 5**: The Intervention • Evaluating the intervention **Chapter 6**: Results • Workshop evaluation • Qualitative findings
4. To refine a model of leadership for implementing practice change.	Descriptive interviews	**Chapter 7**: Integrative Discussion
5. To determine the acceptability and feasibility of study design, methods, and measures for developing a full-scale trial.	Post-only chart audit with comparison group Descriptive interviews	**Chapter 7**: Integrative Discussion

Research Context: Home Healthcare

The Canadian Home Care Association defines home healthcare as "an array of services, provided in the home and community setting, that encompass health promotion and teaching, curative intervention, end-of-life care, rehabilitation, support and maintenance, social adaptation and integration and support for the informal (family) caregiver" (Canadian Home Care Association, 2006). The home and community care sector is one of the fastest growing parts of the Canadian healthcare system (Shamian et al., 2007). Home healthcare in Canada generally serves three main functions: 1) maintenance – allowing people with health problems to remain in their home; 2)

substitution of services provided by hospitals and long-term care facilities; and 3) prevention and monitoring to prevent deterioration in health (Canadian Home Care Association, 2006).

In the province of Ontario home healthcare is arranged and authorized through Community Care Access Centres (CCACs), organizations established in 1996 by the Ministry of Health and Long-Term Care to connect people in the community with appropriate healthcare services (Ontario Association of Community Care Access Centres, 2006). There are 14 CCACs across Ontario. Direct care is provided through organizations that compete in a procurement process using requests for proposals to bid on contracts for the provision of healthcare services. This study was conducted in a home healthcare service organization that provided nursing care through 23 units in the province of Ontario, Canada. At the time of the study, the organization held the contracts to treat foot ulcers for people with diabetes in the study sites.

Clinical Topic: Diabetic Foot Ulcers

Diabetes mellitus is a complex, life-long metabolic disorder characterized by raised blood glucose concentrations. Worldwide the diagnosis of diabetes is increasing. In 2000 an estimated 150 million people around the world were diagnosed with diabetes, a fivefold increase since 1985 (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2008). In Canada 5.5% of women and 6.2% of men were diagnosed with diabetes in 2005-2006, representing approximately 1.9 million, or 1 in 17, Canadians (Public Health Agency of Canada, 2008).

In Ontario the rate of diabetes doubled over 10 years to 7.5% by 2004 suggesting that 1.2 million people in Ontario would be living with diabetes by the end of 2010 (Diabetes Task Force, 2004). Contributing factors include: an aging population (22% of people 75-79 years of age have diabetes); increased immigration of high-risk groups (Asians, Hispanics, Africans); increasing growth of Aboriginal populations (3-5 times higher than non-Aboriginal populations); and increased rates of obesity, (Health Canada, 2002; Public Health Agency of Canada, 2008).

Canadians with diabetes have medical expenditures approximately 2.4 times higher than the general population with more family physician visits, higher hospital admission rates, and over twice the use of home care services than any other chronic disease (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2008). Diabetes markedly increases the chance of having a heart attack, stroke, or of undergoing an amputation (Institute for Clinical Evaluative Sciences, 2003). Ontario data indicates diabetes shortens a person's life span by an average of 13 years (Hux & Tang, 2003).

Landmark clinical trials have demonstrated a positive relationship between glycemic control and reduced complications of diabetes. The Canadian Diabetes Association (CDA) recommends target Glycosylated Hemoglobin A1C levels of 7.0% or lower (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2008). A1C is a measure of an average blood glucose level over the past two to three months. CDA guidelines recommend A1C levels be measured every 3 months to monitor progress towards glycemic goals. Chronic hyperglycemia, or a persistent A1C level of 7% or higher, induces micro-vascular changes that cause complications such as nephropathy and arterial-vascular diseases. If not managed well over time chronic hyperglycemia can result in serious complications including blindness, kidney failure, lower limb amputations, and premature death (Diabetes Control and Complications Trial Research Group, 1993; Idris, Game, & Jeffcoate, 2005; Reichard, Nilsson, & Rosenqvist, 1993; Stratton et al., 2000; UK Prospective Diabetes Study (UKPDS) Group, 1998a; UK Prospective Diabetes Study (UKPDS) Group, 1998b). However, almost one in two Canadians (49%) with diagnosed diabetes has an AIC level greater than 7%, and 17% are above 8.4% (Harris, Ekoe, Zdanowicz, & Webster-Bogaert, 2005).

Ulceration of the foot is a significant problem for people with diabetes, affecting 15% of them at some time in their life (Spencer, 2004; Valk, Kriegsman, & Assendelft, 2001). Foot complications are a major reason for hospital admissions for people with diabetes, accounting for

approximately 20% of all diabetes-related admissions in North America (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2003). Foot ulcers precede 85% of lower limb amputations (Boulton, Kirsner, & Vileikyte, 2004; Valk et al., 2001) and 30% of those undergoing amputation die within the following year (Hux, Jacka, Fung, & Rothwell, 2003). Foot ulcers in people with diabetes are often accompanied by peripheral neuropathy, vascular disease, limited joint mobility, and deformity (Boulton et al., 2004; Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2003; Smith, 2002; Valk et al., 2001). The triad of neuropathy, deformity, and trauma is present in almost two-thirds of people with diabetes and foot ulcers (Boulton et al., 2004) with footwear being a major cause of traumatic ulcers (Birke & Foto, 2000).

Lack of awareness by healthcare professionals and patients of the risk factors associated with diabetic foot ulcers adds to unnecessary morbidity such as infections and gangrene that may result in amputations (Boulton et al., 2004; Boulton, Meneses, & Ennis, 1999; Valk et al., 2001). Mills, Beckett, & Taylor, (1991) reviewed the records of 55 diabetic patients with localized gangrene or infection on a vascular surgical unit and found 29% were delayed in referral for definitive care due to a lack of recognition by practitioners of ischemia or an underestimation of the severity of infections (Mills et al., 1991).

Comprehensive assessments by healthcare professionals are recommended in clinical practice guidelines when treating and managing foot ulcers for people with diabetes (Boulton et al., 2004; Canadian Diabetes Association Clinical Practice Guidelines Expert Committee (CDA), 2008; Hux et al., 2003; McIntosh et al., 2003; Registered Nurses' Association of Ontario, 2005). The RNAO (2005) and CDA (2008) guidelines recommend assessments of: glycemic control; peripheral neuropathy (the most significant predictor of diabetic foot ulcers); vascular status of the foot;

structural deformities and pressure from footwear; signs and symptoms of infection; and size of the ulcer measured by length, width, and depth.

Specific treatment of diabetic foot ulcers depends on characteristics of the wound and patient. Guidelines for treatment include dressings that promote a moist wound environment, debridement, pressure off-loading, patient education, and multidisciplinary management (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2008; Registered Nurses' Association of Ontario, 2005). Margolis (1999) conducted a study of the healing of diabetic foot ulcers in which 24% healed after 12 weeks and 31% healed after 20 weeks of good wound care (unspecified gauze dressings) (Margolis et al., 1999). A more recent Cochrane review, in which results of three randomized controlled trials were pooled, compared hydrogel dressings (dressings that provide a form of topical debridement) to standard care (gauze dressings or dressings not specified) (Smith, 2002). Hydrogel dressings significantly improved healing rates by 23% at 12 to 20 weeks (95% CI 10-36%). Studies of mechanical debridement in the same review were inadequately powered and therefore less conclusive (Smith, 2002).

In summary, the RNAO guideline recommends comprehensive assessments be conducted by healthcare professionals to determine treatment choices based on clinical characteristics of the wound and patient. A summary of the RNAO recommendations is found in Appendix B. Specific recommendations of interest for this study are summarized in Table 1.2.

Table 1.2
Summary of the Registered Nurses' Association of Ontario (RNAO) Guideline Recommendations that Constitute the Primary Outcome for this Study.

RNAO Guideline Recommendation	Levels of Evidence*	Assessment Item
2.0 Include in current diabetes management assessment of patients with diabetes and foot ulceration.	Ib	Glycemic Control
2.1 Clinically assess bilateral lower extremities for vascular supply and facilitate appropriate diagnostic testing.	IIb - IV	Circulation
2.2 Assess for signs and symptoms of infection and facilitate appropriate diagnostic testing and treatment.	IIa	Infection
2.3 Identify peripheral neuropathy by assessing for sensory, autonomic, and motor changes (using a 10 g monofilament).	II - IV	Foot Sensation
2.4. Assess for foot pressure, deformity, gait, footwear, and devices. Facilitate appropriate referrals.	Ia - IV	Foot Pressure/Deformities
3.1 Identify the location, length, width, depth and classify the ulcer(s).	Ia - IV	Location, Length, Width, Depth

*Levels of evidence:
Ia: Meta-analysis or systematic review of randomized controlled trials.
Ib: Randomized controlled trial(s).
IIa: Controlled study without randomization.
IIb: Quasi-experimental study without randomization
III: Non-experiment descriptive studies, such as comparative, correlation, and case studies.
IV: Expert committee reports or opinions and/or clinical experiences of respected authorities.

Chapter 2: Integrative Literature Review
Managerial Leadership for Nurses' Use of Research Evidence: An Integrative Review of the Literature

In chapter two I present the first manuscript, Managerial Leadership for Nurses' Use of Research Evidence: An Integrative Review of the Literature.

Authors: Gifford, Davies, Edwards, Griffin, Lybanon

Formatted for: *Worldviews on Evidence-Based Nursing*, a quarterly peer-reviewed international journal published by Wiley-Blackwell Publishing.

Managerial Leadership for Nurses' Use of Research Evidence: An Integrative Review of the Literature

ABSTRACT

Background: Integration of research evidence into clinical nursing practice is essential for the delivery of high-quality nursing care. Leadership behaviours of nurse managers and administrators have been identified as important to support research use and evidence-based practice. Yet minimal evidence exists indicating what constitutes effective nursing leadership for this purpose, or what kinds of interventions help leaders to successfully influence research-based care.

Aims: (1) To describe leadership activities of nurse managers that influence nurses' use of research evidence; and (2) to identify interventions aimed at supporting nurse managers to influence research use in clinical nursing practice.

Methods: A search of electronic databases was conducted for studies on behaviours or activities of nurse managers/administrators and the use of research evidence by nurses. Sifting, screening, and quality assessments were done by two reviewers. Results were synthesized by study type (quantitative and qualitative) and reported.

Results: Twelve studies met inclusion criteria (eight quantitative, four qualitative). Three activities were found in quantitative studies that influenced nurses' use of research: managerial support, policy revisions, and auditing. Qualitative studies showed organizational issues as barriers to managers' abilities to affect research use, while role modeling and valuing research facilitated research use. Four studies, one of which was experimental, included an intervention to support managers, but all had insufficient information about leadership development.

Conclusions: To date, important descriptive work highlights the strategic role managers have in research transfer. Both facilitative and regulatory activities appear to be necessary for managers to influence research use. These findings have important implications for evolving theoretical models describing factors that affect the process of research utilization. It is time to move the science forward and test a hypothesis linking leadership to outcomes. Qualitative methods are essential for understanding the process of leadership for research transfer.

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KEYWORDS nursing leadership, nurse managers, nurse administrators, research use, research utilization, evidence-based practice

The rapid pace of change in healthcare delivery, coupled with professional responsibilities of nurses to incorporate research evidence into their decision making, underscores the need to understand the factors involved in implementing evidence-based practice. Linking current research findings with patients' conditions, values, and circumstances is the defining feature of evidence-based practice (Muir Gray 1999). It involves "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual clients" (Sackett et al. 1997, p.2). However, simply acquiring knowledge does not necessarily bring about change, and despite creative and extensive implementation strategies, the use of research evidence in clinical practice remains fragmented and inconsistent (Dobbins et al. 2002; Grol 2001; Titler & Everett 2001). Emerging evidence indicates that the leadership behaviours of nurse managers and administrators play an important role in successfully transferring research evidence into clinical nursing (Stetler et al. 1998; Udod & Care 2004).

While much of the earlier work on research use by nurses was focused on individual determinants (Estabrooks et al. 2003), researchers now recognize organizational context as an essential factor (Dobbins et al. 2002; Graham & Logan 2004; Rycroft-Malone et al. 2002; Stetler 2003). A concept analysis of context found that the themes leadership, culture, and measurement were important elements for research use (McCormack et al. 2002). Consistent with other research, leadership factors such as support and commitment of managers have been shown to have a strong effect on the adoption of innovations in organizations (Damanpour 1991; Elenkov & Manev 2005; Van de Ven et al. 1999).

Nursing leadership has been described as essential for promoting evidence-based practice in nursing (Newhouse 2007; Stetler 2003). Nurse managers and administrators are responsible for the professional practice environments where nurses provide care, and are strategically positioned to enable nurses to use research. However, exploratory and descriptive studies consistently describe managers and administrators as major barriers or facilitators to research utilization (Angus et al. 2003; Hutchinson & Johnston 2006; Newhouse 2007).

Despite recognition of leadership as essential for creating change for effective patient care (Grol et al. 2005; Patrick & White 2005; Perra 2000), few researchers have explored leadership to promote evidence-based practice in nursing, and a lack of clarity exists in the empirical literature about the dimensions of leadership that are related to nurses' use of research evidence. Thus, an integrative review was undertaken to understand the current state of evidence. For the purposes of this review, the term "manager" refers to individuals in formal management roles and includes administrators, directors, executives, head nurses, and managers (hereafter termed manager). The term "research use" refers to research implementation, utilization, clinical guideline use, and evidence-based practice. Objectives of the review are: (1) to describe activities of nurse managers that influence nurses' use of research evidence in clinical practice; and (2) to identify interventions aimed at supporting nurse managers to influence the use of research in clinical nursing practice.

Leadership: Historical Perspective

For decades leadership has been an intriguing and elusive concept for researchers. The social scientific study of leadership became popular in the 1930s with the early years of research being largely atheoretical, focusing on innate leadership traits such as gender, height, and appearance (House & Aditya 1997). In the 1950s and 1960s three pioneer research programs at Harvard, Michigan, and Ohio universities indicated two distinct categories of leadership behaviours: people and task. People behaviours were concerned with showing consideration, support, trust, and confidence, while task behaviours were concerned with initiating structures, planning, and scheduling work. This large body of research, largely involving observation studies, interviews, and surveys, was based on the assumption that leadership could be observed or discovered by asking subordinates about their leaders' behaviours. Although plagued by measurement limitations, these two categories continue to significantly contribute to understanding leadership today (House & Aditya 1997).

Although the distinction between task- and people-oriented behaviours was foundational in helping conceptualize leadership, "something was still missing" (Yukl 2006, p. 64). In the 1990s two independent groups of researchers identified a third category as distinct: change-oriented behaviours (Ekvall & Arvonen 1991; Yukl 1999). Change-oriented behaviours include those that are innovative and the ways in which leaders initiate, promote, and implement change. All three categories of leadership behaviours are considered relevant for effective leadership in different situations (Yukl et al. 2002).

In the 1970s a major paradigm shift occurred in leadership theory. Transformational and transactional leadership emerged as new leadership styles. These have provided the foundation to many studies across disciplines, including nursing. Transformational leaders are visionaries and agents of change who motivate people through mentorship, vision, and bringing meaning to their work. Transactional leadership, on the other hand, is concerned with influencing others to achieve goals through rules, corrective actions, and contingent rewards (Bass 1990; Burns 1978), and is closely aligned with effective management practices (Hodson & Cooke 2004; Kotter 1990). Transformational and transactional leadership styles are not mutually exclusive and effective leaders are thought to use a combination of both (Bass 1990; Yukl 2006).

Leadership and Innovation

A relatively small subset of research exists within the broader literature of leadership and innovation within organizations. The bulk of these studies have been conducted outside of healthcare settings. This research has shown, largely through survey designs, that leadership behaviours are critical in successfully influencing the stimulation, acceptance, and utilization of innovations in organizations (Burpitt & Bigoness 1997; Elenkov & Manev 2005; Howell & Avolio 1993; Waldman & Bass 1991; West et al. 2003).

Nursing Leadership Defined

In nursing, definitions of leadership are generally consistent with classic organizational and management theorists such as Bass (1990), Koontz & O'Donnell (1964) and Stogdill (1948), who describe leadership as a process of influencing others to accomplish goals (Bower 2000; Calpin-Davies 2003; Tappen 2001). Recent conceptualizations of leadership in healthcare have shifted the focus from leader–follower dyads to organizational activities and interpersonal processes that influence goal achievement (Barrett et al. 2005) while management theory identifies leadership as an integral part of the managerial role (Hamlin 2002; Yukl 2006).

To guide this review, leadership is conceptualized as a multidimensional process of influence to enable nurses to use research evidence in clinical practice, and includes behaviours and activities of managers (as defined for this review) that exert direct and indirect influence on individuals, their environment, and organizational infrastructures.

Research Use Defined

Although it is acknowledged that nursing decision making is informed by many types of evidence, this review is focused on evidence that is systematically derived from scientifically sound research studies (Estabrooks 1998). Nurses' use of research evidence refers to the direct application and indirect influence of this evidence on clinical practice (Estabrooks 1999), and includes research utilization, research implementation, use of clinical guidelines, and evidence-based practice.

METHODOLOGY

A systematic methodology was used which involved searching, screening, descriptive synthesis, and assessing and appraising quality.

Searching

Selected electronic databases were searched from January 1995 to January 2006. The detailed search strategy is shown in Figure 1. The search strategy was executed for all databases using the same keywords and mapped subject headings (MeSH) for each database. Online searches of authors known to publish in the areas of leadership or research utilization were conducted (e.g., Estabrooks, Hicks, Kitson, Stetler, Upeniek), and reference lists from retrieved articles were manually searched. Search and retrieval yields are shown in Figure 2.

Screening

Several inclusion/exclusion criteria were used in screening.

Inclusion Criteria

1. *Study Purpose.*

Quantitative: Activities of nurse managers and research use by clinical nurses must have been study variables. Research use variables included research implementation, utilization, clinical guideline use, and/or evidence-based practice.

Qualitative: Studies must have specifically focused on nurse managers' roles or activities and their influence on clinical nurses' research use.

2. *Design*: Original research of qualitative and quantitative designs.

3. *Participants*: Nursing healthcare professionals in the sample.

4. *Language*: English only.

Exclusion Criteria

1. Studies that did not meet inclusion criteria above. For example, studies exploring facilitators of research utilization without a specific focus on managers' activities or roles.

2. Studies of general barriers to research utilization, unless they were specifically focused on managers' perceptions or managerial activities as a category within a scale.

3. Studies of research use and the influence of facilitators, educators, clinical nurse specialists, practice development nurses, and/or change agents who did not have an explicit managerial or administrative title.

4. Evaluations of theoretical frameworks, practice models, or quality assurance programs with no research design or methodology.

5. Studies of managers' use of research and not research use by clinical nurses.

6. Studies of participation in research instead of *use* of research.

7. Studies in which educational institutions were the only setting.

8. Studies in which uncertainty existed about whether nurses were part of the sample.

9. Theses, dissertations, commentaries, and editorials.

Screening involved a three-stage process, conducted independently by two authors (WG, VL). First, titles were screened for relevance to the purpose of the review. All titles that clearly indicated that managerial leadership and research use were not the primary focus of the article were excluded. Second, abstracts (n = 186) were reviewed using inclusion and exclusion criteria. Abstracts were primarily excluded because: they were opinion pieces or commentaries (49%), did not focus on research use (16%), or were not focused on managerial activities when examining research use (14%). When uncertainties existed regarding inclusion criteria, or when discrepancies existed between reviewers, articles were retained for the third stage of screening.

CINAHL (limited to 1995-June 2005, research as publication type, English language)	Leadership (MeSH*) Nursing leadership (tx) Nursing leaders (MeSH*) Nurse administrators (MeSH*) Nurse managers (MeSH*) Nursing management (MeSH*) Management styles (MeSH*)	OR
	AND	
	Evidence-based practice (tx) Research utilization (tx) knowledge transfer (tx) Professional practice, evidence-based (MeSH*) Nursing practice, research-based (MeSH*) Practice guidelines (MeSH*) “Diffusion of Innovation” (MeSH*) Intervention (tx)	OR
MedLine	Leadership (MeSH) Nursing leadership (tx) Nursing, supervisory (MeSH) Nurse administrators (MeSH) Nurse manager (tx)	OR
	AND	
	Evidence-based practice (tx) Research utilization (tx) Practice guidelines (MeSH*) “Diffusion of innovation” (MeSH*) Nursing research (MeSH*) Clinical nursing research (MeSH*) Intervention (tx)	OR
tx = textword MeSH = mapped subject heading * denotes explode		

Figure 1. Detailed search strategy for CINAHL and MEDLINE.

The third stage of screening involved full article reviews applying inclusion and exclusion criteria. Eighty-seven potential articles were evaluated independently by the same two reviewers from phases 1 and 2 (WG, VL). Uncertainties regarding inclusion were discussed with a third reviewer (BD) until consensus was reached. Quantitative studies were primarily excluded because they did not have a managerial leadership variable when examining research use (25%). Qualitative studies were primarily excluded because they were not focused on managerial leadership when research use was investigated (13%). Studies indicating general barriers to research use were excluded unless they had a specific focus on managers’ perceptions of nurses’ barriers. Reasons for exclusion are summarized in Table 1.

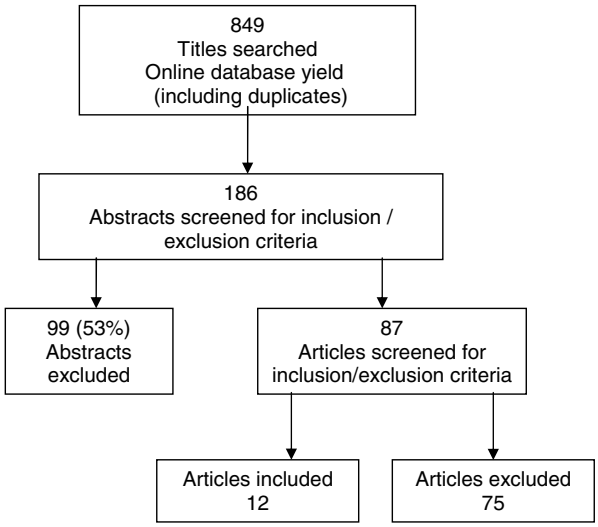

Figure 2. Search and retrieval yields

Quality Assessment & Appraisal

Design-specific quality assessments were completed on all included studies (Table 2). Experimental studies were assessed using the Cochrane Collaboration Effective Practices and Organization of Care Group (EPOC) checklist (2002). All other studies were assessed using checklists from Greenhalgh et al. (2004). Mixed methods were reviewed and classified by the methodology most prominently reported in the study.

All included studies underwent independent quality assessments by two reviewers (WG, VL). Quality criteria were discussed with a third reviewer (BD) and consensus was reached on all studies. Using the checklists and appraisal techniques discussed by Greenhalgh et al. (2004), the quality of papers was classified as "excellent," "some limitations," or "many limitations." Excellent quality was assigned when no major confounders or flaws were found in the quality assessment. "Many limitations" was assigned when the number of confounders or flaws represented greater than half of the criteria.

Table 1
Reasons for exclusion during stage 3 screening

	ARTICLES EXCLUDED (*N* = 75)	
	N	**%**
Not research	27	36
No managerial leadership variable (quantitative)	19	25
No managerial leadership focus (qualitative)	10	13
No clinical research use variable (quantitative)	9	12
No clinical research use focus (qualitative)	5	7
No nurses in sample	5	7
TOTAL	**75**	**100**

Data Synthesis

To understand the type and quality of research and to establish a baseline of evidence, all studies that met inclusion criteria were included in the analysis regardless of quality scores. To synthesize results: (1) studies were shown in qualitative and quantitative tables; (2) outcomes and interventions were tabulated, (3) consistently occurring themes of behaviours and activities of managerial leaders were grouped together, (4) descriptive conclusions were narratively presented by qualitative and quantitative study types.

Table 2
Core categories for appraising quality

Experimental Study
Concealment of allocation
Follow-up of all patients/professionals care randomized into trial
Blinded assessment of primary outcome(s)
Comparability of groups
Baseline measurements
Reliable primary outcome measure(s)
Protection against contamination
Quasi-Experimental Study
Research question/design clear and appropriate
Intervention independent of other changes over time
Sufficient data points
Statistical tests appropriate
Outcome measures valid and reliable
Protection against detection bias (e.g., sources/ methods of data collection same before and after)
Completeness of data set (does the data set cover all or most of the episodes of care)
Long enough follow-up to show impact
Questionnaire Survey
Research question clear and design appropriate
Sampling frame sufficiently large and representative
Instrument reliability and validity
Response rate
Analysis appropriate
Significant and non-significant results reported
Qualitative Studies
Research question clear
Design appropriate
Context sufficiently described
Sampling criteria clear
Data collection processes systematic and adequately described
Data analysis systematic and rigorous
Results surprising, interesting or suspect
Conclusions supported by data and explanation (theory)
Authors' positions clearly stated
Ethics reservations
Worth/relevance to knowledge

Table 3
Type of settings, indicators of research use, quality assessment

	Settings				Indicators of Research Use			Quality Assessment		
	Hospital	Home/ Community	Long Term Care	Professional Association[a]	Patient/ Process Outcomes	Research Utilization/Guideline Use[b]	Evidence-Based Practice[c]	Excellent	Some Limitations	Many Limitations
Quantitative										
Funk et al. 1995				X		X			x	
Harrow et al. 2001	X				x					x
Hodnett et al. 1996	X				x			x		
Resnick et al. 2004			X		x				x	
Rutledge et al. 1998	X			x		X			x	
Rutledge & Donaldson 1995	X	X				X				x
Tsai 2000	X					X			x	
Wallin et al. 2000	X					X			x	
Qualitative										
Caine & Kenrick 1997	X						x		x	
Kenrick & Luker 1996		X				X			x	
LeMay et al. 1998	X					X		x		
Newman et al. 1998							x	x		

[a] Professional associations' membership lists: settings not identified.
[b] Managers' perceptions of research utilization or clinical guideline use.
[c] The concept investigated in qualitative studies.

FINDINGS

Search and Retrieval Yields

Twelve research articles fit the inclusion criteria and were included in this review. Mixed methods studies were classified by the methodology most prominently reported.

Quantitative (*n* = 8)

Randomized control trial (RCT; *n* = 1)

Pre-test-post-test (*n* = 2)

Non-experimental survey (*n* = 4)

Case study with non-experimental survey (*n* = 1)

Qualitative (*n* = 4)

Exploratory content analysis (*n* = 3)

Action research (*n* = 1)

Type of Settings and Participants

Studies were conducted across diverse healthcare organizations, the majority of which were hospitals (Table 3). All studies included nursing managers, directors, or executives in the sample or intervention. Quantitative studies' sample sizes ranged from 16 to 1,507 and response rates from 38% to 90%. The number of participants in qualitative studies was between 10 and 80 (including focus groups).

Indicators of Research Use

Measures and concepts investigated as an indicator of research use included patient and process outcomes, managers' perceptions of research utilization, guideline use, and/or evidence-based practice. See Table 3.

Appraisal of Study Quality

Quantitative studies. Table 3 shows a summary of quality assessments. The majority of studies had some limitations. The one experimental study was of excellent quality. The main concerns regarding quality of non-experimental studies included small sample sizes with unclear representation of the population of interest, limited reporting of methodology and statistical analysis, use of tools with no claims of reliability or validity, self-reporting, and convenience sampling.

Qualitative studies. Criteria that jeopardized the quality of the qualitative studies included insufficient descriptions of study context, convenience sampling with small sample sizes, and no reporting of respondent validation. Two studies indicated theoretical assumptions influencing data collection and analysis (see Tables 4 & 5 for further notes on quality and summary of included studies).

Activities of Managers

Quantitative studies. Three activities were related to research use by clinical nurses: the provision of support, policy revisions, and modifications to quality auditing systems. Each behaviour was found to influence research use in two or more of the eight quantitative studies.

***Support*.** Three studies indicated administrative support as a factor that influenced nurses' use of research (Funk et al. 1995; Rutledge & Donaldson 1995; Tsai 2000). Although administrative support was a theme among studies, what constituted support differed. In the retrospective case study by Rutledge and Donaldson (1995), support was described as the allocation of resources and strategic goals to support nurses' research use. However Tsai (2000) and Funk et al. (1995) identified administrative support as important to research use without describing how it was conceptualized. When asked what they needed for research utilization, 73% of the nurses (*n* = 382) surveyed by Tsai (2000) identified administrative support, in addition to role modeling (83%), consultation (80%), and guidance (80%). With more than half the nurses (64%) having participated in research conferences, the author suggested managers' support included encouragement to attend and participate in conferences. Similarly, administrative support was the most frequently cited facilitator by managers (35.1%; *n* = 414) in the survey by Funk et al. (1995), and was described as including role modeling behaviours to create an organizational culture that values research and incorporating research utilization into performance appraisals.

Policy revisions. Policy revisions were identified as facilitating research use in two studies (Harrow et al. 2001; Rutledge & Donaldson 1995). Both studies had many methodological quality limitations despite clinically important findings. Harrow et al. (2001) reported that managers revised nursing practice policies for preoperative fasting and fluid replacement based on research. Pre- and post-chart audits showed a decrease in both colloidal fluid replacement (28% to 79%), and fasting periods (5.6 to 10 hours).

Rutledge and Donaldson (1995) described policy change as a component of a strategy that increased organizational capacity to engage in research. The case study of 16 organizations indicated that organizational leaders revised policies and protocols and modified quality monitoring processes to reflect research-based care. Additional strategies to support research integration included the incorporation of research use into strategic plans, increased library access and/or computer resources, and education. Sixty-five percent of nurse executives responding to the written survey (*n*= 16) in the third project year reported having more research-oriented departments and 47% indicated nurses had a more scientific approach to using clinical data.

Table 4
Summary of quantitative studies

Author/Country Study Conducted	Study Design Objective	Methods	Setting Sample	Intervention Duration Frequency	Findings	Notes on Quality
Funk et al. (1995) United States	Non-experimental survey to examine administrators' perceptions of barriers to nurses' use of research findings in practice.	Mailed survey question-naire.	Nursing Registry: Clinical administrators ($n = 414$) from random sample of 1,989 members. Overall response rate 40%	N/A	The setting was rated as the greatest barrier, followed by presentation of research, and characteristics of the nurse. Administrative support was the most frequently cited facilitator (35.1%). Administrators' perceptions of barriers differed from that of staff nurses in previous studies.	Strengths • random sampling • validated tool, with acceptable reliability and validity. Limitations • self-report bias • unable to determine representation of sample (no information regarding proportion of administrators within the registry). Quality Assessment: some limitations.
Harrow et al. (2001) Australia	Pre-test–post-test to determine changes in colloid fluid replacement and preoperative fasting periods in patient requiring elective bowel surgery.	Chart audit.	Hospital Charts: $n = 112$ (4 audits: 28 charts per audit).	• Presentations by managers to nursing executive and surgery committees • Policy revisions • Guideline development • Multi-disciplinary education sessions Duration and frequency not provided.	Decrease was found in: • number of patients requiring colloidal fluid replacement (28% to 79%), and • preoperative fasting periods (5.6 to 10 hours) (no p value given).	Strengths • pre/post intervention study • theory-driven intervention addressing factors that impede changes. Limitations • no randomization or control group • unable to determine if the intervention was independent of other changes on the unit. • representativeness of sample not provided. • methods used for analysis unclear. Quality Assessment: many limitations.

Continued.

Table 4
Continued.

Author/Country Study Conducted	Study Design Objective	Methods	Setting Sample	Intervention Duration Frequency	Findings	Notes on Quality
Hodnett et al. (1996) Canada	Randomized control trial to determine whether a marketing strategy to promote research based intrapartum nursing care directed at staff opinion leaders and unit managers would improve the outcomes of labor and birth.	Chart audit.	Teaching hospitals ($n = 3$); Community hospitals ($n = 17$).	2–4 staff and 1 unit manager per hospital participated in 12 month strategy: • 2 workshops, 6 months apart with lectures, discussions, role playing, strategic plan development • ongoing assistance from research staff: regular phone calls, monthly newsletters, additional reading materials. Majority of participants reported working on trial activities every shift or weekly.	The influence of the intervention was unsuccessful in lowering rates of epidural analgesia or supporting the secondary hypotheses.	Strength • RCT • theory-driven intervention linked to patient outcomes • 18-month data collection after first workshop. Limitations • blinded assessment of primary outcomes unclear. Quality Assessment: excellent.
Resnick et al., (2004) United States	Mixed methods pre-test–post-test: single group repeated measures and qualitative interviews to explore feasibility of implementing 2 clinical practice guidelines (Falls & Pain).	Chart audit and interviews.	Long-term care facilities ($n = 23$). Charts: Falls pre: $n = 127$, post: $n = 119$; Pain: pre: $n = 64$, post: $n = 74$. Director interviews ($n = 20$).	Directors and administrators participated/received: • 2-day education session on CPG implementation • Materials related to CPG implementation (step approach; examples of forms to facilitate screening and evaluation).	Falls CPG process indicators significantly increased 46% to 62%, $p = 0.02$; Pain CPG process indicators increased 38% to 48%, $p > .05$.	Strengths • quasi-experimental design • random selection of cases to measure process outcomes. Limitations • no control group • unable to determine duration of time between education sessions and chart audit. Quality score: some limitations.

Continued.

Table 4
Continued.

Author/Country Study Conducted	Study Design Objective	Methods	Setting Sample	Intervention Duration Frequency	Findings	Notes on Quality
Rutledge et al., (1998) United States	Exploratory descriptive study to describe and compare barriers to research utilization by oncology staff nurses and nurse mangers/clinical nurse specialists.	Survey questionnaire.	Oncology Nursing Society members randomly selected from 7 practice settings ($n = 769$; 38% response rate) Oncology staff nurses ($n = 331$) Managers/ CNSs ($n = 407$) Response rates of staff, managers/CNSs not calculated.	N/A	Barriers differed between staff nurses and managers/CNSs. Characteristics of the adopter, organization and innovation were greater barriers to mangers/CNSs than to staff.	Strengths • use of a validated scale • large sample Limitations • no response rate for total sample • low response rate for portion of sample. Quality score: some limitations
Rutledge & Donaldson (1995) United States	Retrospective case study to determine the influence of the Orange County Research Utilization in Nursing (OCURN) project on organizational capacity to engage in research use.	Survey questionnaire and telephone/ on-site consultations.	Hospital and Home nursing organizations ($n = 16$) Nurse executives ($n = 16$) 80% response rate.	• Created a network of hospitals and schools of nursing. • Provided tiered continuing education to: Nurse executives focused on strategic planning, resource allocation, developing strategic goals. Clinical and administrative leaders: focused on coordinating and facilitating the development of research use programs. Staff nurses: focused on research use. • Policy changes • Modifications to quality monitoring processes.	The influence of the intervention was reported as "considerable or great." 65% of nursing executives reported their departments as being more research oriented. Several organizations integrated research use into nursing strategic plans; modified quality management infrastructures; revised policies; and/or established journal clubs.	Strengths • triangulation of multiple data sources • multiple sites • good response rate. Limitations • no comparison or control group • self-report bias • single respondent from each organization • no claims for reliability and validity of the tool • methods used for analysis unclear. Quality assessment: many limitations

Continued.

Table 4
Continued.

Author/Country Study Conducted	Study Design Objective	Methods	Setting Sample	Intervention Duration Frequency	Findings	Notes on Quality
Tsai (2000) Taiwan	Non-experimental survey to describe staff nurses' and nurse managers' participation in research and to describe factors that influenced research utilization.	Descriptive correlational analysis of 2 survey questionnaires.	Hospital Staff nurses: $n = 271$; 68% response rate. Managers: $n = 111$; 63% response rate. Total $n = 382$; 67% response rate.	N/A	Lack of time was the main barrier to research utilization, identified by 66% of nurses. Lack of support from administrators was considered a barrier by 11% of nurses. Identified as necessary for research utilization to occur: Role models (83%), Consultation (80%), Guidance (80%), Administrative support (73%), Financial support (64%). Positive correlation was found between research participation and utilization ($r = .3268$, $p<0.001$).	Strengths: • random sample of nurses • tools were validated and pilot tested • use of open- and close-ended questions. Limitations: • convenience sample of managers • over-representation of nurse managers • self-report bias. Quality Assessment: some limitations.
Wallin, Bostrom, Harvey, Wikblad & Ewald (2000) Sweden	Non-experimental survey to evaluate the application of national neonatal nursing guidelines.	Questionnaire developed for the study. Chi-square and logistic regression analysis.	Neonatal care units ($n = 35$) Nurse managers ($n = 35$) 90% response rate.	• Dissemination of 13 evidence-based guidelines and auditing measures. • Training of 2 nurses per unit in auditing quality improvement with Dynamic Standard Setting System, (DySSSy). • Standards were developed, implemented and audited at each unit with DySSSy.	Extensive guideline use positively correlated with: • use of the DySSSy, • nurse managers with ≥ 4 years management experience, • nursing research experience of the unit, • sufficient staff resources (estimation).	Strengths • multiple sites • high response rate • use of open- and closed-ended questions. Limitations • single respondent from each site • nurse managers' self report bias of the extent of guideline application. Quality Assessment: some limitations.

Table 5
Summary of qualitative studies

Author (Year) Country	Aim Primary Concept Studied Term Used for Research Use	Method	Setting Sample	Key Findings	Notes on Quality
Caine & Kenrick (1997) UK	To explore the perceptions held by managers regarding their role and behaviours in facilitating evidence-based practice for nurses. Evidence-based practice	Semi-structured interviews.	Teaching hospitals ($n = 2$) Managers($n = 10$).	Constraining influences related to managers' roles in facilitating evidence-based practice included organizational hierarchies, budget considerations, and expectations regarding individual responsibilities for evidence-based practice. Findings show that managers are not adequately facilitating research use.	Strengths • theoretical position and details of interview schedule provided. Limitations • context of the study not well described • small convenience sample • ethical approval not reported. Quality Assessment: some limitations.
Kenrick & Luker (1996) UK	To explore management arrangements and practices of five community health districts and the influence on nurses' research utilization in clinical practice. Research Utilization	Semi-structured interviews.	Community health districts ($n = 5$) Middle managers ($n = 22$).	Management arrangement in the form of flat organizational structures (e.g., managers wearing uniforms, carrying nominal caseloads and reporting directly to the director of services) had higher research utilization scores.	Strengths • interview schedule piloted • details of interview schedule provided. Limitations • context of study not well described • limited information regarding the previous study findings are related to • small convenience sample. Quality Assessment: some limitations.

Continued.

Table 5
Continued.

Author (Year) Country	Aim Primary Concept Studied Term Used for Research Use	Method	Setting Ssample	Key Findings	Notes on Quality
LeMay, Mulhall & Alexander (1998) UK	To investigate the research culture of practicing nurses, health visitors and midwives and their managers. Research-based practice.	Semi-structured interviews. Phenomenological approach.	Health care sites ($n = 3$) Managers ($n = 9$) Nurses, midwives, health visitors ($n = 21$).	Practitioners and mangers hold differing perceptions regarding nature of research, its role, and opportunities and constraints which affect research utilization. Individual and organizational factors affect research-based practice.	Strengths: • authors theoretical position and assumptions clearly stated • analysis process well described • credibility and reliability checks undertaken with participants and researchers. Limitations: • context not well described • small number of managers compared to practitioners in sample • ethical approval from a research ethics board not identified. Quality Assessment: excellent.
Newman, Papadopoulos & Sigsworth (1998) UK	To identify individual and organizational infrastructures, structures and cultures that support evidence-based practice.	Part of an action research project. Individual interviews, focus groups, participant and non-participant observations.	Hospital Interviews ($n = 24$ managers, staff nurses, clinical nurse specialists) 7 focus groups ($n = 56$ managers, nursing, medical and quality assurance staff).	Organizational issues identified: • EBP a low management priority • dissemination problems • inadequate systems for professional development • resource and access constraints. Individual issues: • motivation, • a lack of role clarity • culture of 'routine' care.	Strengths: • large sample with multiple data sources • context well described • triangulation of multiple data and theory • findings validated with participants. Limitations: • few illustrative quotes provided. Quality Assessment: excellent.

Author Question

***Monitoring quality indicators*.** Rutledge and Donaldson (1995) and Wallin et al. (2000) reported that a quality monitoring system influenced nurses' use of research evidence. Survey results (n = 35) by Wallin et al. (2000) found use of a quality improvement (QI) system to be significantly correlated to the application of clinical guidelines in neonatal units ($p < 0.02$ OR: 87.3). Additional correlates included managers' length of tenure ($p < 0.03$ OR: 33.2), research experience of the unit ($p < 0.04$ OR: 30.7), and sufficient staff resources ($p < 0.05$ OR: 56.7). The importance of managerial leadership to successfully sustain the use of the QI system was emphasized.

Qualitative Studies

The focus of the qualitative studies varied, but researchers for each attempted to show components of managers' roles to influence research use. Different issues were identified, each contributing to understanding the influence of nurse managers.

Kenrick and Luker (1996) found managers had stronger clinical identities and less hierarchical reporting structures in community health districts with high research utilization scores (obtained in a previous study) than did managers in districts with lower scores. Similarly, organizational hierarchies were perceived to be a constraint to managers' ability to influence evidence-based practice at two teaching hospitals in a study by Caine and Kenrick (1997). Role modeling strong research values and showing a commitment to research were perceived as facilitators. Despite identifying themselves as having an important role in implementing research findings, managers revealed they lacked strategies to provide practical supports and overcome organizational barriers to facilitate evidence-based practice (Caine & Kenrick 1997).

Newman et al. (1998) and LeMay et al. (1998) also identified organizational factors as barriers to managers' influence on research use. As part of a larger action research project, Newman et al. (1998) found low management priority, lack of multidisciplinary care planning, performance appraisals that lacked professional development, inadequate policies, and limited practitioner knowledge, access and time as obstacles to evidence-based practice. Many of these obstacles were similarly identified by Kenrick and Luker (1996). LeMay et al. (1998) further reported that barriers to research-based practice existed between managers and practicing nurses. Managers perceived more organizational and environmental barriers such as the history and nature of the organization (e.g., teaching, community), workforce, and restructuring issues. Practicing nurses, on the other hand, more readily identified attitudes, professional relationships, and lack of time.

Interventions Aimed at Supporting Nurse Managers to Facilitate Research Use

Four of the eight quantitative studies included evaluations of an intervention that included managers to promote nurses' use of research evidence. Three studies showed positive results (Harrow et al. 2001; Rutledge & Donaldson 1995; Resnick et al. 2004); however, lack of control groups made it impossible to draw firm conclusions about the effects of these interventions. Only one study used an experimental design, and found no effect on selected patient outcomes (Hodnett et al. 1996).

The three non-experimental intervention studies delivered multi-level strategies that targeted administrators, directors, and managers to facilitate research use by nurses. The main components of the intervention in Rutledge and Donaldson's (1995) study were formal networks between hospitals and nursing schools, and tiered education tailored to each group of participant (executives, managers, and staff). For example, nurse executives incorporated nurses' use of research into organizational goals, and managers developed and facilitated research use programs. In the third project year Rutledge and Donaldson (1995) reported greater use of research by nurses, with 65% of nursing executives (n = 16) describing their departments as more research oriented.

Unit managers were directly involved in planning and delivering the intervention in the study described by Harrow et al. (2001). Managers delivered formal presentations to executive and multidisciplinary teams, revised policies, and developed education programs for clinical staff. Pre- and post-chart audits showed significant improvements in outcomes (fasting rates and colloidal fluid replacement). In a similar quasi-experimental study Resnick et al. (2004) engaged directors and administrators of long-term care facilities in two full-day educational sessions focusing on guideline implementation, ways to link clinical processes and outcomes, and case examples. Participants were then sent a step approach to implementation, and tools to facilitate screening and evaluation. Pre- and post-chart audits found statistically significant increases in process indicators for implementation of the falls guidelines (46% to 62%, p = 0.02), and non-significant increases for pain guideline (38% to 48%, $p > .05$).

In an experimental RCT, Hodnett et al. (1996) evaluated the effects of a 12-month intervention that included a 2-day workshop and ongoing support for staff nurses and managers to develop a marketing strategy for implementing research-based intra-partum nursing care. Acknowledging that support of managers was critical, the manager (n=10) from each experimental unit participated. At the end of one year, no significant effects on labour and delivery outcomes were found to support any of the hypotheses.

DISCUSSION

In recognition of the large amount of exploratory research conducted in the field of research utilization, the authors were surprised to find so few studies that focused on managerial leadership and research use. In particular, there was a paucity of experimental studies that tested a leadership hypothesis. With the substantial interest amongst researchers, professional associations, and healthcare organizations to understand timely and effective research implementation strategies, this review has highlighted an important gap in the current research.

Activities of Managers that Influenced Research Use

Through analyzing the 12 studies a pattern of leadership emerged that is helpful in understanding leadership factors that influence research use. Managers' activities appeared to be multidimensional, involving behaviours that were both facilitative and regulatory in their

mechanisms of influence. Theories on diffusions of innovation (Greenhalgh et al. 2004; Rogers 2003; Stetler 2003) support these findings, and reinforce the view that behaviour change will not occur without sustained managerial support and integration of formal organizational infrastructures and policies.

Facilitative Behaviours

Facilitative behaviours are directed at stimulating the intrinsic motivation of people, implying an effort to increase the will and internal desire to change through support, encouragement, education, and appealing to a common purpose (Grol et al. 2005; Kouzes & Posner 2003). The leadership support described in reviewed studies included encouragement (Funk et al 1995; Rutledge & Donaldson 1995; Tsai 2000), information sharing (Harrow et al. 2001), and integrating a vision of research-based care into strategic plans (Rutledge & Donaldson 1995). These are all consistent with behaviours that attempt to intrinsically motivate people to change. The concept of "administrative support" was further identified by Tsai (2000) and Funk et al. (1995) without revealing how it was interpreted. This finding is consistent with a recent systematic review of studies that used the 28-item Barriers to Research Utilization scale, and found that lack of support from management, physicians, or other staff was one of the three greatest barriers in seven studies (Hutchinson & Johnston 2006).

While portraying valuable perspectives, there appears to be little congruence across the research utilization literature on how support is defined and operationalized. This may be a reflection of the diversity of supportive behaviours leaders use, or the early development of the concept in relation to research use. Classic behavioural perspectives identify leadership support as a relations-oriented behaviour that involves socio-emotional interactions between leaders and others, and includes consideration, encouragement, communicating well, and valuing individual contributions (Amabile et al. 2004; Ekvall & Arvonen 1991; Yukl 2006; Yukl et al. 2002). However, leadership support may also involve more instrumental behaviours such as providing feedback, allocating resources and initiating structures to get a job done (Amabile et al. 2004; Yukl, 2006). Within this review, it appears that managers used both interpersonal and instrumental behaviours to support nurses' use of research evidence.

Regulatory Behaviours

Monitoring. Monitoring performance and outcomes is a regulatory behaviour that is consistent with the basic principles of continuous quality management strategies where data are collected and used to systematically build knowledge and promote learning (Grol et al. 2005). This review identified two studies where monitoring systems were used to reflect research-based care (Rutledge & Donaldson 1995; Wallin et al. 2000). Monitoring can take many forms, depending on the context and outcomes of interest. Although research on the effects of monitoring and research use is limited, the tracking of key performance indicators, process variables, and outcomes is associated with effective leadership and managerial practices (Amabile et al. 2004; Yukl 2006). Monitoring provides information to managers for planning, problem solving, and decision making

regarding unit performance and training needs (Yukl 2006) and can assist staff in making decisions by reminding them of the impact their care has on patients and on system outcomes (Grol et al. 2005).

Policy change. Modifications to policies, identified in two studies (Harrow et al. 2001; Rutledge & Donaldson 1995), can influence change through external regulatory mechanisms that formally sanction and require the practices (Grol et al. 2005). As Foxcroft and Cole (2000) have suggested, nurses are not typically free to change their practice without the formal support of their organization. Organizational policies that reflect research use by nurses may be necessary to endorse the change and provide direction to people who might otherwise be resistant.

In summary, it appears that managers influenced nurses to use research through facilitative behaviours such as interpersonal and instrumental support, in addition to regulatory activities that extrinsically motivate change such as auditing and policies. A combination of both strategies may be important because some individuals are more responsive to facilitative processes while others require external pressures (Grol et al. 2005). Regardless of the underlying mechanism, managers' involvement appears to be influential and important.

Intervention Studies

Given that only four studies examined an intervention for nurse managers to influence research use, there is insufficient information about how to effectively develop leadership to improve research use. Furthermore, comparing studies was problematic because of the different research designs, target groups, and outcomes measured. While Hodnett et al. (1996) conducted the only experimental design, the mechanism of the intervention was largely directed towards staff with unit managers included to support the study. Surveys have shown managers to perceive barriers to research use differently than do staff (Funk et al. 1995; Rutledge et al. 1998) an important consideration when developing interventions for managers. Hodnett et al.'s intervention did not involve upper management, and an ethnographic follow-up study described lack of nursing leadership and top management support as a central factor for non-success (Angus et al. 2003). As Hodnett and colleagues concluded, behaviour change will not occur if formal supports, structures and policies are not in place. Such strategies are consistent with theoretical models that describe the role of nursing leadership in developing an infrastructure to support evidence-based practice (Gifford et al. 2006; Stetler 2003).

The other three intervention studies involved managerial leaders from different hierarchical levels of the organizations in their intervention strategies, for example, managers and executives (Harrow et al. 2001); directors and administrators (Resnick et al. 2004); executives, administrative, and clinical leaders (Rutledge & Donaldson 1995). It would appear that leadership development at multiple levels is important to address the complexity of factors involved in nurses' use of research, and should be a focus for future research.

Leadership Development

The need to develop leaders in today's rapidly changing healthcare environments has been recognized within (Antrobus & Kitson 1999; Dixon 1999; Dunham-Taylor 2000; Kilty 2004; Porter-O'Grady 2003) and outside of nursing (Baker 2003; Leatt & Porter 2003). Despite existing leadership training programs for nurses (Cunningham & Kitson 2000; Kilty 2004; Tourangeau et al. 2003), this review indicated few intervention studies that developed leadership of nurse managers to influence research use.

Leadership development depends in part on organizational context and conditions, and previous research outside nursing has shown a reciprocal relationship between organizational factors and leadership development (Yukl 2006). A recent systematic review of leadership to foster a healthy work environment (*n* = 48 studies) described organizational climate and supportive structures as two of eight themes that were important (Pearson et al. 2004). Simultaneously, a positive organizational culture and strong supportive managers have been described as essential to incorporate research findings into nursing practice (Pepler et al. 2005; Stetler et al. 1998; Udod & Care 2004). Despite wide recognition that supportive leadership is necessary to manage context and quality patient care, few studies have examined the impact of leadership on innovation adoption or patient outcomes (Greenhalgh et al. 2004; Patrick & White 2005; Perra 2000; Snow 2001; Vance & Larson 2002).

Limitations

The following are limitations of the reviewed studies. Most were related to study design.

A dearth of experimental designs, the strongest design for controlling confounding variables and strengthening internal validity of the study.

Varied response rates (38% to 90%). Small sample sizes, combined with inadequate reporting of sampling strategies, made it difficult to determine how representative samples were of populations. Convenience and purposeful sampling were the most commonly used, increasing the risk of respondent bias.

Validated measures and theoretically explicit definitions for leadership or research use were often not used, making it difficult to understand the precise nature of the constructs.

The review itself has several limitations. First, we attempted to identify the research around a poorly defined concept; that of leadership for research use in nursing. This made identification of the literature difficult, and we might have failed to identify all relevant studies because different keywords may have been used by different researchers. Thus we used a broad search strategy in an attempt to obtain all relevant studies. The search strategy used for research utilization was similar to other published reviews (Estabrooks et al. 2003; Meijers et al. 2007).

Second, leadership was not explicitly identified in the majority of research utilization studies, and therefore we had to carefully scrutinize abstracts and articles to determine whether activities of

managers were being investigated. We suggest that until recently, the importance of managerial leadership was not sufficiently recognized because research use was primarily considered the responsibility of clinical nurses, and interventions were largely aimed at clinical nurses' knowledge and skill. Therefore, if intervention studies included managers, keywords and abstracts might not have reflected this. Having two people sifting and screening strengthens reliability of the review process.

Third, although methodological quality was evaluated, studies with "many limitations" were included to provide a baseline of the research in the field.

Despite these limitations, this review is a synthesis of a diverse literature and a broad overview of the research conducted to date. While there is no common agreement on the best way to combine multiple methodologies (Dixon-Woods et al. 2004; Harden et al. 2004), the approach used here highlights the contributions and clinical implications of non-experimental studies that would have been overlooked by more traditional systematic reviews of clinical effectiveness.

Implications for Theory and Research

Many well-known theoretical models on research utilization such as Promoting Action on Research Implementation in Health Services (PARIHS; Rycroft-Malone et al. 2004) and the Ottawa Model of Research Use (Graham & Logan 2004) recognize leadership; however, it is not a central concept. Arguably, this might contribute to leadership for research use being under-reported. Furthermore, operationalizing managerial leadership from this review appears to blur the differences between leadership and facilitation, particularly in light of the facilitative and regulatory behaviours found. At the very least, the concepts do not appear to be mutually exclusive. The managerial activities found in this review can contribute importantly to theory development in the field and operationalizing the leadership construct for future research.

We suggest the following next steps for future research:

Examine multi-levelled leadership behaviours within a framework of research transfer.

Conduct mixed methods studies that include experimental methods to test a hypothesis linking leadership behaviours to outcomes and qualitative methods to better understand leadership processes that facilitate research use, and contextual variables that mediate leadership effects.

CONCLUSIONS

By virtue of their role, nurse managers are in a unique position to influence individuals and organizational context. This review shows that managerial leadership for research use is more than an individual interaction between a leader and a nurse, but includes activities that create a context and infrastructure for change. Indeed, the complexity of leadership for research use has been illustrated, but equally, the importance of managerial leadership to the success of an adoption and diffusion process has been highlighted.

While the nursing research community continues to focus on factors that influence research use, the effect of managerial leadership must not be ignored. The research conducted to date provides a strong foundation for future research. The knowledge generated can help to bridge the research–practice gap and ultimately improve the quality of health delivery and outcomes of patients, families, and communities.

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Chapter 3: Knowledge and Evidence Review

In chapter three I summarize and present the evidence related to guideline use in healthcare drawing on the theoretical and research literature for the terms research use, research utilization, diffusion of innovations, guideline implementation, guideline utilization, and knowledge translation. The chapter begins with a discussion of the factors that influence guideline use, organized according to the Ottawa Model of Research Use (innovation; potential adopters; practice environment, which includes leadership, and implementation strategies). The chapter concludes with a description of the theoretical framework that guided the development of the intervention.

Factors that Influence Guideline Use

Guidelines are tools that translate research evidence into recommendations for practice and therefore many parallels can be made between the factors that influence research use and those that influence guideline use. Early understandings of research use in healthcare specified a rational and linear relationship between research findings and the application of those findings to practice. The basic assumption was that upon dissemination of high quality research findings healthcare practitioners would accept and use them in relevant practice situations (Nutley, Walter, & Davies, 2007). Critiques suggest that the rational, linear approach underestimates the complexities of the process, in particular the influence of context or environment on the people that were to use the research findings (Kitson et al., 1996; Nutley et al., 2007; Watkins, 1994). The use of rational-linear approaches further implies that research findings are largely uncontested and abundantly available, an assumption that is not necessarily the case (Kitson et al., 1996).

More recent understandings of the research and guideline use process in healthcare suggest that multiple factors and interactions are involved. Broadly, research use is a complex and non-linear process involving a multitude of factors. The Ottawa Model of Research Use (OMRU) (Logan & Graham, 2010) categorizes these factors as the innovation, potential adopters, the practice environment (of which leadership is a part), and implementation strategies.

The innovation.

Rogers' (2003) extensive work on diffusion of innovations (Rogers, 2003) highlights five characteristics of an innovation that influence acceptance and use: benefit or relative advantage (the degree to which the innovation is perceived to improve existing practice); compatibility (consistency with existing norms and values); complexity (ease or difficulty of use and understanding); trialability (degree to which an innovation may be tried on a limited basis); and observability (degree to which people can see the results). Within a Canadian nursing context, compatibility with current knowledge and practice was the most frequently cited guideline characteristic that influenced its use in practice in 22 acute, community, and long-term care organizations (Ploeg, Davies, Edwards, Gifford, & Elliott-Miller, 2007). Similar findings have been made with physician practices; a random sample of 381 physicians showed that a guideline's resonance with usual practices, its brevity and ease of use, and that it came from a credible, unbiased source were characteristics that influenced guideline use (Watkins, Harvey, Langley, Gray, & Faulkner, 1999).

Generally, research findings are more likely to be used when they are clear, credible, and accessible (Nutley, Walter & Davies, 2007). Although the quality of research can be a factor that influences decisions to use it, the relationship between the level of evidence and its use is not straightforward, particularly with nurses for whom limited appraisal skills and understanding of research methodologies are often barriers (Hutchinson & Johnston, 2006). The credibility of the producers of a guideline and its presentation and accessibility may be more important than the quality of the research methodology. A review of 30 studies identified the availability and presentation of research findings among the top three barriers to nurses' use of research (Hutchinson & Johnston, 2006).

Clinical practice guidelines can provide access to research findings, but intrinsic factors such as ambiguity, inconsistency, and incompleteness of the recommendations themselves can contribute to successful or unsuccessful implementation efforts by healthcare providers (Shiffman et al., 2005). Researchers at Yale University developed the Guideline Implementability Appraisal (GLIA) tool to assess the extent to which guideline recommendations are implementable (Shiffman et al., 2005). A recommendation's clarity in describing the circumstances in which to act (decidability) and the procedure to follow in the defined circumstances (executability) are critical dimensions of a guideline's successful implementation (Shiffman et al., 2005).

Potential adopters.

There is scant evidence to suggest that individual characteristics of the potential adopters (in this study home care nurses) shape the use of research findings. In a systematic review of individual determinants of research use by nurses Estabrooks and colleagues (2003) found no link between research use by nurses and their level of education, professional characteristics, involvement in research activities, or socioeconomic factors. A positive attitude towards research was the only personal characteristic with a consistently positive effect (Estabrooks et al., 2003). Indeed, as early as 1989, nurses' attitude towards research was identified as having an influence on their use of it (Champion & Leach, 1989). Numerous studies have found that nurses exhibit a positive attitude towards research (Dunn, Crichton, Roe, Seers, & Williams, 1997; Hicks, 1996; LeMay, Mulhall, & Alexander, 1998; Parahoo & McCaughan, 2001), suggesting that attitude alone is insufficient to induce nurses to use research routinely in their practice decision-making.

The practice environment.

The practice environment exerts a particularly powerful set of influences on nurses' acceptance and use of guidelines (Dobbins, Ciliska, Cockerill, Barnsley, & DiCenso, 2002; Dopson, Fitzgerald, Ferlie, Gabbay, & Locock, 2002; Estabrooks, 2003; Logan & Graham, 1998; McCormack et

al., 2002; Royle, Blythe, Ciliska, & Ing, 2000). In the healthcare literature several terms have been used to describe the practice environment including "organizational context", "culture", and "climate", and the distinction between them is not always clear (McCormack et al., 2002). Graham et al. (2004) describe the practice environment to be multi-dimensional and include structural factors (physical structures, policies, workload), cultural and social factors (belief systems, local politics, peer influences, leadership), and economic considerations (resources, supplies, remuneration systems). For the purposes of this dissertation, and consistent with the language of the study's theoretical framework, the term "practice environment" is used to describe contextual and organizational factors that influence nurses' use of guidelines.

Many of the barriers to using research that nurses report are related to the practice environment. A systematic review (n=30) using the "Barriers to Research Utilization" scale found a high degree of consistency across studies regarding barriers (Hutchinson & Johnston, 2006). Commonly reported barriers were related to perceived lack of time, lack of authority, and lack of organizational support from managers, administrators, physicians, and other staff.

Other factors within the practice environment found to influence guideline use in nursing include: access to resources (McCaughan, Thompson, Cullum, Sheldon, & Thompson, 2002; Rodgers, 2000); organizational support (Champion & Leach, 1989; Hatcher & Tranmer, 1997; Ring, Malcolm, Coull, Murphy-Black, & Watterson, 2005); culture (Estabrooks et al., 2008; Meijers et al., 2006; Pepler et al., 2005; Scott-Findlay & Golden-Biddle, 2005); and leadership (Angus, Hodnett, & O'Brien-Pallas, 2003; Cummings, Estabrooks, Midodzi, Wallin, & Hayduk, 2007; Davies et al., 2006; Edgar et al., 2006; Gifford et al., 2007; Gifford, Davies, Edwards, & Graham, 2006).

Leadership.

As a factor within the practice environment, the importance of leadership to influence research use has been emphasized outside and within healthcare settings. In psychology and

business there is a subset of research that specifically examines leadership in its relationship to the introduction of innovations. The bulk of these studies is done outside healthcare settings and few include nurses. This research shows evidence of a significant association between the acceptance of innovations and the leaders' involvement, attitudes, and commitment to change (Damanpour, 1991; Greenhalgh et al., 2004); identification and clarity of leadership roles (West et al., 2003); transformational and transactional leadership styles (Elenkov & Manev, 2005; Howell & Avolio, 1993; Waldman & Bass, 1991); vision, managerial relations, and the use of data management systems (Greenhalgh et al., 2004). A 'road map' of what leaders do, however, is not possible due to the unpredictability and nonlinear processes of innovation adoption (Van de Ven, Polley, Garud, & Venkataraman, 1999).

A review of the literature on leadership and quality improvement In healthcare shows support for the proposition that the actions, or inactions, of managers and clinical leaders are associated with the successful implementation of quality improvement initiatives (Ovretveit, 2005). The evidence supports either a positive or a negative association wherein certain types of leaders' involvement are associated with success, and lack of involvement is associated with failure. For example, a failure to show a change by nurses and physicians in the care of patients with depression in nine primary healthcare clinics in the United States was attributed to a lack of clinical and managerial leadership (Solberg et al., 2001). In another large study based on data collected from 17,442 patients across 42 randomly sampled intensive care units in the United States, Shortell et al. (1994) provide evidence that team interaction, which was measured on a scale that included nursing leadership, communication, coordination, and conflict management abilities, was significantly associated with outcomes that included lower length of risk-adjusted stay ($p>.05$) and higher quality of care ($p<.01$) (Shortell et al., 1994). Together these studies indicate that a system of

leadership from multiple people in managerial and clinical roles is associated with improvements in quality of healthcare.

Pettigrew et al. (1992) suggest that change is more likely to take place when leaders create a supportive practice environment. In magnet hospitals in the United States research indicates that nurse leaders play a critical role in developing environments that support nursing excellence (Lewis & Matthews, 1998; Upenieks, 2002). The use of guidelines in nursing practice depends, in part, on managers' and clinical leaders' abilities to create a practice environment that is receptive to change, adequately resourced, and supportive. Although little experimental research has been conducted, descriptive research consistently identified leadership as instrumental to implementing and sustaining practice change in nursing (Dobbins et al., 2002; McCormack et al., 2002; Newhouse, 2007; Redfern & Christian, 2003; Rycroft-Malone et al., 2004; Scott-Findlay & Golden-Biddle, 2005; Stetler, 2003; Stetler, Brunell, Giuliano, Prince, & Newell-Stokes, 1998; Wallin, Rudberg, & Gunningberg, 2005). Davies et al. (2006) examined predictors of nurses' sustained use of clinical guidelines 2 and 3 years after implementation (n=37 organizations) and found leadership was the only significant predictor of how much the guideline permeated the organization, accounting for 47% of the variance ($p < .001$). Leaders at all levels of organizations were identified, including direct care staff, advanced practice nurses, managers, and senior executives (Davies et al., 2006). However, the purpose of Davies et al.'s (2006) study was not specific to leadership and therefore measures were related to the presence of leaders and not to the specific leadership behaviours or practices to support continued implementation.

Although the importance of leadership has been identified clearly in the literature, details of what leaders actually do to influence guideline use is under-articulated and poorly understood. In a secondary analysis I conducted on data from nine of the 37 organizations in the Davies et al. (2006) study, described above, different patterns of leadership behaviour were found in

organizations that sustained guideline recommendations (n=4) than in those that did not (n=5) (Gifford, Davies, Edwards & Graham, 2006). Using grounded theory methodology a conceptual model emerged from the analysis that describes leadership behaviours for implementing and sustaining guideline use in nursing (Appendix C). This early work informed the theoretical framework developed for this study.

The integrative literature review presented in chapter two illustrates that leadership support, vision, and regulatory factors are important to influence research use in clinical nursing practice (Gifford et al., 2007). However, only one study was experimental in design, making the empirical evidence limited. Different conceptualizations of leadership have confounded firm conclusions about what leaders do, or what kinds of interventions will support leaders, to influence guideline use effectively.

Implementation strategies.

There is considerable evidence describing the effectiveness of guideline implementation strategies for physicians and multi-disciplinary practitioners. Grimshaw and colleagues (2004) reviewed 235 studies of guideline implementation strategies in which physicians were the focus in 74% of them and multidisciplinary healthcare practitioners the focus in the others (Grimshaw et al., 2004). Although 86% of these studies reported improvements in care, there were substantial variations in results. Grimshaw et al. suggested that multifaceted strategies may be more effective than single interventions, however, further research is needed to determine which guideline implementation strategies are most likely to be effective in which circumstances.

In contrast, relatively little research has been conducted on effective guideline implementation in nursing. Four studies were included in a systematic review of interventions, the authors concluding that little is known about how to increase research use in nursing (Thompson, Estabrooks, Scott-Findlay, Moore, & Wallin, 2007). A mixed methods review (n=10 studies), not

restricted to experimental designs, included studies assessing the relationship between factors within the practice environment and nurses' use of research (Meijers et al., 2006). A synthesis of the findings showed that six contextual factors were associated with research use: 1) multi-faceted support, including administrative support; 2) role of the nurse; 3) access to resources; 4) work climate; 5) time; and 6) provision of education (Meijers et al., 2006). All quantitative studies (n=6) used self-report instruments to measure research use and had limitations in design, sampling, measurement, or statistical analysis. Caution is needed in generalizing from the findings because of methodological limitations.

A more robust evidence base exists regarding intervention strategies that target knowledge and behaviours of individual healthcare workers (Table 3.1). The most recent systematic review of 81 trials involving 11,000 health professionals showed that educational meetings and interactive workshops improved practice performance by 1.8% to 32% when compared to no intervention (Forsetlund et al., 2009). Educational meetings included courses, conferences, lectures, workshops, seminars, and symposiums. Most trials evaluated the effects of educational meetings on physician behaviour. In two studies the providers were nurses; 18 studies involved mixed providers. Outcomes were objective measures of compliance with targeted practices (e.g., percent of patients screened for joint swelling, percent of patients receiving prescribed antibiotics) or patient outcomes (e.g., percent of patients with successful TB treatment completion, quality of life measures, or neonatal mortality). To account for baseline differences in compliance, analyses were based on adjusted risk difference (RD)[1], the difference between intervention and control groups after the intervention minus the difference between groups before the intervention (Forsetlund et al., 2009).

A 6% median RD was observed in compliance with desired practice for dichotomous outcomes (inter quartile range 1.8 to 15.9%; n=30 trials), and 10% RD for continuous outcomes

[1] A positive risk difference (RD) indicates that compliance improved more in the intervention group than in the control group. For example, an RD of 0.09 indicates an absolute improvement in compliance of 9%.

(inter quartile range 8 to 32%; n=5 trials). Mixed interactive and didactic education meetings were more effective (RD 13.6%) than either didactic meetings (RD 6.9%) or interactive meetings (RD 3.0%) alone, and higher attendance at meetings was associated with greater effects. The effect can be small but educational meetings can lead to improvements in professional practice and healthcare outcomes.

Educational outreach is an implementation strategy that involves face-to-face visits by a specialist to a practitioner to provide information on how to change practice (Eccles & Foy, 2009). A form of linkage and exchange (i.e., the use of social influences to impel practice change), educational outreach is also referred to as academic detailing and as educational visiting, and has a similar effect on processes of care as educational meetings described above. A review (n=69 studies) of educational outreach for compliance with desired practices (excluding medication prescribing) found the median RD was 6% (inter quartile range [IQR]=3.6% to 16%) in 17 comparisons of dichotomous outcomes and 21% (IQR=11 - 41%) for continuous outcomes (O'Brien et al., 2007). There were no explanations for the variations in effect. Compared to audit and feedback, educational outreach was slightly superior.

An updated review on audit and feedback, including 118 studies in which 88 comparisons were made between any intervention that included audit and feedback compared to no intervention, found variable effects (Jamtvedt, Young, Kristoffersen, O'Brien, & Oxman, 2006). The RD for dichotomous outcomes (compliance with desired practice or not) varied from a 16% decrease to a 70% increase in compliance (median=5%; IQR=3 - 11%). For continuous outcomes, the change ranged from 10% decrease to 68% increase in compliance (median=16%, IQR=5 - 37%). Low baseline compliance and higher intensity of audit and feedback were associated with greater effectiveness across studies.

Table 3.1
Summary of Cochrane Systematic Reviews of Interventions that Influence Behaviour Change in Healthcare Professionals.

Intervention	Author year	# studies	Median % of change		# studies with nurse participants	
			dichotomous outcomes	continuous outcomes	nurses only	mixed providers & nurses
Educational outreach	O'Brien et al. 2007	69	6% IQR 3.6% - 16%	21% IQR 11 - 41%	0	6
Educational/ interactive workshops	Forsetlund et al. 2009	81	6% IQR 1.8 - 15.9%	10% IQR 8 - 82%	2	15
Opinion leadership	Doumit et al. 2007	12	10% Range .06 - 25%		2	2
Printed educational materials	Farmer et al. 2008	23	4.3% Range .8 - 9.6%	13.6% Range 5 - 26.6%	0	0
	Jamtvedt et al. 2006	118	5% IQR 3-11%	16% IQR 5-37%	3	4
On-screen reminders	Shojania et al. 2009	28	4.2% IQR .8% - 18.8%		0	0

Nurses were the participant profession in only three studies of the 118, of which characteristics of the intervention and sector varied. One study evaluated the effect of withdrawal of feedback on the quality of a hospital capillary blood glucose monitoring program and showed that improvements in performance were maintained at six months, but deteriorated by 12 months (Jones et al., 1996). Another study of audit and feedback alone aimed to improve hand washing and glove use among nurses and patient care aids in Thailand and reported the second largest effect of 19% (Moongtui, Gauthier, & Turner, 2000). The third study (Rantz et al., 2001), which provided nursing homes with audit and feedback plus education about quality improvement, observed no improvements in 13 patient outcomes used as quality indicator scores.

Online computer screen reminders achieved a median improvement of 4.2% (IQR=.8% to 18.8%) in process of care adherence across studies, and 5.6% (IQR=2 to 19.2%) using the best

outcome from each study (n=28 studies reporting 32 comparisons) (Shojania et al., 2009). Twenty-six of the 32 included comparisons were cluster trials where the intervention was allocated to providers or provider groups. Physicians were the only group targeted.

Individuals who are credible, trustworthy, and 'educationally influential' (Rogers, 2003) can influence practice change. Consistent with linkage and exchange activities, opinion leadership "is not a function of the individual's formal position or status in the system; it is earned and maintained by the individual's technical competence, social accessibility, and conformity to the system's norms" (Eccles & Foy, 2009, p. 124). A review of 12 studies (64 comparisons) evaluated the effect of opinion leadership on behaviour change amongst healthcare professionals and reported an overall median improvement of 10% in experimental groups (Doumit, Gattellari, Grimshaw, & O'Brien, 2007). The effect was not consistent across studies, however, with change varying from 25% favouring the intervention to 5% favouring the control.

Of the 12 studies evaluating opinion leadership the majority targeted physicians with only two targeting nurses exclusively and two including nurses with physicians (Doumit et al., 2007). Most were conducted in the United States (n=9), and hospitals were the most frequent setting (n=8). Interventions predominantly lasted between 6 and 12 months (2-15 month range). Opinion leadership was the only intervention in four trials; the remainder used combinations of opinion leadership with other strategies such as audit and feedback, chart reminders, educational materials, and seminars. Of the four studies that included nurses only one showed a statistically significant change, with higher mean practice scores for guideline-based catheter care. However, this study was conducted in Hong Kong over 20 years ago. It remains unclear what impact opinion leadership has on nursing practice today, how to identify opinion leaders effectively, and in what kinds of behaviours opinion leaders engage to influence practice change.

The distribution of printed educational materials, including clinical practice guidelines, showed a small beneficial effect on professional practice behaviours in a recent review of 23 trials (Farmer et al., 2008). Comparing printed educational materials to no intervention (n=12 trials) a median RD of 4.3 percent on categorical process outcomes (range .8 to 9.6%, 6 studies) and a RD of 13.6% on continuous process outcomes (range .5 to 26.6%, 4 studies) was observed. None of the included studies involved nurses. Physician prescribing behaviour, management of various conditions, test ordering, or surgical rates were evaluated. As no nurses were targeted in this review it is not clear what impact printed materials have on nursing practice, nor what kind of nursing practices are amenable to change through their distribution.

In summary, there is growing evidence that interventions affect processes of care amongst healthcare practitioners successfully. However, nursing is not well-represented in existing systematic reviews; the majority of studies have been conducted with physicians. Continuous outcomes appear to show greater improvements across studies, possibly due to their increased sensitivity to change. Opinion leaders, printed educational materials, audit and feedback, and multifaceted interventions, involving educational outreach and educational meetings, appear to have comparable effects on implementing practice change in healthcare.

Theoretical Framework

A number of theoretical models and frameworks have been developed to aid in understanding the process of translating research evidence into healthcare practices, and leadership is integral to many. For example, the authors of a highly cited framework, Promoting Action on Research Implementation in Health Services (PARIHS), suggest that guideline use is explained by the interplay between evidence, facilitation, and context, with leadership a component of context (Kitson, Harvey, & McCormack, 1998; Rycroft-Malone, 2004). However, in the PARIHS framework leadership represents the actions of formal leaders and closely resembles

transformational leadership, a broad term reflecting leaders' abilities to influence the collective beliefs of people whom they lead (Estabrooks, Squires, Cummings, Birdsell, & Norton, 2009; McCormack et al., 2002). In contrast, leadership within this study is not restricted to people in formal leadership or management roles, but includes clinical resource and staff nurses that can influence practice change. Leadership is further conceptualized in this study to not only include behaviours that are consistent with transformational leadership, but also task-oriented behaviours that are more consistent with transactional leadership styles such as initiating structures, planning, and monitoring operations. According to Bass (1990) transactional and transformational styles are thought to augment each other and effective leaders use a combination of both depending on the situation.

No theoretical frameworks were found that were consistent with leadership for influencing guideline use as conceptualized in this study. Although the RNAO has developed a guideline for developing and sustaining nursing leadership (Registered Nurses' Association of Ontario, 2006), it was not specific enough to the process of influencing guideline use. Therefore, a theoretical framework was developed that describes the hypothesized leadership behaviours to influence guideline use and to inform development of the intervention (Figure 1). The framework is based on a synthesis of theory and research from three sources: 1) Ottawa Model of Research Use (OMRU) (Graham & Logan, 2004); 2) organizational leadership (Yukl, 2006); and 3) a model of leadership for sustained guideline use (Gifford et al., 2006).

The first source, the OMRU, is a planned change model that details the elements and processes of deliberately engineering research use in healthcare delivery (Graham et al., 2006). The authors of the OMRU recognized that research use is not a linear process, but involves simultaneous and interactive relationships between three elements: the nature of the evidence or innovation, the potential adopters, and the practice environment. Three key processes are

involved: 1) assessing barriers and supports; 2) tailoring implementation strategies to address identified barriers and monitor progress; and 3) evaluating outcomes. Previous reviews have shown that tailoring implementation strategies to address barriers and strengthen supports may increase the probability of success (Bosch et al., 2007; Shaw et al., 2005).

The action-oriented nature of the OMRU illustrated a process for leaders to assess barriers and supports at the level of the guideline recommendation (innovation), the nurses that will use the recommendations (potential adopters), and the practice environment, and to tailor implementation strategies accordingly. The OMRU has been used in previous implementation research (Graham & Logan, 2001; Hogan & Logan, 2004; Logan, Harrison, Graham, Dunn, & Bissonnette, 1999; Lorimer, 2004; Stacey, Graham, O'Connor, & Pomey, 2005).

The second source, organizational leadership research and theory, has identified three behaviour categories that provide the foundation for the theoretical framework: 1) relations-oriented; 2) change-oriented; and 3) task-oriented behaviours (Ekvall & Arvonen, 1991; Yukl, 2006; Yukl, Gordon, & Taber, 2002). Relations-oriented behaviours include supporting others, developing personal skills and making job adjustments, and recognizing others and their contributions. Relations-oriented behaviours increase mutual trust and cooperation among members, and commitment to a unit and organization. Change-oriented behaviours are primarily concerned with developing and integrating vision, building coalitions to support innovation and change, creating a sense of need, and gaining commitment to the change. Task-oriented behaviours are primarily concerned with accomplishing tasks and include clarifying roles, monitoring operations and performance, and utilizing resources efficiently.

The third source that informed the theoretical framework for this study is the model of leadership behaviours that emerged from the secondary analysis, mentioned previously, of data from nine organizations that had implemented RNAO guidelines; four had sustained nurses' use of

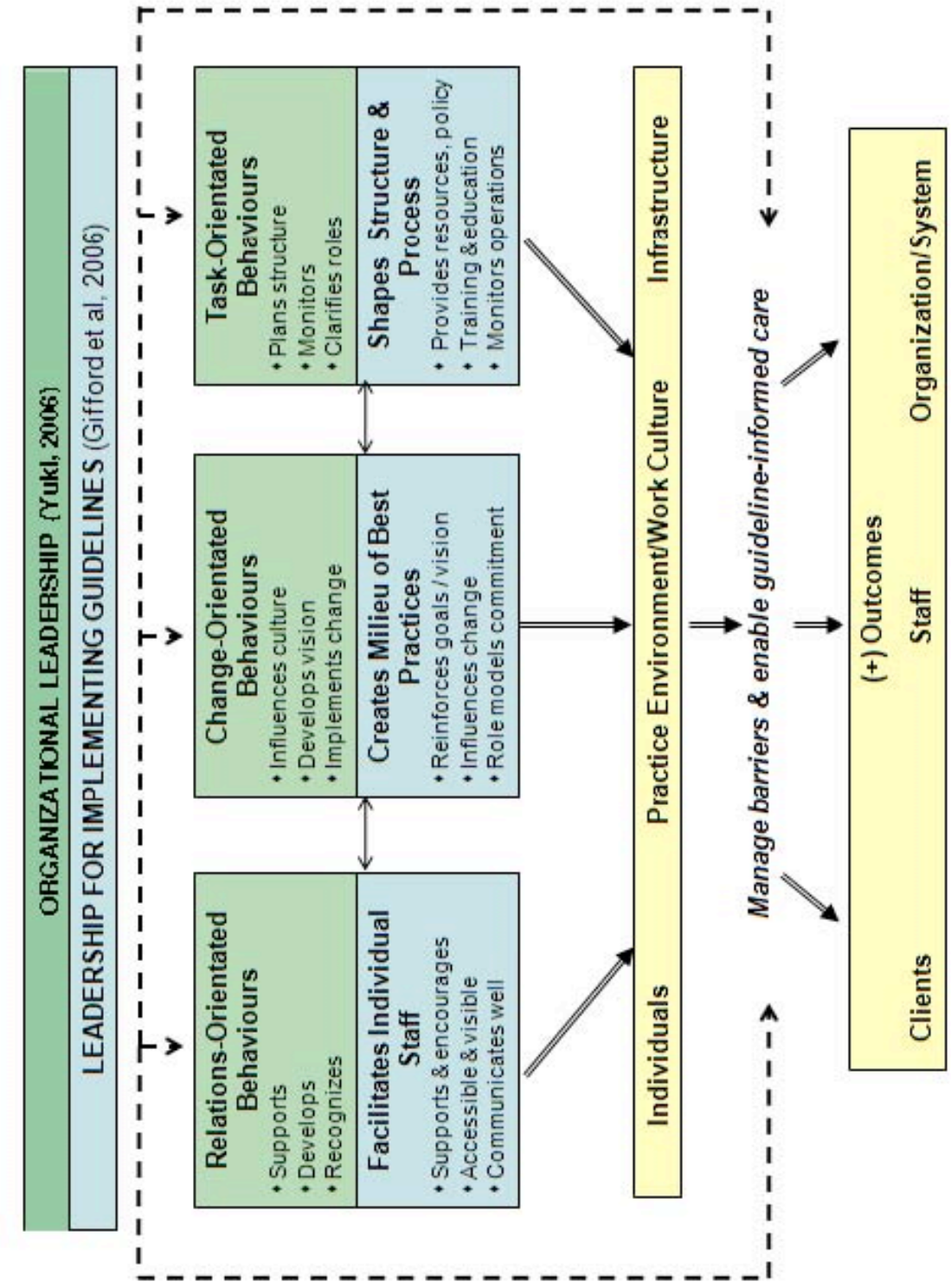
guideline recommendations and five had not 2 and 3 years after implementation (Gifford et al., 2006) (Appendix C). Leadership was enacted by people at different levels of the organization including those in formal leadership positions such as managers and executive directors, and clinical leaders such as resource nurses and staff. Three leadership themes emerged as central to implementing and sustaining the guideline recommendations: 1) facilitating individual staff through behaviours such as support, encouragement, and recognition; 2) creating a positive milieu of best practices by reinforcing goals and philosophies of care, influencing change, and role modeling commitment; and 3) influencing organizational structures and processes through the provision of resources, education, policies, and monitoring. Conceptually, these themes align with the three meta-categories of leadership behaviours described above and form the foundation of the theoretical framework.

Leadership, within the theoretical framework of this study, is "the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives" (Yukl, 2006, p. 8). Drawing on the work of Van de Ven and colleagues (1999), and consistent with findings from my aforementioned grounded theory study (Gifford et al., 2006), leadership at different hierarchical levels of an organization is necessary for the successful introduction of innovations. Thus, an assumption within the theoretical framework is that the leadership process is created by the coordinated and collective efforts of people from both management and clinical roles (termed the “leadership team”).

In summary, effective leaders engineer implementation efforts around identified barriers and supports, prioritize and translate recommendations into relevant knowledge for clinical staff, and create a practice environment that is receptive to, and supports the use of, the guideline recommendations. Leadership within this study is conceptualized as a mix of relations, change, and

task-oriented behaviours that reflect a concern for human relations, influencing change, and accomplishing tasks in efficient ways. The three behavioural categories are not mutually exclusive nor explicit to a particular outcome but interact in multidimensional ways. Effective leaders combine different behaviours depending on the context and relevance to the situation. The theoretical framework describes the behaviours of a multifunctional leadership team, composed of people in clinical and management roles, to manage barriers and enable guideline-based care (Figure 1). It is hypothesized that the impact of these behaviours will influence individual nurses and create a supportive practice environment that enables guideline use and ultimately leads to positive outcomes for patients, staff, and the organization.

Figure 1: Theoretical Framework of Leadership to Influence Guideline-informed Nursing Care



Chapter 4: Methods

In chapter four I present the research design and methods for this study. The original study protocol was published in Implementation Science *in December 2008 (Gifford et al., 2008) and is found in Appendix A. As of January 2010, the protocol was the most frequently accessed article in the journal for the previous 30 days, and the fifth most frequently accessed article for the year 2009.*

I begin the chapter with a review of the study objectives and setting. Details of the primary and secondary outcomes, criteria for determining clusters, randomization procedures, and sample size calculations follow. Methods to conduct the chart audit are described including identifying charts, pilot testing the data collection tool, and abstracting data. Procedures to conduct the qualitative interviews follow. The chapter concludes with a description of the analysis.

Design

Sequential exploratory mixed methods pilot study with post-only cluster randomized controlled trial.

Purpose and Objectives

The purpose of this pilot study was to determine the acceptability and feasibility of developing a leadership intervention to influence nurses' use of clinical practice guideline recommendations for assessing and managing foot ulcers for people with diabetes in home care nursing practice. Specific research objectives were:

1. To identify barriers and to develop a tailored leadership intervention for home care nurse managers, supervisors, resource nurses, and clinical staff to influence implementation of recommendations from a clinical practice guideline for care of foot ulcers for people with diabetes.
2. To determine the impact of the intervention on patient, nurse, and system outcomes.
3. To understand the acceptability and feasibility of influencing leadership behaviours through the intervention.
4. To refine a model of leadership for implementing practice change.

5. To determine the acceptability and feasibility of study design, methods, and measures for developing a full-scale trial.

The study was conducted in two phases. In phase one, qualitative interviews (n=9) were conducted at two units to understand barriers and supports to implementing the guideline recommendations, and to inform development of the intervention strategy. Chart audits (n=56) were conducted at four units as baseline measures of nursing practice. In phase two, the four units were randomized to control or experimental groups. Participants in the control group were offered a guideline implementation strategy that consisted largely of staff education related to the guideline. In addition to receiving the same guideline implementation strategy, managers, supervisors, clinical resource nurses, and specialized wound care nurses of the experimental group participated in a 12-week leadership-focused intervention. Qualitative interviews and chart audits were conducted post-intervention and comparisons made between control and experimental groups[2]. All data collection tools were based on previously developed research instruments. Table 4.1 summarizes the sources that were used to inform development of the data collection tools for this study. Further information about the process to develop the data collection tools is provided below.

Study Setting

The study was conducted in a home-healthcare organization in the province of Ontario. The organization employed approximately 1500 nursing staff, 65 managers and supervisors, 20 clinical resource nurses, and 7 clinical directors. Consistent with its designation as an RNAO 'best

[2] The original protocol (Gifford et al., 2008) proposed to evaluate pre/post differences in chart audit data. However a post-only analysis was conducted because of unanticipated threats to the internal validity of the pre-intervention chart audit sample.

Table 4.1
Sources Used to Develop the Data Collection Instruments

Chart Audit Tool	Qualitative Interviews Guides	Workshop Evaluation
(1) *Reducing Foot Complications for People with Diabetes (*Edwards et al., 2003)	(1) Interviewing nurses and administrators (Edwards et al., 2004b)	(1) Perceived worth and educational/supportive processes (Edwards et al., 2004a)
(2) Nursing care and healing rates of VLU (Lorimer 2004; Lorimer et al., 2003)	(2) Perceived worth and educational/supportive processes (Edwards et al., 2004a)	(2) Tailored intervention for the implementation of clinical practice guidelines (Davies et al., 2002)
(3) Evaluation of RNAO BPG pilot implementation (Davies et al., 2008)	(3) Determinants of the sustained use of research evidence (Davies et al., 2006)	

practice spotlight organization' since 2006 (RNAO 2009) its organizational initiatives have included strategies to implement RNAO clinical practice and healthy work environment guidelines.

Organization administrators and clinical directors estimated that 30 to 40% of patients receiving nursing care had a diagnosis of diabetes. Foot care for people with diabetes was identified as a priority clinical topic with a notable gap between current practices and guideline recommendations. For example, no patients were being assessed for peripheral neuropathy, the most significant predictor of complications of diabetic foot ulcers. Informal chart audits indicated that comorbidity, vascular status, and wound size were not documented in at least 50% of charts for foot and leg ulcers. The organization had previously implemented clinical practice guidelines at an estimated cost of $60,000 per implementation with mixed success. Implementation of the RNAO guideline, *Assessing and Managing Foot Ulcers for People with Diabetes*, was planned for 2008.

Primary & Secondary Outcomes

The primary outcome of the chart audit was a composite score of eight items recommended in the RNAO guideline to be assessed by nurses when caring for patients with diabetic foot ulcers. Named the *Nursing Assessment of Patient Risk Factors* (NAPRF), items in the score included: (1) glycemic control; (2) foot circulation; (3) infection; (4) foot sensation; (5) foot deformities and pressure from footwear; (6) ulcer location; (7) ulcer length and width; and (8) ulcer depth. The eight items are supported by research evidence as being risk factors for poor outcomes (Table 1.2) (RNAO, 2005). They were chosen in consultation with researchers with expertise in evaluating wound care for venous leg ulcers, and corporate clinical directors at the study organization who were responsible for developing the education to support the guideline. Four of the eight items were used previously in a chart audit evaluation of another RNAO guideline related to the prevention of foot complications in people with diabetes (Edwards et al., 2003).

Secondary outcomes included:

1) composite score of the five indicators chosen by intervention participants as the priority for guideline use: (1) foot circulation, (2) foot sensation, (3) ulcer length and width, (4) ulcer depth, (5) patient education;
2) proportion of patients assessed for all items in the NAPRF scale (Nolan & Berwick, 2006);
3) proportion of people with healed ulcers at 12 weeks (defined as complete wound closure);
4) healing times in number of weeks;
5) types of treatments used (e.g., hydrogel dressings, sharps debridement, off-loading devices);
6) nurse referral rates to specialist services;
7) documented patient education;
8) perceived usefulness and relevance of elements of the intervention.

Criteria for Clusters

Units with the highest number of patients on service for diabetic foot ulcers in the first 6 months of 2007 were eligible for the study; seven of 23 units were invited to participate. Invitations to participate (Appendix D) were sent to unit managers by a senior administrator from the organization. Units were identified by the organization's research manager through an electronic search of the organization's data management system using numerical codes to capture patients on service for diabetic foot ulcers.

Six of the seven units agreed to participate (86% response rate). Two units did not have the minimum number of diabetic foot ulcer patients to meet sample size calculations (15 patients per unit over 12 weeks), and were therefore purposefully assigned to phase one (intervention development). Each of the remaining four units was randomly assigned to control or experimental groups with 20 - 45 patients discharged from service in 6 months. Randomization occurred at the unit level to minimize threats of experimental contamination between participants of the leadership intervention (Donner & Klar, 2000; Shadish, Cook, & Campbell, 2002).

At the time of randomization two units had approximately 100 registered nursing staff (RN, RPN) working full-time and two units had approximately fifty[3] (Table 4.2). All units had a similar management and clinical leadership team.

With the exception of control-1, nursing care for diabetic foot ulcers was provided in patients' homes. At control-1 care was provided in two clinics. At all sites care was provided by registered nurses (RN or RPN) who could refer patients to specialized wound care RNs for consultations in complicated cases. Specialized wound care nurses had certification in advanced wound care, such as registered Enterostomal Therapist (ET), or through an organizational

[3] Numbers were provided by the organization's research manager in 2007 at the time of the random allocation. In 2009 the number of registered nursing staff in experimental-1 was reported by the unit's manager to be 90.

Table 4.2
Staffing Levels and Management Structure at Control and Experimental Units (July 2007).

	Control-1	Control-2	Experimental-1	Experimental-2
Manager	1	1	1	1
Supervisor	2	3	1	2
Resource nurse	1	2	2	1
Total management	**5**	**6**	**4**	**4**
RN	25	53	28	60
RPN	10	42	22	40
Total nursing staff	**35**	**95**	**50**	**100**
Venue for nursing care	Clinic	Home	Home	Home

certification program. Additionally, specialized wound care nurses in control-1 conducted consultations in patients' homes based on referral from the CCAC.

Randomization.

A stratified randomization procedure was used to assign each of the four units to control or experimental groups. The four units were stratified into two groups and assigned a code (A or B) based on the number of nursing staff working at each unit (35-50 / 95-100), the proxy for size and managerial span of control. Randomization was done by flipping a coin once for each stratum. Sides of the coin were assigned as control (heads) or experimental (tails). The coin was flipped by a committee member (KW) and witnessed by the thesis supervisor, a second committee member (IG) and myself, the principal investigator (WG).

Sample size.

Sample size calculations were based on use of an independent t-test for NAPRF scores at the end of the study. The following assumptions were made: alpha = 0.05 (two-tailed), Beta = 0.20 and an expected change in NAPRF scores of 20%. Although not all items within the NAPRF have been used previously, four were evaluated previously in a pre/post chart audit that showed a 26%

absolute improvement in nursing documentation (range -3.6 to 57.1) (Edwards, 2003). Thus, a high estimate of 20% improvement was used for this pilot study. In addition, standard deviations (SD) and intra-cluster correlation coefficients (ICCs = ρ) for NAPRF were unknown. It was, however, estimated that the effect size may be small, so to be conservative 0.83 (SD = 3) was assumed for the calculation. Based on these assumptions, 30 charts were needed in both intervention and control groups (n = 60). Senior administrators reassured investigators that a minimum of 30 patients per group was feasible over 12 weeks.

Power estimates for secondary outcomes.

The anticipated rate of healing in the control group was 24% in 12 weeks (Margolis, Kantor, & Berlin, 1999). For the proportion of ulcers healed and healing times 30 charts in control and experimental groups would yield 80% power to detect an absolute increase in healing rates of 40% (alpha .05, two-tailed). Based on the assumption of independence, the study was powered to detect an absolute increase of 40% in referral rates and patient education, measured as a proportion.

Inclusion criteria.

Table 4.3 details the inclusion criteria for patient charts[4]. As charts remained in patients' homes, only discharged patient charts were eligible for the study.

Data Collection: Chart Audit

To understand current practices and gaps in care, baseline chart audit data were collected in fall 2007. Three months following the intervention post-intervention chart audit data were collected in fall 2008 to compare differences in nursing care and patient outcomes between control and experimental groups. Chart audit data were collected on the primary and secondary outcomes.

[4] Sample size could not be reached based on criteria in the original proposal, therefore the following expansions were made to increase eligibility: 1) time period for eligibility (based on discharge date) was increased (from 12 weeks to 27 weeks post audit); 2) location of the ulcer was expanded to include lower leg.

Table 4.3
Inclusion Criteria for Patient Charts.

	Baseline	POST
Patient age: 18 years or older	✓	✓
Diagnosis of diabetes	✓	✓
Ulcer of foot or lower limb below the knee	✓	✓
Admission date	no time limit	Jun 1, 2008 - Feb 15, 2009
Discharge date	Jan 1 – Sep 30, 2007	Jun 1, 2008 – Feb 15, 2009
Time period of eligibility (based on date of discharge)	39 weeks	37 weeks 260 days

Chart audit procedures.

Potentially eligible patient charts were identified by the organization's research manager. The organization's newly installed electronic database of patient services information (Procura DMS) was searched using numeric treatment codes. Treatment codes were intended to categorize the diagnostic reason a patient was on service, and were entered into the database by an administrative clerk at the time of admission. The initial search, conducted using the treatment code for diabetic foot ulcers (DFU), identified 147 charts. Hand-sifting of those revealed that only 38 patients were on service for diabetic foot ulcers; the other 109 charts were either for patients that had an ulcer but did not have diabetes, or were for patients with diabetes but no ulcer on the foot or lower leg. After consultations with administrative supervisors and coding clerks, the search strategy was expanded to include a wider range of treatment codes to capture patients with diabetes and foot ulcers that may have been incorrectly coded in the database, e.g., ulcer, pressure ulcer, venous leg ulcer, cellulitis, open wounds, infection/trauma. Charts were then hand-screened by research staff who received instruction on inclusion/exclusion criteria by the principal

investigator (WG). The same search strategy and screening methods were used for the post-intervention audit.

Charts were audited with a paper-based audit tool developed for this study. The tool was modeled after a previously developed tool from a study that assessed nursing management of venous leg ulcers (Lorimer, 2004; Lorimer, Harrison, Graham, Friedberg & Davies, 2003). Content of the tool was assessed for relevance and face validity by researchers with expertise in chart audit data abstraction, a clinician from an external organization with expertise in wound care for people with diabetic foot ulcers and venous leg ulcers, and two corporate clinical consultants from the study organization with expertise in wound care and diabetes.

The chart audit tool was piloted with 11 charts at two sites prior to data collection. Each chart was audited independently by the principal investigator (WG) and a masters-prepared nurse. Data were compared for accuracy. Inconsistencies were due mainly to unclear interpretations of questions, or to different forms on the patients' charts with conflicting information. For example, date of admission was captured as either the referral date for services, or the first date the patient was seen by the nurse. Primary and secondary diagnoses were problematic because different forms listed different diagnoses, some listing all medical conditions (e.g., diabetes, CHF, PVD, hypertension, asthma, etc.) and some listing reason for treatment (e.g., diabetic foot ulcer, trauma, burn). Documentation of the ulcer length, width, and depth (LWD) was inconsistent because a number of nurses charted length and width but not depth.

Problem areas were discussed, wording of questions revised for clarity, and a key was developed to guide data abstraction. The chart audit tool is found in Appendix E.

Referral rates to specialist services were found to be confusing for data abstractors because it was not clear in the charts who initiated the referrals. Therefore two dichotomous (yes/no) questions were asked: i) were specialists or specialist services utilized while on service for diabetic

foot ulcers, and ii) did a nurse facilitate referral to specialist services. For specialist services, documentation that the patient had seen a medical specialist (e.g., vascular surgeon, endocrinologist, podiatrist/chiropodist) or utilized specialist services (e.g., diabetic clinic, foot care clinic) was coded 'yes.' If no documentation was found in the chart a code of "no/unsure" was applied.

For nurse referral to be coded "yes" documentation must have indicated clearly that a nurse initiated the referral to a specialist or specialist services by, for example, a letter or documentation of phone calls. Routine correspondence to the family physician regarding care was not considered to be a referral. Consultations by specialized wound care nurses were considered referrals because the process within the organization for patients to be seen by specialized wound care nurses involved nurse referrals. For patient education, documentation must have indicated that a nurse provided health teaching at some point during the time on service.

The baseline chart audit was conducted prior to randomization by two people, myself the investigator, and an independent auditor, a PhD student in nursing. Training was provided by me on the use of the tool and key. A random sample of 11 charts (20%) was double-audited and checked for accuracy. Each chart had 32 response items for a total of 352 responses over 11 charts. The overall agreement was 97.7%. The error rate was calculated as 2.3% (8 incorrect responses).

Post-intervention, the audit was conducted by one auditor who was involved in the baseline-audit. The auditor was blinded to which sites were experimental or control. The investigator oversaw the audit and double-coded a random sample of 12 charts (14%). The overall accuracy of the auditor was 97.6%. The error rate was calculated as 2.4% (9 incorrect responses). No areas of discrepancy were related to the primary outcome. Areas of discrepancy involved: type of comorbidity (n=2), level of mobility (n=2), first incidence of foot ulcers (n=2), type of dressing (n=2), documented patient education (n=1), and presence of off-loading (n=1).

Data Collection: Qualitative Interview

Semi-structured telephone interviews were conducted with participants from the control and experimental sites 3 months after the intervention was completed (September – December, 2008). Interview guides were informed by previously published guides (Davies et al., 2002; Edwards et al., 2004a; Edwards et al., 2004b) and conceptually based on the theoretical framework of the study (Appendix F).

The interview guide for the control group had three main sections: 1) demographics; 2) guideline implementation activities, including questions related to each category of the leadership framework (relations, change, and task-oriented leadership behaviours); and 3) barriers to nurses assessing and managing foot ulcers according to guideline recommendations related to the primary and secondary outcomes of the study. (The outcomes included: assessment of glycemic control; circulation to lower extremities; loss of sensation; ulcer length, width, and depth; presence or otherwise of infection; foot deformities and pressure from footwear; debridement; referrals to specialist services; and provision of patient education related to diabetes and foot ulcers.) Then participants were asked what strategies leadership teams used to address or mitigate the impact of barriers.

The interview guide for the experimental group had, in addition, a fourth section that asked about the intervention strategies. Responses were elicited in three areas: Likert scale ratings about the usefulness of each intervention strategy (anchored by (1) not at all useful and (10) extremely useful); behaviours as a result of the intervention that may have facilitated application of the guideline recommendations by nurses; and whether involvement in the study had influenced them as a leader.

A research assistant, independent of the investigators or study organization but experienced in community health research, conducted the interviews to decrease social desirability

response bias. I provided instructions for use of the interview guide, which was piloted and audio-recorded with the first three participants. After listening to the recordings I met with the interviewer to discuss the clarity of the questions and prompts, and made minor changes.

Data Management

Chart audit data were entered into SPSS 17.0 statistical software. All baseline-intervention data were double entered independently by two research assistants and validated using cross-tabulations. Discrepancies in the charts were corrected until 100% accuracy was reached.

Post-intervention data were entered by a private company that provides data entry services for several university-affiliated healthcare research groups in the area. Data were entered by the senior programmer and verified for accuracy on the computer screen with me. Frequencies and descriptive statistics were used to check all variables; extreme or missing values were verified.

Missing data.

There were no missing data for items within the primary outcome variable (NAPRF scores). Data were missing from three variables: sex (n=2), goal of service (n=1), and type of dressing (n=1). Missing data were excluded from the descriptive analysis.

Ethical considerations.

Prior to commencement of data collection, ethical approval was obtained from the University of Ottawa Research Ethics Board (REB), which follows Tri-council guidelines. REB ethical clearance is found in Appendix G. Briefly, a numerical coding system was used to track individual participant and chart audit data. Names of interview participants were kept separate from data collection forms and locked at the University of Ottawa Nursing Best Practice Research Unit. Names from chart audits were kept by the research manager at the participating organization in a secure place; only numerically coded data were sent to investigators, and only aggregated data were

reported. Information consent forms were available in English and French (Appendix H and Appendix I). Data are being securely stored for five years from study completion (2015).

Analysis

Primary measures.

Nursing Assessment of Patient Risk Factor (NAPRF) scores.

Each item of the NAPRF score was dichotomously coded (1=yes or 0=no) and a total score was calculated. Distribution of data for the NAPRF score was assessed through a histogram and found to be normally distributed. An independent sample t-test was used to assess differences in mean scores between control and experimental groups. The alpha level was pre-set at 0.05.

NAPRF grouped score.

NAPRF scores were grouped into three scoring categories: low (0-2), medium (3-5), and high (6-8). A Fischer's exact test (two-tailed) was conducted to determine a difference in the distribution of scores in each category between control and experimental groups.

NAPRF individual items.

Frequency counts of each NAPRF item were compared between control and experimental groups, and between the four sites. A Pearson chi-square test was used unless the expected cell count of a two by two table was less than five, in which case a Fisher's exact test (two-tailed) was used. A Bonferroni corrected alpha level was calculated at 0.006 to control for Type I error with multiple item testing.

Secondary outcomes.

Five-item score.

A five-item score was calculated post-intervention based exclusively on the five items chosen by the experimental group as the priority for the guideline implementation (instead of the eight NAPRF items). Each unit in the experimental group chose the same five items. The five items

included four of the eight NAPRF items (circulation, sensation, length, width, and depth) plus patient education.

Differences in median scores were calculated between control and experimental groups. As the range of scores was small, the Wilcoxon signed rank test was used. Differences in the frequency distributions of scores between zero and five were calculated with Fisher's exact test (two-tailed). As there is no methodology to adjust for clustering effects using the Wilcoxon test (personal communication, Taljaard, April 2010) comparisons of mean scores were calculated to adjust for the effect of clustering with the observed ICC.

Descriptive statistics were used to summarize and compare data between control and experimental groups. Demographic data were calculated for age, sex, location of primary ulcer, presence of more than one ulcer on admission, goal of service, and previous history of foot ulcer. If patients had multiple ulcers, the one on the foot or the first ulcer documented on admission (if there was more than one on the foot) was selected as the primary ulcer. Consistent with other published research (Ince, Kendrick, Game, & Jeffcoate, 2007; Treece, Macfarlane, Pound, Game, & Jeffcoate, 2004) ulcer size was based on cross-sectional area, determined by multiplying length by width. Ulcers were then grouped into three size categories: $< 1\ cm^2$, 1-3 cm^2, and $> 3\ cm^2$ (Ince et al., 2007; Treece et al., 2004). Comorbidities were dichotomously coded (yes/no) and classified according to the 19 categories within the Charlson comorbidity index (Charlson, Pompei, Ales, & MacKenzie, 1986).

Length of time to heal was calculated from the date of the first nursing visit to the date at which the ulcer was confirmed as healed in the chart (in all cases this was the date of discharge). The age of the ulcer at the time of the first nursing visit was not available in charts and no estimates were made. The proportion of people with healed ulcer(s) at 12 and 20 weeks was calculated.

The proportion of charts with documented patient education, specialist seen while on service, and nurse-facilitated referrals was calculated. Education topics and types of specialists and referrals were described.

Types of treatments (i.e., dressings, sharps debridement, and off-loading devices) and the proportion of people that received them were described. Dressings were categorized based on nine different mechanisms of action as described in the RNAO guideline (2005). Moisture retentive non-adherent dressings and dry gauze were counted if they were the only type of dressing documented; these dressings are often secondary layers over top of dressings with more complex mechanisms of action. Based on the data, the order of application was not able to be determined. The proportion of patients that received dressings from each category was calculated. Statistical significance was not calculated.

For all secondary outcome calculations of statistical significance, categorical data were dichotomously coded (yes/no) and comparisons assessed using a Pearson chi-square, or Fisher's exact test if cell counts were less than 5. For interval data, independent sample t-tests were used to assess differences in means, and non-parametric tests were used to compare medians when data were not normally distributed (Wilcoxon tests and Kruskal Wallis). All tests were two-tailed and the alpha level was pre-set for 0.5.

Other outcomes.

An intraclass correlation coefficient (ICC) and sample size estimates for an adequately powered cluster trial were calculated for the post NAPRF scores. A PhD prepared statistician (MT) from the Ottawa Health Research Unit, with expertise in cluster trials, and a co-investigator (KW) were consulted for the ICC and sample size calculations.

The variance component method was used to compare the variance within and between clusters; mixed model analysis was used to calculate the ICC. Sample size calculations were

conducted using formulas recommended in Donner and Klar (2000) with the following criteria: alpha (α)=0.05, beta (β)=0.2, standard deviation (SD)=2.8, effect size=0.8. Because of the degree of inaccuracy in calculating an effect size in small pilot studies a clinically important effect size was used (Kraemer, Mintz, Noda, Tinklenberg, & Yesavage, 2006), in this case the same as that used in the *a priori* sample size calculation (0.8). A sensitivity analysis using formulas recommended by Donner and Klar (2000) was conducted to obtain sample size estimates for three ICCs to guide power calculations for future studies.

Qualitative Interviews

Qualitative data from the semi-structured interviews were analyzed using a descriptive content analysis approach (Graneheim & Lundman, 2004; Miles & Huberman, 1994; Sandelowski, 2000). Interviews were audio-recorded, transcribed verbatim by a professional transcriptionist familiar with nursing research, and entered into NVIVO 8© qualitative software.

Participant responses to each question were grouped to form the unit of analysis. An iterative process was used to summarize the data descriptively. This approach involved: deductive coding of relevant passages using the words of participants; organizing and grouping recurring ideas into response categories; displaying categories in coding matrices to identify patterns and regularities; and re-coding and condensing response categories into descriptive themes (Miles & Huberman, 1994; Sandelowski, 2000).

Themes were verified by a second researcher experienced in qualitative coding. Disagreements were discussed until 100% agreement was achieved. Coding themes that had been identified by three or fewer participants were not retained because it was decided they did not represent the 'best fit' for the data. Demographic data of respondents and Likert scale ratings were aggregated and reported descriptively (means, medians, mode, range).

Barrier themes were categorized by five levels as defined by Bosch et al. (2007) in their systematic review of quality improvement initiatives : 1) individual nurse; 2) team or social interaction; 3) organization or unit; 4) wider environment, including structures and government policies; and 5) patient. The first four barriers are consistent with levels of change as defined by Ferlie and Shortell (2001). Barriers by level were then displayed for each of the selected guideline recommendations.

Strategies to address barriers and influence guideline use were validated by a second researcher and then categorized by knowledge translation interventions as described in Straus et al. (2009): 1) education, 2) linkage and exchange, 3) audit and feedback, 4) informatics reminders, and 5) organizational interventions. Strategies were also categorized by leadership behaviour categories (relations, change, task) as outlined in the study's theoretical framework (Figure 1).

Chapter 5: The Intervention

Developing team leadership to facilitate guideline use: Planning and evaluating a three month intervention strategy

Chapter five begins with a manuscript that describes the development and evaluation of the intervention strategy. The manuscript was prepared and accepted for publication in the Journal of Nursing Management *(Gifford, Davies, Tourangeau, & Lefebre) (2011).*

In the manuscript I address the first and third research objectives of the thesis: to identify barriers to guideline use and develop a tailored leadership intervention, and to understand the feasibility of influencing leadership behaviours through the intervention. The chapter concludes with further details about the intervention not included in the manuscript because of space restrictions.

Developing team leadership to facilitate guideline utilization: Planning and evaluating a three month intervention strategy

Journal: *Journal of Nursing Management*

(Gifford, Davies, Tourangeau, & Lefebre, 2011)

Background: Research describes leadership as important to guideline use. Yet interventions to develop current and future leaders for this purpose are not well understood.

Aim: To describe planning and evaluation of a leadership intervention to facilitate nurses' use of guideline recommendations for diabetic foot ulcers in home health care.

Method: Planning the intervention involved a synthesis of theory and research (qualitative interviews and chart audits). A workshop and 3 follow-up teleconferences were delivered at two sites to nurse managers and clinical leaders (n=15) responsible for 180 staff nurses. Evaluation involved workshop surveys and interviews.

Results: Highest rated intervention components (4-point scale) were: identification of target indicators (3.7); development of a team leadership action plan (3.5). Pre-workshop barriers assessment rated lowest (2.9). Three months later, participants indicated their leadership performance and strategies had changed as a result of the intervention, being more engaged with staff and clear about implementation goals.

Conclusions and Implications for Nursing Management: Creating a team leadership action plan to operationalize leadership behaviours can help in delivery of evidence-informed care. Access to clinical data, and understanding team leadership knowledge and skills prior to formal training will assist nursing management in tailoring intervention strategies to identified needs and gaps.

INTRODUCTION

Despite national and international policy imperatives for nurses to use research evidence in their decision-making (Canadian Nurses Association, 2007; International Council of Nurses, 2007), the translation of research findings into clinical practice remains slow, unpredictable and inconsistent (Grimshaw et al., 2004; Grol et al., 2006). It can take decades for research results to glean improvements in the quality of patient care and health outcomes. Clinical practice guidelines can help bridge the research-practice gap by translating research findings and other forms of evidence into recommendations for practice (Thomas et al., 1999). However, guidelines must be used for benefits to be realized, and their effective use in clinical practice is fragmented and fraught with barriers (Grimshaw et al., 2004; Legare, 2009).

LITERATURE REVIEW

Research has shown very clearly that leadership is instrumental to create a context that enables and supports nurses to use research findings in health care practices (Angus et al., 2003; Newhouse, 2007; Rycroft-Malone et al., 2004; Stetler, 2003). For example, in a follow-up study of 37 organizations, Davies et al. (2006) found leadership to be the only significant predictor of nurses' continued use of guideline recommendations from a variety of clinical topics (n=16) two and three years after implementation into nursing practice. Leaders at all levels of organizations were identified as influencing guideline use, including direct care staff, advanced practice nurses, managers and executive directors (Davies et al., 2006).

Gifford et al. (2006) compared data from nine organizations in the Davies et al. (2006) study and found certain leadership activities in those units that successfully sustained guideline use when compared to those that were not successful. Leadership activities engaged in were described through three categories: 1) facilitating staff through support, visibility and communication; 2) creating a positive milieu through vision, role-modeling and change; and 3) influencing organizational structures and processes through resources, policies and monitoring. Similarly, findings from an integrative literature review demonstrated that leadership support, vision and regulatory factors were influential in transferring research findings into clinical practice (Gifford et al., 2007).

Within psychology, sociology and business, research findings are available that have specifically examined the relationship between leadership and use of innovations in organizations; this research has clearly shown that leadership can facilitate acceptance and utilization (Elenkov & Manev, 2005; Howell & Avolio, 1993; West et al., 2003). Significant associations have been found, for example, between adoption of an innovation and leaders' involvement, attitude, and commitment towards change (Damanpour, 1991; Greenhalgh et al., 2004), clarity of roles (West et al., 2003), leadership styles (Elenkov & Manev, 2005; Howell & Avolio, 1993), vision, managerial relations and use of data management systems (Greenhalgh et al., 2004).

Leadership development

Despite the known importance of leadership to support research use, few intervention studies have been reported about how to prepare current and future nurse leaders for this purpose (Gifford et al., 2007). The review by Gifford et al. (2007) found only four studies with an intervention for nurse leaders to facilitate evidence-based practice. These studies varied in their approach and duration ranging from six months to three years. For example Rutledge and Donaldson (1995) involved top executives and managers in a strategy that included networking with hospitals and academic centers, and developing strategic goals to incorporate research use. Resnick et al. (2004) engaged administrators and directors in a two day session that focused on facilitating guideline implementation through staff education, role clarity, and feedback. While three of the studies in the review showed positive results (Harrow et al., 2001; Resnick et al., 2004; Rutledge & Donaldson, 1995), lack of control groups made it impossible to draw firm conclusions about the effects of interventions. One experimental study used opinion leaders to influence research-based nursing care, and found no effect on selected outcomes (Hodnett et al., 1996).

A recent review examining leadership development in nursing found leaders' participation in educational activities positively influenced observed leadership behaviours (Cummings et al., 2008). The opportunity to practice specific skills in the workplace, such as initiating structures and relations-oriented interactions, were reported as significantly influencing leadership development. However, non-experimental study designs limit the conclusions that can be drawn regarding effectiveness of the interventions to develop general leadership competencies.

A meta-analysis of 83 studies with leadership development interventions found that leadership training may result in significant knowledge and skill improvements, although the effects varied widely across studies (Collins & Holton, 2004). The greatest effects were observed on knowledge outcomes of participants. Objective behaviours and system outcomes were less frequently measured and found to be moderately influenced. Overall, the meta-analysis suggested that leadership development programs can attain substantial improvements in outcomes if sufficient analysis of leadership development needs is conducted prior to training and intervention strategies are geared towards identified needs.

Integrating learning objectives with organizational visions and goals further increased the chance of successful outcomes (Collins & Holton, 2004). In summary, research has clearly demonstrated the importance of leadership to support evidence-based practice. Little is known however about what interventions will effectively influence nurse leaders to facilitate and support research use by clinical staff.

Aim

The aim of this paper is to describe the multi-method planning and evaluation of a leadership intervention to facilitate utilization of a clinical practice guideline for assessing and managing foot ulcers for people with diabetes in community nursing practice. The guideline has been developed by the Registered Nurses' Association of Ontario (RNAO, 2005) and it provides recommendations for

nursing care based on research evidence. The leadership intervention, consisting of one interactive workshop and three follow-up teleconferences over three months, is part of a larger study examining its impact on nursing care (Gifford et al., 2008).

Setting

This study was conducted in a home and community health-care organization that delivers nursing care through approximately 20 units throughout a Canadian province. The overarching vision of the organization is to provide high quality, evidence-informed, patient-centered care. As a designated 'best practice spotlight organization' (RNAO, 2009), initiatives to support the vision have focused on creating healthy work environments and implementing clinical practice guidelines. With approximately 40% of the client population being diabetic, organizational administrators identified the implementation of the diabetic foot ulcer guideline as a clinical priority.

To ensure the focus of the study was consistent with organizational priorities and clinical needs, a collaborative partnership was established between university researchers and organizational decision-makers (i.e. senior executives and middle managers). The partnership allowed both researchers and decision-makers to contribute their unique perspectives to the planning of the intervention. For example, the organization's vision was central to the purpose and objectives of the leadership workshop, and educational strategies were planned to complement professional development programs already in place.

Epidemiological perspective

Diabetes is increasing worldwide. In 2000, an estimated 150 million people around the world were diagnosed with diabetes, a fivefold increase from 1985 (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2008). Almost 2 million Canadians (5.5% of women and 6.2% of men) were diagnosed with diabetes in 2005-2006 and prevalence is increasing due to demographic trends that include an aging population, increased immigration from high-risk groups (Asian, Hispanic, African), Aboriginal populations growth (3-5 times higher incidence of diabetes), and increased rates of obesity (Public Health Agency of Canada, 2008).

Ulcerations of the feet are a significant problem for people with diabetes (Spencer, 2004; Valk et al., 2001). Foot complications are a major contributor of hospital admissions, accounting for approximately 20% of all diabetes-related admissions in North America (Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2008). Foot ulcers precede 85% of lower limb amputations (Boulton et al., 2004; Valk et al., 2001) and 30% of those who have undergone amputation will die within the following year (Hux et al., 2003). Studies have reported that when caring for people with diabetic foot ulcers, health care professional do not consider all the risk factors that lead to increased morbidities such as infection, gangrene and amputation (Boulton et al., 2004; Valk et al., 2001).

The Canadian Diabetes Association (2008) and the RNAO (2004) recommend that health professionals include the following risk factors in their assessments: glycemic control, peripheral

neuropathy, vascular status of the foot, structural deformities, pressure from footwear, signs and symptoms of infection, and size of ulcer measured by length, width and depth. Internal informal audits at the study organization indicated that nurses were assessing few people for glycemic control and vascular status and no clients for peripheral neuropathy, indicating a gap between guideline recommendations for practice and actual care.

Methods and Study Design

Planning of the intervention involved a synthesis of previous research and theory with data from qualitative interviews and chart audits. The evaluation included surveys (Appendix E) and interviews (Appendix F). Ethical approval was received from the Research Ethics Board of the affiliated University.

Planning the intervention

A summary of the methods to plan and execute the intervention is presented in Table 1.

Interviews

Interviews were conducted at two units not participating in the study to minimize the potential of sensitizing the study group to the intervention prior to delivery. Management structures and processes of care for clients with diabetic foot ulcers were similar between units in the planning and intervention phases.

Chart audit

A chart audit tool was developed for the study and evaluated for content validity by researchers and clinicians. Data abstraction was completed by two auditors. A random sample of eleven charts (20%) was double audited for accuracy and the overall agreement was 97.7 percent. The audit occurred over 10 months (January - October, 2007) to reach sufficient sample size based on *a priori* calculations (N=60) for longer term comparisons between control and intervention groups (Gifford et al., 2008).

The Leadership Intervention

The intervention consisted of one workshop and three follow-up teleconferences. The theoretical underpinnings of the intervention were based on theories of planned change (Graham & Logan, 2004), research on organizational leadership (Yukl, 2006), and leadership for guideline implementation (Gifford et al., 2006). Face-to-face meetings, teleconferences and site visits with organizational partners were used to contextualize the language and content of the intervention to participants' work environment.

Table 1: Summary of methods to plan and execute the intervention

	Planning the intervention		*Intervention*
Data Collection & Analysis	Interviews (n=9) September 2007 Data analysis: Qualitative content analysis Software: NVivo 8	Chart audit (n=56) January - October 2007 Data Analysis: Descriptive statistics Software: SPSS 17 for Windows	Workshop (n=1) April 2008 Teleconferences (n=3) May - July 2008
Participants	Managers, supervisors, clinical resource nurses, specialized wound care nurses. Years in nursing: mean = 17 (SD=12.3) Years in position: mean = 1.8 (SD=1.3)	Adult patients > 18 years of age with a diagnosis of diabetes on service for nursing care of one or more foot ulcers	Managers, supervisors, clinical resource nurses, specialized wound care nurses
Purpose	To better understand barriers & facilitators to nurses practicing as recommended in RNAO clinical guideline	To determine baseline measures of eight items recommended to be assessed in RNAO clinical guideline	To enhance team leadership behaviours for managers and clinical leaders to facilitate evidence-based nursing care and benefit patients with diabetic foot ulcers.
Summary of Findings	<u>Barriers</u> • Poor communication with health care team • Unclear expectations of practice • Lack of desire to change • Heavy workload / lack of time • Lack of knowledge & skills • Lack of equipment • Unclear care plan / documentation forms • Inefficient process to access information <u>Facilitators</u> • ↑ communication with health care team • Reinforce professional standards • ↑ managers' visibility and understanding of clinical practice issues • Provide encouragement, recognition, reminders and feedback • Routinely discuss challenges of change	Assessment score /8: mean = 3.6 % patients assessed on admission for each item in the assessment score: Foot sensation 0% Circulation o the feet 22% Foot deformity / pressure 23% Glycemic control 40% Wound depth 47% Wound length and width 63% Infection 72% Location 95%	<u>Workshop Content</u> • Leadership and planned change theory • Barriers and facilitators to guideline utilization • Chart audit findings of nursing care <u>Workshop activities</u> • Identification of clinical indicators and goals of implementation • Development of a team leadership action plan tailored to unit barriers and supports • Reflection on leadership <u>Teleconferences</u> • Discussed leadership strategies and progress with implementation • Updated activities within the leadership action plan

Workshop

Thirteen managers and clinical leaders from two units responsible for over 180 registered nurses participated in the six hour workshop. One week prior, printed materials were distributed to participants. Materials included: readings on leadership (Gifford et al., 2006) and planned change (Graham & Logan, 2004), and four questions related to barriers and facilitators for participants to explore with staff prior to attending the workshop and be prepared to discuss findings.

A senior administrator opened the workshop to emphasize organizational commitment and alignment with strategic goals. A workbook was provided to each participant that included: leadership research and theory, self-reflection exercises, and activities to develop a leadership action plan (Figure 1). The workshop was facilitated by the investigator (WG) and an experienced manager (GS) who had been involved in preparing the workshop. The facilitators' roles were to elicit discussion, self-reflection and interactive problem-solving to identify goals for change and leadership strategies to achieve them. Barriers and supports to nurses using the guideline recommendations were discussed and participants worked together to understand the context-specific barriers and supports at their respective units.

Findings from the chart audit were presented to illustrate the gap between nursing practices for diabetic foot ulcers and recommendations in the guideline. Participants from each unit then identified target indicators and guideline implementation goals, for example increasing nursing assessments of circulation to the feet from 22% to 80%. Emphasizing shared responsibility and group problem-solving, participants based goals for implementation on unit priorities, principles that are consistent with collaborative learning and reconstructing information into meaningful knowledge (Nutley et al., 2007).

Target indicators and goals were then incorporated into a vision statement that became the basis of the team leadership action plan. Aspects of the organizational vision (i.e. to provide high quality evidence-informed nursing care) were also included in the vision statements.

The team-leadership action plan

The second half of the workshop was devoted to developing the team leadership action plan (Figure 1). The purpose of the action plan was to operationalize relations, change and task-oriented leadership behaviours to address barriers and achieve the goals for change as a result of implementing the guideline. Utilizing leadership theory and taking into consideration the context-specific barriers and facilitators, teams operationalized leadership behaviours in each category of the action plan. At the end of the workshop, one unit had completed the action plan, while the other group required two further team meetings to complete their action plan.

Vision Statement and Goals

Example: *to provide high quality evidence-informed nursing care to clients with diabetic foot ulcers, focusing on increasing assessment and documentation of the following indicators: circulation to lower extremities (from 22% to 80%), foot sensation (from 0% to 80%), length & width of wound (from 63% to 90%), depth of wound (from 47% to 90%).*

Relations-oriented leadership behaviours	Change-oriented leadership behaviours	Task-oriented leadership behaviours
I will support staff assess and manage foot ulcers according to the guideline by:	I will reinforce this vision/goal statement by:	I will ensure staff have the resources & tools to practice according to the guideline by:
I will coach/mentor staff by:	I will influence the change process by:	I will clarify roles and expectations to staff by:
I will recognize/acknowledge staff by:	I will role-model commitment to the changes from the guideline by:	I will monitor target indicators by:
I will be accessible/visible to staff by:	I will create an empowering culture and practice environment by:	Other:

Follow-up teleconferences

Beginning approximately one month after the workshop, three teleconferences were conducted at each unit (n=6) over a three month period (May - July, 2007). The purpose was to provide an interactive forum for participants to discuss and refine the leadership activities within the action plan. The same two facilitators (WG and GS) led the teleconferences. After each teleconference, action plans were updated and electronically mailed back to managers for distribution to participants. Teleconferences were scheduled at a time prearranged by unit managers. Each teleconference lasted 10 to 30 minutes, and one to six participants attended. At one unit, only one participant was in attendance at each teleconference.

EVALUATING THE INTERVENTION

Workshop Survey

A survey was completed by all participants (n=13) at the end of the workshop. Data were analyzed in SPSS 17.0 for descriptive statistics, and open ended questions were qualitatively summarized. Results revealed that overall, the workshop was well received. Workshop content and activities were rated above three on a four point scale (1 = not at all relevant and useful, 4=extremely useful and relevant), with the exception of pre-workshop materials. The highest rated activities were: identification of priority indicators and target outcomes (mean=3.7), chart audit findings about the research/practice gap (mean=3.5), discussions of barriers and leadership supports (mean=3.5), and development of the leadership action plan (mean=3.5). Pre-workshop materials were rated as least

useful (mean=2.9) with many participants indicating they had not received the materials beforehand, or did not have enough time to review at work.

Written comments on the survey indicated the following activities were particularly useful: sharing ideas between managers and clinical staff, clarifying managers' and clinical leadership roles regarding support for implementation, having specific goals, and leaving with a finished product. One participant wrote: 'a productive day - we ended up with a result - the strategic plan - that is practical and able to be implemented immediately.' Several participants stated the workshop helped them understand the importance of leadership at all levels when implementing guideline based practice.

Interviews

Three months after the intervention was completed, one-to-one interviews (see Appendix F) were conducted with study participants (n=14); ten had participated in the intervention. Four intervention participants were not available to be interviewed because they had left the organization or were on extended leave.

Interviews were audio-recorded, transcribed, and analyzed in NVivo 8 qualitative software (QSR International Inc. Cambridge, MA). Content analysis was undertaken using an iterative process that involved: deductive coding of relevant passages using participants' words, displaying data in coding matrices to identify patterns and regularities, and recoding and condensing responses to descriptively summarize the data (Graneheim & Lundman, 2004; Miles & Huberman, 1994; Sandelowski, 2000).

Participants had been working in nursing 23 years (SD=11.5) on average, and in their current position on average of 4.2 years (SD=4.3). Five held management positions and nine held clinical leadership positions (resource or specialty wound care nurses). Half held university degrees and half held nursing diplomas. Nine had previously been involved in facilitating implementation of a clinical practice guideline.

The top two rated activities on a 10 point scale: identification of priority indicators and target outcomes (mean= 8.1) and development of leadership action plans (mean=8). Commenting on developing the leadership action plan, one participant stated:

> It was difficult I think initially... because we were not used to thinking like that... so it was a really good exercise for all of us to stop and think a little 'big picture' - so what are we really trying to do here... It wasn't easy but it stretched everybody a little bit (ID-019).

Pre-workshop materials and barriers assessment activity rated the lowest (median=5.5). The median rating for the teleconferences was 7, however the two sites differed greatly with one site rating the teleconferences high, and one site predominately low. Participants that rated the teleconferences high responded that the communications helped them strategize and keep the

implementation activities 'on the radar' as a priority. Conversely, participants who rated the teleconferences low either didn't recall participating or didn't perceive a need for them.

Influence on leadership behaviours

All participants perceived the intervention to have influenced them as leaders of guideline implementation. Many participants stated during the interviews that the intervention validated the importance of working together as a team, and reinforced each member's unique role in supporting practice change:

> This put a whole different light on making a change. ...you don't realize how important it is to have your manager and the people in the office, the resource nurse and ET... backing the nurses. I don't think the nurses realize how important it is but sometimes we ourselves don't realize how important our support is to them. So that brought that piece to light (ID-003).

> It was very helpful... it was very good for everyone to see how we all had a different role... even though I wasn't the person out there doing the teaching or joint visits... my role still was very important to the whole team for the success of this... I think it gave some validation to our different roles and how we can help support a clinical initiative (ID-019).

The intervention seemed to increase participants' motivation and enthusiasm while keeping the guideline implementation a priority:

> The leadership part of it actually gave a little bit more of a spark. Our energy was devoted from the core group... So we looked like we were interested and this was going to be something interesting and fun. And the nurses found that different from other things that we've done lately. ...they could see that we had more energy towards implementing it (ID-009).

> Knowing that you are a part of a bigger structure is also very motivating... you want to keep up your end of the team and not let it go by the wayside because the very purpose behind it was a very worthy purpose (ID-023).

Participants also stated the intervention helped them mentor and acknowledge staff in their efforts to make change. In addition it assisted to make the connection between the guideline recommendation and patient outcomes:

> By coaching and mentoring staff and sending 'bravo' cards. ...we identified and articulated and put it in black and white [in the action plan]... Whereas before if I wanted the nurse to know she did a really great job - it was sort of a one-off kind of thing. I don't think I really recognized the importance of it, the long range importance of it, that it goes back to client healing and the whole bit (ID-002).

Limitations

A number of limitations to planning and evaluating the intervention are noted. While interviews were conducted to tailor content and activities prior to the intervention, participants were not assessed for baseline leadership knowledge and skills. Information regarding baseline leadership knowledge and skills, in addition to team readiness for integrative team leadership, would have been useful to adapt the intervention strategies to meet individual and unit needs. Once the workshop was underway it became apparent that different facilitation strategies were needed for the two units. For example, participants from one unit readily worked together to complete the team leadership action plan by the end of the workshop. The other unit did not readily engage in the workshop activities, and required two further meetings to develop the team leadership action plan.

Another limitation was related to sample size: the number of participating units was small. However, units were purposefully selected with the highest number of clients with diabetic foot ulcers, and the composition of the leadership teams and care delivery processes were typical of all units within the organization. Despite limitations, the evaluation provides insight into directions for future research.

DISCUSSION

The merit of this study lies in the process to systematically develop a leadership-focused intervention based on theory and research. With guidelines use increasingly recognized as a tool for improving quality of care (Grimshaw et al., 2004), findings of this study are important to understand how to assist leaders to better facilitate and support guideline implementation efforts.

Despite a prevailing view that tailoring interventions to pre-determined barriers and facilitators will enhance clinician practice change (Shaw et al., 2005), adequate details about the process to plan and tailor intervention strategies are not typically well described in the literature (Bosch et al., 2007). Furthermore, little is known about how to tailor interventions directed towards leadership and organizational processes such as guideline utilization. It became clear during the workshop that it would have been beneficial to tailor the intervention strategies to each units' specific team leadership needs. Indeed, a meta-analysis of 83 leadership training interventions found that needs-assessments helped match leadership training techniques to participants' needs and increased the probability of success (Collins & Holton, 2004). It is possible to argue that knowledge translation from a leadership development perspective requires the same pre-assessment and tailored approach as outlined in theoretical models such as the Ottawa Model of Research Use (OMRU) (Graham et al., 2006) or the Promoting Action on Research Implementation in Health Services (PARiSH) (Kitson et al., 2008).

Barriers identified to nurses' use of the guideline were similar to those commonly described in the research utilization literature and included lack of knowledge about clinical recommendations, limited time, workload pressures, and insufficient resources (Davies et al., 2008; Gerrish & Clayton, 2004; Ploeg et al., 2007). Categorizing barriers within the leadership framework was useful for

participants to understand how leaders' efforts were often dominated by task-oriented behaviours such as the efficient use of resources. However, research has shown that resources alone do not predict guideline utilization (Davies et al., 2006). In contrast, facilitators to enhance utilization were described more as relations-oriented leadership behaviours, suggesting that guideline implementation is as much about building supportive relationships between leaders and clinical staff.

Findings of this study seem to suggest that in addition to providing education and resources, nurse leaders need to actively engage staff, provide encouragement and recognition, and elicit feedback to facilitate guideline implementation. Despite the small sample, these finding are consistent with leadership and management research demonstrating that relations-oriented leaders are more effective in motivating staff to change (Shaw, 2007; Yukl, 2006). Although leadership has received much attention in literature (McCormack et al., 2002; Ovretveit, 2005; Wallin et al., 2006), the importance of relations-oriented leadership has not been fully described.

The workshop evaluation showed that participants found the discussion of barriers and facilitators during the workshop to be useful. However, of all the intervention components, the pre-workshop materials that included a barriers assessment activity rated the lowest. With lack of time described as a reason for the low ratings, it appears that conducting the barriers assessment during scheduled work hours was pre-empted by other unit priorities. Despite recognition that educational strategies must be incorporated into clinical routines for practice change to occur (Grol and Grimshaw, 2003), there is a need to recognize the importance of incorporating pre-implementation planning strategies, such as barriers assessments, into leadership routines to influence practice change.

The importance of planning has long been recognized in management literature as a means to leadership effectiveness (Kim & Yukl, 1995; Kotter, 1990; Yukl, 2006). Planning is a task-oriented leadership behaviour that largely involves meeting with others to make decisions about priorities, strategies, roles and responsibilities, and resource allocation. In fact, these behaviors were consistent with the intervention strategies used to develop the leadership action plans. Planning does not typically occur in a single episode; rather it tends to be an iterative process that occurs over a period of weeks or months (Yukl, 2006).

The follow-up teleconferences provided an opportunity for participants to engage in leadership planning with two external facilitators (one from outside the implementation site and one from outside the organization). Scheduling the teleconferences however was found to be problematic and participation was particularly low at one site where a change in leadership had occurred at the time of the study. Some participants expressed that the format of telephone conferencing provided a barrier for engagement. These challenges were not dissimilar to those identified by Stetler and colleagues (2006) who found insufficient contact between implementation teams and facilitators as an obstacle to effective facilitation. It appeared that within certain contexts, facilitated teleconferences may provide an opportunity for leadership planning. However in other contexts, face-to-face visits in participants' own setting by external facilitators may be more effective.

Findings from the three month evaluation indicated that nurses from both units felt their leadership behaviours were influenced by the intervention. The team leadership action plans helped operationalize leadership strategies, and participants described being more engaged with staff, and acknowledging staff's efforts. However, engagement and awareness alone are not sufficient to effectively facilitate practice change. Leaders need also be able to problem solve, revise plans and implement solutions while taking into account the competing demands of their units. Leadership development research indicates that for leaders to evolve, newly learned concepts need first to be applied in relatively concrete situations, then elaborated on and applied in more complex situations (Mumford et al., 2000). Opportunities in the workplace such as special assignments and mentoring can help leaders refine and further develop behaviours learned in formal programs (McCauley et al., 1998; Mumford et al., 2000). Ensuring activities that fit with management strategies can help address some of the inherent challenges of leadership development activities in the workplace (Shaw, 2007; Yukl, 2006).

Nurse managers' understanding and involvement in clinical practice issues was perceived as particularly important to implementation efforts. This finding echoes current nursing management literature that underscores the need for managers to focus on more than traditional practices in day to day operations (Shaw, 2007). Modern management needs also to incorporate a strong component of change leadership that focuses on people and relationships. Understanding clinical practice is important for managers to verbalize issues into priorities that are meaningful to decision-makers, and thus effectively advocate for staff needs. Consistent with political leadership, these skills are important for leaders to create work environments that explicate values common to nursing (Antrobus & Kitson, 1999).

Finally, access to clinical measures (vis-a-vis chart audit data) as well as identifying target outcomes was perceived as very useful to participants. Monitoring and benchmarking quality improvement measures have been described as an important leadership strategy to facilitate research use in nursing (Gifford et al., 2007). However, accessing data and findings is often difficult, particularly in homecare where resources are limited and charts remained in clients' homes while on service. Electronic health records (EHR) and information systems such as data dashboards that synthesize large amounts of electronic data are strategies that can increase access to information for monitoring in home healthcare (Handley et al., 2003; Mazzella-Ebstein & Saddul, 2004).

Recommendations

Based on study findings, a number of recommendations can be made. Prior to formal training, it is recommended that team leadership knowledge and skills be assessed so that content and facilitation strategies can be tailored to individual and team needs. Leadership development activities should be incorporated into organization's management strategies and opportunities provided for managers and clinical leaders to participate in leadership development activities in the workplace. Access to relevant data and data summaries is recommended to support leadership planning and decision-making. Lastly, use of a tangible framework such as the team leadership

action plan provides a valuable tool to strategize and operationalize leadership goals, behaviours, and track leadership development progress.

Conclusion

Findings from this study demonstrate that it is possible to support guideline implementation through a leadership strategy that combines principles of leadership development and planned change with organizational decision-makers' ideas about their leadership needs. Creating a team leadership action plan can help managers and clinical leaders prioritize and understand the strategic role they have in leading evidence-informed nursing practice and utilization of guidelines.

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Further Details about the Intervention

Details about the intervention, not included in the published manuscript because of parsimony and space restrictions, are described next. Fifteen people participated in at least one aspect of the intervention. Table 5.1 shows the number of participants from each unit that attended the workshop and teleconferences. Thirteen people from the two intervention units attended the workshop. At unit-1 all workshop participants attended at least two teleconferences. Unit-2 had a markedly different participation rate at the teleconferences with only one person, a different person each time, attending them. Additionally, there were three different managers during the intervention period at unit-2. The manager that attended the workshop left the organization at the time of the first teleconference, an interim manager attended the second teleconference, and a new permanent manager attended the third. Prior to the second teleconference I met with the interim manager for one hour to provide information on the study and the leadership action plan. Neither the interim nor new manager had attended the workshop. Only one participant from unit-2 attended both the workshop and a teleconference.

Table 5.1
Intervention Exposure: Number of Participants that Attended the Workshop and Teleconferences.

	Workshop	Teleconferences			Workshop & teleconference
		#1	#2	#3	
Unit-1	7	6	6	5	7
Unit-2	6	1	1	1	1
Total	13	7	7	6	8

The pre-workshop materials and follow-up teleconference guide are found in Appendix J and Appendix K respectively.

Chapter 6: Results

In chapter six chart audit results related to the primary and secondary outcomes are reported first. Qualitative responses to the post-intervention interviews are then described in relation to guideline implementation activities at each site, barriers to nurses using the guideline recommendations, and leadership strategies to address them. Evaluation of the intervention concludes the chapter.

Chart Audit

Eighty-eight charts (control=54, experimental=34) met inclusion criteria at the four sites and were audited post-intervention. All patients had a diagnosis of diabetes and had been receiving services for treatment of one or more ulcers of the foot or lower leg.

The characteristics of patients, patient ulcers, and goal of services on admission are shown in Table 6.1. Consistent with other research findings (Ince, Game, & Jeffcoate, 2007; Margolis, Allen-Taylor, Hoffstad, & Berlin, 2005) the mean age of patients was 67.1 years and 64.8% were male. Ulcer of the foot was present in 76% of patients; 24% had an ulcer of the lower limb. There was no statistically significant difference in the location of the primary ulcer between control and experimental groups (Pearson chi-square=4.368, df=4, p=0.36). Twenty-eight percent of patients had more than one ulcer on admission. The goal of service for 85% of all patients was complete healing. Eight percent had been on service for maintenance of a chronic wound with healing not expected, such as in palliative care patients, and 7% of the charts had no goal of service documented. There were no statistically significant differences observed between control and experimental groups in any of the descriptive characteristics, with the exception of the proportion of patients that had an ulcer located on the toe.

Table 6.1
Demographic Characteristics of Patients, Patient Ulcers, and Goal of Service on Admission.

	Control n=54	Experimental n=34	Total n=88	p value
Age: Mean(SD)	66 (14)	69 (11)	67.5	0.3†
Sex: Male	36 (67%)	21 (62%)	57 (65%)	.66*
Location of Primary Ulcer				
Foot	44 (81.5%)	23 (68%)	67 (76%)	
→ toe	24 (44.4%)	9 (26.5%)	33 (38%)	
→ heel	3 (5.6%)	3 (8.8%)	6 (7%)	
→ ankle	7 (13%)	3 (8.8%)	10 (11%)	.36‡
→ plantar/dorsa foot or unspecified	10 (18.5%)	8 (23.5%)	18 (20.5%)	
Lower limb	10 (18.5%)	11 (32.4%)	21 (24%)	
> 1 ulcer on admission	14 (26%)	11 (32%)	25 (28%)	.63*
Goal of Service				
Complete healing	47 (87%)	28 (82%)	75 (85%)	.11*
Maintenance of chronic wound	2 (3.7%)	5 (14.7%)	7 (8%)	
Not documented	5 (9.3%)	1 (3%)	6 (7%)	
History of Foot Ulcer	19 (35.2%)	17 (50%)	36 (41%)	.17*

† T-Test
* Fisher's Exact Test
‡ Pearson chi-square

Patient comorbidities are found in Table 6.2. There was no statistically significant difference in documented patient comorbidities between control and experimental groups.

Ulcer size data were available for 68% of patients from documentation in the charts (Table 6.3). There were no statistically significant differences between control and experimental groups in regard to the proportion of people with ulcers in three sizes: < 1 cm^2, 1-3 cm^2, and > 3 cm^2 (Pearson chi-square=2.74, p= 0.25, df=2).

Table 6.2
Comorbidities by Control and Experimental Group.

	Groups			
	Control (n = 54)	Experimental (n = 34)	Total (n = 88)	p value*
Diabetes	54 (100%)	34 (100%)	88 (100%)	-
Hypertension	24 (44.4%)	18 (52.9%)	42 (47.7%)	.44
Cardiac Disease	16 (29.6%)	12 (35.3%)	28 (31.8%)	.58
Renal/Organ Damage	12 (22.2%)	13 (38.2%)	25 (28.4%)	.11
Peripheral Vascular/Artery Disease	11 (20.4%)	5 (14.7%)	16 (18.2%)	.5
Obesity	8 (14.8%)	3(8.8%)	11 (12.5%)	.41
Cerebrovascular Disease	3 (5.6%)	5 (14.7%)	8 (9.1%)	.15
COPD	6 (11.1%)	1 (2.9%)	7 (8.0%)	.17
Smoking	3 (5.6%)	1 (2.9%)	4 (4.5%)	.57
Cancer	2 (3.7%)	1 (2.9%)	3 (3.4%)	.85
Connective Tissue Disease (e.g., polymyalgia rheumatica)	0 (0%)	2 (5.9%)	2 (2.3%)	.07
Alcoholism	1 (1.9%)	0 (0%)	1 (1.1%)	.43

* Based on the Pearson chi-square test

Overall, the number of days on service ranged from 1 to 205 days (mean = 44.4, median = 31 days) with a statistically significant difference observed in the median number of days between control and experimental groups (Wilcoxon test: z= 2.61, p=0.006). It should be noted that single-day consults were provided by specialized wound care nurses from another home care organization at one of the control units, significantly lowering the mean and median days on service within the control group. The median for the control group was 23.5 days (mean=34.8, SD=35.8) whereas the median for the experimental group was 42.5 days (mean=59.6, SD=49.9).

Table 6.3
Ulcer Size.

	Control n=54	Experimental n=34	Total n=88	p value
# charts in which ulcer size could be calculated at admission *	37 (69%)	23 (68%)	60 (68%)	.56‡
Size (area) < 1 cm²	17 (46%)	6 (26%)	23 (38%)	
1-3 cm²	9 (24%)	6 (26%)	15 (25%)	0.25‡
> 3 cm²	11 (30%)	11 (48%)	22 (37%)	

* size based on cross-sectional area, calculated by multiplying length x width
‡ Pearson chi-square

Primary Outcome: Nursing Assessment of Patient Risk Factor Scores (NAPRF)

The primary outcome was a composite score of eight items recommended to be assessed by nurses when caring for patients with diabetic ulcers (Registered Nurses' Association of Ontario, 2005). A score of 8 would indicate that the admitting nurse assessed all eight of the risk factors targeted in this study. The higher the score, the more risk factors were assessed.

Mean NAPRF scores were 3.7 for control and 4.2 for experimental groups (Table 6.4). There was no statistically significant difference between control and experimental groups (two-tailed t-test=-1.5, df=86, p=0.14).

Grouped NAPRF Scores.

When the total NAPRF scores were grouped into three score categories (low, medium, high) a statistically significant difference was found in the distribution of scores across them (chi-square=12.27, df=2, p=0.002) (Table 6.5). The experimental group had a greater proportion of high scores (29.4%), and a lower proportion of medium scores (52.9%), than the control group (3.7% and 79.6% respectively), meaning that patients in the experimental group were assessed for more risk factors than patients in the control group. Both groups had approximately the same proportion of

Table 6.4
Nursing Assessment of Patient Risk Factor (NAPRF) Score /8 Comparison Between Control and Experimental Groups.

Total Score /8	Control n=54	Experimental n=34	p value
Mean (SD)	3.7 (1.4)	4.2 (2.1)	0.14*
Median (Q1, Q3)	4 (3, 4)	4 (3, 6)	0.16°

* two-tailed t-test
° Wilcoxon test

low scores. Three patients overall had all eight items of the NAPRF score assessed on admission, one within the control group and two in the experimental group.

Individual NAPRF items.

Out of the eight individual items within the NAPRF score, one (circulation to the lower extremity) had a significantly higher proportion of patients assessed in the experimental group with a Bonferroni corrected alpha of p=0.006 (chi-square=16.4072, df=1, p<.0001). A second item (pressure from footwear) was significantly higher in the experimental group with a non-adjusted alpha of 0.05, (chi-square=5.9924, df=1, p=.014) (Table 6.6).

The most frequently documented items in both groups were ulcer location (control =96%, experimental=94%), infection (control =78%, experimental=74%), and ulcer length and width (control=70%, experimental=68%). The least frequently documented item was foot sensation using a monofilament (control =2%, experimental=12%).

Experimental site-1 had a significantly higher proportion of patients assessed for circulation to the lower extremities than the other units (69% vs. 0%, 19%, 28%; p<.0001) and foot sensation using a monofilament than the other sites (19% vs. 0%, 4%, 6%; p=.04).

Table 6.5

Distribution of Grouped NAPRF Scores in Three Score Categories.

Score range	Control n=54	Experimental n=34	P value
low (0-2)	9 (16.7%)	6 (17.7%)	
medium (3-5)	43 (79.6%)	18 (52.9%)	**p=0.002**‡
high (6-8)	2 (3.7%)	10 (29.4%)	

‡ Chi-square

Five item score.

The five item score was based on the five target indicators chosen by participants in both units of the experimental group as the focus of implementation and included documentation of: (1) foot circulation, (2) foot sensation, (3) ulcer length and width, (4) ulcer depth, (5) patient education. As with the eight item score, a higher score indicated that a greater number of indicators were documented in patient charts. Table 6.7 shows the frequency distribution of scores between 0 and 5. A statistically significant distribution of scores was observed between control and experimental groups (p=0.04); in the experimental group more patients had four and five items documented and fewer patients had zero to two items documented than in the control.

A statistically higher median score was also observed in the experimental group (p=0.02) (Table 6.7). Adjusting for the effect of clustering with the observed ICC (ICC=0.01), a higher mean score was confirmed (p=0.008) in the experimental group.

Table 6.6
Proportion of Patients Assessed for Individual NAPRF Items.

	Control (N=54)	Experimental (N=34)	p value‡
1. Glycemic control	32 (59%)	17 (50%)	0.39
2. **Circulation to lower extremities**	**5 (9%)**	**16 (47%)**	**<.0001**
3. Signs and symptoms of infection	42 (78%)	25 (74%)	0.65
4. Foot sensation using a monofilament	1 (2%)	4 (12%)	0.071*
5. **Foot deformities or footwear pressure**	**5 (9%)**	**10 (29%)**	**0.014**
6. Location of ulcer	52 (96%)	32 (94%)	0.64
7. Length and width of ulcer	38 (70%)	23 (68%)	0.79
8. Depth of ulcer	24 (44%)	17 (50%)	0.61

‡ Chi-square test
* Fisher's Exact Test

Secondary Outcomes

Healing rates.

Approximately half of patients had healed ulcers at the time of discharge (n=45, 51.1%) (Table 6.8). For the 43 patients with unhealed ulcers at discharge, care was either continued by the patient or family (n=27, 63%), care was transferred to another agency such as a diabetic clinic, hospital, or organization (n=7, 16%), or there was no documentation as to why the treatment ceased (n=8, 19%). One patient died prior to healing. There were no statistically significant differences between control and experimental groups in the number of patients with healed ulcers at discharge, or in the reasons ulcers did not heal.

The length of time to heal ranged from 0.6 to 23.9 weeks (4 - 167 days). At 12 weeks, the overall proportion of patients with healed ulcers was 42% (n=37). At 20 weeks, 47% (n=41) of patients had healed ulcers. Of the 45 ulcers that healed, 82% had healed by 12 weeks, and

Table 6.7
Five Item Score: Frequency Distribution of Scores Between 0 and 5.

Total scores /5	Control (n=54)	Experimental (n=34)	p value	p value adjusted for ICC=0.01
0	7 (13%)	3 (8.8%)		
1	13 (24.1%)	6 (17.7%)		
2	22 (40.7%)	9 (26.5%)	.04†	
3	11 (20.4%)	8 (23.5%)		
4	1 (1.9%)	5 (14.7%)		
5	0	3 (8.8%)		
Median (Q1, Q3)	2 (1,2)	2 (1,3)	0.02°	
Mean	1.74	2.44	0.015‡	0.008

†Fisher's Exact Test
°Wilcoxon test
‡ Chi-square

91% had healed by 20 weeks. No statistically significant differences were observed in the length of time to heal or the proportion of patients with healed ulcers in control and experimental groups.

Referral rates to specialist services.

In total, 66% of patients received specialist services while on service. Types of specialist services received included: specialty wound care nurses (41%), diabetic physicians or clinics (25%), surgical or vascular physicians (11%), podiatrists or chiropodists (8%). Nurses facilitated referrals to wound care nurses only. No statistically significant difference existed between control and experimental groups in the proportion of patients who received specialist services (p=.65, Fisher's Exact Test, two-tailed), or nurse-facilitated referrals (p=0.59, Fisher's Exact Test, two-tailed) (Table 6.9).

Table 6.8
Proportion of Patients with Healed Ulcers at Discharge; Healing Rates (Calculated in Number of Weeks).

		Control n=54	Experimental n=34	Total n=88	p value
Proportion of patients with healed ulcers at discharge		28 (51.9%)	17 (50%)	45 (51.1%)	0.87*
Healing rates in weeks	mean (SD)	5.6 (5.5)	8.7 (7.5)	6.7 (6.5)	-
	median (Q1, Q3)	4 (2, 7.7)	5.9 (2.6, 16.3)	4.4 (2, 9)	.242‡
	mode	1.6	1.9	3.4	-
Proportion of patients with healed ulcers at 12 weeks		26 (48%)	11 (32%)	37 (42%)	.185‡‡
Proportion of patients with healed ulcers at 20 weeks		26 (48%)	15 (44%)	41 (47%)	.83‡‡

* Pearson chi-square two-tailed
‡ Wilcoxon ‡‡Fisher's Exact Test

Patient education.

Overall, patient education was documented in 56% of charts (Table 6.10). No statistically significant difference was observed between control and experimental groups (chi-square=3.215, df=1, p=.07), or between each of the four sites (chi-square=3.839, df=3, two- tailed p=.279). Of charts with documented education, 29% did not specify the topic, rather a notation such as "patient teaching done" was made. The most commonly specified topics were off-loading, wound management, and diabetes management (Table 6.10).

Treatments.

Wound care for optimal healing of diabetic ulcers typically involves debridement, pressure redistribution, and dressings that promote a moist wound environment. Methods of debridement recommended in the RNAO guideline include mechanical irrigation with saline solution, autolytic agents (e.g., hydrogel dressings), and use of a scalpel or scissors (sharps debridement). The frequency of debridement is at the discretion of the clinician. Twenty-eight percent of patients

Table 6.9
Type of Specialist Services Received while On Service for Diabetic Foot Ulcers.

	Control n=54	Experimental n=34	Total n=88	p value‡‡
Total # patients that received specialist services	37 (69%)	21 (62%)	58 (66%)	.65
Type of specialist				
Specialty wound care nurse	24 (44%)	12 (35%)	36 (41%)	.59
Diabetic foot care MD/Clinic	17 (31%)	5 (15%)	22 (25%)	.16
Surgical/Vascular MD	3 (6%)	6 (18%)	9 (10%)	.08
Podiatrist/Chiropodist	3 (6%)	4 (12%)	7 (8%)	.24

‡‡ Fisher's Exact Test

(n=25) received debridement, either sharps or hydrogel dressings. Sharps debridement was documented in 21.6% (n=19) of all patients with no statistically significant difference observed between control and experimental groups (chi-square= .476, p=.6). Of the patients that received sharps debridement, 63% (n=12) received it from a nursing wound specialist, 11% (n=2) from a physician, and 26% (n=5) were unspecified.

The RNAO guideline states that dressings should be selected based on the capacity to maintain a moist wound environment. Overall, dressings from nine different dressing categories were documented in patient charts (Table 6.11). Each patient chart had one to five categories documented: 25% of patients (n=22) received dressings from three or more categories; 63% (n=55) received dressings from two categories; and 33% (n=29) received dressings from one category. Foam dressings were the most frequently used with 50% of all patients receiving a foam dressing while on service. Dry gauze was documented in 11 charts (12.5%) as the only type of dressing used. The use of hydrogel dressings was documented in six charts (6.8%).

Table 6.10
Proportion of Patients with Patient Education Documented in Charts and Education Topics.

	Control n=54	Experimental n=34	Total n=88	p value
Documented patient education	**26 (48%)**	**23 (68%)**	**49 (56%)**	**.07‡**
Off-loading	7 (27%)	8 (35%)	15 (31%)	-
Wound management	10 (38%)	4 (17%)	14 (29%)	-
Unspecified	7 (27%)	7 (30%)	14 (29%)	-
Diabetes management	6 (23%)	6 (26%)	12 (24%)	-
When to seek help	1 (4%)	3 (13%)	4 (8%)	-
Self-inspection of feet	1 (4%)	1 (4%)	2 (4%)	-
Smoking cessation	1 (4%)	0	1 (2%)	-

‡Chi-square

Pressure redistribution can be accomplished by the application of external off-loading devices. Five patient charts (6%) had documented off-loading devices with no statistically significant difference between control and experimental groups (Fisher's Exact Test p=.37). Types of off-loading devices were air casts, wedge shoes (Darco Boot), soft-cast boots (Unna Boots), and crutches.

Intracluster correlation coefficient and sample size calculations.

The intracluster correlation coefficient (ICC) calculated from the data = 0.01. The standardized effect size was small at 0.36. As explained in the methods section and recommended by the statistician consultants, a clinically meaningful effect size of 0.8 was used in the sample size calculations because effect sizes observed in small pilot studies have a large degree of inaccuracy (Feeley et al., 2009; Kraemer et al., 2006).

Based on an ICC of 0.01 and an effect size of 0.8, the required number of clusters per arm of a full-scale trial is ten, with 22 patients per cluster (total n=440). Sample size estimates for future cluster trials are provided for a range of ICCs (Table 6.12).

Table 6.11
Types of Dressings Used to Treat Patients and Proportion of Patients that Received them while On Service for Diabetic Foot Ulcers.

	Control (n = 54)	Experimental (n = 34)	Total (n = 88)
Dressing Category			
Foam	25 (46.3%)	19 (55.9%)	44 (50.0%)
Alginate	10 (18.5%)	9 (26.5%)	19 (21.6%)
Hydrofibre or hypertonic	8 (14.8%)	5 (14.7%)	13 (14.8%)
Moisture retentive non-adherent (only)	12 (22%)	1 (3%)	13 (15%)
Dry gauze (only)	5 (9.3%)	6 (17.6%)	11 (12.5%)
Antimicrobial silver or iodine agent	4 (7.4%)	6 (17.6%)	10 (11.4%)
Advanced wound products	6 (11.1%)	1 (2.9%)	7 (8.0%)
Hydrogel	3 (5.6%)	3 (8.8%)	6 (6.8%)
Hydrocolloid	0 (0%)	1 (2.9%)	1 (1.1%)

Workshop evaluation.

All workshop participants (n=13) completed the evaluation after the workshop (Appendix L). Overall the workshop was well received. Table 6.13 shows results of the Likert scale ratings for different components of the workshop. With the exception of the pre-workshop materials, content and activities were rated above 3 on a scale of one to four (1=not at all relevant and useful; 4=extremely relevant and useful). The highest rated activities were: identifying priority indicator and target outcomes (mean=3.69, SD=.63); receiving chart audit findings about the research/practice gap (mean=3.54, SD=.78); discussing barriers and supports to nurses practicing according to the guidelines (mean=3.46, SD=.66); and developing the leadership action plan (mean=3.45, SD=.70). The pre-workshop materials were rated lowest (mean=2.91, SD=.54) with many participants indicating they had not received materials prior to the workshop, or did not have enough time at work to review them.

Table 6.12
*Sample Size Estimates for Future Cluster Trials.**

ICC	Number of clusters per arm	Number of patients per cluster	Total sample size (2 arm trial)
0.01	10	22	440
0.05	18	22	792
0.10	27	22	1,188

* alpha(α)=0.05, beta(β)=0.2, standard deviation(SD)=2.8, effect size=0.8

Open ended responses revealed the following aspects of the workshop as the most useful: sharing ideas between managers and clinical staff; clarifying management and clinical leadership roles regarding support for implementation; having specific goals; and leaving with a finished product. One participant wrote, "a productive day – we ended up with a result – the strategic plan – that is practical and able to be implemented immediately." Several participants stated the workshop helped them understand the importance of different people providing leadership when implementing guidelines.

Qualitative Results

Three months after the intervention was completed, semi-structured telephone interviews (n=26) were conducted with participants from control and experimental sites. The following section describes the analysis of: 1) participant demographics; 2) guideline implementation activities at each site; 3) barriers to nurses assessing and managing foot ulcers according to the selected guideline recommendations related to the study; and 4) strategies leadership teams used to address or mitigate the impact of barriers.

Table 6.13
Likert Scale Ratings for Relevance and Usefulness of Workshop Components (n=13).

	Mean	(SD)	Median	(25^{th}, 75^{th})
Identification of indicators and outcomes	3.69	(.63)	4	(3.5, 4)
Presentation of chart audit findings	3.54	(.78)	4	(3, 4)
Discussion of barriers and supports	3.46	(.66)	4	(3, 4)
Development of team leadership action plan	3.45	(.70)	3.5	(3, 4)
Writing a vision and goal statement	3.38	(.77)	4	(3, 4)
Discussion of "*What is Leadership*"	3.31	(.86)	4	(2.5, 4)
Exploring Commitment self-reflection exercise	3.25	(.75)	3	(3, 4)
Pre-workshop materials and activity	2.91	(.54)	3	(3, 3)

Note. 1=not at all relevant and useful, 4=extremely relevant and useful

Demographic information

Twenty-six telephone interviews were conducted with participants in control (n=14) and experimental (n=12) groups (87% response rate). The demographic profile was similar for both groups (Table 6.14). The majority of participants was employed full-time and had been working at the organization for an average of 10 years (SD=8.2). Participants held direct care, clinical resource, and management positions and had been in their current position an average of 4 years (SD=3.5). All were registered nurses except one participant who was in a management role.

Within the experimental group, ten people interviewed had participated in some aspect of the intervention; eight had attended the workshop and seven had attended at least one teleconference. Five people that attended the workshop were not interviewed because they had either left the organization or were on a leave of absence.

Table 6.14
Demographic Profile of Interview Participants (n=26).

			Control (n=12)	Experimental (n=14)
Years in healthcare		mean (SD)	20.3 (9.7)	23.3 (12.6)
		range	9 - 37 yrs	1.5 - 41 yrs
Years in organization		mean (SD)	6.8 (4.4)	13.2 (9.6)
		range	2 - 15 yrs	1 - 30 yrs
Years at position		mean (SD)	3.7 (2.3)	4.2 (4.3)
		range	9 months – 9 yrs	1 month – 15 yrs
Full-time		n	10	13
Part-time		n	2	1
Education	Degree	n	7	7
	Diploma	n	5	7
Position	Direct care[1]	n	4	6
	Clinical resource[2]	n	4	3
	Management[3]	n	4	5
Previous guideline involvement		n	6	9

[1] General and wound care specialized visiting nurses
[2] Clinical resource: clinical resource nurses and educators
[3] Management: managers, supervisors

Guideline Implementation Activities

The guideline implementation strategy offered to control and experimental groups involved the delivery of clinical education related to the guideline by corporate clinical consultants at each unit, to clinical leaders who in turn disseminated the education at their respective sites (Table 6.15). For the diabetic foot ulcer guideline, the implementation strategy was offered to the four units simultaneously in February 2008 and consisted of:

- A 4-hour clinical education session delivered through the organization's web communication system[5]. The education was developed and delivered by two advanced practice corporate clinical consultants for diabetes and wound care, and consisted of two modules: diabetes; wound care.
- Introduction of a new assessment tool and care plan based on the guideline.
- Online access to the clinical education modules.
- Access to corporate clinical consultants to clarify issues and answer questions.
- Inclusion of recommendations from the guideline in orientation of new nursing staff.

The number of people that attended the corporate clinical education varied at each unit from two to six (Table 6.15). Clinical resource nurses or specialized wound care nurses attended from each unit. Only one unit included staff nurses and a supervisor.

After delivery of the corporate clinical education the guidelines were implemented at each unit using methods deemed appropriate by unit leaders. At one unit (control-2) no further implementation activities were carried out, with competing priorities described as the reason:

> … it was just very clear from the leadership at our local service delivery centre that other initiatives were the priority ... perhaps if we had had more involvement and clarity from a leadership level locally and corporately, and follow-up to ensure that this initiative gets introduced, that we have set firm dates for when we plan to introduce it. (Control unit)

Table 6.16 shows the implementation activities used by the three units that implemented the guideline. In-service education was held at regional and group practice meetings at all units. Group practice meetings are bi-weekly meetings held for nurses working in specific geographical areas to discuss clinical issues and to determine scheduling and patient assignments. Regional meetings are held less frequently and include nurses from a wider geographical area.

[5] Web communication systems enable interactive online meetings that allow users to communicate live while simultaneously accessing presentations and materials via a web browser.

Table 6.15
Number of Participants that Attended the Corporate Clinical Education.

	Con-1	Con-2	Exp-1	Exp-2
Resource/wound care nurse	3	4	3	2
Staff nurse	2			
Supervisor	1			
Total	6	4	3	2

Two units (control-1, experimental-1) conducted two large-group formal education sessions in which 80 to 100% of staff was estimated to have attended; the teachings were then reviewed at group practice meetings. At experimental-2, one informal drop-in session was held followed by 12 mini presentations at group practice meetings in which 80% of staff were estimated to have attended. At both experimental units, specialized wound care nurses informally audited charts for priority indicators chosen as the focus of the guideline implementation and provided feedback to individual nurses about their charting. The managers at both experimental units attended group practice meetings to communicate goals of the implementation. At experimental-2 the manager additionally sent reminders to staff and conducted regular meetings with implementation leads to plan strategies for the implementation.

> …if you spread some of the responsibility over a group the information gets out a lot better and then it doesn't rest on one person's shoulders. Although I did the education and a lot of things, the WORNs and the CRNs have been doing a lot more of the chart audits, the checking of the charts and answering some of the calls and the one on outgoing visits ... and also by having a leadership group to implement it, I think it's really important ... if it rests on the shoulders of a few people ... [it] would become overwhelming … When we had the initial meeting we said "these are the targets and this is how the manager is going to do it, and this is what I'm going to do, this is what the CRNs are going to do." So we kind of had an idea. (Experimental unit)

Table 6.16
Implementation Activities Utilized by Three Units that Implemented the Guideline.

Activity	Control-1	Experimental-1	Experimental-2
Implementation leads	Resource nurse Wound care nurses	Resource nurse Wound care nurses	Wound care nurses
Clinical education	2 sessions, 2 weeks apart: both diabetes & wounds	2 sessions, 1 month apart: one diabetes, one wounds	1 informal drop-in: diabetic foot assessments
	Review at group practice meetings	Review at group practice meetings	12 mini presentations at group practice meetings
Attendance	~100% staff (n=35)	~80% staff (n=70)	~ 80% staff (n=80)
Handouts	Yes	Yes	Yes
Informal audit and feedback	Not identified	Yes - unclear how many	Yes - unclear how many
Manager's involvement	• Authorized release time for education. • Provided support to implementation leads.	• Authorized release time for education. • Provided support to implementation leads. • Attended group practice meetings to communicate goals of implementation. • Sent reminders to staff. • Held regular meetings with implementation leads.	• Authorized release time for education • Provided support to implementation leads • Attended group practice meetings to communicate goals of implementation.
Documentation changes	Not identified	New care plan & documentation form	Modified old care plan

Work unit culture.

All participants perceived their work unit to have a culture that supported the use of guidelines. Cultural themes that emerged from the data were: a) expectations to use RNAO guidelines; b) assumption of positive impact; and c) negative attitudes towards implementation.

Expectations to use guidelines

Participants described organizational and unit expectations that they use RNAO clinical practice guidelines to make practice decisions about care and to inform education for staff. Participants described the language and conversations amongst staff regarding the use of guidelines in the provision of patient care:

> If we can think of a better way to practice for our clients like best practice guidelines to promote healing for clients etc., we definitely engage in that and that's sort of the normal language around here ... it's sort of an everyday conversation. (Experimental)

> We refer to [guidelines] if we're doing staff education about something or somebody calls up and says what do I do with this, or how do I manage this. So then we'll say to them "*have you looked at the RNAO-BPG that's related to that*" or "*in the BPG it's recommended that you do it this way*." (Control unit)

Assumption of positive impacts

Participants revealed an assumption that practicing as recommended in RNAO guidelines would have a positive impact on patient outcomes. Unit leaders additionally commented that the organization's status of being an RNAO 'best practice spotlight organization' had a positive impact on the work environment.

> It makes you very pleased and proud professionally to be able to say at external tables that we are a spotlight organization – that we have implemented several [guidelines]. You take it to the patient bedside, which is really most important, and I'm confident that there have been improved outcomes related to implementation. I think that as far as satisfaction, motivation for the frontline practitioner, that that is reflected. And then that is a positive reflection for me to share. (Control unit)

Negative attitudes towards implementation

Nurses often described having negative attitudes towards implementing guidelines because of heavy staff workload, exhaustion, and multiple change initiatives within the work environment.

> ... there is a positive view towards the BPG, but I guess the problem being staff burnout and motivation for the staff to learn and encouraging the time for them to be able to absorb it. ... Our staff is so exhausted the motivation to learn is limited because we're so short staffed. (Control unit)

> ... you introduce the BPG and then maybe an internal organizational change happens like a month later and then something else happens a month later before the initial one is fully ingrained. That's when I find we'd have a lot more disgruntled nurses or unhappy nurses. ... The changes are coming one after another, fast and furious and they just can't seem to wrap their heads around them. (Experimental unit)

Barriers to Nurses Practicing According to the Guideline Recommendations

Nurses were asked what were the barriers to assessing and managing foot ulcers for nine recommendations: assessment of 1) glycemic control, 2) vascular status of the foot, 3) sensation of the foot, 4) ulcer length, width, and depth, 5) infection, 6) foot deformities and/or pressure from footwear; and the provision of 7) debridement, 8) referrals to specialist services, and 9) patient education. In total, 19 different barriers were associated with the nine recommendations; each barrier was identified by participants from both control and experimental groups.

Table 6.17 shows the barriers associated with each of the nine recommendations, categorized by the level to which the barrier was primarily related (Bosch, van der Weijden, Wensing, & Grol, 2007). Each recommendation had between four and nine barriers. Guideline recommendations with the most barriers were assessment of glycemic control (n=9 barriers), and referring patients to specialist services (n=9 barriers). Guideline recommendations with the least barriers were assessment of sensation in the foot (n=5 barriers), and assessment of infection (n=3 barriers). Competing priorities and failure of unit and corporate leaders to prioritize the implementation was identified at one control unit as a global barrier to implementing all the recommendations.

Individual level barriers.

Six barriers related primarily to characteristics of individual nurses. Lack of nurses' knowledge and skills to practice according to the guideline recommendation was the only barrier identified for all nine recommendations. The perception that there was no reason to change because nurses were already practicing as recommended was cited across seven of the nine recommendations:

> I haven't had any nurse express to me that they have difficulty documenting [glycemic control]. I think we do it fairly routinely with our diabetic clients. In fact the idea is to teach them. ... I've never had a nurse express to me that they've had difficulty. (Experimental unit)

Perceived lack of time and lack of motivation to disrupt routine practice were identified as barriers for three recommendations: assessment of (1) foot deformities and pressure from footwear, (2) ulcer length, width, and depth, and (3) sensory change.

Six participants reported that a barrier to practice as recommended in the guideline was that nurses had little expectation that their assessments or interventions would influence the outcomes of the patient. This barrier related to recommendations for assessing circulation, glycemic control, and for referring patients to specialist services.

> ... the nurse will have the information but then what do you do with it? ... Just having that information doesn't do a whole lot for you. (Experimental unit)

Barriers at the level of team interaction.

Four barriers related to the interaction of the healthcare team. The most frequently identified were: poor exchange of information; and differing opinions between home care nurses, physicians, and other organizations providing care for patients.

> We have to depend on the doctor to share [test results] with us and that's usually not done. The doctor gets a copy of it but doesn't usually share that with us ... so anything we want we have to write to the doctor and he may or may not even return that follow up note. And for him to actually go look it up and write to us happens very infrequently. ... And some doctors are really agreeable and others, they're not going to share that information with you. (Experimental unit)

Participants also identified unclear and confusing expectations related to practice, and multiple concurrent initiatives in the units, as barriers. Initiatives were either being driven internally by the participating organizations, or by external organizations such as the CCAC.

> Perhaps some of them got confused by the different educational initiatives ... we barely started into one type of education and now we've got another one. We would raise it at the [external] tables too ... staff ... may get out to one group practice and start this education and then get to the next group practice and it's something else. … if they're feeling a little bit overwhelmed or confused, it's valid. (Control unit)

Table 6.17
Barriers (Categorized By Level) Associated with Specific Guideline Recommendations.

Barriers	Guideline Recommendations (n=9)									
	Glycemic Control *	Referral	Deformities/Pressure*	Vascular Status*‡	Length/Width*‡/ Depth*‡	Debridement*	Patient Education‡	Sensory Changes*‡	Infection*	Total # recommendations associated with barrier
Individual Nurse Level Barriers (n=6)										
• Lack of knowledge and skill	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
• No reason to change/already standard practice	✓	✓	✓		✓	✓	✓		✓	7
• Lack of comfort and confidence		✓				✓		✓		3
• Perceived lack of time			✓		✓			✓		3
• Little expectation that nurses' have influence		✓		✓						2
• Lack of motivation to change or disrupt routine			✓		✓					2
Total individual level barriers	2	4	4	2	2	3	2	3	2	
Team Interaction Barriers (n=4)										
• Poor exchange of information b/w HC team	✓			✓			✓			3
• Differing opinions between MDs and nurses	✓			✓						2
• Unclear expectations/multiple initiatives					✓					1
• Resistance to new forms and care plans					✓					1
Total team level barriers	2	0	0	2	2	0	1	0	0	
Unit/Organizational Barriers (n=5)										
• Lack of/difficulty accessing equipment/supplies				✓	✓	✓		✓		4
• Inefficient and time consuming process	✓	✓							✓	3
• Lack of patient information handouts		✓					✓			2
• Limited nursing wound specialists available				✓		✓				2
• Not in staff nurses' scope of practice						✓				1
Total unit/org level barriers	1	2	0	2	1	3	1	1	1	
System Structures & Processes (n=2)										
• No structures to access information	✓	✓								2
• Nurses workload/understaffing	✓		✓				✓	✓		4
Total system level barriers	2	1	1	0	0	0	1	1	0	
Patient Level Barriers (n=2)										
• Pt's resistance to suggestions/lack of knowledge	✓	✓	✓				✓			4
• Pt's lack of access to MDs, services, labs, etc.	✓	✓		✓						3
Total patient level barriers	2	2	3	1	0	0	1	0	0	
Total # barriers with each recommendation	**9**	**9**	**8**	**7**	**7**	**6**	**6**	**5**	**3**	

* Items in primary outcome
‡ Items chosen by intervention group

At control units participants identified lack of opportunity to provide feedback on the care plan developed by the corporate clinical consultants as a barrier to moving the implementation forward. Resource nurses and staff all described a resistance to using the care plan because of its length and lack of adaptation to the practice environment.

> It wasn't so much to do with the diabetic foot ulcer initiative component but rather a new care plan that was eight pages ... we honestly felt the nurses were going to cut our heads off if we presented that to them. …we expected to have further discussion and follow up with the Consultant ... and the discussions never ended up taking place. (Control unit)

Barriers at the level of the organization and unit.

Five barriers were classified at the unit and organizational level. Lack of, or difficulty accessing, equipment (such as Dopplers, monofilaments, large syringes for irrigating wounds – a form of debridement, wound swabs, and rulers) was identified as a barrier in all sites for four recommendations: (1) vascular status; (2) ulcer length, width, and depth; (3) sensory change; and (4) wound debridement.

> [For] some of these nurses it would be an hour's drive to go to the office to get the paper rulers. So I was hoping that that would be something in ample supply at these [group practice] meetings so they could just reach for them … but the reality is ... not all of them had the rulers. (Experimental unit)

Not being in the staff nurses' scope of practice was an identified barrier for wound debridement. The limited number of nursing wound care specialist/consultants available to conduct this procedure was a related barrier.

> Our regular frontline nurses would not be using sharp debridement; but if they see a client that ... requires debridement ... then she would make a request for the wound consultant to be involved. Unfortunately it is not always quick. Sometimes it can be a couple of days, sometimes it can be a couple of weeks ... and part of the challenge is, of course, that the wound consultant are – as one of my clients used to say "As scarce as hen's teeth." We just don't have a lot of them. (Control unit)

An inefficient and time-consuming process was identified as a barrier for nurses' ability to assess glycemic control and infection, or to refer patients to specialist services. This barrier differs

from the individual level barrier of "perceived lack of time" as it relates to the time required in the process itself to, for example, access lab data or contact specialists to make referrals.

> If we were to try and find [HgbA1C], it would take us hours. I mean, if we called the doctor we'd have to explain who we were and why blah blah, and hope the doctor was there, and hope they called us back, and hope the doctor's nurse could actually get the information, and hope they would give it to us, and hope they didn't want to fax it to us, and blah blah blah blah.… (Control unit)

Lack of patient handouts related to healthcare teaching and limited availability of community resources were barriers to referring patients to community resources and to providing patient education.

Barriers at level of the system.

System level barriers are structures and processes outside the organization that have an impact on nurses' ability to practice according to the guidelines. Two system level barriers were identified: (1) lack of structures through which to access information; and 2) nurses' workload and understaffing. Nurses' workload was identified in four recommendations but only two recommendations (glycemic control and referrals) encompassed the system level barrier of lack of structures through which to access information. Although similar to the organizational barrier of inefficient processes within the organization, this barrier refers to structures outside the organization.

> The thing that makes it difficult, because we're in the community, is that we don't have access to their blood work. ...Versus if you were in the hospital you could just look it up on the computer, but we don't have any access to any blood work or any tests or nothing, so anything we want we have to write to the doctor and he may or may not even return that follow up note. (Experimental unit)

The workload of nurses and consequent lack of time was identified in reference to recommendations related to assessing foot sensation and foot deformities, and to providing patient education.

> [The nurses are] passing along information but they've not been given the time to do the follow up necessary to make sure that that information has really cemented itself with the client. ... Anatomically if the feet were up above the shoulders you'd probably get more attention paid to them. (Experimental unit)

Barriers at the level of patient.

Patients' resistance to nurses' suggestions related to referrals to specialty services or pressure from footwear, and patient's inability to access doctors or other healthcare services, were identified as patient-level barriers.

> Well, it's interesting because people are in the wrong shoes ... they've got shoes you just know are improper. You try to suggest going to a podiatrist and that they would be better with orthotics but of course then money a lot of times is a problem. Um, getting them to go there is a problem, transporting them. … It's their home, you're going in and you make the recommendations but if they choose not to follow them, there's not really too much you can do. (Experimental unit)

Strategies to Address Barriers

Table 6.18 lists strategies identified by control and experimental groups to address barriers and to influence implementation of the guideline recommendations. Strategies were categorized by knowledge translation intervention as outlined in Straus et al. (2009). Participants in the experimental group identified more knowledge translation strategies related to linkage and exchange, audit and feedback, and informatics reminders than did the control group. Strategies were also categorized by leadership behaviour categories (relations, change, task) as outlined in the study's theoretical framework. Though strategies were identified in each of the three leadership behaviour categories, more relations-oriented behaviours were identified by the experimental group.

Linkage and exchange.

Leaders in control and experimental groups encouraged nurses to contact wound care specialists with questions and concerns regarding the guideline recommendations. Leaders in the experimental group also conducted regular planning meetings between the manager, supervisors,

clinical resource nurses, and wound care specialists. They increased visibility and communication with managers at group practice meetings, increased access to wound care specialists through electronic communication, encouraged communication with MDs and other healthcare professionals, and encouraged and recognized staff efforts to change.

> ... they were particularly encouraged to connect with [specialty wound nurses] if they're having obstacles. ... All our three wound care resource nurses were provided with Blackberry's so that they are able to respond very quickly to their nurses. (Experimental unit)

Audit and feedback.

At experimental sites participants audited charts for documentation of target indicators of patients receiving care for diabetic foot ulcers. Feedback was then provided to staff regarding the status of documentation.

> Well we definitely talked to the nurses and told them that as a part of their admission, that pedal pulses were a mandatory thing, But then the team would go in to follow up these wounds ... and we absolutely checked pedal pulses and went in the chart to find out if the documentation had been done. So we followed up if there were gaps. (Experimental unit)

Reminders.

At experimental sites, voicemail reminders were sent by participants about specific recommendations and goals of implementation.

> I tried to keep [the staff] engaged by leaving more messages saying, "Okay it's time again." I need to remind them about this diabetic foot ulcer and how we're going to monitor this. (Experimental unit)

Evaluation of the Intervention

In the qualitative interviews 3 months after the intervention, intervention participants were asked about the intervention strategy. The top-rated activities on a 10-point Likert scale (1=not at all useful; 10=extremely useful) were receiving chart audit information to identify priority indicators

Table 6.18
Strategies Identified by Control and Experimental Groups, Categorized by Knowledge Translation Intervention and Leadership Behaviour Categories.

KT Interventions category*	Strategies identified by participants	Leadership behaviour category**	Con	Exp
Educational	In-service education sessions Reinforced fit with current practice	Task	✓	✓
Linkage & exchange	Encouraged communication with clinical nursing specialists	Relations	✓	✓
	Recognized staffs' efforts to change and implement recommendations (e.g., Bravo cards)	Relations		✓
	Reinforced need for inter-professional collaboration	Relations		✓
	Held regular planning meetings with leadership team	Task		✓
	Increased visibility of management and clinical leaders to communicate goals for change	Relations Change		✓
Audit & feedback	Checked charts and left messages if documentation was not complete	Task Relations		✓
Informatics/ reminders	Sent voice-mail and email reminders about target recommendations	Relations		✓
Organizational	Changed charting expectations (from charting by exception to full script charting)	Change		✓
	Ordered & provided equipment & supplies	Task	✓	✓
	Modified care plan & documentation forms	Task	✓	✓
	Advocated for additional resources at external meetings with CCAC (e.g., time, supplies)	Change	✓	✓

* as outlined in Straus, Tetroe and Graham (2009)
** as outlined in the theoretical framework for the study (Figure 1)

and target outcomes (median= 8.5) and developing a leadership action plan (median=8). Table 6.19 provides results of the Likert scale ratings of the intervention.

Participants found the chart audit data particularly helpful to identify priority areas for change based on real care gaps.

> We knew some of the things that the nurses did well and we knew some of the things we wanted to improve upon and by identifying those ... it just helped us with the introduction and helped us to identify perhaps what we could emphasize in our presentation. (Clinical)

> It makes you ... stop and think about what is important and why. ... - for example a lady had stepped on a needle, didn't even know it was in her foot, blood on the white shag, wondering who's bleeding, checks the husband, checks the dog, checks the cat … then realizes that it was her. (Clinical)

Participants also found it helpful to work together as a team of managers, supervisors, and clinical leaders.

> We sort of had something like a heart ... because there were a variety of people there, the Clinical Nurses, the Clinical Resource Nurses, the wound specialist people, the supervisors, and myself (manager) ... and so it was sort of neat, even though I don't go out there and educate, it did open my eyes a little bit as well to some of the steps that the nurses take when they're looking after diabetic foot ulcer client…it was great! (Management)

> Having the opportunity to have a discussion as to why those particular indicators were going to work and what each of us could say about them. I was looking at it from a chart audit perspective, the things that I'd been seeing up to that point and time. The wound care nurses are looking at it from their experience of community with the various teams, their consults to clients that would be affected by the BPG. So it was good to sort of have it in the centre and us all coming at it from a different aspect. (Clinical)

Similar to the survey completed at the end of the workshop, pre-workshop materials were rated the lowest (median=5.5). The teleconferences were the only activity in which the ratings differed markedly between the two units, with the mean at one site 7.5 compared to 4.0 at the other. Participants that rated the teleconferences more highly concluded that they gave them an opportunity to review their leadership strategy, reflect on what was important, and helped keep the implementation activities a priority.

> It did just give us a time to review the points that were made in the workshop, and how we were rolling it [the guideline] out, and how we were getting the information out and things like that. So, I thought it was useful. It gave you a chance to sit back and reflect. (Clinical)

> It would make us take a look at where we were in the whole process and if we needed to do something, if we needed to be reinforcing anything, then that would be kind of a reminder that we needed to do that because we were re-looking at the (leadership action) plan. (Clinical)

Table 6.19
Likert Scale Ratings of the Intervention Activities 3 Months After Completion of the Intervention Experimental Group Interviews (n=12).

	median	mean	score rating categories		
			≤5	**6-7**	**8-10**
Receiving chart audit data and identifying priority indicators & outcomes for change	**8.5**	**8.1**	1	0	7
Developing a team leadership action plan	**8**	**7.9**	1	2	5
Participating in the workshop	**7.5**	**7.2**	1	4	3
Vision/goal statement	**6**	**6.6**	0	6	2
Participating in the teleconference	**7**	**6**	2	3	2
Receiving pre-workshop materials (literature and activity to conduct barriers and supports assessment)	**5.5**	**5.8**	5	2	0

Interview question: How useful were the following intervention activities in helping you and your leadership team support nurses to assess and manage foot ulcers in accordance with the guideline recommendations? 1=not at all useful/ 10=extremely useful

Conversely, participants that rated the teleconferences low either did not recall participating, were not able to attend, did not like the telephone format, or did not perceive there to be a need for the teleconferences.

> There was one we were supposed to go to and nobody showed up … (Clinical)

> I find that a teleconference doesn't facilitate as much conversation … if you're sitting around a table or something and see people, you know face to face. … someone's face will trigger a question within yourself. So if you're doing it over a phone line … it was like sitting in a parking lot. (Clinical)

Chapter 7: Integrative Discussion

In chapter seven I integrate results of the study into a discussion of implications for future research. I begin with a review of the study objectives and summary of principal findings. Study limitations and strengths follow. A brief overview of the theoretical framework that informed the study is then presented with a schematic illustration of how the study findings mapped onto the original framework. A revised leadership model is proposed as a potentially more robust theoretical base for future leadership interventions. Considerations for future research are then discussed in relation to study design, the intervention, procedures, and measures. A summary of the contributions to nursing knowledge generated by this pilot study concludes the chapter.

Table 7.1
Study Objectives and Summary of Findings.

Study objectives	Finding highlights
1. To identify barriers and develop a tailored leadership intervention for home care nurse managers, supervisors, resource nurses, and clinical staff designed to influence use of recommendations from a RNAO guideline for care of foot ulcers for people with diabetes.	• Barriers were identified at the individual, unit, and system levels. • A 12-week intervention (pre-workshop printed materials, 6 hour workshop, 3 teleconferences) was developed for clinical and management unit leaders. • During the intervention participants received summarized chart audit data, identified priority indicators for guideline adherence, and created a team leadership action plan to operationalize relations, change, and task-oriented leadership behaviours.
2. To determine the impact of the intervention on patient, nurse, and system outcomes.	• No statistically significant difference was found in the chart audit findings of the primary outcome (a nursing assessment score of eight process indicators chosen in consultation with corporate leaders at the study organization). • A composite score of the five item chosen by intervention participants (unit-level leaders) as the priorities for change was documented significantly more frequently in the experimental group than in the control. • Gaps in care included: 53%, 76%, and 94% of patients not assessed for ulcer depth, foot circulation, or neuropathy (respectively); 75% and 93% did not receive wound debridement or hydrogel dressings.
3. To understand the acceptability and feasibility of influencing leadership behaviours through the intervention.	• The intervention was perceived to influence participants' leadership behaviours. • Participants described using different leadership strategies than the control group, including audit and feedback, reminders, and more relations-oriented behaviours. • Competing priorities and concurrent initiatives were notable challenges to participants' efforts to influence guideline use.

4. To refine a model of leadership for implementing practice change.	• Many study findings were consistent with the original framework. Findings confirmed that leaders used relations, change, and task-oriented behaviours to influence nurses to use the guideline recommendations. Elements of the intervention and factors within the practice environment were added to the original model and a new model is proposed as the theoretical basis for future leadership interventions.
5. To determine the acceptability and feasibility of study design, methods, and measures for developing a full-scale trial. Cluster randomization by unit was feasible and minimized threat of experimental contamination.	• The inter-rater agreement of the chart audit tool was high (baseline=97.7%; post=96.6%) and the data collection methods were feasible. • Baseline clinical measures were not collected in the chart audit on ulcer and patient characteristics that impact healing. • Participation of formal leaders was high (100% managers, supervisors, resource nurses), however, no clinical staff participated in the intervention. • Some components of the intervention were acceptable and feasible to participants, others were not. • Receiving summarized chart audit data in order to identify priority indicators for change was considered useful (8.5/10). • Developing a team leadership action plan was considered useful (8/10). • Participants at one unit were not able to complete the leadership action plan during the workshop, requiring further time and facilitation. • An interactive discussion of barriers and supports during the workshop was rated highly in the post-workshop evaluation (3.5/4), pre-workshop materials that included a barriers and supports assessment were not (2.9/4). • Attendance at, and ratings of, the teleconferences differed by unit; one unit had low attendance and ratings, the other had high attendance and ratings.

Study Limitations

Limitations in conducting this study are discussed in relation to design, social desirability bias, and exposure to, and integrity of, the intervention.

Design. A post-only comparison was conducted to analyze the chart audit data instead of a pre/post comparison as originally planned. This decision was made after completion of the baseline audit because of problems encountered in identifying patients using a newly installed data

management system (DMS). Inconsistent data entry of patient diagnoses into the new DMS was deemed to pose a threat of sampling bias leading to decreased investigator confidence in the accuracy of the sample's representation. Therefore, a decision was made to conduct a post-only analysis. At the post audit one year later the new DMS was performing well such that the risk of sampling bias decreased.

Social desirability bias. Exposure to the intervention may have sensitized participants in the experimental group to describe certain strategies that were discussed during the intervention; they may have misrepresented their responses in ways they perceived to be socially desirable (Polit & Beck, 2006).

Intervention exposure and integrity. Each unit's exposure to the intervention was different, with one unit participating noticeably less in the post-workshop teleconferences than the other. At one unit five to six participants attended each teleconference whereas at the other unit only one participant was present, a different person each time.

No participant conducted the barriers and supports assessment prior to the workshop. Many revealed they had not received the materials before the workshop, meaning that participants did not come to the workshop prepared to discuss actual barriers and supports as intended. The result was that more time was required to educate participants about barriers and supports, rather than other content areas such as leadership theory. Another limitation related to the integrity of the intervention was the lack of staff nurse participation. Although recruitment of staff nurses was identified as a goal on the *invitation to participate*, the unit managers, who conducted the recruitment, were unable to secure their participation in any aspect of the intervention.

A final limitation to the study was that I, as the principal investigator, delivered the intervention and therefore implementation was not independent of the evaluation. Steps were taken to decrease potential biases in data collection and analysis that included the use of research

assistants to conduct the chart audit, enter data into the statistical database, confirm the statistical analysis, conduct the post-intervention qualitative interviews, and validate themes within the qualitative analysis.

Study Strengths

The following strengths are noted. Selection bias was minimized through randomization. Unit-level cluster randomization minimized the threat of contamination of the control group, and allowed changes in nursing care to be aggregated and measured at the unit level (Donner & Klar, 2000; Grol et al., 2005; Shadish et al., 2002). Participating units had the greatest number of clients on service with diabetic foot ulcers in the study organization. Unit participation was high with 6/7 units participating, and the *a priori* sample size estimates for the chart audit were reached.

As recommended in the National Institute for Clinical Excellence (NICE) manual on best practices in clinical audit, criteria for the chart audit were confirmed by professionals with expertise in related clinical and research areas (NICE, 2002). The primary outcome was an objective measure of nursing care, based on an evidence-based nursing guideline. The items within the primary outcome had been shown by research to influence patient healing rates and outcomes. The use of process measures as the primary outcome provided a direct measure of quality of care without a delay in determining occurrence (NICE, 2002).

The inter-rater reliability of the chart audit tool was high. The chart audit tool was pilot-tested then revised to correct inaccuracies and ambiguities. Double coding of random samples of charts (20% in baseline; 14% in post) provided accuracy rates of 97.7% at baseline and 97.6% in the post audit. Developing a chart audit manual to guide the process of data abstraction, the training of nurse data abstractors by the investigator, and securing the same auditor to conduct both the baseline and post-audit all contributed to the ease and efficiency of the data abstraction process. Conducting the baseline-intervention audit prior to randomization and blinding the post-

intervention data abstractor to control and experimental sites decreased observational bias. Use of a broad electronic search strategy, and hand-screening of all retrieved charts, reduced sampling bias in the post-intervention audit.

Finally, the collaborative partnership established between the investigator and the organizational partners ensured that the study was consistent with the strategic priorities and clinical needs of the participating organization and helped secure national funding to conduct the study.

Summary of the Original Theoretical Framework

In the original theoretical framework (Figure 1) I hypothesized that clinical and management leaders use behaviours from three behavioural meta-categories (relations, change, and task) to influence nurses to use guideline recommendations in clinical practice. While the precise combination and intensity of behaviours is dependent on the specific circumstances, together they influence individual staff and the practice environment. The original framework, however, did not reflect any of the factors that could influence the leaders themselves, such as the organizational environment, unit priorities, or vision. Based on findings from this study, the original framework was revised to include factors that potentially could determine the behaviours of leaders themselves, including core elements of the intervention.

Methods to revise the framework first involved schematically mapping mechanisms of the intervention and study findings onto the original framework. These included: a) components of the intervention described as useful or important in workshop surveys and interviews; b) leadership behaviours that participants used to manage barriers and influence nurses to use the guideline recommendations; and c) chart audit findings that showed a significant difference between experimental and control groups (Figure 2). Core elements of the intervention, and factors within

the internal and external practice environments, were added. A new model is proposed as the theoretical basis for future leadership interventions.

The Proposed Model of Unit-Level Team Leadership

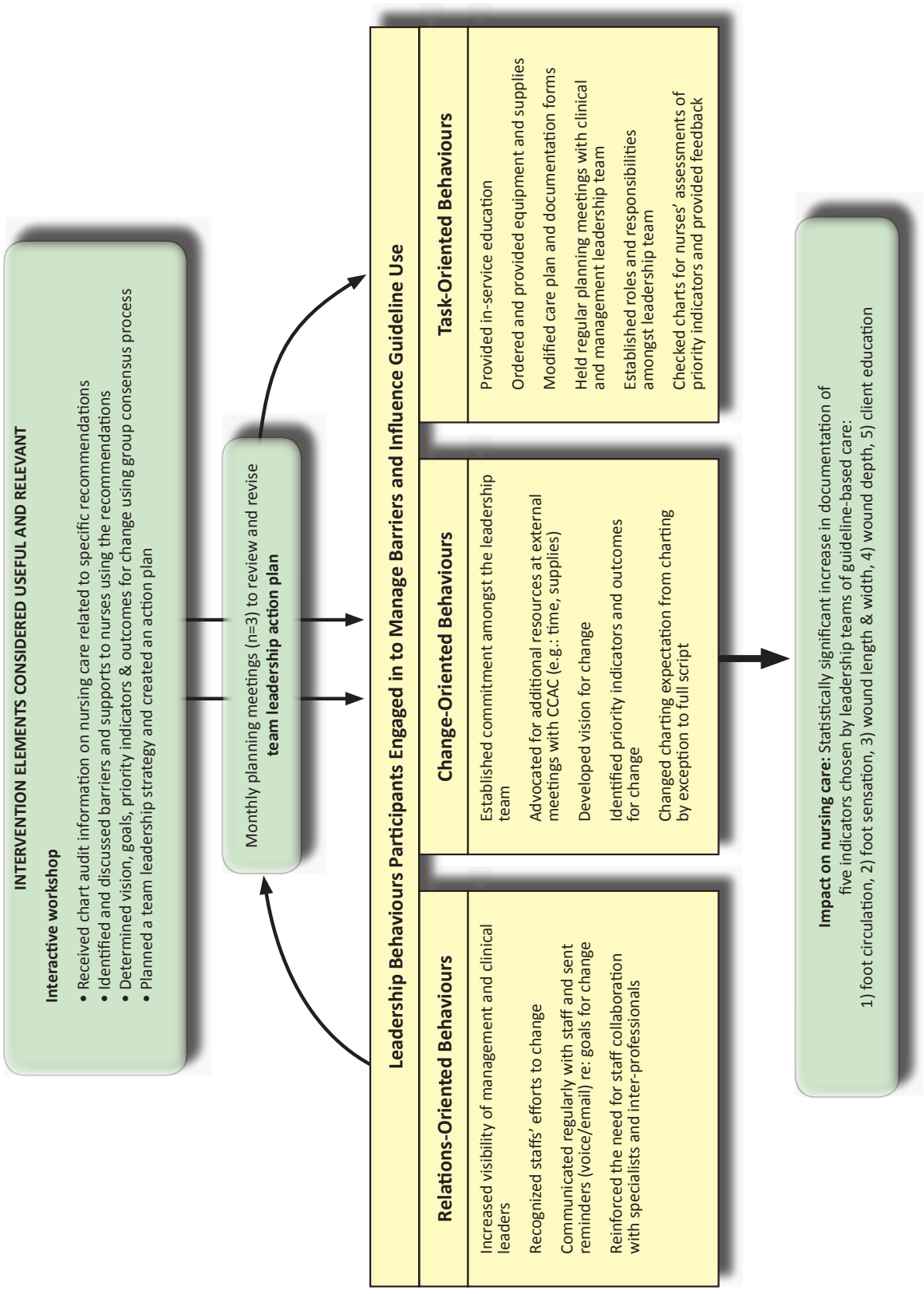
Consistent with impact and process theories described by Grol and colleagues (2007), the proposed leadership model hypothesizes about the elements that are necessary to influence guideline-based nursing care. The model also proposes the unit-level leadership and management behaviours that influence nurses' use of guideline recommendations, and the desired effects of guideline use on patient, provider, and system outcomes (Figure 3).

An assumption inherent within the model is that leadership is a multi-faceted process operationalized by people from formal and informal leadership and management roles. It is hypothesized that the composition of a leadership team should include managers and clinical leaders from different hierarchical levels of an organization. The importance of having leadership from different hierarchical levels of an organization when implementing change has been emphasized by others (Davies et al., 2006; Ferlie & Shortell, 2001; Gifford et al., 2006; Kotter, 1996; Senge, 1999), including the National Health Service (NHS) that describes senior and clinical leader engagement as instrumental to implementing and sustaining change in healthcare organizations (Maher, Gustafson & Evans, 2007). Having leaders from multiple clinical and management roles is also consistent with the original theoretical model for this study. Next, the components of the proposed model will be described in the context of study findings and the broader literature.

Core elements.

The core elements of the framework are the components of the intervention that participants identified as useful and relevant in influencing guideline use. These core elements include: (1) clinical data on current practices; (2) vision for change; (3) knowledge of barriers and supports; and (4) engaging, setting goals and action planning. It is hypothesized that the core

Figure 2. Schematic Illustration of Leadership Intervention and Impacts on Selected Nursing Process Outcomes



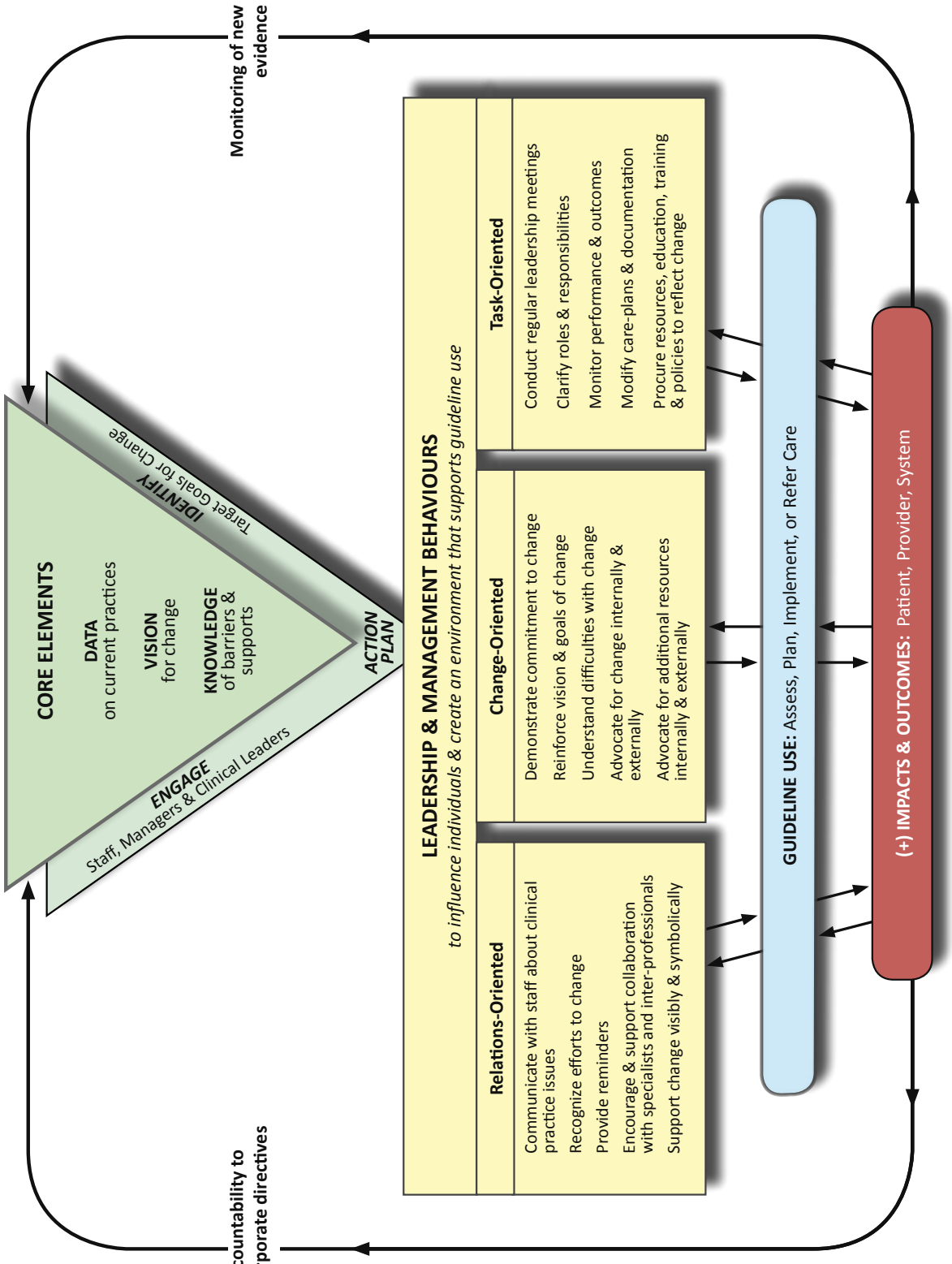


Figure 3. Proposed Model of Unit-Level Team Leadership to Influence Guideline Use in Nursing

elements are essential to create an effective leadership process at the unit level to influence guideline use in nursing.

Data on current care. Chart audit data were utilized to understand current practices, gaps in care, and the need for change. During the intervention, participants used chart audit data to identify the priority clinical indicators for change, set target goals, and demonstrate the need for change to staff. Although recommended in quality assurance initiatives (Baker et al., 2010) accessing and monitoring data on clinical performance was not a routine practice for participants. Receiving unit-level data was the highest-ranked intervention activity, both immediately following the workshop and 3 months after the intervention ended. Findings from this study suggest that clinical data on actual gaps in care are important to leaders to make decisions about priorities for change when implementing guidelines.

Recent research suggests that managing information about care delivery and health outcomes is a necessary but under-recognized component of knowledge translation (French et al., 2009). French et al. (2009) found that *knowledge needs* and *knowledge sharing* were absent from tools that measured research use. Iles & Sutherland (2001) similarly report that the acquisition and sharing of information is necessary to facilitate change in healthcare. Research has shown that healthcare facilities with higher clinical guideline adherence utilized chart data as a source of information more often than facilities with lower adherence (Hysong, Best, & Pugh, 2006; Hysong, Best, Pugh, & Moore, 2005; Hysong, Pugh, & Best, 2006), underscoring the need for leaders to have access to clinical data.

Vision for change. After recognizing the need for change, a clear vision of the desired changes must be articulated by the leadership team. In the current study managers and clinical leaders created a vision statement that reflected the broader purpose of implementation for the patient and included detailed goals for change. Although writing the vision statement was

perceived as difficult, many participants found the exercise helped them to make the connection between quality of care and patient outcomes.

Leadership theory indicates that leaders who share a vision of what they are trying to achieve are more likely to be effective in reaching their goals (Bass, 1990; Jasper & Jumaa, 2005; Koontz & O'Donnell, 1964; Senge, 1990; Shaw, 2007; Stogdill, 1948; Yukl, 2006). Communicating clear and simple goals helps influence change in healthcare organizations (Pettigrew et al., 1992) while the leadership influence is strongest when a common vision and goals are shared by members of a leadership team (Yoder-Wise, 2007; Yukl, 2006). Recent research revealed that when community nurses understand the vision and goals within their work environment, they are more effective in providing quality patient care (Meagher-Stewart et al., 2010; Underwood et al., 2009). To optimize the influence of leadership on guideline use in nursing, members of the leadership team must collectively be clear about the vision and goals for change prior to initiating implementation of guidelines and practice change.

Knowledge of barriers and supports. During the intervention *no* participants completed the pre-workshop activity to assess barriers and supports, and ratings of this activity were low. Despite research and theory that indicate having knowledge of barriers and supports prior to implementing guidelines is important to tailor implementation strategies (Bosch, van der Weijden, Wensing, & Grol, 2007; Legare, 2009; Logan & Graham, 2010), participants in this study were not able to attain this information on their own. However, and in contrast to the ratings of the pre-workshop activity, the facilitated discussion of barriers and supports during the workshop was rated as highly useful and relevant. This contrast suggests that participants valued having knowledge of barriers and supports despite not attempting to acquire it themselves prior to the workshop. Therefore, knowledge of barriers and supports is essential for leaders to plan an effective leadership strategy,

but the process of gaining that knowledge will depend on the context and situation of the leadership team.

Engage, identify, plan. Coming together to identify priority indicators for change and plan a team leadership strategy was perceived by managers and clinical leaders to be useful to coordinate their leadership efforts. In the proposed model this is represented by the outer edge of a funnel to depict the process of synthesizing and assimilating the vision for change, data on current practices and knowledge of barriers and supports into an action plan that will operationalize an effective leadership strategy.

Leadership research highlights that high-performing leaders create, write, and follow action plans, or 'blue-prints for action,' to maintain their focus on key strategies while managing competing priorities (Drucker, 2004; Murphy & Murphy, 2002). The need for leaders to engage, identify, and plan a leadership strategy is supported by research that has shown that when team members interact, share information, and participate in decision-making they are more likely to be invested in the outcomes of those decisions (Burningham & West, 1995). Indeed, during the intervention managers and clinical leaders found it particularly useful to work together to identify priority indicators for change and plan a team leadership strategy. These findings underscore the need for managers and clinical leaders to coordinate their leadership efforts as in the proposed model.

Leadership behaviours.

Leadership behaviours represent a synthesis of the behaviours in the original model and those described by participants in this study to address barriers and influence guideline use. Interview findings confirmed that leaders used behaviours from all three categories of the original model (relations-oriented, change-oriented, task-oriented) with no one participant enacting behaviours exclusive to a particular category. Rather, people from both management and clinical

roles created the team leadership process. The view that leadership is not necessarily hierarchical and change cannot be led by one individual has been supported by others both within and outside healthcare organizations (Kotter, 1996; Maher et al., 2007; Senge, 1999; Shortell, 2002). However, the behaviours of the unit managers in this study were of particular importance. The unit manager at one control unit blocked implementation efforts, indicating that the diabetic foot ulcer initiative was not a priority, and thereby did not endorse the corporate initiative to implement the guideline . Reflecting on this and other findings, it appears that the unit manager was a key driver for the guideline implementation initiative. This is consistent with evidence from research utilization studies (including the integrative review conducted for this study) that has shown managers must provide direction, motivation, and support for frontline implementation activities to influence research utilization (Caraminica & Rob, 2006; Gifford et al., 2007; Melnyk et al., 2004).

The involvement of nurse managers in setting the direction and providing the necessary infrastructure support for staff nurses to deliver quality patient care has been identified in a number of Canadian documents (Advisory Committee on Health Human Resources, 2002; Baumann et al., 2001; Meagher-Stewart et al., 2010; Underwood et al., 2009). Within the proposed leadership model, managers are an essential part of the leadership team with leadership behaviours from the task-oriented category generally consistent with descriptions of good management practices (Yukl, 2006). The nurse manager's leadership in ensuring that the priorities and direction of the unit are consistent with the broader organizational vision and goals is of equal importance (Jasper & Jumma, 2005; Meagher-Stewart et al., 2010). At the time of this study, the participating organization's vision included the provision of evidence-informed health care which, by definition, may involve the implementation of clinical practice guidelines. Additionally, the organization held RNAO "spotlight status" which publically and professionally acknowledged it as a leader in guideline implementation and use (Registered Nurses' Association of Ontario, 2009). This incongruity

between the organization's vision and strategic direction, and the unit managers' commitment to corporate initiatives underscores the need for managers to be accountable for their behaviours that support or refute the vision of the organization.

While a clear organizational vision is important in healthcare organizations, change initiatives are more likely to fail if managers do not support the vision with a clear articulation of what is to be achieved, by whom, and with what (Hodder & Marples, 2005). The front-line manager has situational influence at the micro level of the organizational hierarchy and is aligned strategically to reinforce the organization's vision and goals directly with staff, both through symbolic and explicit actions (Jasper & Juma, 2005; Meagher-Stewart et al., 2010; Yoder-Wise, 2007; Yukl, 2006). However, in this study not all clinical managers saw their role as including the promotion of evidence-informed care. For instance, when asked what the nurse manager's role was when implementing guidelines, the perception of one manager was that they had *no role*, indicating that the role of the manager was to focus on unit operations and not clinical practice issues. This comment is consistent with findings by Dopson et al. (2006) who found that nurse managers did not view responsibilities for clinical effectiveness (of which evidence-based practice was one) as a manager's concern. Similarly, Cain and Kendrick (1997) reported over a decade ago that both the actions and inactions of nurse managers were inhibiting evidence-based practice in community care.

The need for senior leaders and organizational administrators to support front-line managers to influence professional practice has been well-documented in Canadian healthcare environments (Laschinger et al., 2001; Meagher-Stewart et al., 2010; Underwood et al., 2010). However, the kind of support, and the intensity and timing of that support, remains unclear. As part of the leadership intervention in the current study, a senior vice president physically attended and spoke at the opening of the workshop to communicate organizational support and

acknowledge the contributions participants make as leaders of guideline implementation initiatives. However, this did not appear to be enough. Despite the recognition and support by senior leaders, findings from this study failed to show a difference in the primary outcome, suggesting that a leadership intervention for implementing guideline-based care requires further consideration at the macro (systems) and meso (organizational) levels.

At the macro system level, there is a need for flexible and adequate funding structures from government sources for organizations to plan effectively and to provide stable and long term program support. In particular, funding flexibility is necessary to allow organizations to respond to their own emerging needs. In the present study, managers and clinical leaders of the intervention repeatedly stressed the benefits of having the time to collaborate and plan a team leadership strategy that responded to their unit's specific clinical needs. To sustain this type of collaborative leadership planning requires adequate human resource funding, a challenge today amongst the inherent uncertainties and economic demands of community nursing funding structures (Meagher-Stewart et al., 2010). Findings from this study support the need for federal and provincial health ministries and local health authorities to provide adequate funding for organizations to implement programs that develop leadership and management practices at all levels of community organizations. This recommendation is supported by previous research that has identified a positive link between management practices and quality nursing care (Greco & Laschinger, 2006; Meagher-Stewart et al., 2010; Underwood et al., 2009) and a need for leadership development initiatives in community health nursing (Ontario Ministry of Health and Long-Term Care, 2006).

At the meso organizational level, there is a need for nurse managers to be held accountable for their behaviours related to corporate directives and initiatives. Additionally, organizational strategies and mechanisms must be in place to maintain engagement of leaders in corporate initiatives throughout the organization (managers, clinicians, chief executives, and other members

of the corporate leadership team). The leadership behaviours within the proposed model to *"demonstrate commitment to change"* and *"reinforce the vision and goals of change"* are change-oriented behaviours that emerged from the qualitative interviews. Ongoing engagement, however, is essential for leaders to operationalize these behaviours and to be effective at leading guideline use. The importance of senior and clinical leader engagement has been emphasized in the NHS model of sustainability as fundamental to prevent change initiatives from faltering (Maher et al., 2007). Engagement strategies such as regular and concise communication between senior and unit leaders regarding the change, including the benefits, significance, and obstacles that may interfere with leaders' involvement must be in place for leaders to sustain efforts to change and to enact the leadership behaviours in the model.

Many of the behaviours described by participants in the proposed model are consistent with dimensions of facilitation as delineated in the PAHRIS framework for research use (Harvey et al., 2002; Kitson, Harvey, & McCormack, 1998). In their conceptual framework Kitson et al. (1998) characterized facilitation as "a technique by which one person makes things easier for others" (p. 152) and suggest that facilitators work within and across roles to achieve change. Dogherty and colleagues (2010) recently expanded on this definition, describing facilitation as an iterative process that involves building relationships, making people aware of the need for change, monitoring, and evaluation. These strategies are analogous to relations, change, and task-oriented leadership behaviours identified by both management and clinical leaders in this study and are represented within the proposed model.

Equally important in this study were task-oriented leadership behaviours such as allocating resources, providing time for education, and monitoring indicators of change. The proposed model includes relations and change-oriented behaviours integral to facilitation, in addition to task-oriented behaviours that create a supportive practice environment and monitor progress towards

change. The inclusion of these behaviours is consistent with findings from the integrative literature review I conducted for this study (chapter two), which showed that managerial leadership involves facilitative behaviours (such as support, encouragement, and education) and regulatory behaviours (such as monitoring performance and outcomes, and policy changes) to influence research use in nursing (Gifford et al., 2007). Consequently, the conceptual boundaries between leadership and facilitation continue to overlap as discussed in the review (Gifford et al., 2007). Despite this blurring, however, the proposed model offers a concrete working hypothesis for leadership that is consistent with broader leadership literature.

The bi-directional arrows between "leadership behaviours" and other components of the model depict the iterative process that leaders use to respond and adapt to changing contexts and desired impacts and outcomes. Consistent with organizational change theory (Senge, 1990; Yukl, 2006) the model suggests that effective leaders leverage reactions from one area of an organization to influence other areas less responsive to the desired change. A feedback loop from *"impacts and outcomes"* at the bottom of the model back to the core elements of the leadership process illustrates the importance of ongoing feedback mechanisms for leaders to reflect critically on what is working and what is not working in patient care (Doran, 2010). This feedback loop highlights the need for leaders to be accountable to strategic directions of their organization in addition to the ongoing need to monitor new evidence as it applies to patient care. For example, since the RNAO guideline was published in 2005, an updated systematic review has revealed that hydrogel dressings are the only types of dressings that have shown effectiveness in enhancing healing of diabetic foot ulcers. Ongoing monitoring of patient care and outcomes additionally allows leaders to reassess priorities and barriers to change. Feedback on outcomes is consistent with a model described by Doran (2010) that links patient outcomes, measurement, and feedback to encourage evidence-based practice.

Notwithstanding concerns about the extent of transferability, the new leadership model proposes a pragmatic and theoretical conceptualization of the core elements and behaviours that will create an effective team leadership process to influence guideline use in nursing. Clearly articulating the theoretical base of interventions in health services research is an important step in understanding why an intervention is successful or not (Bradley et al., 1999; Davies, Walker, & Grimshaw, 2010). As leadership is only one of many factors in guideline use, the proposed model is intended to be used in conjunction with a planned action framework, such as the OMRU (Logan & Graham, 2010).

Internal and external environments.

While the proposed model is restricted to unit-level leadership, the broader internal and external environments (meso and macro levels) must be considered when developing leadership for guideline use in nursing. Broadly based on central elements of the Ottawa Model of Research Use (OMRU), the internal environment represents the contextual factors within the organization such as the innovation, potential adopters, and the practice environment, while the external environment represents factors outside the organization such as government policies, structures and processes of the healthcare system, and funding formulas.

An organization's internal environment strongly influences leaders' behaviours and activities (Elenkov & Manev, 2005). For example, leaders' span of control is a structural aspect of the practice environment that can influence leadership. A regression analysis at seven teaching and community hospitals with a sample of 51 units, 41 nurse managers, 717 nurses, and 680 patients reported positive correlations amongst leadership, manager's span of control, nurse job satisfaction, and patient satisfaction (McCutcheon et al., 2009). Although certain types of leadership styles were correlated significantly to nurse and patient satisfaction, span of control

moderated the effects of leadership; the wider the span the lower the effect on the outcomes measured (McCutcheon et al., 2009).

Yet research on nursing leadership tells us that leaders can choose how to spend their time and what to emphasize with staff (Cummings et al., 2008; Laschinger, Wong, McMahon, & Kaufmann, 1999; McNeese-Smith, 1997; McNeese-Smith & Yang, 2000; Wong & Cummings, 2007). For example, Cummings et al. (2005) showed that during highly turbulent times, relational leadership by nurse managers (i.e., leadership that builds relationships through listening, empathy, and responding to staff's needs) mitigated negative effects of hospital restructuring on clinical nurses. Nurses who worked with relational leaders reported less fatigue and emotional exhaustion, experienced greater satisfaction, and left fewer patients' needs unattended (Cummings et al., 2005). Participants in this study identified funding formulas and priorities of the community care access centre as factors within the external practice environment that influenced their behaviours.

Implications for Research

Findings from this pilot study highlight a variety of methodological and practical issues regarding leadership interventions to influence nurses' use of guideline recommendations in community healthcare. To answer the question of whether or not a leadership intervention can be effective further work is required to refine the intervention strategy. In the next section I discuss implications for future research in relation to study design, intervention, chart audit procedures, measures, and sample size.

Study design.

A longitudinal design with a cluster randomized control group is recommended to evaluate the effectiveness of a leadership intervention on nursing process and patient outcomes for patients with diabetic foot ulcers. Cluster randomization by unit was feasible in this pilot study and minimized the threat of experimental contamination (Campbell, Elbourne, & Altman, 2004).

Matching the units by size balanced potentially important factors at baseline that could affect outcomes (such as leaders' spans of control) (Donner & Klar, 2000). Longitudinal studies are recommended to capture the evolving nature of leadership over time, the delayed effects of leaders' behaviours, and environmental fluctuations that may impact nursing care and patient outcomes. More powerful than single-measure designs, longitudinal designs can follow different outcomes simultaneously to explore a hypothesized "chain of effects" (Shadish et al., 2002, p.267). For example, the hypothesized impact of a leadership intervention on nurses' use of guideline recommendations (process outcomes) could be evaluated simultaneously with patient outcomes.

To examine the effect of a leadership intervention on nursing care and outcomes for patients with diabetic foot ulcers, a 2-year time period is recommended, with chart audit observations every 6 months after introduction of the intervention. The addition of a comparison group greatly strengthens the validity of findings (Shadish et al., 2002) and cluster randomization by unit is recommended.

Intervention.

The intervention requires further development, particularly the process to deliver the intervention and translate the theoretical principles of the intervention into effective leadership practices. A participatory approach using the proposed leadership model as the theoretical foundation of the intervention is recommended (Figure 3). The model hypothesizes the core elements and behaviours required to develop team leadership for guideline use.

Some components of the intervention were acceptable to participants and feasible to deliver whereas others were not. The highest rated intervention activities on a 10 point scale were receiving chart audit information to identify priorities for change (median 8.5), and developing a leadership action plan (median=8). However, ratings of these activities ranged from 4-10 and 3-9 respectively, suggesting that some participants perceived them as extremely useful whereas others

did not. It became apparent during the workshop that each unit required a different approach to engage participants in the intervention activities. Participants from one unit did not engage readily in the workshop activities, and did not complete their team leadership action plan by the end of the workshop. In contrast, participants from the other unit enthusiastically engaged as a team in all workshop activities, and completed their plan by the end of the workshop. These observations emphasize the importance of matching intervention content and activities to the specific needs of participants and units.

A needs assessment was conducted prior to the intervention at two units outside the experimental group to minimize risk of sensitizing participants to the intervention. It would be more beneficial to conduct a needs assessment with participants in the experimental group so that intervention content and strategies can be matched to the specific needs of participants. For example, it is important to know what content to focus on and what kind of training techniques and feedback are needed to support leaders to be effective. The authors of a meta-analysis of 83 leadership training interventions concluded that substantial improvements in leadership knowledge and skills can be achieved if sufficient front-end analysis is conducted to match intervention strategies to participant needs (Collins & Holton, 2004). Further research is required to understand how best to conduct a leadership needs assessment for knowledge translation, and how to tailor the content, activities, and training techniques of the intervention to identified needs. Whereas knowledge translation models (such as OMRU) are well-suited to assess other components of the practice environment, the proposed leadership model provides a useful taxonomy of leadership behaviours hypothesized to influence guideline-based care effectively. Leadership needs could be assessed in focus group interviews or surveys using the proposed leadership model as a guide to determine barriers and supports to leaders' operationalizing the model.

Receiving the pre-workshop materials rated the lowest of all the intervention activities (median 5.5/10). No participants completed the barriers and supports assessment that was part of the pre-workshop materials. Interestingly, the facilitated discussions of barriers and supports during the workshop rated relatively high in the workshop evaluation (mean=3.46/4). Although having knowledge of barriers and supports is a core element of the proposed leadership model, there appears to be no added benefit to spending time and resources in sending printed materials to participants that asks them to conduct a barriers assessment on their own. Rather, a focus group discussion to understand barriers and supports to nurses using the guideline recommendations, as conducted in the workshop, is recommended (Grol et al., 2005; Legare, 2009). This approach is consistent with research that suggests nurses prefer to acquire evidence from colleagues rather than printed sources (Estabrooks et al., 2005).

Previous research reveals that clinical nurses and administrators differ in their perceptions of barriers to guideline use (Ploeg et al., 2007) underscoring the need to include clinical nurses, unit leaders, and senior corporate leaders in the barriers assessment. Barriers at four levels of change should be considered: the individual, the group or team, the overall organization, and the broader system in which the organization is embedded (Ferlie & Shortell, 2001). Delineating barriers by these levels, as done in this study, will help leadership teams understand and plan implementation strategies to maximize the probability of success. In need of further investigation is the question of how to involve front-line community health nurses, who may work at great distances from a central nursing unit, on participatory leadership teams to facilitate knowledge translation.

With regard to the post-workshop teleconferences, the median rating was low (6/10); however, the teleconferences were the only component of the intervention that differed markedly in scores by unit (mean=7.5 versus 4). Attendance also differed, with the majority of participants at one experimental unit attending each call, but only one participant at the other experimental unit

attending each call. Interestingly, the unit with low teleconference participation rates had three different managers during the study period, a factor that may have contributed to low attendance. Research has emphasized the importance of maintaining engagement of leaders when implementing and sustaining quality improvement initiatives in healthcare (Maher et al., 2007). Maher et al. (2007) suggest that change initiatives may falter if leaders from multiple hierarchical levels of an organization do not stay engaged. A future leadership intervention should include strategies to support and sustain the engagement of leaders in a guideline implementation initiative. The NHS sustainability model suggests different strategies to sustain leadership engagement including: regular communication with leaders in ways that are meaningful to the leader (i.e.: verbal, written, email, teleconference), discussing conflicting priorities that may be distracting a leader's engagement, and ensuring each leader understands their unique contribution to the change initiative (Maher et al., 2007).

Consistent with Stetler et al.'s (2006) definition of external facilitation, the purpose of the teleconferences was to maintain leadership engagement and commitment through "a deliberate and valued process of interactive problem solving and support that occurs in the context of a recognized need for improvement and a supportive interpersonal relationship" (para 4). However, some participants in this study did not find the teleconferences useful because of an inability to attend, a lack of recognized need, or dissatisfaction with the telephone as a medium. Stetler and colleagues (2006) identified similar obstacles in their research of external facilitation. A recent concept analysis uncovered no studies that have assessed facilitation as an effective intervention strategy in nursing (Dogherty et al., 2010). Further research is required to understand how facilitation can effectively support and sustain the engagement of leaders in guideline implementation initiatives, including what type of communication is meaningful and the frequency

of follow-up. Additionally, there is a need to understand how facilitation can effectively support leaders to influence guideline use in nursing.

Chart audit findings showed that a composite score of the five items chosen by intervention participants (i.e., unit leaders) as the priorities for change was documented significantly more frequently in the experimental group than in the control group. In contrast, no difference was observed in the eight item score that constituted the primary outcome for this study and was chosen in consultation with corporate leaders. When intervention participants were provided with chart audit data on 16 different indicators of guideline-based care in the workshop, they collectively chose four of the eight items within the primary outcome plus one other (patient education), as their priorities for change. This finding has important implications for future leadership interventions. First, corporate and unit-level leaders differed in their perceptions of which clinical indicators should be priorities for change. The reason for this difference is unclear. The barriers analysis revealed that two of the four indicators not chosen by intervention participants (glycemic control and foot deformities/pressure) had system and patient level barriers that were not readily modifiable by unit leaders. Chart audit data further revealed that the other two indicators (ulcer location and infection) already had high levels of compliance with the guideline recommendations. These findings suggest that more research is required to understand how to choose the most important clinical indicators for guideline-based care, regardless of multi-level barriers and differing priorities amongst staff, unit leaders, and corporate leaders. Descriptive research is needed to understand how best to elicit these data.

Furthermore, patients and families are important stakeholders with respect to goals and outcomes of care. There is increasing recognition that the involvement of patients and families in the design, content, and evaluation of health services is an important strategy to achieve high quality care (Bick & Graham, 2010; Doran, 2010). The contribution of patients and families in

defining priorities and goals of guideline-based care is a relatively new area of knowledge translation research (Graham et al., 2006) and worthy of further investigation.

Researchers in the United States have identified the involvement of board members on organizational leadership teams as a factor that can influence the quality of healthcare (Hendrich et al., 2007; Jiang, Lockee, Bass, & Fraser, 2009). For example, a study by Jiang et al. (2009) found a statistically significant difference ($p<.05$) in quality of care measures in hospitals where board members were directly involved in defining quality indicators and establishing priority goals for improvement. Recently in Canada, Baker et al. (2010) conducted interviews to identify the extent to which board members influenced quality of care and patient safety in healthcare organizations. Baker and colleagues (2010) concluded that board members are in a position to help organizations develop internal capacity for quality improvement. An area worthy of exploration in a future intervention is the inclusion of board members on leadership teams to help define priority indicators for guideline-based care in nursing.

Findings from the qualitative interviews indicated that leaders in the experimental group used different strategies to address barriers and to implement the guideline recommendations than did the control group. These comprised knowledge translation strategies for linkage and exchange, reminders, and audit and feedback (Straus et al., 2009) and are embedded in the proposed leadership model as relations, change, and task-oriented leadership behaviours. However, there is a need to understand what organizational structures and processes, including computer technology, are required to support nursing leaders to operationalize these strategies in home care. For example, Jamtvedt et al. (2006), concluded that the format, frequency, duration, and content of audit and feedback may have an impact on effectiveness, yet few studies have evaluated ways of conducting audit and feedback. An area worthy of exploration is the relationship between technology and leaders' performance in home care organizations, including the computer systems

required, the timing and presentation of data, and the training required for nursing leaders to access data and use technology in their decision-making.

Sustainability is an important component of knowledge translation that must be considered when planning knowledge translation interventions to prevent fading of short-term improvements (Davies, Tremblay, & Edwards, 2010). With multi-level leadership recognized as a key factor in sustainability (Davies et al., 2006) the need for a unified vision for guideline use is imperative, given the multiple objectives and competing priorities found in healthcare organizations (Davies et al., 2010). Indeed, competing priorities, unclear expectations, and multiple concurrent initiatives were identified as barriers in both control and experimental groups, underscoring the need for clarity of vision and priorities. Longitudinal research is recommended to understand the role of leadership in sustaining guideline use in nursing. Particular attention should be paid to the responses of multi-level leaders to changes in the organizational context and practice setting, unintended effects of the guideline implementation, the need for modifications to implementation strategies, and the emergence of new evidence over time (Davies et al., 2010).

With leadership research predominantly focused on the behaviours and styles of individual leaders and their dyadic interactions (Yukl, 2006) further research is needed to understand leadership as a shared team process embedded within a complex social system. Using the proposed team leadership model as an organizing framework focus group interviews could be conducted to explore: (a) patterns of interaction amongst the leadership team, including how decisions are shared by team members; (b) circumstances in which particular behaviours are used; (c) the influence of behaviours on staff nurses and their practice environment; and (d) how leadership teams coordinate their behaviours to complement, rather than counteract, each other.

Finally, research is needed to explore the relationship between contextual factors in community care environments (such as physical structure, span of control, available expertise and

technology) and outcomes of a leadership intervention for knowledge translation. A number of tools have been developed to assess and understand context and its effect on research use, including the *Context Assessment Index* (Kent & McCormack, 2010) and *Alberta Context Tool* (Estabrooks et al., 2009). Next steps would be to refine and validate a context tool for research in community healthcare environments.

Chart audit procedures.

Although the challenges of conducting research in the community (such as personnel shortages and lack of research skills amongst staff) have been documented previously (Brooker, Collins, Akehurst, & Repper, 1997; Ploeg, de Witt, Hutchison, Hayward, & Grayson, 2008), unanticipated issues were encountered in this study that resulted in the chart audit taking more than three times longer than planned (39 versus 12 weeks). Inconsistencies in the medical diagnoses assigned by healthcare practitioners and the use of numerous diagnostic labels within the electronic data management system made identification of eligible patients challenging. Hand-searching all charts for potential diagnostic labels was required, substantially increasing the time and cost of conducting the study.

Access to charts was provisional on patients being discharged from services, despite having a primary outcome that involved nursing care at the time of admission. Charts remained in patients' homes until discharge; sometimes there was a delay in charts being returned to the central nursing unit after discharge. A recent study indicated that 87% of diabetic foot ulcers (n=410) healed by 52 weeks and 71% healed by 20 weeks (Ince et al., 2007) indicating the need for longitudinal studies to capture chart audit data on patients with diabetic foot ulcers in community care.

Measures.

In a future longitudinal study to determine the impact of a leadership intervention on nurses' use of guideline recommendations for patients with diabetic foot ulcers I recommend that the following measures be included: (1) process measures for guideline-based nursing care; (2) baseline patient and ulcer characteristics; and (3) patient outcomes.

Process measures. The primary outcome for this study was a process measure of eight items recommended in the RNAO guideline to be assessed when caring for patients with diabetic foot ulcers. Although the items were chosen by researchers, clinical experts, and corporate leaders from the study organization, they differed from those chosen by participants during the intervention as the priorities for guideline implementation. It is recommended that both unit and corporate leaders collaborate to choose the priority indicators for guideline implementation in the intervention. However, from a knowledge translation research perspective, it is vital to capture data on all process indicators that are supported by strong research evidence as impacting outcomes. For example, ulcer depth, ulcer area, and ischemia have been shown to affect healing rates of diabetic foot ulcers significantly and are recommended to be assessed in the RNAO guideline (Ince et al., 2008; Margolis, Allen-Taylor, Hoffstad, & Berlin, 2005a). Further, landmark clinical trials have demonstrated that good glycemic control (i.e., A1C[6] levels of 7.0% or lower) is of paramount importance for successful management of people with diabetes (The Diabetes Control and Complications Trial Research Group, 1993; UK Prospective Diabetes Study (UKPDS) Group, 2006). Poor glycemic control induces physiological changes that increase the risk of complications, such as prolonged healing and amputations, significantly (Idris et al., 2005). Therefore, regardless of the barriers and priorities of the implementation leads, in future studies researchers should

[6]Glycosylated Hemoglobin A1C is a measure of an average blood glucose level over the past two to three months.

capture data on the indicators known to have an impact on healing of diabetic foot ulcers. Data can then be used in feedback mechanisms to support sequential implementation of different guideline recommendations to ensure the best possible care for patients.

Baseline patient and ulcer characteristics. Although data on process measures were collected in this study about whether or not nurses assessed baseline clinical data (such as ulcer depth and area, ischemia, neuropathy), clinical data were not collected for all measures. In a future longitudinal study, baseline clinical data on patient and ulcer characteristics should be collected so the relationship to healing times can be explored and compared to other studies in the literature.

Ulcer and patient outcomes. To substantiate the effectiveness of care for patients with diabetic foot ulcers meaningful outcome measures are needed. While complete healing without amputation is considered the most desirable outcome, often it is not achievable (Jeffcoate & Harding, 2003). Therefore, outcomes related to the ulcer, the limb, and the patient should all be considered. To allow comparisons with other studies in systematic reviews (Hinchliffe et al., 2008; Jeffcoate & Harding, 2003) collection of data regarding healing time, healed ulcers at 20 weeks, reduction in ulcer area at 20 weeks, and rates of amputation is recommended.

Functional outcomes and quality of life should also be measured. The existence of depression, anxiety, social isolation, and loss of productivity has been highlighted in previous research of people with diabetic foot ulcers (Jeffcoate & Harding, 2003; Meijer et al., 2001; Vileikyte, 2001). Survey tools such as the SF-36 health survey (Armstrong, Lavery, Wrobel, & Vileikyte, 2007), Barthel index, (Meijer et al., 2001), or the NeuroQoL measure (Vileikyte, 2001), validated in studies of patients with diabetic foot ulcers, could be considered.

In this study, length of time on service was the proxy for healing rates. Research has demonstrated that ulcer duration prior to the first healthcare visit is a predictor of foot ulcer complications (Ince et al., 2007; Margolis, Allen-Taylor, Hoffstad, & Berlin, 2002). As patients

typically do not know the precise date their ulcer began, a simple calculation has been developed: "record the date of onset simply by month … as if the ulcer had started on the 15th day of that month. If the calculated duration was negative, ulcer duration was taken as 0 days" (Ince et al., 2007, p.978). Researchers should include a formula such as this when calculating healing rates for more accurate comparisons across other studies.

A recent benchmark study of 27,193 individuals reported 68% of diabetic foot ulcers healed at 20 weeks (Margolis, Allen-Taylor, Hoffstad, & Berlin, 2005b). However, only 47% of ulcers in this pilot study healed at 20 weeks, raising concerns about ulcer care. The RNAO guideline recommends that nurses consider debridement and dressings that promote a moist wound environment for optimal management of diabetic foot ulcers. However, only 25% of patients in this sample received wound debridement, and hydrogel dressing (a form of autolytic debridement) was only used with six patients (6.8%). Furthermore, nine different categories of dressings were used, including dry gauze as the only dressing, in 11 patients. Given that the RNAO guideline recommends that dressing must not dry the wound bed, but keep it continuously moist, the use of dry gauze is particularly disconcerting. An updated systematic review (n=60 studies) reported hydrogel dressings as the only type of dressing with evidence of effectiveness to enhance healing of diabetic foot ulcers (Hinchliffe et al., 2008). Hinchliffe and colleagues (2008) concluded that there is little justification for the use of any other topically applied products or dressings (except hydrogel) until further evidence can be provided to substantiate effectiveness.

One of the factors responsible for failure of ulcers to heal is continued mechanical trauma, often occurring during normal activities of daily living (Jeffcoate et al., 2008). Pressure redistribution to decrease mechanical trauma is recommended in the RNAO guideline. The use of removable off-loading devices is a form of pressure redistribution that was documented in five patient charts. Although the use of non-removable off-loading devices (such as casts or walking

braces) has resulted in a higher proportion of plantar ulcers being healed in shorter times (Armstrong et al., 2001; Jeffcoate et al., 2008) the effectiveness of removable off-loading devices remains to be substantiated in controlled studies.

In their summary of systematic and non-systematic reviews the *International Working Group on the Diabetic Foot* concludes that, in general, the scientific evidence on interventions to promote healing of diabetic foot ulcers is thin and many issues remain unresolved (Jeffcoate et al., 2008). Although trial design poses considerable problems because of the complex pathogenesis of diabetes and foot ulcers, there is a need for robust prospective controlled studies to substantiate the effectiveness of different interventions to treat diabetic foot ulcers (Hinchliffe et al., 2008; Jeffcoate et al., 2008). A research team with strong methodological expertise will be required to consider the multiple interactions between comorbidities, treatments, and outcomes for people with diabetic foot ulcers.

Sample size considerations.

The observed intraclass correlation coefficient (ICC) for this study was calculated on a grouped score of eight different nursing practices based on RNAO guideline recommendations. Although no previous studies were located evaluating the association between clustering effects and nursing care for people with diabetic foot ulcers, previous studies show that ICCs vary greatly for physician care. For example, in a study to determine ICCs by chart audit for 13 procedures Baskerville, Hogg and Lemelin (2001) observed a range of ICCs from 0.005 for blood pressure measurements to 0.66 for chest radiographs. Similarly, Littenberg and MacLean (2006) calculated ICCs for 112 variables related to diabetes care from 73 primary care practices and found wide variability around a median of 0.0185 (inter-quartile range: 0.006 - 0.037). Variables such as recent creatinine tests were highly associated with practice clusters (ICC=0.29), whereas others such as presence of patient comorbidities were poorly associated (ICC=0.001).

It is reasonable to expect similar variability in nursing processes of care. Sample size calculations in a future cluster randomized trial could use the range of ICCs provided in this study, however, they should also be informed by a clinically significant effect size and previous studies (if they exist) (Kraemer, Mintz, Noda, Tinklenberg, & Yesavage, 2006). Consistent with Campbell, Grimshaw, and Elbourne (2004) ICCs should be calculated and reported for outcomes of interest in future cluster trials.

Summary of Recommendations for Future Research

A summary of recommendations for future research is presented in relation to knowledge translation, leadership, and community health nursing.

Knowledge translation

1. Develop leadership interventions at multiple organizational levels

Further research is needed to understand how to assess leadership needs for knowledge translation, and how to tailor leadership interventions to individual, unit, and organizational needs. The proposed leadership model provides a beginning taxonomy of leadership behaviours that are hypothesized to influence knowledge translation. The model could be used as a guide in descriptive research to determine barriers and supports to leaders influencing guideline-based care. Further understanding is required about the type and frequency of follow-up strategies required to facilitate leaders' use of the theoretical principles of the model in their leadership practice.

2. Decision-making on clinical indicators for guideline-based care

Further research is required on how to choose the most important clinical indicators for guideline-based care, regardless of multi-level barriers and differing priorities amongst front-line, unit, and corporate leaders. Descriptive research is needed to understand how to best elicit these data. Engaging patients in the decision-making process is an area worthy of future exploration.

3. Use a longitudinal design for evaluating implementation and sustainability

Based on what was learned from this pilot study, the protocol could be adapted to evaluate the effect of a leadership intervention on nursing process and patient outcomes using a longitudinal repeated measures design with a cluster randomized control group. Nursing process and patient outcomes could be evaluated every six months over a two year time period for people with diabetic foot ulcers. The protocol could also be adapted for use in other areas, and with other guidelines.

Longitudinal designs are further recommended to understand leadership behaviours that sustain guideline-based nursing practice. Particular attention should be paid to the responses of leaders at unit and organizational levels to, for example: changes in the organizational context and practice setting, unintended effects of the guideline implementation, the need for modifications to implementation strategies, and the emergence of new evidence over time.

Leadership

4. Understand leadership as a team process

Further research is needed to understand leadership as a shared team process. Study designs should be exploratory and sensitive to: (a) patterns of interaction amongst the leadership team; (b) circumstances in which particular behaviours are used; (c) the influence on staff nurses and their practice environment; and (d) how leadership teams coordinate their behaviours to complement each other.

Community healthcare

5. Engage community healthcare nurses

There is a need for research to understand what kinds of funding formulas and service delivery models are required to engage front-line community healthcare nurses, who may work at great

distances from a central nursing centre, on participatory leadership teams to facilitate knowledge translation.

6. Infrastructure to access clinical data

Further understanding of what organizational structures and processes are required for leaders to have timely access to reliable data on process and patient outcomes in community healthcare organizations is needed. An area worthy of future exploration is the relationship between electronic information systems and leaders' performance, including the types of electronic records and database systems best suited for use in the community, the timing and presentation of data, and the type of trained personnel required to maintain the system and access the data.

7. Explore contextual factors

Research is needed to explore the relationship between contextual factors in community care environments (such as physical structure, span of control, available expertise, and technology) and outcomes of a leadership intervention for knowledge translation. A number of tools have been developed to assess and understand context and its effect on research use in hospital-based care. Next steps would be to test and validate a context tool for research in community healthcare environments.

Contributions to Nursing Knowledge

The purpose of this pilot study was to determine the acceptability and feasibility of developing, delivering, and evaluating a theory-based leadership intervention to influence guideline use in home care nursing practice. A synthesis of the primary research on managerial leadership for research use provided knowledge of the role that nursing managers have in influencing guideline use (Gifford et al., 2007). The review revealed that, although leadership is highlighted as important in descriptive research, little experimental research has been conducted on the hypothesized link between leadership and nurses' use of research evidence. Building on a grounded theory study I conducted on leadership in organizations that sustained or did not sustain guideline use (Gifford et al., 2006), a leadership model was developed that articulates relations, change, and task-oriented leadership behaviours to influence nurses to use guideline recommendations in clinical practice.

Using the leadership model as a guide, a three-part leadership intervention was developed to operationalize leadership behaviours through a team leadership action plan. The intervention and study protocol were pilot-tested with a cluster randomized design and qualitative interviews. The protocol was published in *Implementation Science* (Gifford et al., 2008).

Findings from the study suggest that a theory and evidence-based leadership intervention can influence knowledge translation in nursing, in particular nurses' use of guideline recommendations for patients with diabetic foot ulcers. Pilot-testing the intervention provided information on the elements of a leadership intervention that were feasible to deliver and perceived as useful to clinical and management leaders. Integration of qualitative and quantitative methods helped in the interpretation of results by clarifying processes and testing the theoretical premises of the intervention. The development and evaluation of the intervention is published in *Journal of Nursing Management* (Gifford et al., 2011).

Based on study findings the original leadership model was revised and a new leadership model is proposed to guide the development of future leadership intervention research. The model suggests that leadership for guideline use in nursing is a multi-level team process, created by people in management and clinical roles. The model further suggests that to create an effective leadership process an intervention should engage leaders in identifying priority indicators for change and planning a synchronized leadership strategy; to do so leaders require clinical data, knowledge of barriers and supports, and a unified vision. An important link between unit leaders' priority-setting and nurses' use of clinical guideline recommendations was revealed and the theoretical premise that leadership involves relations-oriented, change-oriented, and task-oriented leadership behaviours was confirmed. However, more research is required to understand how to deliver and translate the theoretical principles of the intervention into effective leadership practices. This is consistent with the need for more research about effective strategies to translate research findings into practice, suggesting leadership development requires the same pre-assessment and tailored approach as other knowledge translation strategies.

A data collection tool with high inter-rater reliability was developed. The tool provides meaningful measures of nurses' instrumental use of guideline recommendations for patients with diabetic foot ulcers. For unit-level leadership interventions in home care nursing, cluster-randomization was feasible; ICC and sample size estimates have been determined for future cluster trials to examine nursing process outcomes for patients with diabetic foot ulcers.

Conclusion

Although a considerable body of literature exists about the importance of nursing leadership, little research has focused on intervention strategies to develop leadership behaviours to support nurses' use of guidelines in clinical practice. Few experimental studies have been conducted examining leadership interventions and nursing process and patient outcomes.

The purpose of this pilot study was to determine the acceptability and feasibility of developing, delivering, and evaluating a leadership intervention to influence guideline use in home care nursing practice. Although parts of the intervention were well received, others were not; however, findings show promise that a leadership intervention can influence knowledge translation in nursing. A revised leadership model has been developed that provides a useful taxonomy to inform future leadership intervention studies.

Contributions of Collaborators

Wendy Gifford (WG) conceptualized, participated in, and led the research study as part of the requirements for completion of the degree of Doctor of Philosophy at the University of Ottawa under the supervision of Dr. Barbara Davies. WG is a registered nurse with over 15 years clinical experience in the areas of critical care, outpost nursing in remote Aboriginal communities, and community program development. An associate member of the Nursing Best Practice Research Unit, a joint initiative between the Registered Nurses' Association of Ontario (RNAO) and the University of Ottawa, WG was the recipient of the RNAO doctoral scholarship (2005-2008) and the Academy of Canadian Executive Nurses doctoral award in 2009. All data in this study were collected for the express purpose of this PhD thesis.

Collaborators were selected based on their expertise to gain a broad perspective of knowledge in the areas of research methodology, organizational feasibility, leadership, and guideline use. The thesis supervisor is Dr. Barbara Davies (BD), Professor at the School of Nursing, University of Ottawa. The thesis committee includes (in alphabetical order): Dr. Ian Graham (IG), Vice-President for Knowledge Translation at the Canadian Institute of Health Research; Nancy Lefebre, Senior Vice President of Knowledge and Practice at Saint Elizabeth Health Care; Dr. Ann Tourangeau, Associate Professor and Graduate Chair, Lawrence S. Bloomberg Faculty of Nursing, University of Toronto; and Dr. Kirsten Woodend, Associate Professor, School of Nursing, University of Ottawa.

All thesis committee members collaborated in the development of the research proposal and provided consultation throughout the research process. Specifically, BD, IG, and KW provided guidance for design and methods. BD and IG also provided content expertise in knowledge translation and guideline use. KW provided expertise in statistical analysis, sample size estimates, and ICC calculations. AT provided content expertise and guidance on the topics of leadership and

leadership development. NL provided organizational support and guidance related to the feasibility of conducting the study, chose the clinical topic for guideline implementation (diabetic foot ulcers), and oversaw the implementation of the organization's guideline implementation strategy (control). Thesis committee members all contributed to interpreting results, and provided feedback on earlier drafts of the thesis. Members of the thesis committee who are listed as co-authors on the three manuscripts provided content expertise and guidance in bringing the manuscripts to publication.

Additional research staff and consultants contributed in the following ways. Elham Sabri and Dr. Monica Taljaard, PhD, statisticians at the Ottawa Health Research Unit, provided support with the post-intervention statistical analysis, and Dr. Taljaard conducted the intracluster correlation coefficient (ICC) and sample size estimates for future cluster trials. Research assistants Ben Belanger and Monica Prince assisted with data entry for the pre-intervention chart audit and for the post-intervention chart audit, respectively. Era Mae Ferron, RN, PhD(c) assisted with the pre and post-intervention chart audit. Jane Simpson, RN, MScN conducted the post-intervention interviews, and Jeanie Zeiter transcribed the interviews. Research staff at Saint Elizabeth Health Care, Karen Ray, Michelle Conn, and Jessie DeSouza, helped to coordinate schedules with the participating study sites and intervention participants. Research assistant Sarah Graydon provided assistance with entering data into tables and formatting documents early in the analysis, and Carol Kavanagh provided editorial and formatting assistance with the final thesis document.

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Appendix A:

A Mixed Methods Pilot Study with a Cluster Randomized Control Trial to Evaluate the Impact of a Leadership Intervention On Guideline Implementation in Home Care Nursing.

Gifford, W. A., Davies, B., Graham, I. D., Lefebre, N., Tourangeau, A. E., & Woodend, K. (2008). A mixed methods pilot study with a cluster randomized control trial to evaluate the impact of a leadership intervention on guideline implementation in home care nursing. *Implementation Science, 3*(51), 1-10.

Implementation Science

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Study protocol

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A mixed methods pilot study with a cluster randomized control trial to evaluate the impact of a leadership intervention on guideline implementation in home care nursing

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Abstract

Background: Foot ulcers are a significant problem for people with diabetes. Comprehensive assessments of risk factors associated with diabetic foot ulcer are recommended in clinical guidelines to decrease complications such as prolonged healing, gangrene and amputations, and to promote effective management. However, the translation of clinical guidelines into nursing practice remains fragmented and inconsistent, and a recent homecare chart audit showed less than half the recommended risk factors for diabetic foot ulcers were assessed, and peripheral neuropathy (the most significant predictor of complications) was not assessed at all.

Strong leadership is consistently described as significant to successfully transfer guidelines into practice. Limited research exists however regarding which leadership behaviours facilitate and support implementation in nursing.

The purpose of this pilot study is to evaluate the impact of a leadership intervention in community nursing on implementing recommendations from a clinical guideline on the nursing assessment and management of diabetic foot ulcers.

Methods: Two phase mixed methods design is proposed (ISRCTN 12345678). Phase I: Descriptive qualitative to understand barriers to implementing the guideline recommendations, and to inform the intervention. Phase II: Matched pair cluster randomized controlled trial (n = 4 centers) will evaluate differences in outcomes between two implementation strategies. Primary outcome: Nursing assessments of client risk factors, a composite score of 8 items based on Diabetes/Foot Ulcer guideline recommendations.

Intervention: In addition to the organization's 'usual' implementation strategy, a 12 week leadership strategy will be offered to managerial and clinical leaders consisting of: a) printed materials, b) one day interactive workshop to develop a leadership action plan tailored to barriers to support implementation; c) three post-workshop teleconferences.

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Discussion: This study will provide vital information on which leadership strategies are well received to facilitate and support guideline implementation. The anticipated outcomes will provide information to assist with effective management of foot ulcers for people with diabetes.

By tracking clinical outcomes associated with guideline implementation, health care administrators will be better informed to influence organizational and policy decision-making to support evidence-based quality care. Findings will be useful to inform the design of future multi-centered trials on various clinical topics to enhance knowledge translation for positive outcomes.

Trial Registration: Current Control Trials ISRCTN06910890

Background: diabetic foot ulcers

Diabetes mellitus, a complex, life-long metabolic disorder characterized by raised blood glucose concentrations, affects 4.2 percent of the world's population and over 1.5 million Canadians [1,2]. Ulceration of the foot is a significant problem for people with diabetes, affecting 15 percent at some time in their life [3,4]. Foot complications are a major reason for hospital admissions, accounting for approximately 20 percent of all diabetes-related admissions in North America [1]. Foot ulcers precede 85 percent of lower limb amputations [4,5] and 30 percent of those undergoing amputation die within the following year [6]. Diabetes pathology that increases risk of foot ulcerations and complications includes peripheral neuropathy (impairment of nerve function), peripheral vascular disease, limited joint mobility and deformity [1,4,5,7]. The triad of neuropathy, deformity, and trauma is present in almost two thirds of people with foot ulcers [5] with footwear being a major cause of traumatic ulcers [8].

Lack of awareness of risk factors associated with diabetic foot ulcer by health care professionals and patients adds to unnecessary morbidity such as prolonged healing, infections and gangrene that may result in amputations [4,5,9]. Mills et al. (1991) reviewed records of 55 diabetic patients with localized gangrene or infection on a vascular surgical unit and found 29 percent were delayed in referral for definitive care due to a lack of recognition by practitioners of ischemia or an underestimation of the severity of infections [10].

Comprehensive assessments by health care professionals of risk factors are recommended in clinical practice guidelines for effective management and treatment of diabetic foot ulcers, and are supported by strong empirical evidence [1,4-7,11-16]. A recent Cochrane review showed managing ulcers with hydrogel dressings when compared to usual care (gauze dressings) improved healing rates by 23 percent at 12 to 20 weeks (95% CI 10–36%) [7]. Assessments are recommended to include: peripheral neuropathy, vascular status, structural deformities, infection and ulcer size [1,5,9,12-15]. Referrals to multidisciplinary foot care specialists [5,12,13] and patient education [4,17] are equally emphasized.

Problem: Implementing clinical guideline recommendations

Clinical practice guidelines synthesize and translate high quality research evidence into recommendations for practice, and provide an easy and accessible tool for bridging the evidence-practice gap [18-21]. For practice change to occur however, guidelines must be utilized, and their timely and effective transfer into clinical practice remains fragmented and inconsistent [21-24]. Implementation strategies directed at individuals, the environment and the organizational context are necessary for successful implementation and practice change to occur [20,25-27]. In recent Cochrane reviews, tailored interventions that focus on individual and organizational barriers to change showed promise for implementing change and improving patient care [28], and interactive workshops were found to have moderately large effects on changing professional practice [29].

The importance of top managers' involvement and commitment in implementing innovations such as guidelines and change have been emphasized outside [30-39] and within healthcare settings [40-45]. Descriptive and qualitative evidence has identified leadership and management behaviours as having an important impact on nurses' work environments [42,46-50] and their use of research evidence to inform practice [27,51-63]. Similarly, a systematic review of 30 studies identified the lack of support from managers, and 'other staff' to be one of the greatest barriers to nurses' use of research [60]. Management behaviours such as support and commitment [56,58,64-69], policy revisions [66,70] and monitoring of clinical outcomes [66,71] have been described as enablers to nurses' use of research [72]. Limited experimental research exists however regarding which behaviours are most effective to facilitate guideline implementation in nursing. A recent mixed methods study of 37 organizations found leadership to be the only predictor of sustained use of clinical guideline recommendations two and

three years post-implementation, accounting for 47 percent of the variance ($p < .001$) [73]. Using grounded theory to analyze 9 of the 37 organizations, Gifford et al. found patterns of leadership and managerial behaviours in organizations that sustained practice change based on guideline recommendations (n = 4) at 2 and 3 years differed when compared to organizations that did not sustain practice change (n = 5) [63]. A conceptual model was developed from the analysis that operationalizes leadership behaviours for implementing and sustaining practice change.

Study Aim

The aim of this pilot study is to evaluate the impact of a leadership intervention on implementing new recommendations from a clinical practice guideline on nursing assessments and management of foot ulcers for people with diabetes in community nursing practice. Specific objectives include:

1) To identify barriers and develop a tailored leadership intervention for home care nurse managers, supervisors, resource nurses and clinical staff to influence implementation of selected recommendations from the Registered Nurses Association of Ontario (RNAO) clinical practice guideline for care of foot ulcers for people with diabetes.

2) To determine the impact of the intervention on client, nurse and system outcomes.

3) To understand the feasibility of influencing leadership behaviours through the intervention.

4) To test and refine a model of leadership for implementing practice change.

We plan to test the following study hypotheses:

$\mathbf{H_1}$: Nurses working in centers that receive the intervention will obtain significantly higher scores for practicing in accordance with guideline recommendations than control group.

$\mathbf{H_0}$: No change in group means will occur following the intervention.

Design/Methods

A two phase mixed method design is proposed (Figure 1). A pilot study is planned because there is little information regarding effective leadership behaviours for implementing practice change in nursing, and there is a need to test the intervention strategies prior to launching a larger multi-centered trial. Phase one involves descriptive qualitative methods to understand barriers to implementing the guideline recommendations and to refine the intervention strategy to be useful and appealing to leaders. A cluster randomized controlled trial, considered the optimal design when evaluating strategies to change professional behaviour [20,74], will evaluate differences in outcomes between the two implementation strategies. Randomization will occur at the unit level to minimize threats of experimental contamination [20,75,76].

Site

The research is being conducted in a home and community health-care service organization that provides nursing care through 23 centers in the province of Ontario Canada. The organization employs approximately 1500 nursing staff, 65 managers and supervisors, and 20 clinical resource nurses, and 7 clinical directors. Approximately 30 to 40 percent of clients receiving nursing services are diabetic, and clinical directors identified foot care for this population as a priority clinical topic, with a notable gap between current practices and guideline recommendations. For example *no* clients are currently being assessed for peripheral neuropathy the most significant predictor of ulcers, and recent chart audits indicated that co-morbidity, vascular status and wound size were not documented in at least 50 percent of charts for foot and leg ulcers. The organization has previously implemented clinical practice guidelines at an estimated cost of $60,000 per implementation. To date implementation strategies have had mixed success. Implementation of the RNAO guideline *Assessing and Managing Foot Ulcers for People with Diabetes* [13] is planned in 2008.

Primary outcome

Nursing assessments of client risk factors scores (NACRF), a composite score of 8 items based on recommendations from the Diabetes/Foot Ulcer guideline. The 8 items were chosen in consultation with clinical experts in diabetes and wound management, have a high level of research evidence for prediction of poor outcomes [13], and were reviewed for content validity by researchers and clinical experts in the field. Four of the eight items were previously used in a chart audit evaluation of another RNAO guideline related to the prevention of foot complications in people with diabetes [77,78].

Secondary outcomes

1) proportion of people with healed ulcers at 12 weeks (defined as complete wound closure),

2) healing times in number of weeks,

3) types of treatments used (eg: hydrogel dressings, sharp debridement, offloading devices),

4) referral rates to specialists services,

5) documented patient education,

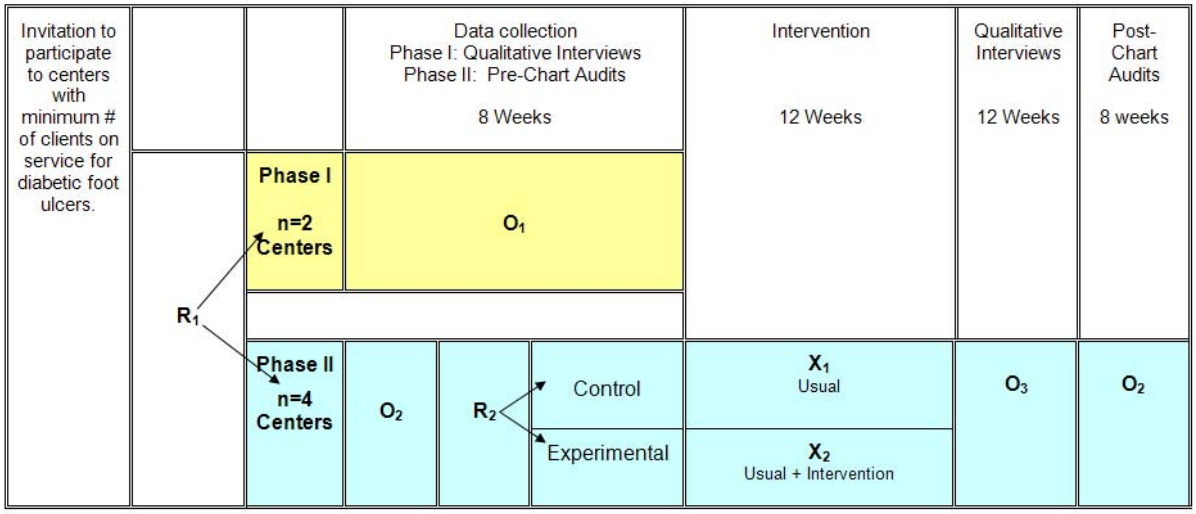

Figure 1
Design: Two phased mixed methods pilot study.

6) proportion clients assessed for all items in the NACRF scale (all-or-none measure) [79],

7) Nursing participant satisfaction and perceived utility of elements of the intervention.

Sample

All centers (approximately 10) with the minimum number of clients being treated for diabetic foot ulcers to satisfy sample size calculations will be invited to participate in the study. Two centers will be randomly assigned to participate in phase one and four will be randomly assigned for phase two. The four sites in phase two will be randomly allocated to control (n = 2) or experimental (n = 2) groups.

Sample size

Sample size calculations were determined, and are based on the use of an independent t-test on NACRF scores at the end of the study. The following assumptions have been made: alpha = .0.05 (two-tailed), Beta = 0.20 and an expected change in NACRF scores of 20 percent. Although all items within the NACRF have not been previously used, four were previously evaluated in a pre/post chart audit that showed a 26 percent absolute improvement in nursing documentation (range -3.6 to 57.1) [78]. Thus, an estimate of 20 percent improvement will be used. In addition, standard deviations (SD) and intra-cluster correlation coefficients (ICCs = ρ) for NACRF are presently unknown. It is however, estimated that the effect size may be as small as 1.00 but to be conservative 0.83 (SD = 3) is assumed for this calculation. Based on these assumptions, 30 charts will be needed in both intervention and control groups (n = 60). While it is not known exactly how many clients with diabetes will be on service for foot ulcers during the study period, senior administrators have reassured investigators that a minimum of 30 clients per group is feasible.

Power estimates for secondary outcomes

The anticipated rate of healing in the control group is 24 percent in 12 weeks [16]. For the proportion of ulcers

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healed and healing times, 30 charts in control and intervention groups would yield 80 percent power to detect an absolute increase in healing rates of 40 percent (alpha .05, two tailed). The study is also powered to detect an absolute increase of 40 percent in referral rates and patient education, also measured as a proportion.

Data Collection

Baseline

All adult clients (18 years or older) diagnosed with Type 1 or Type 2 diabetes being treated for a first or recurring foot ulcer(s) will be eligible for the study. Using data abstraction forms modified from a previous guideline evaluation project [77], chart audits will be performed at control and experimental sites prior to randomization until sample size is achieved or up to 12 weeks prior to the intervention. Chart audit data collectors will be trained and supervised by researchers with experience in conducting chart audits. Interrater and test-retest reliability will be assessed in a random review of 10 percent of charts.

PHASE I: Barriers Assessment and Intervention Development

Semi-structured interviews will be conducted at two centers with a sample of managers, supervisors, resource nurses and 2 'preceptor' staff nurses from each site (n = 10). Preceptor staff are experienced clinical nurses who volunteer to provide support to novice or newly hired nurses regarding clinical issues. The interview guide is based on previously published guides for assessing barriers and supports [80], and has been structured to understand components of an intervention strategy considered useful to managers and clinical leaders. Results of phase I will inform content and structure of the intervention strategy.

PHASE II: Intervention Strategy

Control Group

Staff at each center will receive the 'usual' guideline implementation strategy consisting of: 1) a formal guideline launch; 2) self-directed learning package, 3) educational sessions for staff related to the clinical application of practice recommendations. Senior administrators estimated that approximately 70 percent of staff typically attend 'usual' strategies.

Experimental Group

In addition to the 'usual' implementation strategy, a 12 week leadership strategy will be offered to mangers, supervisors, resource nurses, and 2 preceptor staff from each center to facilitate and support implementation, consisting of:

1) Mailed package of printed materials: to include study purpose; summary of recommendations, models of leadership and planned change; literature article; three questions to assess barriers to nurses assessing and managing foot ulcers in accordance to the guideline recommendations. Review time: approx 15–30 minutes.

2) Interactive workshop (one day): Content and activities will be tailored to results of phase one, planned to include: a) evidence and theory on leadership and implementing practice change; b) focus group discussions about barriers to implementing the recommendations; c) role playing exercises; and d) facilitated development of a team leadership implementation plan for each center, tailored to identified barriers.

3) Post-workshop teleconferences: (2, 6, and 10 weeks after workshop) to provide a forum for questions, discussions and networking amongst participants.

Guiding Theoretical Framework

The theoretical underpinnings of the proposed intervention are based on mechanisms of planned change as described in the Ottawa Model of Research Use (OMRU©) [52,81], effective leadership behaviours described by Yukl [82], and leadership for guideline implementation described by Gifford et al [63].

The OMRU is a planned change framework for knowledge transfer in health care delivery [52]. Derived from evidence and theories of change, the OMRU recognizes that practice change is not a linear process, but involves simultaneous and interactive relationships between the nature of the innovation, the potential adopters, and the context within the practice environment. Three key processes involved are: 1) assessing barriers and supports; 2) developing and monitoring interventions tailored to barriers and supports; 3) evaluating outcomes. The underlying mechanism is that tailoring intervention strategies to address barriers and strengthen supports related to the innovation, potential adopters and practice environment will result in practice change.

The OMRU provides a template to assess barriers and supports for implementing change and will facilitate the selection of intervention strategies with the best probability of success. The relevance and pragmatic utility of the OMRU for guiding implementation of innovations (including nursing guidelines) has been demonstrated in previous research [83-87].

Leadership is "the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives" [[82], p.8]. Three meta-categories of effective leadership behaviours described by Yukl and supported by decades of research

[82,82,88,89], provide the foundation for this study: 1) relations-orientated, 2) change-orientated and 3) task-orientated. Relations-oriented behaviours include supporting, developing personal skills and job adjustments, and recognizing others and their contributions. Relations-oriented behaviours increase mutual trust, cooperation among members, and commitment to a unit and organization. Change-oriented behaviours are concerned with integrating a vision, developing strategies and building coalitions to support change, creating a sense of need and demonstrating commitment to change. Task-oriented behaviours include clarifying roles, monitoring operations and performance, and the efficient use of resources [82].

Three leadership themes emerged as central to implementing guidelines in the grounded theory study by Gifford et al., and these align closely with Yukl's [82] metacategories of effective leadership behaviours. Leaders were found to have: 1) facilitated staff through relations-oriented behaviours (e.g.: support, encouragement and recognition); 2) created a positive milieu within the clinical practice environment through change-related behaviours (e.g.: reinforced goals and philosophies of care); and 3) influenced organizational structures and processes through task-oriented behaviours (e.g.: providing resources, policies and monitoring). Together these behaviours influenced individuals, practice environments and infrastructures to enable nurses to practice based on guideline recommendations.

Drawing on the work of Van de Ven et al. (1999), effective leadership at different hierarchical levels is necessary for the adoption of new innovations in organizations [90]. Successful implementation in healthcare is dependent on strong effective leadership to create a context which is receptive to change [26,27,51,63,82,90-96]. The organizational context exerts a particularly powerful set of influences on nurses' adoption of new innovations [81,97,98]. Extensive managerial involvement, commitment and attitude toward change, role clarity, and leadership styles are significantly associated with maintaining the momentum of innovation adoption in organizations [32,33,90,99,100]. A 'road map" that explains what leaders do is not however possible due to the inherent unpredictability and nonlinear processes of innovation adoption [90]. "Management cannot ensure innovation success but can influence its odds" (p.11, 88). Leadership is an integral part of managerial roles, and is necessary for managers to influence change [34,82,96,101-104]. Individuals and organizational context must be influenced for practice change to occur based on new innovations [20]. The proposed intervention aims to influence individuals, the practice environment and organizational context through leadership processes and behaviours that manage barriers and enable practice change to occur. (Figure 2)

Post-intervention measures

Chart audits will be conducted on all patients being treated for diabetic foot ulcers up to 12 weeks following the intervention. To understand the leadership and management behaviours that influenced nursing practice, semi structured qualitative interviews will be conducted with managers, supervisors and resource nurses and staff nurses at control and experimental sites (n = 20). The experimental group interview guide will also ask for participants' opinions regarding the usefulness of the intervention. The interview guides are based on previously published guides for assessing barriers and supports [80], and previous research on implementing guidelines [105]. To evaluate satisfaction and perceived utility of the one day workshop, an evaluation form, based on previously evaluations from RNAO guideline implementations, [106] will be administered at the end of the workshop.

Data Analysis

Pre/post univariate descriptive data will be computed for demographics of patients and staff.

Primary Outcome: Composite NACRF scores

Eeach item within the scale will be coded dichotomously (1 = yes; 0 = no), and a total score calculated out of 8. Bivariate analysis using independent groups t-tests will be conducted to assess the significance of differences pre/post intervention between control and experimental groups. The alpha level will be pre-set at .05, and 95 percent confidence intervals calculated. An 'intent to treat' analysis will be used [75].

Secondary Outcomes

The proportion of people with healed ulcer(s) at 12 weeks, and time to complete healing will be calculated. Types of treatments used (eg: hydrogel dressings, sharp debridement, offloading devices) will be calculated. Clients with documented patient education and referrals will be dichotomously coded (1 = yes; 0 = no/don't know). Independent groups t-tests for continuous variables, and chi squares for categorical variables will determine differences before and after the intervention within each center, and between control and experimental groups. Descriptive statistics will be used to evaluate nursing participants' satisfaction and perceived utility with the elements of the intervention.

Other Outcomes

ICCs (ρ) will be calculated on pre/post measures of composite NACRF scores, and demographic characteristics of clients (e.g.: age, gender) [107]. Matching is expected to minimize between-unit variations, and previous research

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Figure 2: Conceptual Framework

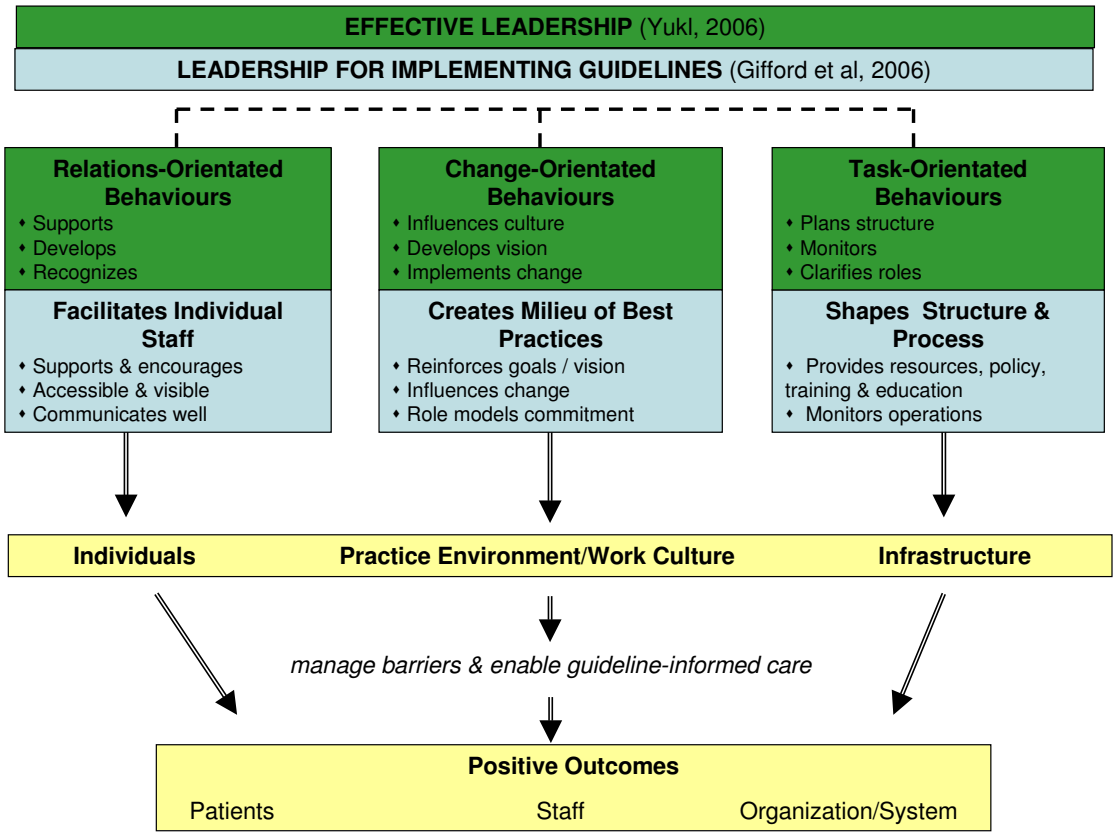

Figure 2
Conceptual Framework.

shows ICCs for the process of care to be high [20,74,108]. ICCs from this study will be useful to inform future studies regarding sample size calculations [107,109,110].

Qualitative Findings

To understand how the intervention influenced leadership practices, data from qualitative interviews will be audio-taped, transcribed, entered into qualitative software (NVIVO) and analyzed using content analysis techniques involving an iterative process of data reduction, data display, conclusion drawing and verification [111].

Discussion

Limitations

An inherent limitation of collecting data through chart audit is the documented data obtained may potentially underestimate actual care [112]. Other methods of data collection, such as direct observations are not feasible for this pilot study due to geographical distances and associated costs of observing home-care nurses provide care in patients' homes throughout the province. A second limitation of collecting data through chart audits involves reviewers accuracy, impartiality, attentiveness and consistency in extracting data [112]. Having an experienced research manager overseeing the process, and pilot testing for interrater and test-retest reliability will assist with addressing this limitation. Additionally, this is a pilot study and not sufficiently powered to account for the effect of clustering.

Ethical Considerations

Prior to commencement, ethical approval will be obtained from University of Ottawa Research Ethics Board which follows Tri-council guidelines [113]. Details of ethical considerations, including informed consent, anonymity and confidentiality are found in ethics submission

form. Briefly, a numerical coding system will be used to track individual participant and chart audit data. Names of interview participants will be kept separated from data collection forms and locked at the University of Ottawa Nursing Best Practice Research Unit. Names from chart audits will be kept by the research manager at the participating organization in a secured place; only numerically coded data will be sent to investigators. Only aggregated data will be reported. Information consent forms will be available in English and French. Data will be securely stored for 5 years after study conclusion (e.g. December, 2014).

Feasibility

This study aligns with the participating organization's timeline to implement the *Diabetes/Foot Ulcer BPG*, and has been developed in consultations with senior administrators to ensure feasibility, support, and compatibility with organizational direction, initiatives and training strategies.

Potential Impact on Nursing Care

This pilot study will contribute to the development of leadership strategies to facilitate implementation of guideline recommendations on a priority clinical topic in community nursing. The anticipated outcome is information to assist with more effective management and faster healing of foot ulcers in community health nursing for people with diabetes. With the high cost of guideline implementation, this study will provide vital information on which strategies are well received when implementing practice change. By tracking clinical outcomes associated with guideline use, nursing administrators will be better informed to influence organizational and policy decisions to support high quality nursing care. Findings will be useful to inform the design of future multi-centered trials on various clinical topics, and to enhance the science of knowledge translation for evidence-informed practice change that impacts quality nursing care and client outcomes.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

WG and BD conceptualized the study. WG led the writing and application for funding. All other authors contributed to conceptualizing based on specific areas expertise: IG for knowledge translation framework and tool development; NL for organizational feasibility and data collection methods; AT for leadership development theory and leadership outcomes; KW for quantitative methodology and power analysis. All authors have read drafted versions of the manuscript, provided input and refinements, and agreed to the final manuscript.

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Appendix B:

Summary Recommendations from the RNAO Clinical Guideline: Assessment and Management of Foot Ulcers for People with Diabetes

Assessment and Management of Foot Ulcers for People with Diabetes

Summary of Recommendations

RECOMMENDATION		*LEVEL OF EVIDENCE
Practice Recommendations		
Patient Empowerment and Education	1.0 All patients with diabetic foot ulcer(s) (PWDFU) or caregivers should have an understanding of their condition and the resources available to optimize their general health, diabetes management and ulcer care.	Ia
	1.1 Education is essential as an empowerment strategy for diabetes self-management and prevention or reduction of complications.	IV
	1.2. Education is based on identified individual needs, risk factors, ulcer status, available resources and ability to heal.	IV
Holistic Assessment	2.0 Complete and document a health history, including diabetes management, allergies, medications, functional assessment and physical examination (vascular status, infection, callus, neuropathy, foot deformity/pressure, ulcer).	Ib – IV
Vascular Status	2.1 Clinically assess bilateral lower extremities for vascular supply and facilitate appropriate diagnostic testing.	IIb – IV
Infection	2.2 Assess all patients with diabetic foot ulcers for signs and symptoms of infection and facilitate appropriate diagnostic testing and treatment.	IIa
Neuropathy	2.3 Identify peripheral neuropathy by assessing for sensory, autonomic and motor (S.A.M.) changes.	II – IV
Foot Deformity and Pressure	2.4 Assess for foot pressure, deformity, gait, footwear and devices. Facilitate appropriate referrals.	Ia – IV
Foot Ulcer Assessment	3.0 Describe and document the ulcer characteristics.	IV
	3.1 Identify the location, length, width, depth and classify the ulcer(s).	Ia – IV
	3.2 Assess ulcer bed, exudate, odour and peri-ulcer skin.	IV
Goals of Care	4.0 Define goals based on clinical findings, expert opinion and patient preference.	IV
	4.1 Determine the potential of the ulcer to heal.	IV
	4.2 Develop goals mutually agreed upon by the patient and healthcare professionals.	IV
Management	5.0 Identify and optimize systemic, local and extrinsic factors that can influence wound healing.	IV
Systemic Factors	5.1 Modify systemic factors and co-factors that may interfere with or impact on healing.	IV
Local Factors	5.2 Provide local wound care considering debridement, infection control and a moist wound environment.	Ia-III
Extrinsic Factors	5.3 Provide pressure redistribution.	IIa

*See page 12 for details regarding “Interpretation of Evidence”.

	RECOMMENDATION	LEVEL OF EVIDENCE
Non-healing diabetic foot wounds	**5.4** Evaluate and implement treatment options for non-healable wounds.	IV
Evaluation	**6.0** Evaluate the impact and effectiveness of the treatment plan.	IV
Reassess	**6.1** Reassess for additional correctable factors if healing does not occur at the expected rate.	III-IV
Other therapies	**6.2** Consider the use of biological agents, adjunctive therapies and/or surgery if healing has not occurred at the expected rate. Review each specific modality for recommendations.	Ia-IV
Education Recommendations		
Continuing Professional Development	**7.0** Nurses and other members of the interdisciplinary team need specific knowledge and skills in order to competently assess and participate in the treatment of diabetic foot ulcers.	IV
Curriculum Support and Resources	**8.0** Educational institutions are encouraged to incorporate the RNAO Nursing Best Practice Guideline *Assessment and Management of Foot Ulcers for People with Diabetes* into basic RN, RPN, MD and allied health professional curricula.	IV
Organization & Policy Recommendations		
System Support	**9.0** Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. Organizations may wish to develop a plan for implementation that includes: ■ An assessment of organizational readiness and barriers to education. ■ Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process. ■ Dedication of qualified individual(s) to provide the support needed for the development and implementation process. ■ Ongoing opportunities for discussion and education to reinforce the importance of best practices. ■ Opportunities for reflection on personal and organizational experience in implementing guidelines. In this regard, RNAO (through a panel of nurses, researchers and administrators) has developed the *Toolkit: Implementation of Clinical Practice Guidelines,* based on available evidence, theoretical perspectives and consensus. The RNAO strongly recommends the use of this *Toolkit* for guiding the implementation of the best practice guideline on *Assessment and Management of Foot Ulcers for People with Diabetes*.	IV
Resources	**9.1** Organizations are encouraged to develop policies that acknowledge and designate human, material and fiscal resources to support the nurse and the interdisciplinary team in diabetic foot ulcer management.	IV
Team Development	**9.2** Organizations are encouraged to establish and support an interdisciplinary, inter-agency team comprised of interested and knowledgeable persons to address and monitor quality improvement in the management of diabetic foot ulcers.	IV

Assessment and Management of Foot Ulcers for People with Diabetes

	RECOMMENDATION	LEVEL OF EVIDENCE
Partnerships	**9.3** Organizations are encouraged to work with community and other partners to develop a process to facilitate patient referral and access to local diabetes resources and health professionals with specialized knowledge in diabetic foot ulcer management.	IV
Financial Support	**9.4** Organizations are encouraged to advocate for strategies and funding to assist patients in obtaining appropriate pressure redistribution devices.	IV
Advocacy	**9.5** Organizations are encouraged to advocate for an increase in the availability and accessibility of diabetic foot ulcer care for all residents of Ontario.	IV

Interpretation of Evidence

Levels of Evidence

Ia	Evidence obtained from meta-analysis or systematic review of randomized controlled trials.
Ib	Evidence obtained from at least one randomized controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomization.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study, without randomization.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Appendix C:

Leadership Strategies to Influence the Use of Clinical Practice Guidelines

Gifford, W. A., Davies, B., Edwards, N., & Graham, I. D. (2006). Leadership strategies to influence the use of clinical practice guidelines. *Canadian Journal of Nursing Leadership, 19*, 72-87.

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Leadership Strategies to Influence the Use of Clinical Practice Guidelines

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Abstract

Support from nursing managers and administrators, together with the role of a dedicated project lead, are consistently identified as important strategies for nurses to be able to use research evidence in their practice. However, little is known about the key behaviours and activities required to successfully implement and sustain research-based innovations in practice. This study describes the leadership behaviours and activities that influenced nurses' use of clinical practice guidelines. A secondary analysis of qualitative data was conducted to investigate factors that contributed to sustaining (or not) the use of clinical guidelines two and three years after implementation as part of the Registered Nurses Association of Ontario Best Practice Guidelines project. Grounded theory techniques were used to develop a theoretical model of leadership. Findings

indicated a different pattern of leadership in organizations that sustained guidelines, when compared to those that did not. Three broad leadership strategies emerged as central to successfully implementing and sustaining guidelines: (1) facilitating staff to use the guidelines, (2) creating a positive milieu of best practices and (3) influencing organizational structures and processes. Leadership for guideline implementation was found to include such behaviours as support, role-modelling commitment and reinforcing organizational policies and goals consistent with evidence-based care.

The use of research evidence to guide clinical decision-making in today's health-care environments underpins high-quality patient care and improved health outcomes. Support from nursing managers and administrators is consistently identified as necessary if nurses are to use research evidence in their practice (Angus et al. 2003; Parahoo 2000; Tranmer et al. 2002). The role of a dedicated project lead, such as a change agent or clinical resource nurse, who influences individuals in their practice setting has also been identified as important (Dopson et al. 2002; Rycroft-Malone et al. 2004; Thompson et al. 2001). Little is known, however, about the key behaviours and activities required by managers, administrators or project leads to successfully implement and sustain research-based innovations in practice.

Clinical practice guidelines are a promising tool to translate high-quality research evidence into accessible and understandable recommendations for practice (Ciliska et al. 2001; Davies 2002). However, stimulating the implementation of guidelines within nursing environments presents a considerable challenge, and tested methods of facilitating guideline use are limited (Graham et al. 2004). The purpose of this paper is to identify and describe the leadership behaviours and activities of nursing managers, administrators and clinical resource nurses (CRNs) that influenced the implementation and sustained use of clinical guidelines in nursing practice.

Data for this study were collected in the Determinants of the Sustained Use of Research Evidence in Nursing (SURE) study, a prospective panel study investigating factors that contributed to sustaining (or not) the use of clinical guidelines two and three years after their implementation. The clinical guidelines were implemented as part of the Registered Nurses Association of Ontario Best Practice Guideline (RNAO-BPG) project, a multi-year initiative to develop and evaluate nursing clinical guidelines in the province of Ontario, Canada (Grinspun et al. 2001). At the time of this study, 16 guidelines within 47 organizations had been implemented

and evaluated. Participating organizations were provided with (1) partial funding for six to nine months for a CRN to lead implementation, (2) a formal launch organized by the RNAO, (3) an orientation workshop for managers, senior administrators and CRNs that focused on implementation strategies and evaluation processes and (4) pre- and post-evaluations for each BPG (Edwards et al. 2005).

Design and Methods

A secondary analysis of qualitative data was conducted. The research objectives were (1) to identify leadership behaviours and activities associated with organizations that sustained the implementation of clinical practice guidelines and (2) to generate a theoretical model of leadership that enables nurses to use clinical guidelines in practice.

Sample

All organizations that participated in one implementation cycle of RNAO BPGs were invited to participate in the SURE study, which began approximately two years after the original implementation ended. Following an informed consent process, approved by the University of Ottawa Research Ethics Board, nine of the 12 organizations (75%) agreed to participate in the SURE study. Data were collected annually at two and three years of followup. Each organization was categorized in the SURE study as either sustained (n=4) or non-sustained (n=5) through a validation process that involved administrators and resource nurses reviewing and discussing a written summary of research findings with SURE investigators. Sustained use was determined by meeting minimum requirements in four of six categories of indicators (Table 1).

The sample of organizations was purposefully chosen, as it represented one implementation cycle where the BPGs were simultaneously implemented with the same financial resources from the RNAO. In addition, there were both sustained and non-sustained cases, allowing for negative case comparisons.

All organizations implemented one of the following RNAO-BPG topics: (1) Risk Assessment and Prevention of Pressure Ulcers, (2) Prevention of Falls and Fall Injuries in the Older Adult or (3) Promoting Continence Using Prompted Voiding and Prevention of Constipation in the Older Adult Population. The number of organizations implementing each BPG topic ranged from one to four. Table 2 illustrates the types of organizations represented within the sample. Organizations ranged in size from (approximately) 150 to 750 beds.

Data sources consisted of

- audiotaped and transcribed, individual semi-structured telephone interviews from three types of participants at each organization two years post-

implementation (n=32; 91% response rate): nurses (n=15), CRNs (n=9) and administrators (n=8)
- audiotaped group interviews and written summary reports from one-day site visits (n=3) held at one organization representing each BPG topic at two years post-implementation
- documents from each organization (e.g., policies, procedure manuals, staff continuing education resources, documentation forms, patient hand-outs) and
- audiotaped and transcribed, one-hour group telephone interviews with administrators, CRNs or both at three years post-implementation.

table 1 **Categories and indicators of sustained use**

Core Category	Indicator Example
Provider	Interviewees indicated recommendations are being used most/all of the time with most/all patients
Continuing Education	Staff still receiving some form of continuing education regarding the BPG
Policies/Procedures	Policies/procedures implemented during the pilot are being maintained
Leadership	Recognizable role models, leaders, champions and/or administrative support for the continued implementation of the BPG
CRN Recommendations/Action Plan	At least 50% of the CRN recommendations within the action plan developed during the pilot implementation period have been implemented
Workplace Culture	Existence of a philosophy of care, strategic plans, etc. supportive of evidence-based practice

Data analysis

All audiotaped individual interviews and group site visit interviews were transcribed and entered into N5 qualitative software program. Consistent with grounded theory, three coding phases were used: open, axial and selective (Strauss and Corbin 1990).

Open coding involved reading through transcripts and coding relevant passages related to leadership activities or behaviours. Documents were examined to attest

the activities identified within transcripts, such as changes to policies, staff education and documentation forms. Automated searches were done for recurring words such as *commitment, support, goals, philosophy, vision* and *policy*.

Axial coding was completed by using data matrices of open coding to allow for comparisons of emergent themes between sustained and non-sustained organizations (Miles and Huberman 1994). An iterative method was used to analyze the matrices that involved theoretically organizing and comparing the emergent themes by sustained status, returning to the transcripts to support or refute theme assignments, and re-coding as necessary. Central themes were thematically clustered into deductive categories.

table 2 **Types of organizations by sustained status**

Type of Facility	Sustained	Not Sustained
Long-term care	✓	✓
Complex continuing care	✓	✓
Rehabilitation	✓	✓
Acute care hospitals	-	✓
Teaching facility	✓	✓

Selective coding involved refining the themes and categories, and developing a coherent model that represented the data. The relevant literature informed the choice of concepts and categories included in the final model. The core category that emerged from the analysis was "nursing leadership."

Participants

Demographics of participants and response rates are found in Table 3. The response rates were slightly lower at the non-sustained organizations (83%) compared with the sustained organizations (94%).

Site visits were conducted at one organization representing each of the three BPG topics. Travel costs, time for the research staff and SURE funding from the Canadian Health Services Research Foundation (CHSRF) permitted only one site visit per BPG topic. The choice did not depend on sustainability status, or the variables investigated. The number of participants ranged from four to 17 and included either a Director of Nursing, Director of Care or Chief Nursing Officer from each

site. Other site visit participants included administrators, CRNs, advanced practice nurses, staff nurses and other interdisciplinary team members. The followup telephone interviews three years post-implementation were conducted with nursing administrators and/or clinical resource nurses from each site.

table 3 **Demographic characteristics of participants who completed semi-structures interviews**

	Sustained[1] Organizations (*n*=4)	Response Rate	Non=Sustained[1] Organizations (*n*=5)	Response Rate	Total
Total number of interviews	17/18	94%	15/18	83%	32
Staff Nurses	9/9	100%	6/6	100%	15
Clinical Resource Nurses	5/5	100%	6/8	75%	11
Administrators*	3/4	75%	3/4	75%	6
Professional Licence	16	–	14	–	30
RN/RPN	1	–	1	–	2
Gender					
Female	16	–	15	–	31
Male	1	–	0	–	1
Years employed at agency (mean, range)					
Staff Nurses	13 (3–28)	–	11 (4–16)	–	–
Clinical Resource Nurses	12 (7–23)	–	8 (1–18)		
Administrators*	21 (15–27)	–	9 (3–15)	–	–

1 Level of guideline use validated by participants at the organizations
* Administrators include: Directors of Nursing; Directors of Care; Administrators; Managers

Findings

Different patterns of leadership emerged within organizations that sustained the use of guidelines versus those that did not. Three broad leadership themes emerged as central to implementing and sustaining guidelines: (1) facilitates staff to use the guidelines, (2) creates a positive milieu of best practices and (3) influences organizational structures and processes.

Facilitates staff to use the guidelines

The behaviours and activities within this theme represent a nursing leaders' role in facilitating individual staff to use the guidelines.

Provides support

Respondents consistently identified support from administrators and CRNs as necessary to implement and sustain the guidelines. Support was described in a number of ways: addressing individual concerns, encouraging staff and creating opportunities for education. In the following excerpt, a staff nurse describes support from the Director of Nursing (DON):

> She [DON] doesn't allow us to jump ship. ... she was right there, in there with us encouraging us, educating us, reassuring us and we need that momentum to keep focus and to keep going. ... the encouragement, the support was always there. ... you didn't feel alone. (Staff Nurse)

CRNs also identified management support as a factor that contributed to their success:

> Number one, we needed top management support. We needed the support of our administrator and we certainly needed the support of our Director of Nurses because these are your key people. ... if your administrator isn't behind you a hundred percent or your Director of Nursing ... it won't work. ... you have to have top management support. (CRN)

Another CRN described the many layers of leadership support in the organization that were critical to success:

> We have the management team, which are the unit managers. Then we have the directors of the program who do have to provide support. Then we have the senior vice-president of patient care who is the leader from all those groups ... the chief nursing officer, the directors and all of that. The senior vice-president ... knows that it is important. [CRN]

When asked what was needed in order to successfully sustain the guidelines in the non-sustained organizations, staff nurses, administrators and CRNs consistently identified administrative support as essential: "Someone right there being a cheerleader, saying, 'Here's what we're going to do' and bringing it to people's attention every day" [Staff Nurse]. In a non-sustained organization, the absence of administrative support was identified by CRNs as a factor that contributed to lack of success: "[Administrators] were abdicating their role as partners and leaving you out to dry and sort of manage by yourself..." [CRN].

Is accessible and visible

Across all organizations, respondents emphasized the need for someone to be accessible and visible, bringing the guideline recommendations and the evidence

behind them to the attention of staff nurses, and interdisciplinary and administrative teams. In the sustained organizations, this role was taken on by CRNs, clinical specialists and educators who were available to staff.

Respondents in the non-sustained organizations reiterated that after the initial implementation, no one was present to facilitate use of the guidelines:

> I think the guideline itself is good. ... the practice is right. It's just ... it's got to have somebody who can really address it and be there in place and dedicated. ... there wasn't even a sort of educator person at any of these places. ... without having that sort of dedicated person, then there's not the same visibility. [CRN]

Communicates well

In all organizations that successfully sustained the guidelines, communication skills of managers, administrators and CRNs contributed to success. To raise awareness, multifaceted modes of communication – such as verbal contact, electronic mail and communication books and boards – were used during and after the pilot. When asked what was needed for success one administrator stated:

> Communication, communication, communication. ... take it to the staff. ... Also, contacting other people who have implemented it, to find out what their obstacles and barriers have been ... and making sure that everybody has the information they need at the time that they need it. ... it's just a matter of being able to communicate well to the registered staff [so] they have an understanding of the importance of it. [Administrator]

Managers and administrators described the importance of acknowledging the efforts of staff to implement BPGs as a means of motivating them to sustain application of the guidelines:

> We do try and recognize the staff. ... we go around and say, "This is for your exceptional work, thank you very much, we do appreciate you," and ... we make sure that it gets in the communication book or on the board. [Administrator]

In the non-sustained organizations, communication related to the guidelines was described as inconsistent and fragmented. Frequent changes among administrative staff and a failure to communicate the history of the implementation project were offered as reasons why:

> [The administrators] were no longer there. ... so who was standing in

> was the Director of Care but [the DOC] hadn't been kept apprised of what this was all about because the power in that particular agency was the communication held in the administrator's office. Or you'd have a Director of Care who was gung-ho and then that person was gone and you'd get an administrator who didn't know ... the history. [CRN]

Creates a positive milieu of best practices

The need to create a positive milieu within the clinical environment to support best practices emerged as a particularly strong theme. The activities of administrators and managers helped to establish practice norms and value systems that supported nurses' use of the guidelines.

Reinforces goals and philosophy

In the sustained organizations, respondents emphasized that the guideline recommendations had become embedded in the philosophy of the organization. When asked what her role was in sustaining the Falls Guideline, one administrator stated: "Reinforcement that this is the philosophy of the institution." Further elaboration on how this was done included:

> having all departments working together for a common goal to provide safety and a safe environment for residents. ... we talk to the staff, whether it's one-on-one, or small group. ... it's a workplace culture. We look at the philosophy as much as anything else. [Administrator]

In contrast, staff nurses in organizations that did not sustain BPGs described implementing the recommendations as a low priority: "it sounds so awful, but ... it's generally not one of the goals that [the nurses] identify. ... generally other things ... are much more important to them" [Staff Nurse]. The DON and CRN explained that the recommendations were not an expectation of practice, and voiced uncertainty about how to change that:

> We have a very functional culture. ... "Functional" means you do it every two hours, no matter what. "Resident-centered" means you find out what the resident wishes – the "theory to practice." [DON]

> We have a philosophy of patients' better care, but how can we bring that Best Practice Guideline and bring it to life and make it really live around here? [CRN]

Influences change

Administrators in sustained organizations identified that their management team had a reputation for "trying new things and being innovative." This

involved working cooperatively with teams and other departments to influence change: "We have a team effort when we change ... so I have to ensure [other departments'] cooperation and the cooperation of the staff on the floors." [Administrator]

In the non-sustained organizations, senior administrators were identified as being resistant to making many of the changes necessary to embed the guidelines into practice:

> Despite the fact that I was keen to do this, because it required documentation going into the chart and because that's a site-wide or corporate-wide thing, I met quite a bit of resistance to doing that at the upper levels. There is only so much that you're going to beat your head against a brick wall for. [CRN]

Role-models commitment

Role-modelling commitment and institutional acceptance of the guidelines by administrators and CRNs contributed to sustainability. Leadership by example and commitment to the project were often described:

> Our resource nurse and our DON ... they're just, leadership by example, they were very committed to this project and just gave their full attention to it, and I think that just made us even more interested in facilitating that everything went okay. [Staff Nurse]

In the non-sustained organizations, lack of commitment by senior administrators to sustain the guidelines was indicated: "the Director of Care ... actually said, 'You know, I think we have enough projects going. I don't think we should be doing this" [CRN]. Competing priorities were frequently associated with administrators' inability to "keep them on the radar map" [Administrator].

Influences organizational structures and processes

The last theme to emerge involved nursing leaders' influence on organizational structures and processes. Respondents described the need for nursing leaders to understand practice issues at the bedside: "We need to be at the bedside and know what the bedside clinician thinks" [Administrator].

Ensures education and policies

Adequate equipment for assessments and treatments was present in both sustained and non-sustained organizations. However, ongoing staff education, documentation forms, policies and staff performance appraisals that reinforced

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use of the guidelines existed only in organizations that sustained implementation. Education was described as a key enabler to continued guideline use by all groups of participants. Administrators and CRNs identified creative ways to ensure that all staff received adequate education related to the guidelines:

> We're still doing work on education ... to do it 24 hours a day ... to all staff. ... we had one champion who did it on nights. ... we need more on evenings ... to get to all the relief staff. [Administrator]

> [Administrators] will pay for replacements for nurses to go through these educational activities. ... That's a true facilitator. [CRN]

In the non-sustained organizations, no staff education had occurred over the past two years, and policies and documentation forms did not reflect practice that was consistent with guideline recommendations. When asked what would help nurses use the guidelines, one administrator stated:

> We're going to have to make a policy and make sure that everything is done that should be done, and we have to do a lot of training and keep up the training and make that a priority. [Administrator]

Monitors clinical outcomes

Administrators indicated that tracking and regularly reviewing clinical indicators related to the guidelines contributed to sustainability:

> We look at the prevalence and incidence ... and if there are any changes ... we put our heads together and make recommendations, and those recommendations then go to .... [the Director of Care]. [Administrator]

Supports the development of clinical champions

To successfully implement and sustain guidelines, respondents indicated the need for clinical champions, that is, local opinion leaders who informally model and influence practice behaviour. Administrators and CRNs identified themselves as having an important role in supporting staff to become clinical champions:

> ... replacing the nurses at the bedside so they can become champions to their colleagues" [Administrator]

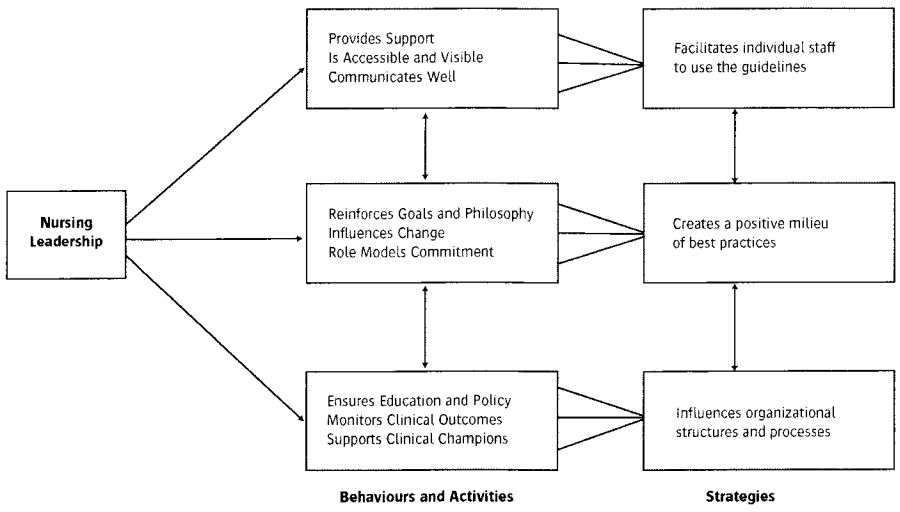
> I'm trying to have all of them [champions] at least attend one [teaching session]. ... it's an ongoing process ... building a critical mass in our organization. [CRN]

Clinical champions were not present in organizations that did not sustain guidelines. However, the need for champions was frequently identified by CRNs and administrators.

Discussion

This study revealed that nursing administrators and CRNs played a role in enabling and sustaining guideline adoption. Together, the activities encompass a multi-layered leadership approach that influenced staff nurses, the practice environment and the organizational infrastructure. A conceptual model illustrating the leadership activities and behaviours that emerged from the data is presented in Figure 1. This model operationalizes the leadership construct as it pertains to guideline use, both during implementation and for longer-term sustainability. While leadership is recognized in comprehensive models of research utilization such as the Ottawa Model of Research Use (OMRU) (Graham and Logan 2004) and the model Promoting Action on Research Implementation in Health Services (PARIHS) (Rycroft-Malone et al. 2004), the concept remains largely theoretical and underdeveloped. Exactly what leaders do to implement and sustain guidelines effectively has not been previously determined.

figure 1 **Model of leadership for sustaining guidelines**



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The model categorizes leadership behaviours into strategies that can be useful to administrators, managers and project leads. However, leadership is a complex phenomenon, and the behaviours identified are multidimensional and interrelated. Many behaviours in one category may also influence others. This assumption is consistent with theories on organizational leadership that suggest leadership behaviours may have multiple effects and relevance for more than one objective (Yukl 2006; Yukl and Taber 2002).

Descriptions from participants consistently indicated that staff nurses' perceptions of leadership behaviours such as support and role-modelling played a role in the adoption of evidence-based recommendations. This finding is consistent with previous research (Hatcher and Tranmer 1997; Kajermo et al. 2001; McCaughan et al. 2002; Parahoo 2000; Retsas 2000). Furthermore, the presence of a clinical resource nurse who continued to facilitate use of guidelines was important, and has implications for administrators and managers. While there are many factors that must be considered when implementing guidelines (e.g., appropriateness of the guideline, readiness/attitudes of staff, available resources), it appears from this study that the investment in a CRN with knowledge and skills to facilitate and drive implementation was important. Other studies have emphasized a similar finding for the successful transfer of research evidence into practice (Dopson et al. 2002; Rycroft-Malone et al. 2004).

This study suggests that organizations with a receptive environmental context that included philosophies of care, policies and administrative support were successful in reinforcing continued use of the guidelines. Inherent within many leadership behaviours was the reinforcement of a practice milieu that embraced best practices and guideline use as a core philosophy. Although contextual factors and their influence on research use are complex, leadership behaviours can be a strong force that creates or discredits the practice norms and values of the environment (Pepler et al. 2004; Stetler 2003). A number of leadership strategies – such as support, role-modelling commitment and reinforcing goals – built an environment to facilitate guideline use. These strategies are substantiated by the works of others who have shown, for example, that leaders' commitment to change influences guideline use (Solberg et al. 2000) and that the strategic vision and values of an organization influence the adoption of innovations (Greenhalgh et al. 2004).

Basic components of an organization's infrastructure are required for nurses to use research evidence (Foxcroft and Cole 2000; Stetler 2003). Policies, job descriptions, performance reviews and quality assurance measures that include principles of evidence-based practice are suggested to promote research use in nursing (Udod and Care 2004). Data from the current study revealed that policies, documentation forms, continuing education and monitoring processes were in place within the sustained organizations, but were consistently underdeveloped in the non-sustained organizations.

Strengths

Strengths of this study included the use of multiple sources of data to increase credibility of the findings, and the inclusion of sustained and non-sustained organizations to allow negative case sampling for comparisons. The participation rates of organizations, staff nurses, clinical resource nurses and administrators were good. Methodological rigour of the research was maintained by audiotaping and transcribing interviews verbatim, multidisciplinary team debriefings that included the SURE study research coordinator to discuss and confirm findings, and maintenance of memos to document decisions as the analysis proceeded. Additionally, the principal investigator of the SURE study (BD) was involved with analytical interpretations as a co-investigator on this study.

Limitations

One limitation of any secondary analysis is the use of data that were not specifically generated to address the research questions (Szabo and Strang 1997). In this case, participants were not interviewed in depth on the topic of leadership, but rather on general factors that had an impact on guideline use. The density of leadership descriptions, therefore, was not always high, and theoretical saturation, particularly for negative case comparisons, was not always possible. Given the multiple data sources, however, the consistency with which the themes repeated themselves across the nine organizations allowed a coherent and credible model to emerge that was supported by the literature on research use, guideline implementation and leadership.

A second limitation, also inherent in secondary analysis, was that data collection and analysis did not occur concurrently, and member checks with participants were not done. However, a number of other sources were available for validation of the findings, including the investigators and research coordinator of the SURE study.

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Finally, it was not possible to tell from the data which leadership activities or behaviours were more important than others. Future research should consider addressing the impact and effectiveness of specific behaviours by administrators and project leaders on implementing and sustaining guidelines.

Implications and Conclusion

Leadership at all levels of an organization is an important factor influencing the transfer and uptake of research in nursing. This study has identified a number of ways that administrators and resource nurses enhanced the sustained implementation of clinical guidelines. A conceptual model illustrates leadership strategies with specific behaviours and activities that enable guideline use. The model will be useful to organizational leaders who are planning and implementing clinical guidelines by providing a practical guide of what nursing administrators and resource nurses need to do for successful implementation. Implications for future research include validating the model through further analysis of organizations that have integrated guidelines into clinical practice, and testing the leadership implementation activities through pragmatic intervention studies, such as randomized control trials and interrupted time series.

While the use of clinical guidelines in nursing is both an individual and an organizational responsibility, the contributions of leadership are substantial. Through direct and indirect influences, nurse leaders are in a strategic position to encourage and enable research transfer.

Acknowledgements

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Appendix D: Invitation to Participate

Special Invitation

A leadership development opportunity

As part of Saint Elizabeth Health Care's overall effort to provide high quality evidence-informed nursing care, we will be implementing the Registered Nurses' Association Best Practice Guideline: ***Assessment and Management of Foot Ulcers for People with Diabetes*** in 2007.

We are inviting your SDC to apply to participate in a research study designed to develop new leadership strategies to facilitate implementation of recommendations from this guideline. Our research study is funded by the Canadian Nurses Foundation in partnership with Saint Elizabeth Health Care and the University of Ottawa.

A random selection process will be used to select SDCs for participation.
If selected, participation will involve **either**:

Group I: Interviews. An exploration of what you think the main barriers and supports to implementing recommendations are going to be, and what types of leadership development activities would be useful to managers, health services supervisors, resource nurses and staff to facilitate successful implementation.

OR

Group II: Workshop, Teleconferences, Interviews. A one-day workshop, 4 teleconferences, and an opportunity to apply new leadership strategies to facilitate implementation. Participants will also explore barriers and supports to implementing the recommendations.

OR

Group III: Interviews. An exploration of what you encountered as barriers and supports to implementing recommendations, and what worked or didn't work to overcome these barriers.

HIGHLIGHTS:

- Hear the latest evidence on strategic leadership for guideline implementation.
- Discuss barriers and supports reported by your unit regarding new practices for *assessing and managing foot ulcers for people with diabetes.*
- Gain insight into leadership and management strategies that may influence nursing practice for people with diabetes (i.e.: monofilament assessments, debridement techniques, and wound management).
- Collaborate with researchers from the University of Ottawa.
- Have fun and contribute to knowledge development about leadership for evidence-informed nursing care.

PLEASE NOTE

- Selection to participate and allocation into groups will be entirely random.
- The workshop is designed for managers, health services supervisors, resource nurses and preceptor staff to develop leadership strategies to facilitate guideline implementation, and will be held at corporate office. All travel expenses, materials and meal breaks are provided at no cost to the participants.
- The focus is to provide a fun forum to discuss your experiences, and explore and develop new ideas. There are no right and wrong answers, and no tests.
- Workshop participants will receive a certificate for 8 hours of professional development.
- SDCs that are not selected to participate in the workshop will be offered a similar workshop after the study is complete.

_____

Nancy Lefebre, Clinical Executive, Senior VP Knowledge and Practice
Saint Elizabeth Health Care

Letter to service delivery centers that have been selected to participate in **Phase 1: Group 1**.

To: _____ (Service Delivery Center Manager)

Re: Research Study:

Leadership for implementing new recommendations for the assessment and management of foot ulcers for people with diabetes

Thank you for your interest in participating in this study.

We are pleased to inform you that random selection procedures have determined that your service delivery center has been selected to participate in **Phase 1** (Group 1) of the study.

Random selection ensures that each service delivery center has an equal chance of being selected to participate in the study - phase 1 or phase 2. Random selection is consistent with the design and methodology of this study.

The purpose of **Phase 1** is:

- to explore barriers and supports to implementing selected recommendations from the Registered Nurses Association Best Practice Guideline for the assessment and management of foot ulcers for people with diabetes, and
- to determine what type of leadership development activities would be useful and appealing to managers, health services supervisors, resource nurses and preceptor clinical staff.

As part of your service delivery center's participation, we are recruiting 4-6 people to voluntarily participate in one individual telephone interview.

We would like to invite you as the service delivery manager to participate in one interview. We are also asking you to provide names and phone numbers of the health services supervisor, resource nurse, and 2 preceptors or experienced clinical staff at your service delivery center who are willing to be contacted by the researcher Wendy Gifford to explain the study and invite them to participate.

Please see the information consent letters for a more detailed description about the study (enclosed)
Please provide potential participant's names and contact numbers (phone and/or email) to Wendy Gifford, co-principal investigator: [redacted], phone: [redacted] ext: [redacted]. We would appreciate receiving names of potential participants within 2 weeks, so Wendy can contact them for potential participation.

If you have any questions or concerns or would like to learn more about this study please don't hesitate to contact the co-principal investigators:

- Wendy Gifford, RN, PhD(c),
  Doctoral Student University of Ottawa
  phone [redacted]
- Barbara Davies, RN, PhD,

Doctoral Supervisor, Associate Professor, School of Nursing
University of Ottawa
Phone: [redacted] extension [redacted]
email: [redacted]

- Nancy Lefebre, RN, MScN, CHE
Clinical Executive, Senior VP Knowledge and Practice
Saint Elizabeth Health Care
Tel: [redacted]
email: [redacted]

On behalf of the researchers at the University of Ottawa, and senior administration at Saint Elizabeth Health Care, we thank you for your interest in participating in this exciting research.

Sincerely,

W. Gifford
B. Davies
N. Lefebre

Letter to Service Delivery Centers that have been selected to participate in **phase 2: Group 2.**

To: _____ (Service Delivery Center Manager)

Re: Research Study:

Leadership for implementing new recommendations for the assessment and management of foot ulcers for people with diabetes

Thank you for your interest in participating in this study.

We are pleased to inform you that random selection procedures have determined that your service delivery center has been selected to participate in **Phase 2** (Group 2) of this study.

Random selection ensures that each service delivery center has an equal chance of being selected to participate. Random selection is consistent with the design and methodology of this study.

The purpose of **Phase 2** is:
- to determine whether a leadership development strategy impacts nursing assessments and management of foot ulcers for people with diabetes,
- to understand what is feasible and useful in a leadership development strategy.

Two chart audits will be conducted at service delivery centers participating in phase 2 on all client's charts that have a diagnosis of diabetes and have received services for foot ulcers. Karen Ray, corporate research manager at Saint Elizabeth Health Care will supervise and over-see the chart audit, and will be contacting you to discuss the process and procedures.

After the first chart audit is conducted, your service delivery center will be randomly allocated to participate in either strategy A or B:

A	• Leadership development workshop and teleconferences, • Saint Elizabeth Health Care's 'usual' guideline implementation strategy, • Individual telephone interviews with 5-6 participants.
OR	
B	• Saint Elizabeth Health Care's 'usual' implementation strategy, • Individual telephone interviews with 5-6 participants.

As the manager of your service delivery center, we would like to invite you to participate in the study. We are also asking you to provide names of the health services supervisor, resource nurse, and 2 preceptor clinical staff working at your service delivery center people who are willing to be contacted by the researcher Wendy Gifford to invite them to participate in the study.

Please see the information consent letters for a more detailed description about the study (enclosed).

If you have any questions or concerns or would like to learn more about this study please don't hesitate to contact the co-principal investigators:

- Wendy Gifford, RN, PhD(c),
  Doctoral Student University of Ottawa
  phone [redacted] ext: [redacted]
  [redacted]
- Barbara Davies, RN, PhD,
  Doctoral Supervisor, Associate Professor, School of Nursing
  University of Ottawa
  Phone: [redacted] extension [redacted]
  email: [redacted]
- Nancy Lefebre, RN, MScN, CHE
  Clinical Executive, Senior VP Knowledge and Practice
  Saint Elizabeth Health Care
  Tel: [redacted]
  email: [redacted]

Please provide potential participant's names and contact numbers (phone and/or email) to Wendy Gifford, co-principal investigator: phone: [redacted]. We would appreciate receiving names of potential participants within 2 weeks, so we can contact them for potential participation.

On behalf of the researchers at the University of Ottawa, and senior administration at Saint Elizabeth Health Care, we thank you for your interest in participating in this exciting research.

Sincerely,

W. Gifford
B. Davies
N. Lefebre

Letter to Service Delivery Centers that were **not randomly** selected to participate in the study.

To: _____ (name of service delivery center manager)

Re: Research Study: Leadership for implementing new recommendations for the assessment and management of foot ulcers for people with diabetes

Thank you for your interest in participating in this study.

A random selection process has determined that your service delivery center was not chosen to participate in this study.

Random selection ensures that each service delivery center that volunteered to participate had an equal chance of being selected into the study.

The use of random selection is consistent with the design and methodology of this study and does not reflect you or your SDC in any way.

If you have any questions or concerns please don't hesitate to call or email the researchers: Wendy Gifford Tel: [redacted], Dr. Barbara Davies, Tel: [redacted] from the University of Ottawa, or Nancy Lefebre, Saint Elizabeth Health Care Tel:[redacted], email: [redacted]

.

On behalf of the researchers at the University of Ottawa, and the Senior Vice President of Knowledge and Practice, we thank you for your interest.

Sincerely,

Wendy Gifford, RN, PhD(c)
Co-Principal Investigator
Doctoral Student
University of Ottawa
tel. [redacted]
email: [redacted]

Barbara Davies, RN, PhD
Co-Principal Investigator
Doctoral Supervisor
Associate Professor, School of Nursing
University of Ottawa
Phone: [redacted]
email: [redacted]

Nancy Lefebre, RN, MScN, CHE
Clinical Executive, Senior VP Knowledge and Practice
Saint Elizabeth Health Care,
Tel:[redacted]
email: [redacted]

Appendix E: Chart Audit Data Abstraction Tool

1

Chart Audit Form

Date Data Collected: ____ (d) ____(m) _____(yr) Chart Abstractor's Initials _____

Patient/Client ID #: _____ Site: _____

1. Date of Admission: _____(d) _____(m) _____ (yr)
2. Date of Discharge: _____(d) _____(m) _____ (yr)
3. Date of Birth: ____(d) ____(m) _____ (yr)
   Client's age _____
4. Gender: ❑ male ❑ female
5. Primary Diagnosis (reason for admission) (tick one)
   - ❑ foot ulcer
   - ❑ leg ulcer
   - ❑ wound
   - ❑ burn
   - ❑ other, describe: _____
6. Does the client have diabetes
   - ❑ yes
   - ❑ no
7. What was the goal of Service? (tick one)
   - ❑ complete healing
   - ❑ maintenance
   - ❑ palliative
   - ❑ not documented

<u>Client History of Risk Factors</u>

8. Is this the first incidence of foot ulcer(s)?
   ❑ yes ❑ no ❑ unsure / not documented
9. Is there documentation in the chart related to comorbidities?
   ❑ yes ❑ no
   If yes, tick all those that apply:
   - ❑ Diabetes
   - ❑ Renal failure,
   - ❑ Hypertension,
   - ❑ Smoking
   - ❑ Nutrition Status (Braden Scale on back of wound assessment)
   - ❑ Other, describe _____
10. Was client's level of mobility documented?

❑ yes ❑ no

If yes, tick one that applies:

❑ bed bound
❑ chair / wheelchair (with assistance)
❑ wheelchair (independent)
❑ cane or walker
❑ independently mobile
❑ other, describe: _____

11. Does the client have more than one ulcer on lower limb(s) on admission?
❑ yes ❑ no

If yes how many: _____

12. Were the following assessments done by a nurse on admission to services?

Nursing Admissions Assessment	Yes	No
1. Glycemic Control Blood Sugar, or AIC, or indication from client		
2. Circulation to lower extremities: Pedal Pulses or ABPI		
3. Signs and Symptoms of Infection colour of wound/skin, kind and amount of exudate, odour		
4. Foot sensation using a monofilament		
5. Foot deformities or Structural abnormalities or Pressure from footwear		
6. Location of ulcer(s). Describe_____		
7. Length & width of ulcer(s)		
8. Depth of ulcer(s)		
TOTAL SCORE /8		

21. If ulcer size recorded - what was the initial measurement?

ulcer 1: Length _____ Width _____ Depth _____

ulcer 2: Length _____ Width _____ Depth _____

ulcer 3: Length _____ Width _____ Depth _____

22. Was the measurement repeated?

❑ yes ❑ no

23. Did complete healing occur while on service?
❑ yes ❑ no ❑ unsure

23.1. If no, why? (tick one)

❑ care continued by client, family or other
❑ institutionalized
❑ amputation
❑ died
❑ other (explain) _____

23.2. If no, what was the last recorded measurement?

ulcer 1: Length _____ Width _____ Depth _____

ulcer 2: Length _____ Width _____ Depth _____

ulcer 3: Length _____ Width _____ Depth _____

ULCER MANAGEMENT

24. What cleaning agent was used?
❑ water
❑ normal saline
❑ other, specify _____
❑ not documented

25. What type(s) of dressings were used? (tick all that were used while on service)
❑ hydrogels *(eg: Intrasite gel, Normogel*)
❑ foams *(eg: Allevyn, Cutinova, Meplix)*
❑ hydrocolloids *(eg: Comfeel, Cutinova Hydor, DuoDERM CGF)*
❑ hypertonic saline dressings (*eg: Mesalt, Hypergel, Curasalt*)
❑ calcium alginates *(eg: Alginate, Curasorb, Calcicare)*
❑ dry gauze (DSD: dry sterile dressing)
❑ hydrofiber (*aquacel*)
❑ silver based products
❑ other (*Adaptic* [Vaseline contact layer])
❑ unknown
Specify product names: _____
_____

26. Was sharps debridement done (using scalpel or scissors)?
❑ yes ❑ no ❑ unsure, explain _____
If yes, by whom:
❑ WORN ❑ ET ❑ Other (name) _____

27. Were topical antibiotics or antimicrobial used on the ulcer?
❑ yes ❑ no

If yes, specify _____

(eg: Betadine, Iodosorb, Framycetin, Sofra-Tulle, Neomycin, Gentamicin, Polysporin, Flamazine, Fucidin, Flagyl)

28. Were oral/IV antibiotics used?

❑ yes ❑ no

If yes, specify _____

29. Were offloading devices used?

❑ yes ❑ no

If yes, specify _____

(eg: TCC, Scotchcast Boot, Removalbe walker, Halfshoes, Healing Sandles, Mabal Shoe, Felted Foam, Crutches, Walkers, wheelchairs)

30. Was patient education done?

❑ yes ❑ no ❑ unsure

If yes, what topics (tick all those that apply - provide direct quotes when possible)

- ❑ Basic diabetes management
- ❑ Client risk factors
- ❑ Off-loading
- ❑ Self-inspection / checking of feet
- ❑ Nail and skin care
- ❑ Injury prevention
- ❑ When to seek help
- ❑ Referal processes
- ❑ Other (specify):_____

_____

31. Is there documentation in the chart indicating that the client has seen a specialist or received specialist services?

❑ yes ❑ no

If yes, which services?

- ❑ Nursing wound specialist (ET, WORN)
- ❑ Vascular services
- ❑ Orthopedic MD
- ❑ Endocrinologist
- ❑ Podiatrist
- ❑ Chiropodist
- ❑ Community Foot Care Clinic
- ❑ Diabetes Education
- ❑ Assistive Devises Program
- ❑ Other (describe) _____

32. Were referrals to specialist services facilitated by the nurse?

❑ yes ❑ no

If yes, which services (tick all that apply)

- ❑ Nursing wound specialist (ET, WORN)
- ❑ Vascular services
- ❑ Orthopedic MD
- ❑ Endocrinologist
- ❑ Podiatrist
- ❑ Chiropodist
- ❑ Community Foot Care Clinic
- ❑ Diabetes Education
- ❑ Assistive Devises Program
- ❑ Other (describe) _____

Appendix F: Post-Intervention Interview Guide

WORKSHOP GROUP INTERVIEW GUIDE

Leadership / Diabetic Foot Ulcer Study

Participant ID# _____ Site code _____ Date of interview: _____

Start time _____ End time _____ Length of interview_____

Introduction:

Hi …… Thank you so much for agreeing to this interview.

My name is _____ and I am calling from the University of Ottawa, School of Nursing. I am an RN and research associate working with Wendy Gifford and Dr. Barbara Davies at the University of Ottawa. We are conducting a study with Saint Elizabeth Health Care to evaluate the implementation of recommendations from the RNAO Best Practice Guideline (BPG) on *Assessment and management of foot ulcers for people with diabetes*. Foot ulcers for people with diabetes are a big problem.

For this study, your SDC has been part of a leadership strategy that included a workshop in April and 3 follow-up teleconferences to support nurses assess and manage foot ulcers according to this guideline. This interview is part of the final evaluation, the last step being a chart audit in October.

Now I would like to ask you several questions about the implementation. I'll also be asking you what you thought of the leadership strategy, and whether or not it helped move the BPG into practice.

Have you returned your signed consent form? (if no, please do so as soon as possible).

Do we have your consent to record this telephone interview?
I am recording our conversation to ensure that we have an accurate summary of your opinions. This interview should take between 45 and 60 minutes.

The interview has 4 parts:

- Part 1 is some basic demographic information.
- Part 2 is about implementation of the BPG.
- Part 3 is about the leadership strategy (ie: pre-workshop materials, workshop, teleconferences).
- Part 4 is about the barriers and activities you and your SDC team engaged in.

We want to know what is actually happening in your SDC related to this BPG, and whether or not the leadership strategy was useful.
We are not evaluating you, and there are no right or wrong answers. Everything you say is confidential through codes and grouping of responses.

At this point, do you have any questions?
Please feel free to ask questions at any time.

Part 1: Demographic questions
These questions are about your background. This is standard demographic data for statistical purposes only.

1. How many years have you been employed in nursing
   _____ years

2. How long have you been employed at Saint Elizabeth Health Care?
   _____ years

3. Would you describe your employment as Full Time, Part Time or Casual?
   - ❑ Full-time
   - ❑ Part-time
   - ❑ Casual
   - ❑ Other

4. What is your highest level of education?
   - ❑ Diploma
   - ❑ Baccalaureate degree
   - ❑ Masters degree
   - ❑ Other: specify _____

5. What is the title of your current position
   - ❑ Staff Nurse
   - ❑ Resource Nurse
   - ❑ Supervisor
   - ❑ Manager
   - ❑ other, please explain _____

6. How long have you been in this position? _____

7. Have you previously been involved in practice change related to an RNAO BPG?
   - ❑ No
   - ❑ Yes, which ones
     _____

Part 2: BPG Implementation Strategy

The next questions are about the BPG implementation strategy.

Advanced Practice Consultants at SEHC developed a package about diabetes and wound care to help implement the BPG. We'd like to know how you used the package.

1 Were you able to participate in the **Breeze education sessions** in February 2008 conducted by the diabetes and wound-care Advanced Practice Consultants (Bo and Virginia)?

- ❑ No (proceed to 1.5)
- ❑ Yes (proceed to 1.1)

1.1 How many Breeze education sessions did you attend?

- ❑ One
- ❑ Two

1.2 Where did you attend?

1.3 How long was each session?

1.4 Did any learning materials accompany the Breeze education?

- ❑ No
- ❑ Yes: please describe what they were.

1.5 Do you know how many people from your SDC attended the Breeze education session conducted by the advanced practice consultants?

- ❑ No
- ❑ Yes. Approximately how many: _____
  Who were they: (i.e.: Staff nurses, preceptor staff, CRN, ET, WORN, Manager, Supervisor)

2. Did you complete any component of the **self-learning education module** that was on-line related to the content and practices within this BPG?

- ❑ No (Please explain *why* and proceed to question 2.3)

- ❑ Yes (Proceed to question 2.1)

2.1 How much of the module did you complete?

- ❑ All of it
- ❑ Part of it: which parts

2.2 How long did it take?

2.3 Do you know approximately how many people in your SDC completed the on-line self-learning module?

3 Can you now describe how the BPG for *Assessing and Managing Foot Ulcers for People with Diabetes* was implemented in your SDC?

Prompts: What strategies were used?
Did you use a train-the-trainer approach?
What parts of the BPG did you focus on? Why?

4 Who led the implementation process within your SDC?

4.1 What was your role in implementing the BPG?

4.2 What was the role of the manager in implementation?

5 Have you seen a copy of the RNAO BPG on *Assessing and managing foot ulcers for people with diabetes*?

- ❑ No
- ❑ Yes. Where and when?

6 How many staff received education related to assessing and managing foot ulcers according to the BPG? (number of staff and/or estimate)

7 Has your SDC reviewed any charts to see if nurses' actual practice is reflective of the guideline recommendations?

- ❑ No:

7.1.1 Do you plan to do so in future
- ❑ No
- ❑ Yes

Please explain:

- ❑ Yes:

7.1.2 How and when

8 Since January, do you know if there has been any modifications to policies or procedures regarding assessing and managing diabetic foot ulcers in your SDC?

- ❑ No
- ❑ Don't know
- ❑ Yes: what modifications and who was involved in making the them?

9 Was there adequate equipment and supplies to implement the BPG?

10 How was information communicated to staff about the BPG implementation?

11 In what ways were nurses encouraged to use the BPG recommendations in their

practice?
(Prompts: visibly recognizing their efforts, communicating support)

12 Do you consider your SDC to have an environment or culture that supports the use of BPGs? (Prompts: positive or negative feeling towards using BPGs, vision, role models, leadership commitment…..)

- ❑ No
- ❑ Don't know
- ❑ Yes

Please explain your answer:

Part 3: The team leadership strategy

As you may recall, the intervention took place between April and July 2008 and involved:

- A pre-workshop package of printed materials
- A one day workshop at corporate office.
- 3 teleconference after the workshop.

1. Did you receive a **pre-workshop package of printed materials**?

- ❑ No (proceed to question 2)
- ❑ Yes. (proceed to 1.1)

As you may recall – there were 2 parts to the package:

- reading materials (included study purpose, leadership article, change model, summary of the BPG recommendations)
- Barriers assessment activity: to assess barriers to implementing the BPG recommendations in your SDC.

1.1 The evaluation of the workshop showed the pre-workshop materials were not very useful (ie: rated low compared to other activities)
Is it a waste of time and resources to mail these materials out 1 week ahead of time?

- ❑ No
- ❑ Yes (it is a waste of time)

Please explain your response

1.2 How **useful** were these materials in preparing you and your team to support implementation of the BPG recommendations, on a scale of 1 – 10 where 1 is not at all useful, and 10 is extremely useful?

1	2	3	4	5	6	7	8	9	10
not at all useful									extremely useful

Please explain:

One day workshop

The first few questions are about the workshop in general - then specific activities within the workshop.

2 Did you participate in the **one-day workshop** held at corporate office April 3, 2008?

- ❑ No (please explain if there was a reason *why not,* and proceed to question 3)
- ❑ Yes. (proceed to 2.1)

2.1 Thinking about the BPG implementation over the past 5 months, how **useful** was the workshop in helping you and your leadership team support nurses assess and manage foot ulcers in accordance with the BPG recommendations, on a scale of 1 – 10.

1	2	3	4	5	6	7	8	9	10
not at all useful									extremely useful

Can you explain:

2.2 How useful was identifying **priority indicators** to support implementation of the BPG recommendations, on a scale of 1 – 10.

1	2	3	4	5	6	7	8	9	10
not at all useful									extremely useful

Can you explain:

2.3 How useful was creating **a vision/goal statement** in helping you and your leadership team support implementation of the BPG recommendations, on a scale of 1 – 10.

1	2	3	4	5	6	7	8	9	10
not at all useful									extremely useful

Can you explain:

2.4 How useful was **team leadership action plan** in helping you and your team support implementation, on a scale of 1 – 10.

1	2	3	4	5	6	7	8	9	10
not at all useful									extremely useful

Can you explain:

3 Do you know if the target indicators within your action plan were reached?

- ❑ Don't know
- ❑ No
- ❑ Yes.

Please explain your response (ie; how do you know either way?)

4. The workbook was intended as a resource. Since the workshop did you ever refer to the workbook?

 No
 Yes

4.1 Do you think the workbook would be a useful on-line resource for yourself and others?

 No
 Yes

Can you please explain your answers?

Post-workshop **teleconferences.**

5. Did you participate in any of teleconferences?

 No (please explain if there was a reason *why not,* and proceed to question 9)

 Yes. (proceed to 8.1) How many_____

5.1 How useful were the teleconferences in helping you and your team facilitate and support implementation of the BPG recommendations?

1	2	3	4	5	6	7	8	9	10
not at all useful									extremely useful

Please explain:

Please refer to the strategic team leadership plan your SDC developed for the next questions.

6. Looking over the plan, was there anything that wasn't feasible to do? Please explain.

7. Was it helpful or not helpful for your team to be involved in this leadership strategy?

 Helpful
 Not helpful

Please explain which parts were helpful or not helpful.

8. Do you think you did anything differently to help nurses at your SDC use this BPG than you would have done if you hadn't been in the intervention?

 No
 Yes

Can you please explain:

9. What, if anything, made it difficult to do the activities in your leadership plan?

10. How might SEHC better support you as a leader of guideline implementation and do the activities you identified?

11. What suggestions do you have to modify or adapt this strategy to be useful to nursing leaders for future BPG implementation?
    Prompts: pre-workshop materials, workshop, teleconference: who, what, when

Part 4: **Barriers and leadership activities**.

Often what people think the barriers are to practice change are not the actual barriers. I'm going to ask you the following 2 questions based on 9 of the BPG recommendations:

- What made it <u>difficult</u> for nurses to assess and manage diabetic foot ulcers in accordance to the recommendation?

  <u>Prompts</u>: Innovation itself (BPG recommendations), potential adopters (Nurses attitudes, knowledge/skills, current practices, concerns), Practice Environment (physical, cultural/social, patients, leadership…)

- Were you and your team able to <u>address these difficulties</u>? Please explain.

12. The first recommendation is related to assessing and documenting **<u>glycemic control</u>** ie: Hgb A1C or blood sugar.

    a. What made it <u>difficult</u> for nurses to assess and document Hgb A1C or blood sugar when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain.

13. The next recommendation is assessing and documenting **<u>vascular supply in lower extremities.</u>**

    a. What made it <u>difficult</u> for nurses to assess and document vascular supply in the lower extremities when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain?

14. Next recommendation is assessing and documenting **signs and symptoms of infection**.

    a. What made it difficult for nurses to assess and document signs and symptoms of infection when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain?

15. The next recommendation is assessing **sensory changes** in the foot with a 10-gram monofilament.

    a. What made it difficult for nurses to assess sensory changes in the foot with a 10-gram monofilament when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain?

16. The next recommendation is assessing and documenting **foot deformities and pressure** from footwear.

    a. What made it difficult for nurses to assess and document foot deformities and pressure from footwear when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain?

17. The next recommendation is assessing and documenting the ulcer **length, width and depth**.

    a. What made it difficult for nurses to assess and document length, width and depth of the ulcer when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain?

18. The next recommendation is **debridement** – either with saline irrigations, hydrogel dressings (autolytics) or sharps (scalpel / scissors–method of choice in infected wounds).

    a. What made it difficult for nurses to debride foot ulcers with saline irrigations, hydrogel dressings, or sharps when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain?

19. The next recommendation is providing and documenting **patient education** for diabetes management, ulcer care and available resources.

    a. What things made it difficult for nurses to provide and document patient education for diabetes management, ulcer care and available resources when treating foot ulcers for people with diabetes?

    b. Were you and your team able to address these difficulties? Please explain?

20. The last recommendation I am asking you about is **referring** clients for vascular status, infection, neuropathy, and foot deformities or pressures.

    a. What things made it difficult for nurses to refer clients for vascular status, infection, neuropathy, and foot deformities or pressures. when treating foot ulcers for people with diabetes?
    b. Were you and your team able to address these difficulties? Please explain?

And very lastly,

21. Has being involved in this research project influenced you as a leader of BPG implementation?

    ☐ No
    ☐ Yes

    Can you please explain:

Do you have any additional suggestions about potential strategies to enhance guideline implementation in community practice at SEHC?

Thank you so much for your time and thoughtful answers.

At the end of this project the researchers will be providing a summary of the research results to each participating SDC manager for you to access and see.

Appendix G: Research Ethics Board Approval Letter

Université d'Ottawa University of Ottawa
Service de subventions de recherche et déontologie Research Grants and Ethics Services

May 9, 2007

Doctor Barbara Davies & Ms. Wendy A. Gifford
Faculty of Health Sciences, School of Nursing
451 Smyth Rd.
University of Ottawa
Ottawa, ON, K1H 8M5

Object: "Evaluation of a leadership intervention for implementing recommendations for nursing care for people with diabetes and foot ulcers in community nursing practice" (file #[redacted]

Dear Dr. Davies, Ms. Gifford;

You will find enclosed the Health Sciences and Science REB ethical clearance for the abovementioned study.

During the course of the study, any modifications to the protocol or forms may not be initiated without prior written approval from the REB. You must also promptly notify the REB of any adverse events that may occur.

This certificate of ethical clearance is valid until May 9, 2008. Please submit an annual status report to the Protocol Officer in May 2008 to either close the file or request a renewal of ethics approval. This document can be found at:
[redacted]

A copy of this approval will be sent to research services, if necessary.
If you have any questions, you may contact the undersigned at the numbe[redacted]

Sincerely yours,

[redacted]

Dorothyann Curran
Protocol Officer for Ethics in Research
For Dr. Daniel Lagarec, Chair of the Health Sciences and Science REB

550, rue Cumberland 550 Cumberland Street
Ottawa (Ontario) K1N 6N5 Canada Ottawa, Ontario K1N 6N5 Canada
[redacted]

Université d'Ottawa University of Ottawa
Service de subventions de recherche et déontologie Research Grants and Ethics Services

HEALTH SCIENCES AND SCIENCE RESEARCH ETHICS BOARD

CERTIFICATE OF ETHICAL APPROVAL

This is to certify that the University of Ottawa Health Sciences and Science Research Ethics Board has examined the application for ethical approval of the research project entitled **"Evaluation of a leadership intervention for implementing recommendations for nursing care for people with diabetes and foot ulcers in community nursing practice" (file #[redacted]** submitted by Barbara Davies and Wendy Gifford of the Faculty of Health Sciences, School of Nursing. The Board found that this research project met appropriate ethical standards as outlined in the Tri-Council Policy Statement and in the Procedures of the University of Ottawa Research Ethics Boards, and accordingly gave it a Category 1a (approval). This certification is valid one year from the date indicated below.

[redacted]

Date: May 9, 2007

Dorothyann Curran
Protocol Officer for Ethics in Research
For Dr. Daniel Lagarec, Chair of the
Health Sciences and Science REB

550, rue Cumberland 550 Cumberland Street
Ottawa (Ontario) K1N 6N5 Canada Ottawa, Ontario K1N 6N5 Canada

[redacted]

Appendix H: Consent to Participate, Phase 1 and Phase 2, English

Information Consent: Phase I

Evaluation of a leadership intervention for implementing recommendations for nursing care for people with diabetes and foot ulcers in community nursing practice:

Names of Researchers
Co-Principal Investigators

Wendy Gifford, RN, PhD(c),
Doctoral Student, School of Nursing,
University of Ottawa,
phone: [redacted]

Barbara Davies, RN, PhD
Doctoral Supervisor, Associate Professor, School of Nursing,
University of Ottawa
Phone: [redacted]
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Nancy Lefebre, RN, MScN, CHE
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Co-Investigators

Ian D Graham, PhD
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Ann Tourangeau, RN, PhD
Assistant Professor & Career Scientist,
Faculty of Nursing,
University of Toronto,
Phone: [redacted]
email: [redacted]

Kirsten Woodend, RN, PhD,
Associate Professor, School of Nursing,
University of Ottawa,
Tel: [redacted]
email: [redacted]

Invitation to Participate:

You are invited to participate in this research study conducted by doctoral student Wendy Gifford, and her doctoral supervisor Dr. Barbara Davies et al. funded by the Canadian Nurses Foundation in partnership with Saint Elizabeth Health Care.

Saint Elizabeth Health Care will be implementing the Registered Nurses Association of Ontario (RNAO) best practice guideline titled "*Assessment and management of foot ulcers for people with diabetes"* across all service delivery centers in 2007.

The purpose of this study is to see if the development of leadership strategies for managers, supervisors, resource nurses and selected preceptor clinical staff will assist nurses implement

recommendations for assessing and managing foot ulcers in people with diabetes. The study is being conducted in 2 phases.

PHASE I OBJECTIVES:

- To explore barriers to implementing selected recommendations from this BPG, and to determine what type of leadership development activities would be useful and appealing to managers, supervisors, resource nurses and preceptor clinical staff.

PHASE II OBJECTIVES:

- To determine the impact of a leadership development strategy on the implementation of new recommendations for nursing assessments and management of foot ulcers for people with diabetes, and to understand what is feasible and useful in leadership development activities.

PARTICIPATION:

Your participation is for **phase I** only. The service delivery center in which you work is one of two centers that has agreed to participate in **phase I** of this study.

Your participation will essentially consist of one telephone interview to explore your opinions about: a) current nursing practices for foot ulcers care for people with diabetes, b) barriers to changing current practices based on new recommendations from the RNAO-BPG for assessing and managing foot ulcers for people with diabetes, and c) what type of leadership development activities might be useful and appealing to your center's management and leadership team (managers, health services supervisors, resource nurses and preceptor clinical staff). The interview will take approximately 30 - 60 minutes, and will be scheduled at your convenience sometime in May 2007.

RISKS: During participation in this study you might express some negative opinions or information that causes you to feel some emotional or psychological discomfort. Negative opinions are a normal response that may occur when responding to questions about barriers such as those in the study. Identifying barriers is important so that organizational leaders understand the issues that impact nursing care, and what they might do to support nurses to provide quality care.

CONFIDENTIALITY AND ANONYMITY:

All information collected from you will be kept strictly **confidential** and only be used for the purposes of this study. Data collected will be protected and kept **anonymous** in the following ways:

- your name will not be associated in any way with the interviews;
- your name will not appear on any information collected. A numerical identification code will be used on written interview guide, interview tape recording and transcription and electronic copies of the data.
- your name and corresponding identification code will be kept in a locked research office at the University of Ottawa Nursing Best Practice Research Unit.
- no names of individuals or organizations will be used in written or electronic transcriptions or reporting of results – a numerical identification code will be used.
- only pooled data will be used when reporting results;

- quotes used in reports or publications will not reveal your identity.

BENEFITS:

Your participation in this study will help identify important information about factors that might impact nursing care for people with foot ulcers with diabetes. The study will also help determine whether a leadership development strategy is useful and feasible for nurse leaders. This information is important for future policy and program planning to ensure high quality nursing care and good outcomes for staff and clients.

CONSERVATION OF DATA:

Tape recordings of interviews, electronic and paper copies of transcriptions and interview notes will be kept secured. Only the researcher named in the consent form and research assistants will have access to the raw data. Names of participants will be kept separated from the data in a locked research office at the University of Ottawa Nursing Best Practice Research Unit. During the study, data will be stored in the locked research office research of the co-PI (Gifford). After completion of the study, data will be stored in a locked research office at the Nursing Best Practice Research Unit at the University of Ottawa for five years (e.g.: 2008 – 2013), then destroyed following procedures at the University of Ottawa for destroying confidential documents.

VOLUNTARY PARTICIPATION:

You are under no obligation to participate and if you choose to participate you can withdraw from the study at any time and/or refuse to answer any questions without suffering negative consequences. If you withdraw from the study, you can choose to have all your data destroyed.

If you have any questions about the study, you may contact the researcher, Wendy Gifford, Tel: phone: [redacted] or her supervisor Dr. Barbara Davies, Tel: [redacted]
If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, [redacted]

Acceptance: I, _____ *(Name of participant),* agree to participate in the above research study conducted by W. Gifford, doctoral student under the supervision of Dr. B. Davies of the School of Nursing, Faculty of Health Sciences, University of Ottawa.

❑ I consent to audio-taping this interview for research purposes.

_____ _____

Participant's signature *Date*

There are two copies of the consent form, one of which is yours to keep.

Information Consent: Phase 2

Evaluation of a leadership intervention for implementing recommendations for nursing care for people with diabetes and foot ulcers in community nursing practice:

Names of Researchers
Co-Principal Investigators

Wendy Gifford, RN, PhD(c),
Doctoral Student, School of Nursing,
University of Ottawa,
phone: [redacted]

Barbara Davies, RN, PhD
Doctoral Supervisor, Associate Professor, School of Nursing,
University of Ottawa
Phone: [redacted]

Nancy Lefebre, RN, MScN, CHE
Clinical Executive, Senior VP Knowledge and Practice,
Saint Elizabeth Health Care,
Tel: [redacted]

Co-Investigators

Ian D Graham, PhD
Vice-President for Knowledge Translation,
CIHR
Tel: [redacted]

Ann Tourangeau, RN, PhD
Assistant Professor & Career Scientist,
Faculty of Nursing,
University of Toronto,
Phone: [redacted]

Kirsten Woodend, RN, PhD,
Associate Professor, School of Nursing,
University of Ottawa,
Tel: [redacted]

Invitation to Participate:

You are invited to participate in this research study conducted by doctoral student Wendy Gifford, and doctoral supervisor Dr. Barbara Davies et al. funded by the Canadian Nurses Foundation in partnership with Saint Elizabeth Health Care.

Saint Elizabeth Health Care is planning to implement the Registered Nurses Association of Ontario (RNAO) best practice guideline titled "*Assessment and management of foot ulcers for people with diabetes"* in 2007. All service delivery centers implementing the RNAO guideline will receive Saint Elizabeth Health Care's 'usual' BPG implementation strategy that essentially consist of: 1) a formal launch of the guideline held at your service delivery center regional monthly meeting, 2) education sessions for clinical staff related to the practice application of the guideline recommendations, and 3) a self-directed learning package.

The purpose of this study is to see if the development of leadership strategies for managers, supervisors, resource nurses and selected preceptor clinical staff will assist nurses implement recommendations for assessing and managing foot ulcers in people with diabetes. The study is being conducted in 2 phases.

PHASE I OBJECTIVES:

- To explore barriers to implementing selected recommendations from this guideline, and to determine what type of leadership development activities would be useful and appealing to managers, supervisors, resource nurses and preceptor clinical staff.

PHASE II OBJECTIVES:

- To determine the impact of a leadership development strategy on the implementation of new recommendations for nursing assessments and management of foot ulcers for people with diabetes, and to understand what is feasible and useful in leadership development activities.

Participation:

Your participation is for **phase II** only. The service delivery center in which you work is one of four that has volunteered to participate in **phase II** of this study.

Two service delivery centers participating in phase II will be randomly allocated to receive a leadership development strategy for implementing recommendations from the guideline.

If your service delivery center **is selected** to receive the leadership development strategy, your participation will essentially consist of:

1. Saint Elizabeth Health Care's 'usual' guideline implementation strategy (described above).
2. Receive a mailed package of printed materials: study purpose; summary of recommendations, and information on leadership and planned change. Review time: approx 15-30 minutes.
3. Participate in one full day workshop (7.5 hours) held at the head office of Saint Elizabeth Health Care (90 Allstate Parkway, Markham, Ontario). During the workshop you will hear information on leadership and guideline implementation. You will also have the opportunity to:
    - participate in a focus group with participants from your service delivery center to discuss barriers to implementing the guideline recommendations;
    - hear what people from other service delivery centers see as barriers,
    - participate in a case study discussion on guideline implementation,
    - develop a strategy for your service delivery center to address barriers to implementing the guideline recommendations. The workshop will be scheduled sometime in September or October 2007.

    At the end of the workshop you will be asked to complete a survey questionnaire about what you liked and didn't like about the workshop. The questionnaire may be completed anonymously and will take approximately 2-10 minutes to complete.

4. Three group teleconferences.
    - Teleconferences will be conducted at 2, 6, and 10 weeks after the workshop with all workshop participants, a researcher and a workshop facilitator to discuss how things are going with implementation. The teleconferences will last approximately 45 - 60 minutes. The teleconferences will be scheduled at the convenience of the participants around the weeks of October 15, November 12, and December 10, 2007.
5. One individual telephone interview scheduled after the final teleconference to explore what helped or didn't help with implementing the guideline recommendations. You will also be asked what you thought about participating in the study. The interview will take approximately 30 minutes, and will be scheduled at your convenience within a month after the final teleconference.

If your service delivery center is **not selected** to receive the leadership development activities, your participation will essentially consist of

1. Saint Elizabeth Health Care's 'usual' BPG implementation strategy (described above).
2. One individual telephone interview: to explore your opinions about things that influenced nurses to provide care consistent with guideline recommendations in your service delivery center. The interview will take approximately 30 minutes and will be scheduled at your convenience between December 16, 2007 and January 16, 2008.

Risks: During participation you might express some negative opinions or information that causes you to feel some emotional or psychological discomfort. Negative opinions are a normal response that may occur when responding to questions about barriers such as those in the study. Identifying barriers is important so that organizational leaders understand the issues that impact nursing care, and what they might do to support nurses to provide quality care.

CONFIDENTIALITY AND ANONYMITY:

All information collected from you will be kept strictly **confidential** and only be used for the purposes of this study. Data collected will be protected and kept **anonymous** in the following ways:

- your name will not be associated in any way with the study;
- your name will not appear on any information collected. A numerical identification code will be used on written interview guide, interview tape recording and transcription, notes from workshop and electronic copies of the data.
- your name and corresponding identification code will be kept in a locked research office at the University of Ottawa Nursing Best Practice Research Unit.
- no names of individuals or organizations will be used in transcriptions or reporting of results – a numerical identification code will be used.
- only pooled data will be used when reporting results;
- quotes used in reports or publications will not reveal your identity.

BENEFITS:

Your participation in this study will help identify important information about factors that might impact nursing care for people with diabetes with foot ulcers. The study will also help determine whether a leadership development strategy is useful and feasible to nurse leaders. This information is important for future policy and program planning to ensure high quality nursing care and good outcomes for staff and clients.

CONSERVATION OF DATA:

Tape recordings of interviews, electronic and paper copies of transcriptions and interview notes will be kept secured. Only the researchers named in the consent form and research assistants will have access to the raw data. Names of participants will be kept separated from the data in a locked research office at the University of Ottawa Nursing Best Practice Research Unit. During the study, data will be stored in the locked research office research of the co-PI (Gifford). After completion of the study, data will be stored in a locked research office at the Nursing Best Practice Research Unit at the University of Ottawa for five years (e.g.: 2008 – 2013), then destroyed following procedures at the University of Ottawa for destroying confidential documents.

VOLUNTARY PARTICIPATION:

You are under no obligation to participate and if you choose to participate you can withdraw from the study at any time and/or refuse to answer any questions without suffering negative consequences. If you withdraw from the study, you can choose to have all your data destroyed.

If you have any questions about the study, you may contact the researcher, Wendy Gifford, Tel: phone: [redacted] or her supervisor Dr. Barbara Davies, Tel: [redacted]
If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, [redacted]

Acceptance: I, _____ *(Name of participant),* agree to participate in the above research study conducted by W. Gifford, doctoral student under the supervision of Dr. B. Davies of the School of Nursing, Faculty of Health Sciences, University of Ottawa.

❑ I consent to audio-taping this interview for research purposes.

_____ _____

Participant's signature *Date*

There are two copies of the consent form, one of which is yours to keep.

Appendix I: Consent to Participate, French

Information Consent

Evaluation of a leadership intervention for implementing recommendations for nursing care for people with diabetes and foot ulcers in community nursing practice: Phase I

Names of Researchers
Co-Principal Investigators

Wendy Gifford, RN, PhD(c),
Doctoral Student, School of Nursing,
University of Ottawa,
phone: [redacted]

Barbara Davies, RN, PhD
Doctoral Supervisor, Associate Professor, School of Nursing,
University of Ottawa
Phone: [redacted]

Nancy Lefebre, RN, MScN, CHE
Clinical Executive, Senior VP Knowledge and Practice,
Saint Elizabeth Health Care,
Tel: [redacted]

Co-Investigators

Ian D Graham, PhD
Vice-President for Knowledge Translation,
CIHR
Tel: [redacted]

Ann Tourangeau, RN, PhD
Assistant Professor & Career Scientist,
Faculty of Nursing,
University of Toronto,
Phone: [redacted]

Kirsten Woodend, RN, PhD,
Associate Professor, School of Nursing,
University of Ottawa,
Tel: [redacted]

Invitation to Participate:

You are invited to participate in this research study conducted by doctoral student Wendy Gifford, and her doctoral supervisor Dr. Barbara Davies et al. funded by the Canadian Nurses Foundation in partnership with Saint Elizabeth Health Care.

Saint Elizabeth Health Care will be implementing the Registered Nurses Association of Ontario (RNAO) best practice guideline titled "*Assessment and management of foot ulcers for people with diabetes"* across all service delivery centers in 2007.

The purpose of this study is to see if the development of leadership strategies for managers, supervisors, resource nurses and selected preceptor clinical staff will assist nurses implement recommendations for assessing and managing foot ulcers in people with diabetes. The study is being conducted in 2 phases.

PHASE I OBJECTIVES:

- To explore barriers to implementing selected recommendations from this BPG, and to determine what type of leadership development activities would be useful and appealing to managers, supervisors, resource nurses and preceptor clinical staff.

PHASE II OBJECTIVES:

- To determine the impact of a leadership development strategy on the implementation of new recommendations for nursing assessments and management of foot ulcers for people with diabetes, and to understand what is feasible and useful in leadership development activities.

PARTICIPATION:

Your participation is for **phase I** only. The service delivery center in which you work is one of two centers that has agreed to participate in **phase I** of this study.

Your participation will essentially consist of one telephone interview to explore your opinions about: a) current nursing practices for foot ulcers care for people with diabetes, b) barriers to changing current practices based on new recommendations from the RNAO-BPG for assessing and managing foot ulcers for people with diabetes, and c) what type of leadership development activities might be useful and appealing to your center's management and leadership team (managers, health services supervisors,

resource nurses and preceptor clinical staff). The interview will take approximately 30 - 60 minutes, and will be scheduled at your convenience sometime in May 2007.

RISKS: During participation in this study you might express some negative opinions or information that causes you to feel some emotional or psychological discomfort. Negative opinions are a normal response that may occur when responding to questions about barriers such as those in the study. Identifying barriers is important so that organizational leaders understand the issues that impact nursing care, and what they might do to support nurses to provide quality care.

CONFIDENTIALITY AND ANONYMITY:

All information collected from you will be kept strictly **confidential** and only be used for the purposes of this study. Data collected will be protected and kept **anonymous** in the following ways:

- your name will not be associated in any way with the interviews;
- your name will not appear on any information collected. A numerical identification code will be used on written interview guide, interview tape recording and transcription and electronic copies of the data.
- your name and corresponding identification code will be kept in a locked research office at the University of Ottawa Nursing Best Practice Research Unit.
- no names of individuals or organizations will be used in written or electronic transcriptions or reporting of results – a numerical identification code will be used.
- only pooled data will be used when reporting results;
- quotes used in reports or publications will not reveal your identity.

BENEFITS:

Your participation in this study will help identify important information about factors that might impact nursing care for people with foot ulcers with diabetes. The study will also help determine whether a leadership development strategy is useful and feasible for nurse leaders. This

information is important for future policy and program planning to ensure high quality nursing care and good outcomes for staff and clients.

CONSERVATION OF DATA:

Tape recordings of interviews, electronic and paper copies of transcriptions and interview notes will be kept secured. Only the researcher named in the consent form and research assistants will have access to the raw data. Names of participants will be kept separated from the data in a locked research office at the University of Ottawa Nursing Best Practice Research Unit. During the study, data will be stored in the locked research office research of the co-PI (Gifford). After completion of the study, data will be stored in a locked research office at the Nursing Best Practice Research Unit at the University of Ottawa for five years (e.g.: 2008 – 2013), then destroyed following procedures at the University of Ottawa for destroying confidential documents.

VOLUNTARY PARTICIPATION:

You are under no obligation to participate and if you choose to participate you can withdraw from the study at any time and/or refuse to answer any questions without suffering negative consequences. If you withdraw from the study, you can choose to have all your data destroyed.

If you have any questions about the study, you may contact the researcher, Wendy Gifford, Tel: phone: [redacted] or her supervisor Dr. Barbara Davies, Tel: [redacted]

If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, [redacted]

Acceptance: I, _____ *(Name of participant),* agree to participate in the above research study conducted by W. Gifford, doctoral student under the supervision of Dr. B. Davies of the School of Nursing, Faculty of Health Sciences, University of Ottawa.

❑ I consent to audio-taping this interview for research purposes.

_____ _____

Participant's signature *Date*

There are two copies of the consent form, one of which is yours to keep.

Information Consent

Evaluation of a leadership intervention for implementing recommendations for nursing care for people with diabetes and foot ulcers in community nursing practice: Phase 2

Names of Researchers
Co-Principal Investigators

Wendy Gifford, RN, PhD(c),
Doctoral Student, School of Nursing,
University of Ottawa,
phone: [redacted]

Barbara Davies, RN, PhD
Doctoral Supervisor, Associate Professor, School of Nursing,
University of Ottawa
Phone: [redacted]

Nancy Lefebre, RN, MScN, CHE
Clinical Executive, Senior VP Knowledge and Practice,
Saint Elizabeth Health Care,
Tel: [redacted]

Co-Investigators

Ian D Graham, PhD
Vice-President for Knowledge Translation,
CIHR
Tel: [redacted]

Ann Tourangeau, RN, PhD
Assistant Professor & Career Scientist,
Faculty of Nursing,
University of Toronto,
Phone: [redacted]

Kirsten Woodend, RN, PhD,
Associate Professor, School of Nursing,
University of Ottawa,
Tel: [redacted]

Invitation to Participate:

You are invited to participate in this research study conducted by doctoral student Wendy Gifford, and doctoral supervisor Dr. Barbara Davies et al. funded by the Canadian Nurses Foundation in partnership with Saint Elizabeth Health Care.

Saint Elizabeth Health Care is planning to implement the Registered Nurses Association of Ontario (RNAO) best practice guideline titled "*Assessment and*

management of foot ulcers for people with diabetes" in 2007. All service delivery centers implementing the RNAO guideline will receive Saint Elizabeth Health Care's 'usual' BPG implementation strategy that essentially consist of: 1) a formal launch of the guideline held at your service delivery center regional monthly meeting, 2) education sessions for clinical staff related to the practice application of the guideline recommendations, and 3) a self-directed learning package.

The purpose of this study is to see if the development of leadership strategies for managers, supervisors, resource nurses and selected preceptor clinical staff will assist nurses implement recommendations for assessing and managing foot ulcers in people with diabetes. The study is being conducted in 2 phases.

PHASE I OBJECTIVES:

- To explore barriers to implementing selected recommendations from this guideline, and to determine what type of leadership development activities would be useful and appealing to managers, supervisors, resource nurses and preceptor clinical staff.

PHASE II OBJECTIVES:

- To determine the impact of a leadership development strategy on the implementation of new recommendations for nursing assessments and management of foot ulcers for people with diabetes, and to understand what is feasible and useful in leadership development activities.

Participation:

Your participation is for **phase II** only. The service delivery center in which you work is one of four that has volunteered to participate in **phase II** of this study.

Two service delivery centers participating in phase II will be randomly allocated to receive a leadership development strategy for implementing recommendations from the guideline.

If your service delivery center **is selected** to receive the leadership development strategy, your participation will essentially consist of:

1. Saint Elizabeth Health Care's 'usual' guideline implementation strategy (described above).
2. Receive a mailed package of printed materials: study purpose; summary of recommendations, and information on leadership and planned change. Review time: approx 15-30 minutes.
3. Participate in one full day workshop (7.5 hours) held at the head office of Saint Elizabeth Health Care (90 Allstate Parkway, Markham, Ontario). During the workshop you will hear information on leadership and guideline implementation. You will also have the opportunity to:
   - participate in a focus group with participants from your service delivery center to discuss barriers to implementing the guideline recommendations;
   - hear what people from other service delivery centers see as barriers,
   - participate in a case study discussion on guideline implementation,
   - develop a strategy for your service delivery center to address barriers to implementing the guideline recommendations. The workshop will be scheduled sometime in October 2007.

   At the end of the workshop you will be asked to complete a survey questionnaire about what you liked and didn't like about the workshop. The questionnaire may be completed anonymously and will take approximately 2-10 minutes to complete.
4. Three group teleconferences.
   - Teleconferences will be conducted at 2, 6, and 10 weeks after the workshop with all workshop participants, a researcher and a workshop facilitator to discuss how things are going with implementation. The teleconferences will last approximately 45 - 60 minutes. The teleconferences will be scheduled at the convenience of the participants around the weeks of October 15, November 12, and December 10, 2007.

5. One individual telephone interview scheduled after the final teleconference to explore what helped or didn't help with implementing the guideline recommendations. You will also be asked what you thought about participating in the study. The interview will take approximately 30 minutes, and will be scheduled at your convenience within a month after the final teleconference.

If your service delivery center is **not selected** to receive the leadership development activities, your participation will essentially consist of

1. Saint Elizabeth Health Care's 'usual' BPG implementation strategy (described above).
2. One individual telephone interview: to explore your opinions about things that influenced nurses to provide care consistent with guideline recommendations in your service delivery center. The interview will take approximately 30 minutes and will be scheduled at your convenience between December 16, 2007 and January 16, 2008.

Risks: During participation you might express some negative opinions or information that causes you to feel some emotional or psychological discomfort. Negative opinions are a normal response that may occur when responding to questions about barriers such as those in the study. Identifying barriers is important so that organizational leaders understand the issues that impact nursing care, and what they might do to support nurses to provide quality care.

CONFIDENTIALITY AND ANONYMITY:

All information collected from you will be kept strictly **confidential** and only be used for the purposes of this study. Data collected will be protected and kept **anonymous** in the following ways:

- your name will not be associated in any way with the study;
- your name will not appear on any information collected. A numerical identification code will be used on written interview guide, interview tape

recording and transcription, notes from workshop and electronic copies of the data.

- your name and corresponding identification code will be kept in a locked research office at the University of Ottawa Nursing Best Practice Research Unit.
- no names of individuals or organizations will be used in transcriptions or reporting of results – a numerical identification code will be used.
- only pooled data will be used when reporting results;
- quotes used in reports or publications will not reveal your identity.

BENEFITS:

Your participation in this study will help identify important information about factors that might impact nursing care for people with diabetes with foot ulcers. The study will also help determine whether a leadership development strategy is useful and feasible to nurse leaders. This information is important for future policy and program planning to ensure high quality nursing care and good outcomes for staff and clients.

CONSERVATION OF DATA:

Tape recordings of interviews, electronic and paper copies of transcriptions and interview notes will be kept secured. Only the researchers named in the consent form and research assistants will have access to the raw data. Names of participants will be kept separated from the data in a locked research office at the University of Ottawa Nursing Best Practice Research Unit. During the study, data will be stored in the locked research office research of the co-PI (Gifford). After completion of the study, data will be stored in a locked research office at the Nursing Best Practice Research Unit at the University of Ottawa for five years (e.g.: 2008 – 2013), then destroyed following procedures at the University of Ottawa for destroying confidential documents.

VOLUNTARY PARTICIPATION:

You are under no obligation to participate and if you choose to participate you can withdraw from the study at any time and/or refuse to answer any questions without suffering negative consequences. If you withdraw from the study, you can choose to have all your data destroyed.

If you have any questions about the study, you may contact the researcher, Wendy Gifford, Tel: phone: [redacted] or her supervisor Dr. Barbara Davies, Tel: [redacted]
If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, [redacted]

Acceptance: I, _____ *(Name of participant),* agree to participate in the above research study conducted by W. Gifford, doctoral student under the supervision of Dr. B. Davies of the School of Nursing, Faculty of Health Sciences, University of Ottawa.
❑ I consent to audio-taping this interview for research purposes.

_____ _____
Participant's signature *Date*

There are two copies of the consent form, one of which is yours to keep.

Appendix J: Pre-workshop Materials

SDC Team Leadership in Action

Leading to improve outcomes for clients with diabetic foot ulcers

Pre-Workshop Materials

Wendy Gifford, University of Ottawa
Barbara Davies, University of Ottawa
Nancy Lefebre, Saint Elizabeth Health Care
Gayle Seddon, Saint Elizabeth Health Care

March, 2008

Congratulations on being chosen to participate in this exciting phase of our study.
As you may recall, your service delivery center was one of two randomly selected to participate in the leadership workshop and follow-up teleconferences beginning on April 3rd, 2008.

The following is a summary of the study purpose and activities that you and your SDC leadership team will be participating in.

Purpose

- To determine whether a leadership team strategy impacts evidence-based nursing assessments and management of foot ulcers for people with diabetes,
- To understand what is feasible and useful in a leadership development strategy.

Your participation in this leadership strategy will essentially involve:

1. Reviewing pre-workshop reading materials and assessing barriers & supports in your SDC related to implementation of recommendations from the RNAO-BPG.
2. Participating in a full day workshop scheduled for April 3rd, 2008: 09:00 – 16:00 hours held at the Corporate Office, Markham, Ontario.
3. Attending three follow-up teleconferences, to be scheduled approximately 2, 4 and 6 weeks following the workshop.

This package consists of 2 components: 1) Reading Materials, and 2) Barriers & Supports Assessment activity for you to complete prior to attending the workshop April 3rd, 2008.

READING Materials

I. Summary of the RNAO guideline recommendations.
II. Article on Leadership for Sustaining Guidelines (Gifford et al., 2006).
III. The Ottawa Model of Research Use (Graham & Logan, 2006)

BARRIERS & SUPPORTS ASSESSMENT

Research has shown that tailoring implementation strategies to identified barriers and supports improves success of implementation. The Ottawa Model of Research Use is a pictorial guide for assessing barriers and supports to implementing new practices and is included in this package for your consideration.

Additionally, we have developed 4 questions for you to easily assess barriers and supports to implementing recommendations from the RNAO guideline for ***Assessment and management of foot ulcers for people with diabetes*** in your SDC:

- **How important do you** think it is for home care nurses to follow the recommendation, on a scale of 1 to 10, where 1 is not at all important, and 10 is extremely important?
- What do you see as the **main barriers** interfering with nurses' willingness and ability to follow this recommendation?
- What do you think might be helpful for managers, supervisors, resource nurses and preceptor staff to do to **support** nurses adopt this recommendation into their routine client care?
- Which 3 recommendations will be the most challenging for nurses to implement?

In preparation for the workshop, we are asking you to use these 4 questions to assess the barriers and supports in your SDC as perceived by yourself, and at least 2 of your staff.

Please bring your assessment findings to the workshop April 3rd. We will be using them to develop leadership strategies to support implementing the BPG recommendations.

In addition to the barriers & supports assessment, please take a few minutes to reflect on the following prior to the workshop:

Reflection Point

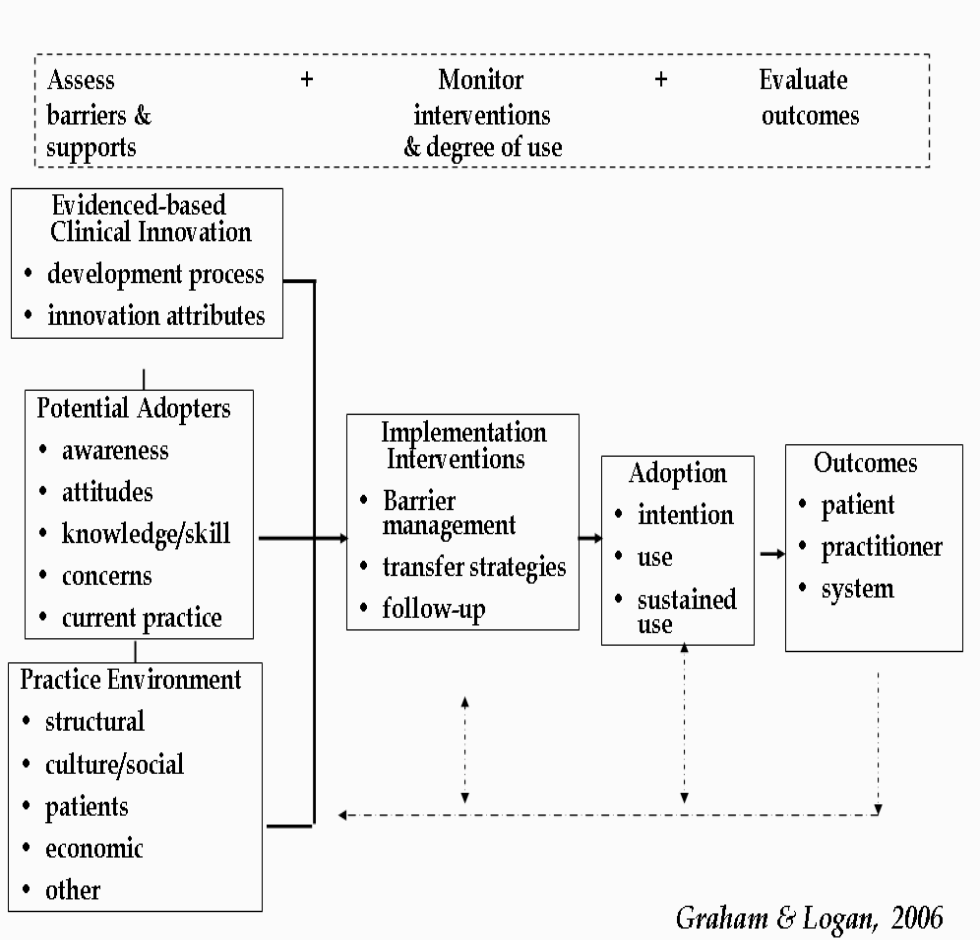
- There are different perspectives of the role managers have in influencing clinical practice and monitoring clinical outcomes.
  - What **role** do you think managers should have in implementing clinical guidelines and in monitoring clinical outcomes?
- Previous research has identified **leadership support** to be important for nurses to implement guideline recommendations, but it is not known what kind of support is the most important.
  - What does leadership support mean to you, and what are your experiences with leadership support?

We look forward to working with you and your leadership team to enhance team leadership and support evidence-based nursing practices for clients with diabetic foot ulcers.

Wendy Gifford, RN, PhD(c)
Barbara Davies, RN, PhD(c)
University of Ottawa

Nancy Lefebre, RN, MScN, CHE
Gayle Seddon, RN, BScN
Saint Elizabeth Health Care

Ottawa Model of Research Use



Appendix K: Follow-up Teleconference Guide

SDC Team Leadership Research Study
Follow-up teleconference

Teleconference # ___ Date: _____ Time: _____

Service Delivery Center: _____

Participant Name: _____ Participant Title: _____

Call Facilitators: Wendy Gifford, Gayle Seddon

Purpose

1. To provide an opportunity to discuss progress with implementing your strategic leadership plan.
2. To provide a forum for problem-solving and brain-storming leadership ideas related to supporting your staff with the practice changes related to diabetic foot ulcer care.

OUTLINE

1. Outcomes & Indicators

1.1. What are your targets?

1.2. What have you found?

1.3. Do you want to make any changes?

---

2. Leadership Plan

2.1. Over the past 2 weeks, what strategies have you used from your leadership plan?
- 2.1.1. Relations
- 2.1.2. Change
- 2.1.3. Task

2.2. What seems to be working well?

2.3. What's not working well?

2.4. Will you do anything differently?

2.5. Are there any organizational supports that you need to implement your leadership plan?

Thank you

Next teleconference scheduled for 2 weeks

Date & Time: _____,

Appendix L: Workshop Evaluation

SDC Team Leadership in Action

Workshop Evaluation

Your feedback is important to help us better understand what is valuable for future workshops.

1. Please indicate your current position

Staff nurse/ Champion Resource Nurse Supervisor/ Manager Other_____

2. What did you find **most useful** about the workshop?

3. What did you find **least useful** about the workshop?

4. Please rate the usefulness and relevance of different content & activities for leadership development to facilitate guideline implementation.

	not at all useful/relevant	a little useful/relevant	somewhat useful/relevant	extremely useful/relevant
Pre-Workshop materials	1	2	3	4
Chart Audit Findings	1	2	3	4
Interview findings (Barriers & Supports)	1	2	3	4
Indicators & Outcomes Activities	1	2	3	4
"What is leadership" discussion	1	2	3	4
Leadership Supports Exercise	1	2	3	4
Creating a Vision / Goal Statement	1	2	3	4
Exploring Commitment Exercise	1	2	3	4
Self-Reflection Exercise (name the…)	1	2	3	4
Herb's Behaviour discussion	1	2	3	4
Action Plan Updates & Development	1	2	3	4

THANK YOU !