

Hypertension screening and management: Does primary care nurse involvement  
affect care delivery?

By

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**Abstract**

Increasing numbers of RNs are working in primary care settings. Emerging evidence suggests RNs have a significant influence in this workplace. This study investigated Manitoba primary care clinics to determine if the involvement of primary care RNs affected care delivery. To better understand the influence of RNs in this setting, thirty-seven clinics, including fee-for-service and alternate funded clinics, were surveyed. Information surrounding clinic funding model, team composition, hours of operation, geographical location and scope of practice of RNs in hypertension screening and management was obtained. Manitoba Primary Care Research Network (MaPCReN) data was analyzed to determine hypertension screening and management rates. While RNs are frequently involved in hypertension screening, and to a lesser extent in hypertension management, there appear to be opportunities to support role clarity to minimize underutilization, duplication and overlap of roles. These steps could assist RNs to be an integral part in supporting comprehensive primary care delivery.

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## **Chapter One: Introduction**

Role expectations of registered nurses (RN) evolve in response to advances in health care technology, health policy changes, and professional regulatory legislation. Currently, the term scope of practice is perceived as a concept synonymous with role expectations. They are, however, two distinct concepts. While the term scope of practice has existed in the literature for many years, its importance to nurses, nursing regulators and their employers is heightened. The heightened interest in scope of practice is due to current fiscal constraints, increasing attention of accountability, and a result of the move from the RN Act to the Regulated Health Professions Act. As the political context surrounding scope of practice and role expectations change, having an awareness of how these two concepts do not align in the reality of everyday practice is important.

At its most basic definition, scope of practice defines the outer boundaries of practice expectations for all members of a profession (Mate, 2010a). Essentially the regulatory bodies for nurses authorize the parameter for care delivery (Kilpatrick et al., 2012). This basic definition seems clear and easy to follow, but confusion exists as RNs work in diverse health care settings that come with unique parameters concerning role expectations (Besner et al., 2011; Malloch & Ridenour, 2014). As a result, the scope of practice of a registered nurse and the workplace role expectations can be different and there is a lack of clarity within the literature of what various factors in health care settings influence or support role expectations, and ultimately scope of practice. While the newly emerging Regulated Health Professions Act (RHPA) aims to diminish confusion and variance by clearly defining scope of practice, the success of this aim will only be known over time. In this thesis, the variance in role expectations within primary care settings

across Manitoba will be investigated with the intention of generating evidence that demonstrates benefits with nurses working to fuller scopes of their practice parameters.

This chapter provides a foundational discussion of ideas driving this thesis. I begin by addressing scope of practice relevant to nursing, and then locate myself professionally and my interest in this study, which leads into my framing of the problem this thesis will address. After stating the research question and underlying assumptions, I provide definitions of key concepts and address the significance of my thesis.

### **Nursing Scope of Practice**

Scope of practice for RNs resides in a relatively new public policy context through the development of the RHPA (Nelson et al., 2014). In addition, as health care settings look for strategies to improve efficiency with delivery of care, there are both concerns about the amount of time RNs are engaged in non-nursing work and confusion over scope of practice due to diversity of role expectations among care settings (Canadian Nurse, 2012; DeMone, 2011). Over the last decade, government and professional regulatory body's role in defining scope of practice has been expanded with the evolution of the RHPA. A key goal of this Act is to clearly define boundaries for the scope of practice for diverse health professional groups and diminish variance in role expectations. Evidence regarding the degree to which RNs practice to full scope has emerged as a novel research area. The following discussion provides details concerning the RHPA, the evolution of scope of practice, and nursing within a primary care context.

### **Regulated Health Professions Act (RHPA)**

Health care and nursing have undergone significant changes with the development of the RHPA, which will replace the RN Act that governed the role of nurses since 1999

(Manitoba Laws, 1999). The RHPA was ascended to government June 2009 and proclaimed January 1, 2014. The College of Registered Nurses of Manitoba (CRNM) has been actively engaged in discussions regarding the Act since 2009 with increasing intensity over time (Mate, 2014). For each of the 22 health professional groups that will fall under the RHPA, the Act became a driving force for self-reflection and redefining the practice activities within their scope of practice (CRNM, 2010b). Discussions surrounding the RHPA have heightened awareness regarding nursing scope of practice and at times challenged common beliefs and misconceptions of what health care activities fall within the full scope of RNs practice.

**Importance of scope of practice.** Scope of practice refers to the care nurses are authorized to deliver as defined in the RHPA; yet, there is evidence of confusion (Allard, Frego, Katz, & Halas, 2010; Oelke, Besner & Carter, 2014) and variation (Dinh et al., 2014; Dutton Chiarella & Curtis, 2014; Oekle, Besner & Carter, 2014) regarding how this definition is realized in practice and role expectations. The literature suggests RNs are not effectively utilized and correspondingly, not working to their full scope of practice in many primary care settings (Jackson et al., 2014; Malloch & Ridenour, 2014; Registered Nurses Association of Ontario, 2012). Variability in expected roles create challenges in working to full scope in different health care settings (Institute for Healthcare Improvement, 2012; Mate, 2009; Martinez-Gonzalez, Rosemann, Tandjung, & Djalali, 2015b). While there is evidence that the expected role of RNs influences patient care and health outcomes, there are many factors that influence the practice of RNs (CNA, 2009; Jackson et al., 2014).



The literature suggests variation in role expectations and scope of practice exists due to their dynamic nature with various factors found within health care contexts. Each evolves in response to health care needs (Hudson, 2010; Mate, 2010b; Schluter, Seaton & Chaboyer, 2011), advances in technology, changes in politics, (Barosh et al., 2011; CRNM, 2010a; Fairman, Rowe, Hassmiller & Shalala, 2011; McCarty, 2012; Munk et al., 2012; Saria, 2011) and with changes in national and global environments (CNA, 2007b). A greater understanding of the factors associated with role variation is a first step in addressing the issue. Further to this, knowledge of the factors that support nurses to work to their full scope of practice assist with development of the primary care RN role. The actualization of role expectations and working to full scope of practice is influenced by education, experience, area of practice, (D'Amour et al., 2012; Oandasan et al., 2010; Schluter, Seaton & Chaboyer, 2011), employer structures, inter-professional trust and relationships (Oelke, Besner & Carter, 2014), licensing agency, professional organization standards, legislation (Baker, 2012), clinical competence and patient preferences (Mate, 2010b; Saria, 2011).

The benefits of RNs working to full scope of practice have been cited in the literature. RNs who work in environments where they are supported to work to their full scope report increased rates of satisfaction (Laschinger, Almost, Purdy & Kim, 2004; Manojlovich & Laschinger, 2002; Ning, Zhong, Libo & Qiuji, 2009), fewer sick days, lower levels of emotional exhaustion (Gilbert, Laschinger & Leiter, 2010; Greco, Laschinger & Wong, 2006; Laschinger, Wong & Greco, 2006), and are more effective for the employee and workplace. In essence, the variability seems to create role confusion within work settings and has the potential to impact satisfaction with the role.

Beyond these professional intrinsic rewards for RNs, there are patient-centered benefits. For example, working to full scope can benefit the provision of care, when RNs are supported to work to full scope (CNA 2009; Institute of Medicine 2011). RNs working to full scope of practice support more efficient access to care (Auberbach et al., 2013; D'Amour et al., 2012; Institute for Healthcare Improvement 2012), improved clinical outcomes (Mate, 2009; Mate 2010b; Roumie & Rothman, 2010; Watts & Lucatorto, 2014), increased satisfaction, quality of care and decreased costs (Bohmer & Imison, 2013; Fairman et al., 2011). In terms of quality of care, research demonstrates chronic disease management and cancer screening are enhanced by team-based care (Buttaro, Trybulski, Bailey & Sandberg-Cook, 2013; Canadian Diabetes Association Guidelines, 2013; Mahomed, St. John & Patterson, 2012; Poulton & West, 1999; Reid et al., 2010; Shortell et al., 2004).

The scope of practice for RNs is of increasing interest to employers in a time where healthcare systems have budgetary constraints, there is a greater focus on accountability, and the need to effectively utilize this resource is significant (Browne, 2014; Kennedy, 2014). While variability can lead to multiple challenges as noted above, removing variability may be impossible. Variability can exist due to different organizational goals, setting, team composition (Institute of Medicine, 2001), and individual preferences. The variability in available resources can be a defining factor in nurses working to a full scope of practice. Variability can negatively affect the ability to form cohesive care teams. In Canada, nursing scope of practice varies from province to province. This variability is echoed in the United States where scope of practice changes from state to state. The reality is variability may be a challenge to avoid. At the very

least, variability should be reduced. A reduction in variability can lend to improved provider satisfaction, efficiencies and standardization in care delivery. This reduction could be supported by supporting opportunities for primary care RNs to work to full scope of practice regardless of their workplace setting.

### **Locating My Experience Within Primary Care and Scope of Practice**

As an RN, I have spent my career working in northern settings where minimal resources shape the RN role. Due to limited human resources in these settings, maximizing the role of every provider is important. Over the last ten years, I have been in a management position within primary care settings. Initially, I was struck by the lack of hands on clinical roles for the nurses. I struggled with the disconnect between their existing role and their potential role if they could actually work at full capacity. The limitation of the RNs role I observed was a concern because nurses are the largest part of the health care workforce, who work in a variety of contexts. For example, from my experience, the RN role satisfaction increases when the nurse is part of a well functioning collaborative inter-professional team. Nurses supported to work to their highest scope based on licensure and workplace policy can be the most effective in their role and highly satisfied in their workplace.

Beyond my immediate role as a manager within various primary care settings, people have consulted with me on nursing scope relevant to primary care. Consultations tended to focus on a range of questions concerning employers' lack of support for primary care RNs to provide cervical cancer screening (within nursing scope of practice) to finding ways to support nurses to order tests or medications (not within the RN Act but within the RHPA nursing scope of practice). Ultimately, my passion is to support nurses

to work at full scope and be effective members of the health care team and this is what led me to my thesis study. As an employer, the supports we put in place, or not, can influence the RNs success in their role and patient care. If a nurse working to their full scope is associated with improved patient outcomes, then this evidence could support employers to ensure the correct workplace supports for the patient, nurse and health care system.

### **Health Care Delivery within Primary Care: Contextualizing a Problem**

Primary care is the first contact patients have with the health care system, which commonly includes visits to the traditional doctor's office, clinic settings or more recently, nurse-led clinics. In our current health care delivery system, there is a vital need to strengthen primary care delivery. Long waits to access care or inability to find a care provider plague primary care environments; and fiscal constraints further challenge employers, regulators and government to deliver a sustainable system. When RNs work to full scope in their workplace, it is projected that wait times will decrease as a result (CNA, 2009).

Nurses in primary care have a critical role to play in improving not only access to care but also leadership in influencing positive changes, leading practice development and ensuring high quality standards of care delivery (Taylor & Martindale, 2013). The role of the primary care RN is relatively new. In the recent past, the role of the family physician's nurse included reception duties of answering phones, booking appointments and filing results. To date, the RN role within primary care settings has received minimal attention (Anderson, St. Hilaire, & Flinter, 2012; Martin-Misener & Bryant-Lukosius, 2014; Moaveni et al., 2010). The Institute of Medicine (2011) advocates for removing

barriers that inhibit RNs to work to their full scope and others have suggested advancing the role of primary care RNs will be a solution to addressing issues within primary care settings (Laughlin & Beisel, 2010), in particular chronic disease management care (Boase, Mason, Sutton & Cohn, 2012; Martin-Misener & Bryant-Lukosius, 2014). These endorsements are a valid first step; yet, simply defining their scope of practice may not be enough to diminish variance among RNs' practice and influence provision of care. Rather investigation of workplace environment and evidence of RNs working to full scope of practice has been recommended (Jackson et al., 2014; Martin-Misener & Bryant-Lukosius, 2014).

One key reason for stress on our health care system is increasing rates of chronic disease resulting in a growing burden of illness. Rising chronic disease rates and an aging population are challenging the health care system to deliver quality and timely care (Bohmer & Imison, 2013; Dinh, Stonebridge, & Theriault, 2014; Frankish et al., 2007; Halcomb, Salamonson, Davidson, Kaur, & Young, 2014; Jackson, White, Besner, & Norris, 2014; Parkinson & Parker, 2013). A series of compounding issues including a shortage of health care professionals, fiscal constraint, increasing wait times and a growing need to focus on improving quality of care delivery have increased the pressure of health care organizations to meet these needs effectively (Jackson et al., 2014; Parker, Desborough & Forrest, 2012; Phillips & Byrne, 2013).

Fiscal constraint seems to underlie a push to ensure efficient use of human resources for effective health care delivery. As RNs comprise the largest group of providers in the health care workforce in Canada, it is critical that nursing human resources are utilized effectively and efficiently (Canadian Nurses Association (CNA),

2007a; Jackson et al., 2014, Lewis, 2010; Parkinson & Parker, 2013). The current climate of fiscal constraint within health care and increasing demands of population health challenges, could support increasing RNs' role expectations with primary care settings to meet those employers' priorities (Aubersbach et al, 2013; Bodenheimer & Smith, 2013; Hansen-Turton, Bailey, Torres & Ritter, 2010) and support RNs delivering preventive screening care (Smith Kepka & Yabroff, 2014). As we struggle to figure out how to adapt to these changing conditions a better understanding of the factors that underlie our health care system is necessary. Maximizing scope of practice and ensuring supportive structures are in place so RNs can function at their full capacity consistently across worksites.

In Canada, over the past decade there have been a number of changes in primary care including the move towards inter-professional health care teams (Aggarwal & Hutchison, 2012; Aggarwal & O'Shaughnessy, 2014; Besner, Drummond, Oelke, McKim, & Carter, 2011; Dinh et al., 2014; Health Council of Canada, 2009; Oandasan et al, 2010; Parkinson & Parker, 2013; Registered Nurses Association of Ontario, 2012). Emergence of inter-professional care teams suggests a paradigm shift moving away from single health care providers delivering care; a key player in these new teams are RNs which is a global phenomenon with international recognition of the value of team-based care (Bohmer & Imison, 2014; Houle, Chatterley, & Tsuyuki, 2014; Kepka, Smith, Zeruto, & Yabroff, 2014; Rashidian et al., 2012).

There is support for the inclusion of nurses in primary care inter-professional models aimed to improve the needs of an aging population facing increasing rates of chronic disease through the effective utilization of a diversified and skilled workforce

(Afzali et al., 2014; Nelson et al., 2014; Villegas & Allen, 2012). Despite this support, primary care RNs account for a small proportion of nurses in Canada (Canadian Institute for Health Information, 2016; Martin-Misener & Bryant-Lukosius, 2014) and the United States (Laughlin & Beisel, 2010) and there is limited evidence of RN roles within these settings. The Canadian context needs to be explored to better understand factors that lead to quality of care as resource allocation changes within primary care.

Internationally, health care delivery systems are undergoing reform in response to these multiple challenges (Bohmer & Imison, 2013; Frankish et al., 2007). For example, in the UK, changes that support the role of the primary care RN have resulted in improvements in patient care and health care team environment. Canada is just beginning to explore such policy and funding changes. As the scope of practice for RNs expand, understanding of the impact of supporting RNs will be important. This understanding will be helpful to enhance future success in meeting the shifting needs of the populations that our health care delivery systems serve. Part of primary care reform will need to include supporting RNs to be actively involved in the provision of care as outlined by RHPA scope of practice definitions. Yet little is known about the clinical setting and structures associated with RNs in primary care. This needs further study in the Canadian context.

### **An Example of Sub-Optimal Primary Care Delivery**

**Hypertension screening and management.** Hypertension affects over one billion people globally and kills nine million every year. It contributes to the burden of illness in the population through heart disease, kidney failure, stroke, premature disability and mortality. Increasing rates of hypertension are being observed and it is suggested to

be a result of population growth, ageing and lifestyle risk factors such as smoking, excess alcohol, obesity and sedentary lifestyles (World Health Organization, 2013). It is estimated that annually there are over 450,000 adults in Canada newly diagnosed with hypertension (Robitaille et al., 2012).

The prevalence of hypertension in Manitoba, for adults 19 years of age or older, is 24.8%-25.6%. This rate has steady increased from year to year (Fransoo et al., 2013; Manitoba Health, Seniors and Active Living, n.d.). In Canada, six million or 19% of the adult population have hypertension. Of those who have hypertension, only 66% have it treated and controlled (McAlister et al., 2011; Wilkins et al., 2010). In Manitoba, it has been estimated the cost of hypertension, associated with modifiable risk factors, constitutes a direct cost to the health care system of over \$48 million dollars (Heart & Stroke Foundation of Manitoba, Health in Common, CancerCare Manitoba and the Alliance for the Prevention of Chronic Disease, 2010). Approximately 17% of Canadians have undiagnosed hypertension. In order to be able to address these concerns, routine assessment of blood pressure is recommended to identify patients at risk of cardiovascular disease (Lindsay et al., 2013; Hypertension Canada, 2014). Globally, hypertension is a key modifiable risk factor for cardiovascular disease (Public Health Agency of Canada, 2010) and as such, a significant factor to address. The importance of screening and hypertension management is clear.

Studies assessing cardiovascular risk management care found nurses were able to achieve equal or better results for the management of cardiovascular risk factors than physicians (Berra, Miller, & Jennings, 2011; Caruana, 2008; Houle et al., 2014; Khunti et al., 2007; Voogdt-Pruis, Beusmans, Gorgels, Kester, & Ree, 2010). Utilization of nurses



in this role can then effectively release physicians and nurse practitioners from some of the follow up (Onders, Spillane, Reilley, & Leston, 2014) for which nurses can then be accountable. Hypertension screening and management is an important indicator to focus on in light of the significant impact it has on people and the potential to decrease morbidity and mortality with improvements in hypertension control.

The expanded role of RNs in primary care is emerging as a fiscally responsible strategy to improve care delivery (Aggarwal & Hutchinson, 2012; Dinh et al., 2014; Shui, Lee & Chau, 2011). Workplaces that prioritize evidence based care suggest better outcomes occur as a result of improved hypertension control (Maeda et al., 2015). A focused and intentional approach to hypertension screening and management could influence cardiovascular risk factors.

### **Outcomes Associated with RN Screening**

It is important we have an understanding of the factors that are associated with improved patient outcomes. There is a significant body of literature exploring acute care settings and the association between quality, as measured by patient health outcomes, and nurse related factors. In acute care settings, RN factors such as level of education, certification status, work environment, staffing models and RN to patient ratio indicators have been demonstrated to be associated with positive patient outcomes (Aiken, 2014; Aiken et al., 2011a; Aiken et al, 2011b; Aiken, Shang, Xue, & Sloane, 2013; Kelly, McHugh, & Aiken, 2011; Kendall-Gallagher, Aiken, Sloane, & Cimiotti, 2011; Kutney-Lee, Sloane & Aiken, 2013; Lucero, Lake, & Aiken, 2009). Similar studies addressing factors that lead to quality have not been done in primary care settings. It is unknown if workplace factors such as team based care, hours of operation, nurses working to a fuller

scope of practice, leadership and clinic funding model are associated with positive patient outcomes. As similar studies have not been conducted in primary care settings it is unknown if the workplace and nursing factors that influence patient outcomes in acute care settings are associated with quality in primary care.

In primary care settings, studies have explored nursing substitution with traditional family physician roles. Substitution or task shifting of RNs has been studied in the areas of chronic disease management, in particular hypertension and diabetes. These studies examining substitution found outcomes associated with nursing care that were equal or greater when compared to physicians (Laurant et al., 2014; Laurant, Wjers, Watananirun, Kontopantelis, & Sibald, 2012; Martinez-Gonzalez et al., 2015b; Martinez-Gonzalez et al., 2015a). What is not found in the literature is information about the structures that support RN role expectations such team mix, hours of operation and clinic funding model. Further studies are needed to explore the role of the RN in primary care to understand the factors that lead to improvement and quality of care within the context of working to full scope of practice.

### **Thesis Research Question**

This is a quantitative study using a survey approach. This thesis study investigated primary care settings in Manitoba by addressing the following research question: “In primary care settings is there a relationship between the degree to which RNs are supported to work to a full scope of practice and reported rates of hypertension screening and hypertension management?”

To address the question, a survey approach of Manitoba primary care clinics that are affiliated with the Manitoba Primary Care Research Network (MaPCReN) of the

Canadian Primary Care Sentinel Surveillance Network (CPCSSN) was used. The CPCSSN is the first pan-Canadian multi-disease electronic medical record surveillance system. Established in 2008, the CPCSSN extracts primary care practice EMR data from ten networks across Canada (Rigobon et al., 2015). The vision of the CPCSSN is to obtain a better understanding of the health of Canadians by collecting national surveillance data and conducting research that will improve the study of primary care in Canada (Canadian Primary Care Sentinel Surveillance Network, n.d.). As this study is interested in hypertension screening and management rates in Manitoba, clinics participating in MaPCReN are included in this study.

In the survey, items focus on the RN practice and structural workplace factors. Clinics were selected from both urban and rural locations. Survey data was linked with reported screening and management rates for participating Manitoba clinics, which investigated the extent to which higher rates of hypertension screening and management were associated with factors such as degree to which RNs are supported to work to a full scope of practice, team mix, hours of operation and funding model.

**Defining key concepts.** In this study I will refer to several terms and assist the reader in following my intention by providing definitions for these terms.

**Primary care.** Primary care is synonymous with family practice or general practice (Hoare, Mills, & Francis, 2012). The Institute of Medicine (1994) defines primary care as “the provision of integrated, accessible care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and

community” (p. 15). In Manitoba, primary care is recognized as a foundation of the health care system (Manitoba Health, Healthy Living and Seniors, n.d.).

***Scope of practice.*** Scope of practice is defined by the CNA (2007a) as “the activities that RNs are educated and authorized to perform as set out in legislation and complemented by standards, guidelines and policy positions of provincial and territorial regulatory bodies” (p. 13). Scope of practice articulates which activities RNs can or cannot provide when caring for patients.

***Regulated Health Professions Act.*** The Regulated Health Professions Act (RHPA) is newly enacted legislation that will encompass 22 health professions. The Act will provide a consistent structure for regulators and define the activities health care professionals can provide.

***Active patient.*** An active patient is defined as a patient who has received care within the past 12 months by their primary care provider (physician or NP).

***Screening and management.*** Routine preventive screening is an important component of health care. The increased care needs of an aging population with greater rates of chronic disease may be impacting how health care is delivered. Acute and chronic health care needs and resultant time constraints may be taking priority over the screening needs of the population (Kepka et al., 2014). It has been suggested screening needs may not be integrated into routine care delivery.

***Hypertension screening.*** In hypertension screening a blood pressure reading is conducted with a sphygmomanometer or an instrument for checking blood pressure to assess for high blood pressure. Screening rate refers to patients, age 18 and over, who have had their blood pressure measured.

***Hypertension management.*** Hypertension management refers to blood pressure control and screening for management of modifiable risk factors in adults with hypertension. A normal blood pressure is defined as a patient, age 18 years and over, who have a blood pressure measurement less than 140/90. Hypertension management includes, in addition to blood pressure, routine lab tests of Hemoglobin A1C, lipids, creatinine and an assessment of body mass index (BMI).

The above terms have been defined as they relate to the thesis study. In review, the thesis question is “In primary care settings is there a relationship between the degree to which RNs are supported to work to a full scope of practice and reported rates of hypertension screening and hypertension management?”.

### **Thesis Study Significance**

For Manitoban and Canadian nurses, their role within primary care is an emerging domain that has a limited base of evidence. The number of nurses working in the Canadian primary care system is slowly growing. Over the past ten years in Canada there has been an increase of registered nurses working in community settings from 13% to 31% (Canadian Institute for Health Information, 2016). Globally there is a shift to increasing numbers of RNs in primary care and Canadian policies are moving in this direction. This is a result of growing evidence of the value associated with this role and the increasing importance that primary care has on the health care system. There is clear evidence the delivery of screening in primary care settings is falling short of provincial and national goals. Studies in the primary care setting, in Canada and internationally, have examined nursing activities, education level and funding for nursing positions.

What has not been found in the literature is an examination of the influence of teams, hours of operation, geography and clinic funding models.

This survey study will explore factors associated with RN scope of practice, in particular the primary care setting structural components, and their associations with reported hypertension screening and management rates. Study findings provide insight for employers interested in supporting RNs in a full scope of practice role to enhance hypertension screening and management rates. It behooves us to obtain a firm understanding of the role and the implications behind the creation of these positions in a time of fiscal constraint and increasing patient care demands.

It is important for nursing to take an active role in demonstrating value in their role as important health care decisions are being made based on budgets (Browne, 2014). Funding decisions by government will be influenced by demonstrated value of RNs working to fuller scope of practice roles. Given fiscal constraint and unmet care needs, employers will be attentive to ensuring appropriate utilization of their nursing workforce (Auerbach et al., 2013; Fairman et al., 2011; Registered Nurses Association of Ontario, 2012). Studies that explore this will generate valuable findings to assist with these determinations.

This survey study explored factors that influence hypertension screening and management rates in primary care clinics. The information gained from this research highlights workplace structures that are associated with the RN role in primary care. This information can be helpful for employers and policy makers as the primary care RN role becomes more abundant in Manitoba.

## **Chapter Summary**

There is a vital need to strengthen primary care delivery, which will not necessarily be an easy transformation as primary care reform is complex. As Canada embarks on primary care reform, a clear understanding of the influence of RNs working to full scope is essential. Current primary care reform means RNs are becoming more involved in the provision of care. The RHPA is influencing how we understand nursing scope of practice, which now provides a clear description of outer parameters of nursing role and at times challenges role expectations in some settings. Population needs are changing and the requirement for evidence based screening care is needed, which includes, hypertension screening and management. Nursing has a significant role to play in addressing this health care gap. What has not been explored is the influence RNs can have, when supported to work to a fuller scope of practice, on hypertension screening and management rates.

## **Chapter Two: Literature Review**

As the political climate surrounding primary care and RN scope of practice evolves, the value of investigating RN practice within primary care settings is imperative. While a key aim of the RHPA is to clearly identify practice boundaries, factors within health care delivery influence role expectations in health settings. Advancing the evidence base of factors associated with working to fuller scope of practice holds the potential to improve health care delivery and outcomes. A review of published literature concerning RN scope of practice; hypertension screening and management within the context of primary care settings; and outcomes in primary care settings was conducted to advance our understanding of evidence relevant to this thesis study.

### **Search Method**

Arksey and O'Malley's (2005) scoping review methodology guided the literature review process. Scoping reviews are used to review a broad topic area and identify gaps in the research literature. Unlike systematic reviews, scoping reviews are iterative in nature. For the purposes of this thesis, a five stage process has been used: defining the research question; determining relevant articles; article selection; data extraction including defining general information and study description (included author(s), year of publication, country of study, method, site, aim, intervention, highlights conclusions and framework) along with addressing topic specific questions; and synthesizing and summarizing the studies. In the search of literature, key topics were scope of practice; hypertension screening and management; and outcomes associated with RNs in primary care.



The search was conducted using the databases PubMed, CINAHL and Scopus. The main search terms for scope of practice were: scope of nursing practice; nurs\*; primary care; primary health care; primary care nurs\*; and family practice nurse. The main search terms for hypertension screening and management were: nurse managed care; primary care nurse; hypertension screening; blood pressure screening; hypertension management; blood pressure management; primary care; primary health care; and family practice. The main search terms pertaining to outcomes associated with RNs in primary care were: nursing outcomes; patient outcomes; blood pressure screening; blood pressure management; hypertension screening; hypertension management; primary care; and family practice. A librarian was consulted in the development of the search strategy.

Inclusion criteria:

- English language
- Published between 2010 – 2015
- Systematic reviews, along with primary studies (various qualitative, quantitative and mixed method studies)
- Registered nurse role in a primary care setting including family practice, primary care and primary health care settings
- Adult population
- Studies from health care systems in Canada, the United Kingdom, Australia, New Zealand and the United States
- Studies including Canadian First Nations or Inuit populations as these are pertinent to the Canadian context

Exclusion criteria

- Nursing care provided in other settings such as acute care, home, telephone, long-term care
- Specific populations such as mental health, gerontology, race (such as Taiwanese, Chilean, Appalachian), elderly, immigrant health, HIV positive
- Studies examining nurse practitioner, advanced practice nurse, licensed practical nurses, midwives.

Data base search results were reviewed for relevance to this study using a three-step process that was guided by the criterion stated above. First titles were reviewed for relevance to the study. For those retained, abstracts were reviewed by a single reviewer, for those abstracts appearing eligible for the study the full text article was obtained. Articles were excluded if they focused on a specific population and did not address delivery of care to general populations. In addition, article exclusion resulted if the study did not include hypertension screening or management. While inclusion criteria focused on articles from Canada, United States, Australia, New Zealand and the United Kingdom, through this search the decision to include articles from the Netherlands and Switzerland was made, as these countries are leaders in nurses' delivery of primary care (Esmail, 2013 & 2014; Joyce & Piterman, 2011; McCarthy, Cornally, Moran, & Courtney, 2012).

**Scope of practice search and results.** The scope of practice topic search yielded a total of 576 citations (with duplicates removed), of which 537 articles were excluded because the titles did not meet the relevant criteria. There were 16 articles included based on the criteria for inclusion from the abstract review. Eventually, only 10 articles were included in the analysis based on review of full text. The reference lists of the included

studies were examined for any relevant studies not identified through the initial search. A total of 14 publications met the inclusion criteria for scope of practice (see Table D).

A data extraction table (Table A) and a series of questions guided the review of these articles. The questions for scope of practice were: How does the literature describe scope of practice in a primary care/family practice setting? Are any factors noted in the literature, which influence scope of practice? What outcomes are noted in the literature associated with RN role working to a fuller scope of practice?

Data extracted from the 14 articles is presented in Table A. A discussion of the articles begins with a description of the publications that covers date range, country, type of study use of interventions, and identification of any theoretical frameworks used within the studies. Next the discussion covers a synthesis of the articles that address the guiding questions noted above and finally a summary and identification of research gaps are noted.

***Scope of practice article descriptions.*** The 14 scope of practice articles were published between the years 2010 to 2015 and six were from Australia. Of the eight remaining, three were Canadian, two from the United Kingdom and United States and one from the Netherlands. The articles focused on studies conducted in primary care, primary health care and family practice settings; this variation in name of setting is an artifact of how each country names these settings, versus a representation of a vastly different setting. Primary care is the term commonly used within Canada; whereas, primary care, primary health care and family practice are observed in the other countries. Descriptions of these settings are all of an inter-professional clinical setting where

patients access care from their family physician/nurse practitioner and care team of which the RN plays a key role in patient care.

The articles cover both qualitative and quantitative studies, along with two mixed methods and a single study for the following: secondary analysis, meta-analysis, administrative data review and a randomized clinical trial. Of the 14 articles, 12 did not include an intervention. In a randomized clinical trial (Voogdt-Pruis, Beusmans, Gorgels, Kester & Van Ree, 2010), patients were randomized to a practice nurse group to receive care following the Dutch cardiovascular risk guidelines. In a mixed methods study (Drennan, Grant & Harris, 2014), nurses trained in chronic disease management were placed in family physician practices. Patient care outcomes were evaluated based on nurse or physician delivered chronic disease care.

One study identified a theoretical framework. Smolowitz et al., (2015) utilized an appreciative inquiry framework in their study to explore the utilization and contribution of RNs in a primary health care setting. The remaining 13 studies did not identify the use of a framework to guide their study. The majority of studies examined factors associated with scope of practice including employer support and policies, role clarity, education and standardized practices to maximize RN care.

***Description of primary care RN role in the literature.*** Primary care nursing role is described in a variety of ways in the scope of practice literature search. Patient care in a primary care setting has shifted from being delivered by a lone physician to a multi-disciplinary care team of which, the primary care RN plays an integral role in supporting comprehensive care delivery. The role of the RN in chronic disease management is most frequently cited (Al Sayah, Szafran, Robertson, Bell, & Williams, 2014; Eley et al., 2013;

Halcomb et al, 2014; Health Quality Ontario, 2013; McCarthy et al., 2012; Parker, Keleher & Forrest, 2011; Smolowitz et al., 2015; Voogdt-Pruis et al., 2010). Education and lifestyle counseling is the second most frequently cited primary care RN role studied in the literature (Halcomb, Peters & Davies, 2013; Halcomb et al., 2014; Joyce & Piterman, 2011; Ku et al., 2015; McCarthy et al., 2012; Smolowitz et al, 2015).

The role of the primary care RN was also described in the articles by the activities of injections and immunizations (Allard et al., 2010; Joyce & Piterman, 2011; Ku, Frogner, Steinmetz & Pittman, 2015; McCarthy et al., 2012; Parker et al., 2011), wound care (Allard et al., 2010; Halcomb et al., 2013; Joyce & Piterman, 2011; McCarthy et al., 2012; Parker et al., 2011) and medication review (Allard et al., 2010; Drennan et al., 2014; Halcomb et al., 2013; Halcomb et al., 2014; Smolowitz et al., 2015). To a lesser extent, the RN role was identified as being involved with activities of phone triage (Allard et al., 2010; McCarthy et al., 2012; Voogdt-Pruis, 2010) cervical cancer screening (Allard et al., 2010; McCarthy et al., 2012; Smolowitz et al., 2015) and mental health counseling (Halcomb et al., 2013; Halcomb et al., 2014; McCarthy et al., 2012). Moving beyond the role of a care team member, the primary care RN has also been studied as a substitution of physician care (Eley et al., 2013; Health Quality Ontario, 2013).

Several studies concerning scope of practice in primary care settings examined the nursing role, which is frequently referred to as a generalist role (Joyce & Piterman, 2011; McCarthy et al., 2012). Frequently cited in the literature is scope of practice discussions centered on the roles RNs played in primary care settings (Al Sayah et al., 2014; Eley et al., 2013; Halcomb et al., 2014; McCarthy et al., 2012; Mills et al., 2010; Voogdt-Pruis et al., 2010). The literature also discusses the idea of unfamiliarity and

confusion that exists with nurses and other health care providers as to what constitutes nursing scope of practice (Allard et al., 2010; Halcomb et al., 2013; Parker et al., 2011). The above articles demonstrate a wide range of activities that the primary care RN may be involved in. As such it is understandable that confusion and role clarity issues exist.

Primary care nursing role was described (Allard et al., 2010; Halcomb et al., 2014; Joyce & Pitterman, 2011; McCarthy et al., 2012; Mills et al., 2010) as it relates to teamwork (Al Sayah et al., 2014; Smolowitz et al., 2015), the influence in chronic disease management (Eley et al., 2013; Health Quality Ontario, 2013; Voogdt-Pruis et al., 2010) and in relation to RN prescribing practices (Drennan et al., 2014). The role of the primary care RN role was examined for patient satisfaction (Halcomb et al., 2013), the influence on staffing patterns (Ku et al., 2015), and educational preparation required for the role (Parker et al., 2011).

The literature contains multiple descriptions of the role of the primary care RN. Some commonalities exist while clear differences are present. Chronic disease management and the role of the primary care RN were examined from both an Australian and a Canadian perspective. The role of the RN prescriber exists in the United Kingdom and not in Canada. Further to this, while some of the variation can be accounted by differences in nursing role between countries, differences still exist within countries.

***Factors believed to influence role.*** The primary care nursing role is a relatively new role and variation between settings is notable (Parker et al., 2011). The role of RNs in primary care settings has evolved. The literature suggests remuneration factors for family physician offices where RNs are employed may have an influence on nursing roles in primary care. It is suggested by some authors that the RN activities of wound

care, pap smears and immunizations are reported frequently as a result of their association with remuneration models in certain countries (Halcomb et al., 2014; Joyce & Piterman, 2011; Parker et al., 2011). Primary care nursing roles may have been based on the need of the family physician in the practice; however, more recently there has been a shift in the primary care RN role as defined by government funding mechanisms (McCarthy et al., 2012; Parker et al., 2011). The variation in role is frequently cited as the impetus behind the discussions of standardization for the RN role in primary care. The influence of funding models may change the nursing role and could result in a decrease in variation.

Evidence suggests that lack of clarity in role and responsibilities is a barrier to teamwork (Al Sayah et al., 2014) and inefficient use of health care dollars through underutilization of the primary care RN role (Allard et al., 2010; Drennan et al., 2014; McCarthy et al., 2012). Role clarity for the nurse and inter-professional team is suggested to influence the effectiveness, or lack thereof, of the nursing role. The pivotal nature of role clarity extends beyond the inter-professional care team to the surrounding community or population the team provides care for. Halcomb et al. (2013) and Mills et al. (2010) found that the local communities benefited by having a greater understanding of the roles of the health care professionals that serviced their communities. The communities that understood the roles RNs were involved in were more apt to see the nurse for care.

Nurses who transition into a primary care environment experience a change in role expectations, which commonly includes activities closer to working at a fuller scope of practice (Al Sayah et al., 2014). To meet this change in practice, educational

preparation and training have been suggested as key facilitators for RNs to have a positive effect in these settings (Allard et al., 2010; Eley et al., 2013; Halcomb et al., 2014; Joyce & Piterman, 2011; McCarthy et al., 2012). Thus, diminishing variation in role expectations could support availability of appropriate training and education to adequately prepare RNs to meet the needs of the role (Parker et al., 2011; Smolowitz et al., 2015). Further to this, employers and nursing leadership need to advocate for environments where RNs are supported to practice to their full scope of practice.

The remaining studies examine scope of practice in terms of regulation and the outer boundaries of nursing. Additional education and training (such as the RN prescriber) are identified as factors that are supportive for nurses to engage in many of the primary care roles (Drennan et al., 2014; Health Quality Ontario, 2013; Joyce & Piterman, 2011; Ku et al., 2015; Smolowitz et al., 2015). Sites that included RNs with additional education and training to conduct pap testing noted a significant range of participation in this clinical activity fluctuating between 8% in Canada (Allard et al., 2010) to 21% (Parker et al., 2011) and 40% in Australia (Joyce & Piterman, 2011). The greater percent of primary care RNs engaging in cervical cancer screening in Australia may be a result of the larger proportion of nurses working in primary care. As such, the expanded role of RNs in primary care may support increased screening provided by RNs.

***Outcomes associated with RN role and scope of practice.*** Role and scope of practice are both attributed to the positive patient outcomes. When the RN role in primary care settings was investigated a variety of areas were studied. In one study, RNs who were trained in chronic disease management were placed in a family practice setting and patients received nurse-led or physician-led chronic disease management. Patients



enrolled in the nurse-led group reported greater levels of self management and indicated they felt supported in lifestyle changes compared to the patient group receiving MD only care (Eley et al. 2013). Studies from primary care settings note patient satisfaction with RN led care in primary care settings (Eley et al., 2013; Halcomb et al., 2013; Health Quality Ontario, 2013).

Improved clinical outcomes in the area of chronic disease management for patients cared for by a RN are attributed to increased scope of practice (Health Quality Ontario, 2013) and role (Voogdt-Pruis et al., 2010). Patients who have seen a primary care RN for hypertension screening and management have, in several studies, demonstrated equal or better control than the traditional physician care model (Health Quality Ontario, 2013; Voogdt-Pruis et al., 2010). Further, it is suggested that increased utilization of inter-professional team members may result in improved access to care for patients (Ku et al., 2015). In part this improved outcome is thought to be a result of better knowledge of guidelines and better application of the guidelines compared to physicians (Voogdt-Pruis et al., 2010). Long-term studies are needed to determine if the improvements are consistent over time. Thus primary care RNs who work to a fuller scope of practice than traditional roles within primary care seem to influence patient satisfaction and health outcomes.

### **Scope of Practice Search Summary**

The roles investigated for nurses in primary care setting included chronic disease management, wound care, immunizations, and to a lesser extent, cervical cancer screening. The focus among the articles reviewed was on nurses' roles rather than regulated scope of practice. Uncertainty surrounding the role of the primary care RN was

frequently cited as a concern and contributing factor towards role clarity issues. As the primary care RN role emerges, literature suggests adequate education and training, combined with role clarity for the nurse, team and community, are required to support nurses in working to their greatest capacity. Some studies demonstrate improved outcomes with RN delivered chronic disease management but there is limited evidence regarding screening rates as a function of RNs role. Studies involving primary care RNs who were part of a multi-disciplinary team demonstrated quality patient outcomes thus suggesting further studies examining the influence of the primary care RN role over time are needed to fully evaluate this model.

### **Hypertension Screening and Management Search and Results**

The search topic of screening produced a total of 1160 citations (with duplicates removed), of which 1137 articles were excluded because the titles did not meet the relevant criteria. Abstract review resulted in 14 eligible articles; of which 7 articles were included in the analysis after full text review. The reference lists of the remaining articles were reviewed for any relevant studies not identified through the search. One further article was identified that met the inclusion criteria making a total of 8 publications identified strategies related to factors for screening (see Table E).

The review of these articles was guided by a data extraction table (Table B) and a series of questions. The questions for screening articles were: How does the literature define the role of RNs in screening and management? What factors, environmental or organizational, affect hypertension screening and management? Are there other factors that support hypertension screening and management?

The presentation of data extracted from the eligible screening articles are displayed in Table B. A discussion of review results begins with a description of the publications that covers date range, country, type of study, use of interventions, and identification of any theoretical frameworks used within the studies. Then the discussion moves onto a synthesis of the articles that addresses the guiding questions and finishes with a summary along with identification of research gaps.

**Hypertension screening and management article descriptions.** The 8 articles were published between the years 2010 to 2014; the articles were equally divided between Australia (n=3) and the United States (n=3) and two articles from Canada. Studies addressed in these articles were mostly from primary care, primary health care, and family practice, minus a single study that was jointly community and primary care settings (Lucky, Turner, Hall, Lafaver & de Werk, 2011). Four studies included chronic disease screening and management of which hypertension was a component of the care delivered. One study involved hypertension screening, while the remaining four were specific to hypertension management. None of the studies identified a theoretical framework that guided their study.

More of the articles reported on qualitative studies (n=5), while three were quantitative studies. Of the eight articles, three were intervention studies consisting of investigating hypertension management (n=1), hypertension screening (n=1), and chronic disease screening and management (n=1). Lucky, Turner, Hall, Lefaver & de Werk (2011) assessed the effectiveness of RN delivered community blood pressure screening and the use of motivation to encourage follow up for those with elevated readings. Maciejewski et al. (2014) compared blood pressure results when patients who were

provided with usual care versus patients who received behavioral or medication management, or a combination of these interventions to determine which were the most effective in maintaining hypertension control. Tobe et al. (2014) prospective delayed phase cohort study included the intervention of enrolling patients to participate in an inter-professional hypertension management program based on clinical practice guidelines.

Before providing a discussion of these eight articles, it is worth noting that when reviewing articles from the outcomes literature search significant overlap of themes, ideas and concepts were found. A decision was made to coalesce the findings from the two searches into one section to avoid repetition in the discussion of the articles. In the next section, I will provide is the overview of the primary care outcomes research search and results, which is followed by a discussion that integrates finding from the two searches.

### **Primary Care Outcomes Search and Results**

This search of the three databases revealed a total of 1669 citations (with duplicates removed), of which 1604 articles were excluded because the titles did not meet the relevant criteria. A total of 18 abstracts were reviewed and six articles met inclusion criteria. Reference lists of the included studies were examined for any additional relevant studies not identified through the search. Five additional articles were identified that met the inclusion criteria, which means a total of 11 articles were reviewed (see Table F).

A data extraction table (Table C) and a series of questions guided the review of these articles. The questions for the outcomes associated with RNs in primary care literature were: what types of roles were studied? What factors support outcomes? Are

any barriers to outcomes identified? What outcomes are examined from a primary care setting?

The presentation of results from reviewing the articles in this section can be found in Table C and the following discussion. The discussion begins with a description of the publications that covers date range, country, type of study use of interventions, and identification of any theoretical frameworks used within the studies. Then the discussion addresses the guiding questions along with a summary of relevant ideas and identification of research gaps.

**Outcomes associated with RNs in primary care.** The publication dates of reviewed articles included: two from 2010, five from 2011 and four from 2014. Most of the articles were from the United Kingdom (n=7), two were from the United States, and the final two were from Australia (n=1) and Switzerland (n=1). Similarly, the settings consisted of primary care, clinic, or general practice settings with one article from an unspecified inter-professional team setting. Seven articles focused on hypertension care and the other four were related to patient outcomes and the RN role in primary care.

Among these articles were five systematic reviews, two randomized clinical trials and two reviews of administrative data. The final two studies included one cross-sectional survey study and a bivariate probit regression model. Here two articles reported on intervention studies. One intervention was a mailed patient reminder for those patients with an elevated blood pressure inviting them to follow up with a nurse specialist. The appointment with the nurse specialist included an assessment of blood pressure in relation to the target, medication review and changes and a regular follow up until blood pressure was at target. The nurse specialist was trained in motivational interviewing to encourage

behavior change (Dean, Kerry, Khong, Kerry, & Oakeshott, 2014). In the other intervention study, nurses used an algorithm to make care decisions with hypertensive patients (Ishani et al., 2011). No theoretical frameworks were identified in the outcomes related articles.

***RN role in hypertension.*** When reviewing the articles, a key role of RN's in hypertension screening is patient educator (Boase, Mason, Sutton & Cohn, 2012; Maciejewski et al., 2014). The study concerning the RN role in hypertension screening suggests that education delivered by RNs can have a direct influence on prevention, early detection and treatment of hypertension (Lucky et al., 2011) especially when the information is individualized for each patient (Boase et al., 2012).

In addition to the role of educator, the RN roles in relation to hypertension management included ordering tests, prescribing hypotensive and lipid lowering agents, blood pressure assessment and behavior change counseling (Al-Motlaq, Mills, Birks & Francis, 2010; Hoare, Mills & Francis, 2012; Maciejewski et al., 2014; Tobe, Lum-Kwong, Von Sychowski & Kandukur, 2013; Tobe et al., 2014). Nurses in the studies were actively involved in the management of hypertension as part of the inter-professional care team.

In the articles reviewed, the RN role identified as a substitution of physicians for primary care RNs was investigated (Griffiths, Murrells, Maben, Jones & Ashworth, 2010; Martinez-Gonzalez et al., 2014; Pearce et al., 2011). The literature suggests RN substitution in the areas of chronic disease management result in equal or better patient outcomes (Shaw et al., 2014; Vallejo-Torres & Morris, 2011) and note further research into substitution is needed to obtain a greater understanding of this. A relatively new role

for RNs is the ability to prescribe. The role of the RN prescriber for patients with hypertension has been suggested to demonstrate improvements in hypertension control (Clark, Smith, Taylor & Campbell, 2010).

***Organizational factors.*** The practice expectations for the roles of various providers within primary care settings are shaped by organizational structures that emerge through the leadership. Settings where leadership supports inter-professional collaboration tend to be those with enhanced role expectations of RN practice (Hoare et al., 2012; Keleher & Parker, 2013). The support leadership provides helps influence the existing organizational structures associated with role expectations. Organizational factors explored in the reviewed articles include: culture of collaborative care and inter-professional teams; role clarity; education and training; systemic structural supports; interest in quality care delivery system and clinical practice guidelines.

A culture of collaborative care for inter-professional teams is suggested to facilitate care delivery. The fuller scope of practice for collaborative care teams is proposed to enhance care delivered to patients. Efficient use of inter-professional care teams has been suggested to improve screening rates by optimizing teamwork in the primary care setting. For this to occur, family physicians and nurse practitioners need to be willing to relinquish the role of screening and management (Keleher & Parker, 2013) to obtain the greatest potential benefits of the RN role.

A recent study suggested the improved outcomes found in nurse-led hypertension management might actually be a result of greater white coat hypertension when a physician versus a nurse takes their blood pressure (Clark, Horvath, Taylor, & Campbell, 2014). This study minimizes the benefits associated with RN care provision. Further

study is needed to determine the factors involved in hypertension management to determine the differences in management between physicians and nurses. This knowledge will help to better understand the factors related to how to obtain clinical improvements for patients and will identify the various attributes different inter-professional team members bring.

Role clarity through clearly defined role expectations is suggested to lend support to maximizing each health care provider's scope of practice. Roles that are clearly defined have been found to enhance the inter-professional nature of primary care settings (Keleher & Parker, 2013). Knowing and understanding each other's roles minimizes duplication and facilitates care delivery.

Skill development, continuing professional education and role development to optimize skills have been found necessary in order to deliver effective broad-based health care (Al-Motlaq et al., 2010; Boase et al., 2012; Keleher & Parker, 2013). In fact, the organizational factors of education and training were suggested to be predictors of quality clinical care (Griffiths, Maben, & Murrells, 2011). An identified need for greater knowledge and education pertains to learning how to influence behavior change in patients in order to support meeting patient and population goals (Lucky et al., 2011). The role of appropriate education for the RN to support an advanced role in order to effectively provide hypertension care is frequently cited in the literature (Al Motlaq et al., 2010; Hoare et al., 2012; Keleher & Parker, 2013). Education and training are suggested to support quality of care through optimizing nurse's skills including behavior change intervention.



Systemic structural supports have been identified as important organizational factors (Tobe et al., 2014) which, when not present, have been suggested to create barriers to screening services, and when changed have been shown to improve screening services. Screening rates have been shown to improve through clinic level structural changes. Sufficient space, equipment and time create workplace environments that are suggested to positively influence the RN being able to work to full scope of practice (Keleher & Parker, 2013). The literature suggests staffing levels may influence factors related to clinical improvement. Practices that employed more nurses seemed to perform better than their counterparts with fewer nurses. Further research is needed to determine if this outcome is a direct result of staffing, nurses assuming care delivery components or as a factor of inter-professional care delivery (Griffiths et al., 2010; Shaw et al., 2014). Future studies are also needed to determine the optimal staffing levels to obtain clinical improvement. As no Canadian studies were included in the literature surrounding staffing levels, it is unknown if the RN to family physician or NP ratio has an effect on screening rates in a Canadian context. Hours of operation were not a factor that was identified in the literature search. These are gaps in the literature that need to be explored further.

A focus on overall quality improvement has been found to facilitate the delivery of effective and efficient screening interventions (Hoare et al., 2012). Hypertension screening and management have evidence-based guidelines to support best patient outcomes. It is suggested when screening and management algorithms and guidelines are followed by RNs there is a direct effect on the outcomes of care delivered (Clark, Smith, Taylor & Campbell, 2011; Ishani et al., 2011; Keleher & Parker, 2013; Maciejewski et

al., 2014; Shaw et al., 2014; Vallejo-Torres & Morris, 2011). Improved outcomes have been found to be associated with nurse prescribers as a study suggests patients' experienced greater reductions in blood pressure (Clark et al., 2010). Clinical sites that strive for a culture of quality care through the application of guidelines have been found to deliver better outcomes. Clinical effectiveness, the measure of the extent an intervention works, and audit, combined with education, and training, are believed to be the means to enable RNs to evaluate care delivered to patients.

*Other factors.* The role of government policy has been suggested to support the RN role. A comparison of the United Kingdom versus Australia and New Zealand suggests the government policies of the United Kingdom that incentivized primary care settings to achieve positive patient health outcomes demonstrated improvements over countries that did not adopt similar policies. Primary care teams were financially rewarded for meeting criteria and nurses played a significant part in meeting these goals (Hoare et al., 2012). It has been suggested the government policies that rewarded practices for achieving set health indicators, and utilized nursing role in this goal setting, demonstrated greater rates of meeting deliverables such as meeting clinical practice guidelines than countries that did not include incentive based policies.

Certain factors have been associated with patient acceptance of the role of RNs providing hypertension screening and management such as geography, patient demographics and reported health status. The location where patients live, relative to rural versus urban locations, has been investigated as a factor of patient acceptance of RN delivered care. It is suggested the further away a patient is from a health care provider, the greater the chance they will be cared for by a nurse. The literature notes the RN

screening and chronic disease management role is an accepted role perhaps even more so in rural locations where the delivery of care is more frequently provided by RNs (Al-Motlaq et al., 2010). Patient demographics have also been suggested to influence accessing a RN in primary care. Those patients who self-report lower health status or who have a chronic disease are more likely to receive care from a RN (Vallejo-Torres & Morris, 2011). Health status and location may both influence whether a nurse cares for patients.

### **Summary of Hypertension Screening, Management and Outcomes**

In general, primary care settings with leadership and organizational culture that values inter-professional teams tend to be workplaces with better screening rates. Other organizational supports associated with screening rates and RNs role in providing screening include: education and training, role clarity and structural resources, such as space, time and equipment. The use of algorithms and guidelines has been suggested to show improved screening rates, as have supports of reminders and flags where screening is due. While there is evidence that when RNs deliver hypertension screening and management there are enhanced rates and better patient outcomes, some research gaps still exist. For example, what clinic organizational factors are associated with nurses in the role they can play in hypertension screening and management. What are the optimal staffing numbers in the primary care environment to influence care in relation to hypertension? What effect does the composition of various team members have on hypertension rates? And finally, do rate vary based on patient population and geography. Moreover, not found in the literature was a study examining hours of operation and screening rates. Further study in these areas is warranted.

Outcomes of RNs in primary care are influenced by several factors. As found with screening, organizational supports including education and training are suggested to influence screening outcomes. The inter-professional environment, and support for collaborative care practices supports RN delivered care. These factors are positively correlated with improved screening rates and outcomes. The use of algorithms and protocols are felt to support the RN role in obtained improved outcomes. While evidence based guidelines further support care and the use of an algorithm is suggested to facilitate patient care and provide role clarity by clearly defining roles and activities. Clinic location, such as urban or rural, influences the rate of receiving care delivered by a nurse. Global variations in education level and nursing role make comparisons to the Canadian context difficult. Hypertension outcome studies have been limited primarily to international sites. It is unknown if similar results would occur in a Canadian or Manitoban context. This thesis is intended to examine some of these factors.

### **Chapter Summary**

In summary, the literature review relevant to scope of practice, hypertension screening and management, and outcomes was identified. Significant variation in the primary care RN role is suggested to contribute to role clarity issues and confusion. Organizational support consisting of education and training, space, resources, role clarity and inter-professional relationships, was identified as important. Each of these aspects influenced how well nurses were able to move into new roles within primary care settings and practice to a fuller scope. Nursing use of and adherence to guidelines was suggested to support positive clinical outcomes however studies did not include long term follow up. Finally, reported patient benefits were improvements in hypertension screening and

management. Inter-professional relationships, education and training and staffing comprised the organizational factors that influence outcomes. Differences between rural versus urban service delivery locations were also explored. The review of the literature highlights there is limited research in the areas of scope of practice, hypertension screening, hypertension management, and outcomes

In spite of existing evidence, there is a lack of understanding of these factors in Manitoba. Few articles were Canadian and none were from Manitoba. Further to this, are questions comparing rural versus urban context. Does location affect scope of practice or screening rates? Studies note an increased likelihood of having a RN provide care the further away from urban centres people live. Are these finding consistent in our province? While there are documented differences in health status between the regional health authorities in Manitoba, we do not know what factors have either facilitated or hindered hypertension screening and management in the respective primary care settings. Does the RN role vary in relation to team composition? Does a RN in primary care influence hypertension screening and management rates? What is not known is if there are the differences in hypertension screening and management rates between the funding models in primary care fee-for-service clinics versus alternately funded clinics.

### **Chapter Three: Conceptual Framework**

The conceptual framework chosen to guide this thesis is Donabedian's quality assurance model (1978), which focuses on understanding workplace structural influences on health care delivery processes. The Structure-Process-Outcome model, developed by Avedis Donabedian, suggest that health care outcomes are a product of the health care setting structures that support processes, which in turn influences outcomes (Donabedian, 1978). While positive outcomes from having RNs in a primary care setting has been demonstrated (Griffiths et al., 2010; Shaw et al., 2014), what is less evident is the influence of workplace structural factors in shaping RN's role; in particular, with screening procedures that fall within their identified scope of practice. Although workplace structure factors are vague, this framework supports the analysis of workplace structures in the context of primary care settings. Therefore, Donabedian's Structure-Process-Outcome model for health care delivery has been chosen to guide this study.

#### **Utilization of Donabedian's Structure-Process-Outcome Model**

Donabedian's framework has been utilized in health care evaluative research and quality assurance activities since the 1960's. As a physician, Donabedian was concerned about the quality of health care (Frenk, 2000; Glickman, Baggett, Krubert, Peterson, & Schulman, 2007). And in fact, Donabedian (2003) recognized the negative impact of delays to access care. As a result, the Structure-Process-Outcome Model was created to provide a quality improvement lens in health care (1978; 1981; 1988). This health care evaluative model is well respected as a method to look beyond outcomes towards factors that precipitate the end result. In fact, today there is substantial body of literature supporting the use of Structure-Process-Outcome model examining the quality of health

care in diverse settings, among different patient populations and across a variety of health care disciplines globally (Groene et al., 2011; Hoenig, Lee, & Stineman, 2010; Mears, Vesseur, Hamblin, Long, & Ouden, 2011; Liu, Singer, Sun, & Camargo, 2011; Watkins et al., 2010) which includes nursing practice (Gardner, Gardner & O'Connell, 2013; Holt, Zabler & Baisch, 2014; Liebel, Friedman, Watson, & Powers, 2009; McKay & Crippen, 2008; Parker et al., 2012; Upenieks & Abelew, 2006).

Donabedian's framework has been used in a variety of ways. For example, Upenieks & Abelew (2006) study of the magnet designation process used this model to identify structures that were essential to the flow of the work. Quality processes built on good structure were required to achieve the desired magnet outcome. Glickman, Baggett, Krubert, Peterson, & Schulman (2007) examined the element of structure relevant for initiating quality improvement initiatives. They viewed structure with a present day lens to suggest this should include concepts such as culture and information management and technology. Liebel, Friedman, Watson, and Powers (2009) utilized the Structure-Process-Outcome model to guide a literature review of in home nursing care of patients with a disability. McKay & Crippen (2008) studied collaboration through Donabedian's framework to logically organize the required antecedents to collaboration. Parker et al., (2012) defined linkages between policy, organizational structures, process of care and outcomes using the Structure-Process-Outcome framework. Clearly, the uptake of Donabedian's model has moved beyond simply conducting an evaluation of a health care setting.

The model describes three categories or levels: structure, process and outcome. An underlying proposition is that the study of outcomes, in isolation of structure and

process, limits the understanding of outcomes variations (Donabedian, 1978; Watkins et al., 2010). The inclusion of structure sheds understanding on the foundational factors shaping work processes, which in turn enables an understanding of influences resulting in favorable or unfavorable outcomes (Irvine, Sidani & Hall, 1998b). While in health care we are ultimately interested in the outcomes, the components that precede outcomes are equally important. Donabedian's model is based on quality improvement philosophy and thus is an appropriate framework to guide the examination of structures in a primary care context influencing work processes (Gardner et al., 2013; van Driel, Sutter, Christiaens, Maeseneer, 2005).

The Structure-Process-Outcome Model suggests a linear relationship. The linear relationship is proposed to exist between the structure of the workplaces (primary care environment) and work processes (nursing activities). The model provides a mechanism to identify why processes or outcomes quality is below benchmarks, by considering clinical or administrative approaches as a means to enhance results (Watkins et al., 2010). The theory suggests that when the right things (structure) support performing the right activities (process), the right things happen (outcomes).



Figure 1: Application of Structure-Process-Outcome model to evaluate the influence of RNs are working to their full scope of practice in primary care settings has on the rates of delivering preventative hypertension screening and management



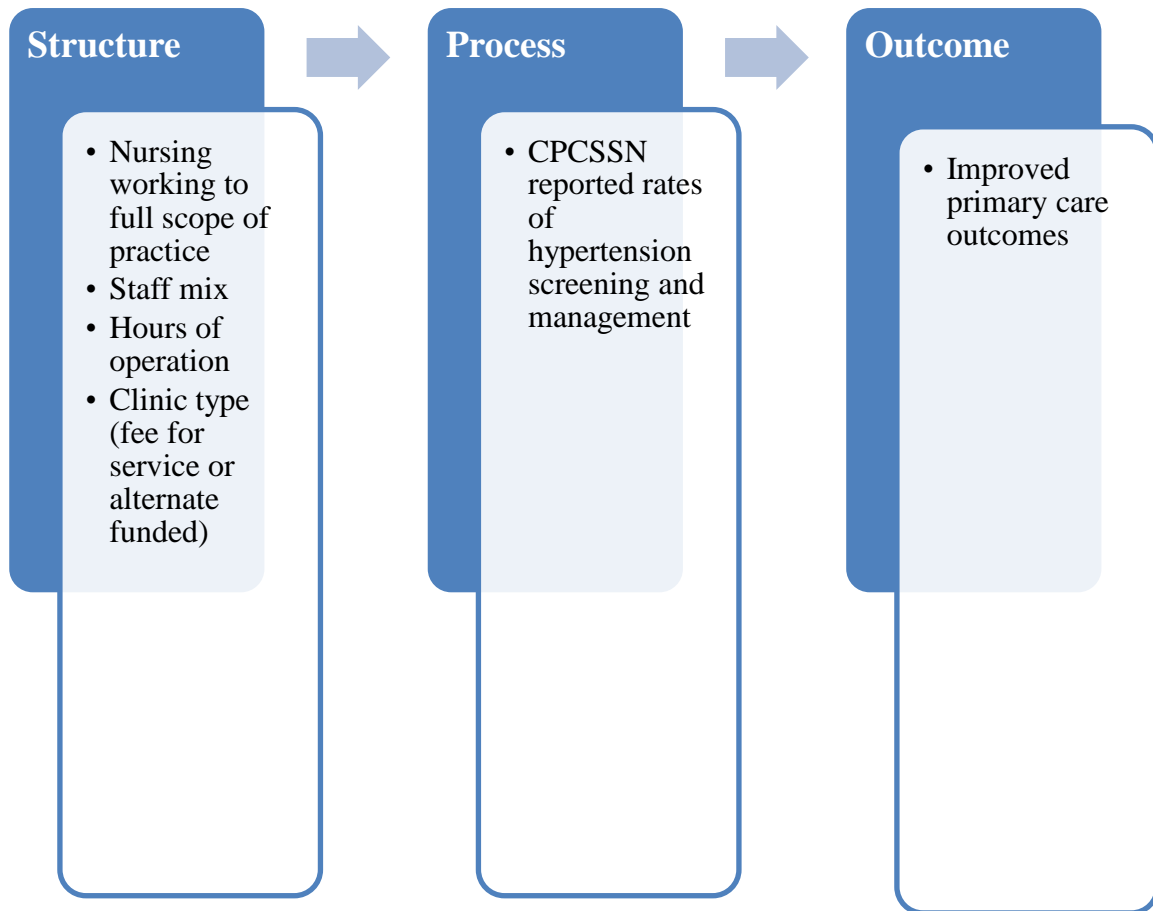
**Describing the model components.** Donabedian's Structure-Process-Outcome model is depicted in Figure 2. Structure refers to the qualities of material, human and organizational resources that an organization has to achieve its aims. Material resources include the setting, equipment and finances. Human resources include the number of employees, staff mix, and their qualifications. Organizational resources refer to inter-professional teams, and leadership for role clarity. Structures do not have a direct influence on outcomes of care; rather, structures affect the processes that are then associated with outcomes (Groene et al., 2011). In this study, structural components would refer to the degree to which nurse's work to full scope of practice. Structure also refers to environmental conditions and clinic components such as staff mix, hours of operation, geographical location (RHA geographical boundary the clinic is located), clinic funding model (private, RHA or community agency operated). These clinic components are based on what was found in the literature review from chapter two.

Process refers to the activities that occur within and between health care providers and the population for which they are responsible to provide care. These process activities are comprehensive including access to care and the way in which care is delivered. An assessment of outcomes in isolation has limitations in determining causality. The advantage of processes is that they are relatively easy to interpret (Mears et al., 2011). In this study, process refers to the role of nurses providing preventive hypertension screening and hypertension management and the degree to which screening and management guidelines are met.

Outcomes refer to changes in health, behavior, knowledge and satisfaction as a result of health care provided (Donabedian, 1978). Quality outcomes are frequently

defined as a value or goal of the current health care system and of society (Donabedian, 2005). In this study, outcomes refer to the end point of care. These would include improved primary care outcomes such as reduction in risk associated with screening: lower rates of cardiovascular disease, myocardial infarction, stroke and renal disease. Finally, outcomes can be of a cost reduction nature as in lower cost to the health care system as a result of improved outcomes (patients not experiencing the above complications or a reduction in harm due to earlier diagnosis or treatment) or potentially lower costs as a result of RN versus the more costly option of family physician delivered care.

Figure 2. Donabedian's Structure-Process-Outcome Depiction



**Critically reflecting on the model.** Donabedian's model has been chosen for the proposed study as it is widely used in quality improvement studies. A key benefit of Donabedian's model is it's presented as a linear process that is relatively easy to follow. There are noted limitations with this model. While some have applauded the simplicity of the model, others have questioned the relevance of the model to be able to reflect the complexity within health care settings. Donabedian's model has been criticized, as there can be difficulty in establishing the relationship between structure, process and outcome. It may be challenging to determine where to locate factors: in structure, process or outcome domains. Another concern that has been put forth is an overlap in the components that make up structure, process or outcome may exist, again making the difficult unsuitable (Liu et al., 2011). The Structure-Process-Outcome model has also been criticized for failing to incorporate antecedent characteristics. Medical care antecedents include patient and environmental risk factors that have an influence on the outcomes and as such should be included in a model (Coyle & Battles, 1999).

Others have viewed the simplicity of the Structure-Process-Outcome as a benefit or a weakness. In fact, people are trying to refine and further develop the model. A multidimensional aspect has been suggested as an advantage with the development of the Nursing Role Effectiveness Model and the Quality Health Outcomes Model. These frameworks with greater complexity have been developed from Donabedian's work. Irvine, Sidani & Hall (1998a, 1998b) developed the Nursing Role Effectiveness Model in order to measure the effect of care providers other than physicians, specifically to consider nursing specific factors in health care. This adaptation is suggested to exemplify the multidimensional nature of nursing (Irvine et al., 1998a). Further to this, the model

was suggested to conduct quality improvement and research into the factors that affect nurses' ability to perform in the independent, dependent and interdependent roles (Irvine et al., 1998b). In this adaptation, the process component identifies nursing contribution in three key roles: independent, dependent and interdependent roles.

The Quality Health Outcomes Model was also derived from the work of Donabedian. Mitchell, Ferketich, & Jennings (1998) proposed a dynamic model versus the traditional linear model of Donabedian. In this model, patient characteristics and a two-direction relationship are included among the components. Reciprocal directions are representative of the interventions that are affected by the patient characteristics and the system structures. The model, as is its predecessor Structure-Process-Outcome, is proposed to apply to quality improvement, research and practice.

While these frameworks are interesting to consider, they are all still discussing the three basic concepts of structure, process and outcome. Researchers and policy makers benefit from the conceptualization of the mechanisms that influence the different component. In my readings about these models I have gleaned a greater understanding of Donabedian's model and recognize it is the model that most accurately reflects this study. All three models bring the quality improvement lens to their application. The proposed study is an examination of the structural components that influence screening rates. When applied to this research, the model easily conceptualizes the factors related to scope of practice that influence screening.

This model has the advantage in that it enables an examination of the influence of structural components as a factor of quality in health care settings. An increasing need for accountability in health care is driving the quality improvement (Glickman et al.,

2007). Donabedian's model is a good fit as it is intended to examine the linear relationship focusing on structural factors (van Driel et al., 2005).

### **Chapter Summary**

Donabedian's model has been utilized in a variety of settings and has been shown to demonstrate the relationship between structure, process and outcome. The components of Donabedian's Structure-Process-Outcome model have been used as a framework for health care research for over 50 years. As is evident in Figure 1, the elements of structure influence processes; and as such, processes affect outcomes. Understanding the elements of structure and their influence on process will support this study to better understand primary care clinic structures associated with hypertension screening and management.

## **Chapter Four: Methodology**

A quantitative approach was used to examine factors in primary care settings that support RNs to work to full scope of practice in relation to reported hypertension screening and management rates. A survey was designed to guide data collection from eligible Manitoba primary care clinics regarding workplace structures and processes, which was guided by Donabedian's conceptual framework (Donabedian, 1978). The chapter begins with a brief discussion of survey methodology. Next the research design is addressed: study variables, survey items to measure variables, setting, sampling strategy, data collection procedures, data analysis and ethical considerations.

### **Survey Methods**

Surveys are useful when the aim of a study is to gain information about characteristics within a specific population (Knapp, 1998). Surveys are a basic mechanism to capture descriptive information although they can also be used to gather explanation, comparison and prediction of responses of the area of interest (Knapp, 1998). Key aspects of the phenomenon are operationalized as variables and survey items are developed, which then becomes the means for data to be collected. Data is commonly obtained through self-report. Some noted advantages of surveys are the flexibility and breadth of information that can be obtained, which are helpful in addressing study objectives. As well, data collected can be quantified and easily analyzed (Polit & Beck, 2012). Despite these benefits of surveys, there are limitations associated with this method of data collection. The willingness of the participant to report on the question of interest can negatively affect data quality. As the data are self-reported, there is limited ability to ensure accuracy of information provided. Surveys

also tend to be restricted to brief responses, only providing direct information, thus limiting the type of questions that can be asked (Polit & Beck, 2012).

Surveys are a relatively easy and efficient way to gather information (Polit & Beck, 2012). Collection of data can be facilitated through a telephone interview, which is thought to be a less time consuming and expensive option than personal interviews. Telephone survey interviews tend to obtain response rates of 80-90%. This is significantly higher than self-administered surveys that deliver response rates of less than 50%. Finally, telephone survey interviews tend to have lower rates of missing information.

In this thesis, a telephone interview survey methodology was used to assist with understanding what primary care setting factors related to RN practice expectations are associated with reported screening rates. The survey provides data on the structure and process factors that allows evaluation of RNs working to a fuller scope of practice, while the EMR data helps evaluate screening and hypertension management outcomes. Both of these data sources was used to answer the thesis research question: In primary care settings is the degree to which RNs are supported to work to a full scope of practice associated with rates of delivering hypertension screening and hypertension management.

**Research design.** A cross-sectional telephone interview survey of Manitoba primary care clinic managers or person in charge, conducted in the winter of 2016/2017, investigated workplace environmental factors relevant to RN practice associated with hypertension screening and management rates reported through the MaPCReN. This approach was intended to provide a glimpse into primary care clinics regarding hypertension care services by investigating differences in reported hypertension

screening and management rates based on evidence of clinic support of RNs involved in these activities. Cross-sectional research captures a single period of time, which is an efficient and economical approach but are not able to infer change over time or causality (Polit & Beck, 2012). The underlying assumption driving the study design is primary care clinics that support RN's involvement in providing hypertension screening and management services will report higher rates of screening and management.

The cross-sectional survey focused on the primary care settings where RNs are employed, their roles in regards to hypertension screening and management, and the associated rates. The rates were obtained through the MaPCReN data extract for study clinics. The telephone survey interview with the clinic manager or person in charge addressed details regarding RN roles along with clinic composition and organizational factors revealed from the literature review in chapter two. The survey data was analyzed using multiple regression analysis that allowed for simultaneous examination of the effects of multiple independent variables has on the dependent variables (Kellar & Kelvin, 2013).

**Survey development.** In research involving a survey using a previously developed and tested instrument is one option; however, not all research questions can be addressed by existing survey instruments (Polit & Beck, 2012). In this study, a brief survey specific to the thesis topic and research question was created. The survey was informed by the literature review, the theoretical framework and in consultation with the thesis committee. A limitation of this approach to develop a survey is lack of validity and reliability testing (Knapp, 1998). Validity is an indicator of knowing that the survey is measuring the concepts it has been designed to measure. Reliability refers to the



dependability of the instrument in measuring the concept (Polit & Beck, 2012). A step to offset this limitation, the survey was pilot tested prior to data collection from eligible Manitoba clinics. The pilot test included three former clinic managers and one current manager from a province other than Manitoba. Feedback from the clinic managers indicated the questions were clear and the survey easy to complete. Pilot testing of surveys highlight any questions that need to be added (Knapp, 1998). This was used to address face validity of the survey items.

### **Data Collection**

The CPCSSN is the first pan-Canadian multi-disease electronic medical record surveillance system. Established in 2008, the CPCSSN extracts primary care practice EMR data from ten networks across Canada (Rigobon et al., 2015). The vision of the CPCSSN is to obtain a better understanding of the health of Canadians by collecting national surveillance data and conducting research that will improve the study of primary care in Canada (Canadian Primary Care Sentinel Surveillance Network, n.d.). The purpose of the CPCSSN is to develop reports for providers and conduct research with the intent of improving outcomes through better management of conditions based on Canadian data.

The EMR database allows for the study of chronic disease at a national level (Greiver et al., 2014). Longitudinal data is obtained from electronic medical records into the CPCSSN to assess primary care epidemiology and disease management (Birtwhistle et al., 2009). Initially developed for five chronic diseases: diabetes, depression, chronic obstructive lung disease, osteoarthritis and hypertension; the list has expanded to include three neurologic conditions: Parkinson's disease, epilepsy and Alzheimer's and related

dementias. Case definitions have been developed for these conditions and demonstrate excellent sensitivity and specificity for hypertension (Birtwhistle & Williamson, 2015; Williamson et al., 2014).

The CPCSSN is comprised of 11 primary care networks covering seven provinces and 1 territory and contains information on over one million patients (Canadian Primary Care Sentinel Surveillance Network, n.d.). Primary care providers, including physicians and nurse practitioners, consent to extraction of data from their electronic medical record. De-identified data is extracted every three months from participating clinics (Godwin et al., 2015). Information dating back from the time the clinic's EMR was first implemented is extracted to CPCSSN.

In Manitoba, the CPCSSN local network is the Manitoba Primary Care Research Network (MaPCReN). At the time of this study, the MaPCReN included 43 clinics, over 200 sentinel providers (physicians, pediatricians, and nurse practitioners) and over 240,000 patients. EMRs were implemented over a number of years in Manitoba. The MaPCReN data extracts information from when the site first went live with their EMR. The EMR implementation date varies between clinics, with the earliest date of 2004 to 2014 when the majority of clinics first started entering patient information into an EMR. Below is a discussion of variables included in this thesis study.

**Study Variables.** In this thesis there are five independent variables and two dependent variables. The developed survey operationalizes the five independent variables (see Appendix A), which will determine the degree to which nurses are supported to work to a full scope of practice in association with hypertension screening and management along with key clinic organizational factors supporting this practice.

The MaPCReN report produced data for the two dependent variables: hypertension screening and hypertension management.

**Survey items and variable measures.** The *independent variables* focus on clinic factors relevant to RN practice expectations: (1) degree to which RNs are supported to work to a full scope of practice; (2) team mix; (3) hours of operation; (4) clinic funding model; (5) geography.

(1) Degree to which RNs are supported to work full scope.

The first independent variable, degree to which RNs are supported to work to a full scope of practice is measured through six survey items:

- Independent practice as evidenced by the clinic having a receptionist;
- RNs have a scheduled template for patient appointments;
- Length of time RN has had a schedule to see patients
- And are involved in appointments for blood pressure assessment and appointments for hypertension management (see Appendix A, question one and three, through to seven).

Rational for these items being relevant to RNs practice expectations is discussed. The presence of receptionists is deemed an important factor to differentiate clinics where the nurse provides receptionist duties. Having RNs with a scheduled template for patient appointments is an indicator of nurse-led care as the patient appointment is with the nurse as a provider of care. The amount of time RNs have been in the role can influence the extent this role has had on hypertension screening and management. The inclusion of counseling and assessment on hypertension management requires dedicated time. The Hypertension Canada protocols are followed in nurse-led hypertension programs

(Hypertension Canada, 2018), which demonstrate nurses working to their full scope of practice. The nurse-led work is providing care at a fuller scope of practice versus a setting where a blood pressure is taken by a clerk or assistant to the physician or nurse practitioner.

The four remaining independent variables concern clinic characteristics relevant to providing screening services.

(2) The presence of an inter-professional care team

The presence of an inter-professional team is included in the survey. Team composition in the clinic, was measured by number of health professionals, broken down by title, including full-time, part-time or casual status, and support staff. Care teams comprised of diverse professionals are more adept at meeting the corresponding health care needs of the patient population they serve (Dinh et al., 2014) and provide enhanced quality of care (Buttaro, Trybulski, Bailey & Sandberg-Cook, 2013; Canadian Diabetes Association Guidelines, 2013; Mahomed, St. John & Patterson, 2012; Poulton & West, 1999; Reid et al., 2010; Shortell et al., 2004). From this, it is postulated that there is a greater likelihood that the increase in diversity of the care team will reflect the RN role in hypertension (see Appendix A, question four, a through d). The presence of an inter-professional team, can affect the role expectations of the primary care RN.

(3) Hours of operation.

Hours of operation which will be determined based on hours of scheduled appointments day, evenings and weekends (see Appendix A, question eight, a & b). Determining the type of appointment as a booked appointment is to differentiate between regular appointments versus walk-in clinics. The premise of assessing for evening and

weekend hours is that extended hours would increase access to services for patients who have barriers to access care during typical working hours. Studies of clinics with extended hours have suggested improved outcomes with the assumption from this could lend to greater screening rates (Jerant, Bertakis, Fenton & Franks, 2012; Zickafoose, DeCamp & Prosser, 2013).

(4) Clinic funding model.

The type of clinic defined as either privately operated (fee for service clinic), RHA operated clinic or community agency funding model was obtained (see Appendix A, question nine, a, b & c).

(5) Location.

Location is important as the further north a person lives the greater the chance they will have received primary care from a nurse (Black, McCulloch, Martin, & Kan, 2011; McDonald & Treholm, 2010). The RHA in which the clinic is located was identified.

**Dependent variables.** There are two *dependent variables*: (1) hypertension screening rates and (2) hypertension management rates. The hypertension screening and management rates were as reported in the year 2016. Hypertension screening refers to the presence of a blood pressure reading in the EMR for patients who do not have a diagnosis of hypertension. Hypertension management is defined by five tests. Hypertension management for modifiable risk factors for patients 18 years and over includes annual testing of the following: fasting blood sugar or hemoglobin A1C; lipid profile screen; renal dysfunction through a serum creatinine; blood pressure measurement; and obesity/overweight screening through body mass index (BMI) or waist

to hip ratio (WHR) (Canadian Institute for Health Information, 2006 and 2012). The MaPCReN uses hemoglobin A1C (instead of fasting blood sugar or hemoglobin A1C) and BMI (instead of BMI or WHR) in the hypertension data extraction (personal communication, A. Singer)

### **Setting and Sample**

The setting for this thesis is selected primary care clinics in Manitoba funded as fee-for-service or an alternate funded clinic that participate in the MaPCReN. In 1997, the Manitoba government set up RHAs as a regional governance structure responsible for the administration and delivery of health services in specific geographical areas in the province (Manitoba Centre for Health Policy, 2013). Currently in Manitoba there are five Regional Health Authorities (RHA): Winnipeg, Southern, Interlake-Eastern, Prairie Mountain and Northern. While there are primary care clinics located throughout the province, the mix of type of clinics differs among the five regions. For example, fee-for-service clinics are located throughout the province however the majority is located south of the 53<sup>rd</sup> parallel.

**Sampling strategy.** The independent variables were collected using a telephone survey of clinic managers or person in charge of selected primary care clinics (see Appendix A). The sampling strategy for clinics eligible for the study included all clinics that were participating in the MaPCReN at the time of the study (October 2016). This includes three regional health authorities (RHA): Winnipeg, Southern, and Northern. The eligible clinics in Manitoba were grouped by their geographical RHA. The surveys of Manitoba's primary care clinics were linked with the MaPCReN data extract to study

screening and management rates for hypertension in 2016 for patients who have presented for care in the last year (between January 2016 through December 2016).

**Sample size.** Sample size decisions are based on the study approach to support drawing sound conclusions from study findings. With regression analysis, having too small of a sample can lead to Type II errors and regression coefficients that are not indicative of the true picture (Polit & Beck, 2012). A general rule for multiple regression analysis is ten subjects for each independent variable (Knapp, 1998). As noted earlier, this thesis proposed five independent variables, which mean a sample size of 50 clinics, was originally targeted.

**Eligibility of primary care clinics.** Manitoba primary care clinics that were actively engaged with the MaPCReN at the time of the study were eligible for inclusion in this study; this means clinics not using an EMR system, or those with an EMR system but not participating in the MaPCReN, were ineligible. There are 43 Manitoba primary care clinics enrolled in the MaPCReN, 25 from Winnipeg RHA, 12 in Southern RHA, and six clinics from Northern RHA. All primary care clinics were included in the survey portion of the study.

**Data collection procedures.** Once approval from ENREB and the Regional Health Authorities was obtained, the list of participating MaPCReN clinics and contact email was received. Then the following procedures to collect the survey data from the clinic manager or person in charge of the clinic were employed. A letter was emailed to eligible clinics to explain the study and invite participation in a survey of the clinic (see Appendix C). The letter indicated the brief survey would be completed by phone interview and a follow-up phone call would occur later in the week. Clinics were

assigned a participant code. The code will consist of a letter, representing the RHA (Winnipeg A; Southern B; Northern C;) and then each participating clinic was sequentially numbered. For example, the first clinic from the Winnipeg RHA received A1 as a participant code. The second WHRA participating clinic received A2 as a participant code, and so forth. The principle investigator has retained a master copy of the participating clinics.

The researcher contacted the clinic office manager or person in charge to explain the study and/or address questions, and then offered to conduct the interview at that time or set up a convenient time to complete the survey by phone interview. The response rate from surveys can be low so follow up reminder from the initial outreach was planned to improve response rate (Polit & Beck, 2012). Moreover to enhance survey response rate, three additional follow up phone calls occurred at one-week intervals. A message was left with each phone call attempt if there is no answer and there was the ability to leave a message. One follow up email was sent if no response occurred after the phone calls. Survey responses were directly entered into the researcher's computer. The computer is password protected. The information will be deleted permanently after the required seven years (07/23). The survey data will be shared with the MaPCReN and stored in a de-identified database.

The sampling strategy for clinics eligible for the study included all clinics that were participating in the MaPCReN at the time of the study (October 2016). In order to protect privacy, clinics were assigned a participant code. Of the total 43 clinics that participate in the MaPCReN, 39 clinics consented to the telephone survey. The



remaining four clinics did not participate in the study; two declined; one site did not return the consent; and one site did not respond to requests to participate.

There were 39 clinics surveyed in this study. In review of the MaPCReN data, it was noted the number of clinics reporting data for hypertension screening and management was 37. In consultation with the MaPCReN, it was determined one clinic did not have any MaPCReN providers and the other site did not have any data. As such data from those 37 sites were included in this study.

**Coding description.** The telephone survey was coded to transform the data into numbers for analyzing purposes. Survey questions with fixed response options were assigned a numeric code during survey development. A codebook was developed and codes were assigned as noted below.

The research questions developed to guide this study were focused on determining if hypertension screening and management were affected by primary care RN involvement. The intent was to obtain a better understanding of factors that may be involved in this. The independent variables data was coded in preparation for multiple regression analysis (see Table 1).

Scope of practice was calculated based on survey information regarding RN role. Scoring of RN scope of practice was determined through the questions on RN presence (no 0; yes 1); RN schedule to see patients (no 0; yes 1); years with an RN schedule (<6 months 0; >6 months 1); involvement in screening/management (never or rarely 0; frequently, usually, always 1); and hypertension screening/management part of scheduled appointment (never or rarely 0; frequently, usually or always 1). Years in the role were examined to ensure correlation with the MaPCReN data. For a clinic to be defined as

having advanced scope of practice in relation to hypertension screening or management, all of the above variables had to be met (RN presence, RN schedule; years with a schedule >6 months; responsibility for, and scheduled, hypertension related appointments) (Table 2). As such, scope of practice was created into a binary number with advanced scope of practice present or not present.

Table 1

Coding: Provincial Telephone Survey Data

Reception	Present = 1 Absent = 2
Manager	Present = 1 Absent = 2
Geography	Winnipeg = 1 Outside of Winnipeg = 2
Hours	Regular Hours = 1 Evenings &/or weekends = 2
Team mix	MD only = 1 MD & NP = 2 MD and RN = 3 Team (more than MD and RN) = 4
Funding	Alternate = 1 Fee-for-service = 2
Advanced scope of practice for screening or hypertension management present	Yes No

Table 2

Coding: RN Scope of Practice

RN	RN	Year RN	Responsible for	Involvement in
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present	schedule	schedule	hypertension screening/management	hypertension screening/management
0 – no	0 – no	0 - <6 months	0 – score 0 (never or rarely)	0 – score 0 (never or rarely)
1 – yes	1 - yes	1 – >6 months	1 – yes (frequently, usually or always)	1 – yes (frequently, usually or always)

**Data management and analysis.** Primary care clinic survey data and screening rates data were entered into SPSS Statistics Grad Pack 22 version (SPSS, an IBM Company) data file. Descriptive statistics were used to describe each of the clinics in relation to the collected variables. These statistics were generated using mathematical equations to determine frequencies. Descriptive analysis of the MaPCReN data followed using a similar process as the clinics descriptive data analysis.

Test of between group differences was conducted on the data to determine if there are statistically significant differences of hypertension screening and management between the independent variables of geography, hours, team composition, funding and scope of practice. Where the data was determined to be parametric, a t-test was used to determine if differences existed between the means of two independent groups. An ANOVA was used where more than two groups existed. The Mann-Whitney U test and Kruskal Wallis-H test were utilized for data analysis used for the non-parametric data.

Once the above was completed, this study used multiple regression model testing analysis was conducted. Regression is a statistical model to predict an outcome based on other variables (Kellar & Kelvin, 2013). In order to conduct linear regression, the dependent variables need to be normally distributed and of ratio scale. Ratio scale refers to variables that have a true zero and where there are equal intervals between data points (Kellar & Kelvin, 2013). In the study, the dependent variables were screening rates for

hypertension screening and management as reported in the MaPCReN. As such, they fulfilled the requirement of ratio scale variables. In a linear regression model, the independent variables can be of any scale. In the study, the independent variables were of nominal scale.

A multivariate linear regression was used to analyze independent variables predictability on each of the two dependent variables; two separate models were tested for each dependent variable (hypertension screening and hypertension management). Multivariate statistics are used to study three or more variables (Polit & Beck, 2012). The benefit of a multivariate linear regression is that it will allow simultaneous examination of the unique effects of the four independent variables on the dependent variables (Kellar & Kelvin, 2013).

The analysis results suggested an overall percentage of variance explained by the independent variables, and the significance of each independent variable. For each dependent variable a two-step analysis was used; the first step analyzed the scope of practice as the only predictor of a screening rate, and the second step analyzed all of the independent variables on a screening rate. A Manitoba Centre for Nursing and Health Research statistician was consulted to support the full analysis and review the final results.

### **Ethical Considerations**

**Informed consent.** Given that the clinic managers or the person in charge were be asked to participate in a survey, verbal consent to participate was obtained. A brief description outlining the key ethical and consent details were provided with the letter of

invite (see Appendix C). If they choose not to participate then consent will not have been provided. Following participation in the survey, the manager/person in charge was emailed a written consent form. They were instructed to fill in the consent form with their name and email back to the researcher. Returned completed consents indicated consent and from those sites the MaPCReN data was extracted. There was no deception involved in this study.

**Anonymity.** Anonymity of participating clinics was maintained. Clinics were assigned a number and in no way were identified in the results or discussion of this study. Clinic manager or person in charge's name was not disclosed. The study did not involve any patients directly and all information is being presented on a clinic population level (rate of screening). Data has been presented in aggregate form.

**Voluntary participation.** Participation in this study is voluntary and clinic managers were informed they could withdraw at anytime during the interview without negative consequence. Information gathered in this study may be presented in public forums or published. No identifying information such as clinic or manager/person in charge name will be identified.

**Feedback.** Participants were provided with the opportunity to receive a copy of a brief report of the study following analysis and synthesis of data. This was included in the ethical considerations letter with the survey invitation. Participants were asked to indicate their interest in receiving the report at the end of the survey. For the manager/person in charge who expressed interest in this report, their contact information was stored separately from the survey responses.

**Risks and benefits.** There are no anticipated risks to the participant or the clinic for participating in this study. Anticipated benefits may occur as a result of sharing their clinic information. Potential indirect benefits of clinics participating in this study is their participation may assists in obtaining a better understanding of clinic organizational support structures nurses and their employers need to support optimal conditions for RN delivery care in a primary care setting. There is the potential that workforce decisions may be facilitated by gaining this information.

**Compensation.** No monetary compensation was provided to the participants. The clinic managers who were contacted and participated in the study were thanked.

**Summary of ethical considerations.** Prior to commencing the study, ethical approval was obtained from the University of Manitoba Education and Nursing Research Ethics Board (ENREB) and the Winnipeg, Northern and Southern Regional Health Authorities. The submission included the certificate of completion from the Interagency Advisory Panel on Research Ethics (PRE) online tutorial TCPS 2: Course on Research Ethics (CORE). Approval was requested from the MaPCReN for access to the de-identified patient information. Clinic contact information was obtained from the MaPCReN via Health Research Ethics Board (HREB) amendment. Consent was obtained from the clinic manager or person in charge at the primary care clinic. Written consent was obtained following the survey from each of the clinic managers/person in charge. Participants were all made aware their participation was voluntary and they could withdraw from the survey at any time without consequences. All information collected was kept strictly confidential and anonymity of participant's names and clinics

will be maintained. Only the graduate student and advisor have access to the survey information.

### **Chapter Summary**

Multivariate regression analysis is the methodology used to gain an in-depth understanding of the structural factors of the workplace environment that influence screening rates. The survey items were derived from the literature review, committee and graduate student professional knowledge and the conceptual framework. Ethical considerations for this study have been outlined. Donabedian's structure-process-outcome model has guided the study design, and informed interpretation of findings, which aim to enhance our understanding of system and structural factors of relevance to RNs practice specific to hypertension screening and management rates.

## Chapter 5: Results

This chapter presents findings from the 37 Manitoba primary care clinics participating in this thesis. Findings address the research question “In primary care settings is there a relationship between the degree to which RNs are supported to work to a full scope of practice and reported rates of hypertension screening and hypertension management?”. As increasing numbers of RNs in Canada work in primary care settings, it becomes essential for us to gain a better understanding of the clinical setting and structure that influence their role. This study provides a preliminary look into the primary care RN role in relation to working to a full scope of practice and influencing factors as they relate to hypertension screening and management.

Donabedian’s structure-process-outcome model provided the framework for this study. This study examines the structures present in the primary care setting (nursing scope of practice; team mix; hours of operation; geographic location; and clinic funding model) and how they relate to hypertension screening and management rates.

The chapter will start with a descriptive analysis of the survey findings. This will be followed by an examination to determine if differences exist between the groups. Finally, a regression analysis will be conducted to determine if the variables can predict hypertension screening and management rates.

### Descriptive Analysis Results

**Frequencies of telephone survey items.** The 37 clinics surveyed were asked a series of questions. Table 3 displays the frequencies of each survey item.

Table 3

Descriptive Analysis: Provincial Telephone Survey Results



Variable	n	Percent
Clinic location	37	
Southern	10	27.0%
Northern	4	10.8%
Winnipeg	23	62.2%
Receptionist present	37	100%
Clinic manager	36	97%
Team mix	37	
MD only	8	21.6%
MD and NP	5	13.5%
MD and RN	6	16.2%
MD, NP and RN	0	0
Team more than above	18	48.6%
RN present	24	65%
RN scheduled appointments	22	92%
Years RN had scheduled appointments	22	
Less than 6 months	2	9%
6-12 months	1	4.5%
1-3 years	3	14%
More than 3 years	16	73%
RN responsible for hypertension screening	19	
Rarely	5	26%
Frequently	8	42%
Usually	2	10%
Always	4	21%
Hypertension screening part of scheduled appointment	19	
Rarely	5	26%
Frequently	9	47%
Usually	3	16%
Always	2	10%
RN responsible for hypertension management	15	
Rarely	3	20%
Frequently	6	40%
Usually	5	33%
Always	1	7%
Hypertension management part of scheduled appointment	15	
Rarely	4	27%
Frequently	6	40%
Usually	5	33%
Hours of operation	37	
Evenings	7	19%

Weekends	4	11%
Evenings and weekends	2	5%
Regular hours	24	65%
Clinic funding model	37	
Fee for service	13	35%
RHA	19	51.4%
Community agency	5	13.5%

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**Clinic locations and descriptions.** As expected, the majority of the participating sites were from Winnipeg (n=23, 62%). All of the clinics surveyed had designated reception staff that worked during the hours patients were scheduled appointments. The vast majority of clinics had a manager or person in charge (36 out of 37). The only clinic that did not have a designated manager position was a fee-for-service clinic where the lead physician indicated he covered that role.

The majority of clinics surveyed had clinic hours during regular daytime hours and were funded through the regional health authorities in Manitoba. Nineteen percent of the clinics had evening hours and 11% were open on weekends. Far fewer of the clinics (5%) were open both weekends and evenings. The majority of the clinics surveyed were funded through the RHAs (51.4%), while fee-for-service clinics accounted for 35%, and community health agencies 13.5%, of the clinics surveyed.

**Clinic team members.** The clinics included in this study have a variety of professionals providing services. The most common clinic team make up was an inter-professional team (18 clinics or 48.6%); the mixture of professionals is listed in Table 4. The clinic team mix was the greatest in the RHA or community agency funded clinics.

Table 4

Identified Members of Inter-professional Teams (N=18)

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Licensed practical nurse (n=10)	Speech language pathologist (n=2)	Social work (n=8)
Chronic disease nurse (n=6)	Psychiatrist (n=5)	Dietitian (n=20)
Foot care nurse (n=2)	Counselor (n=14)	Midwife (n=2)
Palliative care nurse (n=1)	Psychologist (n=3)	Physician assistant (n=4)
Retinal screen nurse (n=1)	Respiratory therapist (n=2)	Health promotion (n=1)
Pharmacist (n=9)	Occupational therapist (n=2)	Kinesiology (n=1)
Physiotherapist (n=2)	Pediatrician (n=1)	

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The second most common team composition was clinics with only physicians providing services (13), which were mostly fee-for-service clinics. Still not all fee-for-service clinics were physician only sites, as five of the fee-for-service clinics had funding for other team members (13.5%). These clinics participated in either the MyHealth Team (MyHT) funding or Inter-professional Team Demonstration Initiative (ITDI) which are funded from Manitoba Health. The clinics that participated in MyHT or ITDI have some access to a greater team mix compared to fee-for-service clinics that did not participate in these initiatives.

The MD and NP clinics and the MD and RN clinics comprised 13.5% (n=5) and 16.2% (n=6) respectively. No clinics had a MD, NP and RN combination of service providers.

**RN presence and roles.** Of the 37 clinics, over half (65%, n=24) were clinics where RNs were employed. Of the 24 clinics, there were two clinics, both fee-for-service

clinics, where the RN did not have their own schedule for patients to be booked into. In these clinics, the RN was described as working “alongside the physician” in the clinic. One of the two sites noted the RN did engage in independent practice in relation to cervical cancer screening.

For the 22 clinics where RNs had schedules, the majority (73%) of clinics had a schedule for RNs for greater than 3 years. The two clinics where RN schedules existed for less than six months were both fee-for-service clinics that had recently implemented MyHealth Team funded primary care RNs.

**Appointment types.** The clinics that booked appointments for the RNs indicated a significant variety of appointment types. Terms used in describing the type of appointments booked included “anything”, “big scope” and “variety”. Hypertension appointments were preceded in frequency only by immunizations and diabetes. The number of clinics reporting the various types of appointments is displayed in Table 5.

Table 5

Types of Appointment Scheduled for Primary Care RNs (n=22)

Immunizations, diabetes	N=9
Hypertension, cervical cancer screening	N=8
Well baby/child care	N=7
Reproductive health, initial assessment, smoking cessation, wound care	N=6
Chronic disease management, injections	N=5
Asthma management	N=4
Prenatal, foot care, spirometry	N=3

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Suture removal, triage, latent Tuberculosis infection, follow up acute cases, lipids/cholesterol, ear syringe, travel health, ankle brachial index testing, Tuberculin skin test/Mantoux test, provider assist, weight management	N=2
Sexually transmitted infection testing; birth control, pre-operative assessments, INR, pregnancy testing, home visits, complex management, detox, healthy lifestyle, arthritis, coronary artery disease, warts, exercise, mini-mental exam, well woman, counseling, insulin start, sore throat, urinary tract infection	N=1

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***Hypertension screening practice.*** There were 19 clinics where hypertension screening was considered part of the RN role. In these clinics, the RN provided a role in the assessment of patients for hypertension. The study indicator for hypertension screening is simply the recording of a blood pressure. Of the clinics that reported how often RNs are responsible for hypertension screening in patients age 18 or older, the majority (86%) indicated a RN participates to a degree in hypertension screening. In these clinics, the majority of the time, RNs were providing hypertension screening care and this was part of their scheduled appointments. It is unclear if the difference in reported appointments for hypertension compared with those reporting RN role in hypertension screening are related to the manager being able to recall all types of appointments booked, or if the hypertension screening practice was, in some clinics, not a booked appointment type.

There was a range of nursing practice responses to the survey question about the RN role relevant to hypertension screening practice. Several clinics reported a degree of independence as the RN was able to assess, support the ordering of outstanding blood tests, follow the patient for a number of visits as outlined in the Hypertension Canada guidelines, complete referrals and conduct goal setting with the client (N=9). Follow up with the primary care provider occurred after these activities were completed, or sooner if concerns were identified that required medical management. There were some clinics where the RN role was less robust, where the RN was involved in hypertension education related to screening activities (N=7). A smaller number of clinic responses indicated hypertension screening was done in conjunction with the family physician (N=3). In these sites, the physician determined the care for the patient and the RN conducted the care as advised without independence in action.

***Hypertension management practice.*** Question seven of the telephone survey asked the clinic manager to report on the procedure for hypertension management at the site. Far fewer of the clinics noted RNs were involved in hypertension management as compared with hypertension screening. Where the RN was involved in hypertension management, the level of independence decreased significantly compared with hypertension screening. Of the clinics surveyed, 61.5% indicated hypertension management is the sole responsibility of the primary care provider. The clinics where RNs have some involvement in hypertension management, the majority (67%) of the clinics indicated the role of the RN included patient education. Hypertension education was reported as including lifestyle, diet, medication, weight, lab result and blood pressure review. There were only two clinics which noted the role of the RN had responsibility

for hypertension management where the patient might see only the RN for hypertension management follow up. Of the clinics where RNs were involved in hypertension management, forty percent of the clinics noted the role of the RN depends on the primary care provider. The RN role in some sites was limited to taking a BP. One clinic indicated the RN role was to care for patients with hypertension who had more social complexities where the RN would support the patient in areas greater than hypertension. Table 6 details randomized clinic information surrounding team composition, RN role and determination of scope of practice.

Table 6

## Randomized Clinics: RN Role and Scope of Practice Details

Clinic	Team Mix	Years in Schedule	Involved in Hypertension Screening	Involved in Hypertension Management	SOP Screen	SOP Management
1	Team	<6mo's	Never	Never	Nil	Nil
2	MD	-	-	-	Nil	Nil
3	Team	1-3yrs	Frequent	Never	Advanced	Nil
4	Team	>3yrs	Never	Never	Nil	Nil
5	Team	>3yrs	Frequent	Frequent	Advanced	Advanced
6	MD/RN	>3yrs	Always	Usually	Advanced	Advanced
7	MD/NP	-	-	-	Nil	Nil
8	MD	-	-	-	Nil	Nil
10	MD/RN	>3yrs	Rarely	Rarely	Nil	Nil
11	MD/NP	-	-	-	Nil	Nil
12	Team	>3yrs	Rarely	Rarely	Nil	Nil
13	Team	<6mo's	Usually	Usually	Nil	Nil
14	Team	>3yrs	Usually	Usually	Advanced	Advanced
15	MD/RN	No sched	-	-	Nil	Nil
16	MD/NP	-	-	-	Nil	Nil
18	MD	-	-	-	Nil	Nil
19	Team	>3yrs	Usually	Usually	Advanced	Advanced
20	Team	>3yrs	Rarely	Never	Nil	Nil
21	Team	>3yrs	Frequent	Never	Advanced	Nil
22	MD/RN	1-3yrs	Always	Usually	Advanced	Advanced
23	Team	>3yrs	Usually	Never	Advanced	Nil
24	MD/RN	>3yrs	Rarely	Rarely	Nil	Nil
25	Team	No sched	-	-	Nil	Nil

26	MD/NP	-	-	-	Nil	Nil
27	Team	>3yrs	Usually	Usually	Advanced	Advanced
28	MD/NP	-	-	-	Nil	Nil
29	MD/RN	>3yrs	Usually	Usually	Advanced	Advanced
30	Team	>3yrs	Usually	Usually	Advanced	Advanced
31	MD	-	-	-	Nil	Nil
32	MD	-	-	-	Nil	Nil
33	Team	>3yrs	Never	Never	Nil	Nil
34	Team	1-3yrs	Frequent	Frequent	Advanced	Advanced
35	MD	-	-	-	Nil	Nil
36	MD	-	-	-	Nil	Nil
37	Team	>3yrs	Frequent	Frequent	Advanced	Advanced
38	Team	>3yrs	Rarely	Rarely	Nil	Nil
39	MD	-	-	-	Nil	Nil

Note: Clinics 9 & 17 were removed from the analysis as in the receipt of MaPCReN data, they were found not contain any information.

**Descriptive analysis of the MaPCReN data.** De-identified patient data for each of the 37 consenting participating clinics was obtained from MaPCReN. The purpose of the MaPCReN is to develop reports for providers and conduct research with the intent of improving outcomes through better management of conditions based on Manitoba data. As such, this data source was used for this study.

Data was analyzed from the information obtained through the telephone survey along with the MaPCReN data. Table 7 provides a summary of the survey findings in relation to scope of practice with hypertension screening and management rates.



Table 7  
Provincial Descriptive Survey Details and MaPCReN Data Findings

Clinic	Geo	Hours	Funding	Team	Scope of Practice Screening	Hypertension Screening Rate	Scope of Practice Management	Hypertension Management Rate
1	Wpg	Daytime	Alt	Team	Nil	57%	Nil	65%
2	Wpg	Daytime	Alt	MD	Nil	15%	Nil	19%
3	Wpg	Daytime	FFS	Team	Adv	47%	Nil	73%
4	Wpg	Daytime	FFS	Team	Nil	37%	Nil	40%
5	Wpg	Eve/wknd	FFS	Team	Adv	56%	Adv	46%
6	Wpg	Eve/wknd	FFS	MD/RN	Adv	68%	Adv	66%
7	Outside	Daytime	FFS	MD/NP	Nil	24%	Nil	46%
8	Wpg	Eve/wknd	Alt	MD	Nil	44%	Nil	69%
10	Wpg	Daytime	Alt	MD/RN	Nil	83%	Nil	80%
11	Outside	Daytime	FFS	MD/NP	Nil	78%	Nil	61%
12	Wpg	Daytime	FFS	Team	Nil	57%	Nil	56%
13	Wpg	Daytime	FFS	Team	Nil	29%	Nil	26%
14	Wpg	Daytime	Alt	Team	Adv	49%	Adv	70%
15	Wpg	Daytime	FFS	MD/RN	Nil	15%	Nil	19%
16	Outside	Daytime	Alt	MD/NP	Nil	41%	Nil	51%
18	Wpg	Daytime	FFS	MD	Nil	22%	Nil	25%
19	Wpg	Daytime	Alt	Team	Adv	30%	Adv	61%
20	Wpg	Eve/wknd	FFS	Team	Nil	50%	Nil	61%
21	Wpg	Eve/wknd	FFS	Team	Adv	51%	Nil	65%
22	Wpg	Daytime	FFS	MD/RN	Adv	48%	Adv	61%
23	Outside	Daytime	Alt	Team	Adv	67%	Nil	56%

24	Wpg	Eve/wknd	FFS	MD/RN	Nil	35%	Nil	63%
25	Outside	Eve/wknd	Alt	Team	Nil	22%	Nil	27%
26	Wpg	Daytime	Alt	MD/NP	Nil	89%	Nil	86%
27	Outside	Daytime	FFS	Team	Adv	59%	Adv	66%
28	Wpg	Daytime	FFS	MD/NP	Nil	33%	Nil	52%
29	Outside	Daytime	FFS	MD/RN	Adv	41%	Adv	63%
30	Wpg	Eve/wknd	Alt	Team	Adv	41%	Adv	57%
31	Outside	Daytime	Alt	MD	Nil	37%	Nil	79%
32	Wpg	Daytime	FFS	MD	Nil	43%	Nil	65%
33	Outside	Daytime	FFS	Team	Nil	66%	Nil	62%
34	Wpg	Daytime	Alt	Team	Adv	37%	Adv	74%
35	Outside	Daytime	FFS	MD	Nil	9%	Nil	30%
36	Wpg	Daytime	Alt	MD	Nil	24%	Nil	25%
37	Outside	Daytime	FFS	Team	Adv	44%	Adv	59%
38	Wpg	Daytime	FFS	Team	Nil	35%	Nil	57%
39	Outside	Daytime	FFS	MD	Nil	12%	Nil	38%
	Wpg							

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Note: Clinics 9 & 17 were removed from the analysis as in the receipt of MaPCReN data, they were found not contain any information.

***Hypertension data descriptive results.*** Of the 37 clinics included in the dataset from MaPCReN, there were 153,281 individuals who were present in the dataset for the calendar year 2016: 80,011 female patients (54.2%), 70,262 male patients (45.8%), and eight patients where gender was not identified. Hypertension screening rates were calculated for each clinic based on the absence of a diagnosis of hypertension and a presence of a recorded blood pressure among their patients. There were 96,945 individuals who did not have a diagnosis of hypertension recorded in the EMR, which accounts for 63% of the clinic population. There was a range in screening rates among the clinics with the lowest rate recorded at 9% and the highest at 89%. Overall, the clinics had a 33% hypertension screening rate. Clinic data by ascending hypertension screening rates is presented in Table 8.

Table 8

MaPCReN 2016: Hypertension Screening Data by Clinic

Total Number Patients without Diagnosis HTN	No recorded BP	Percent screened
267	244	9%
331	291	12%
14,832	12,654	15%
2824	2415	15%
8439	6596	22%
3904	3049	22%
66	50	24%
8029	6126	24%
7308	5218	29%
2908	2022	30%
642	433	33%
3487	2276	35%
2964	1913	35%
1297	812	37%
955	598	37%
2881	1805	37%
340	199	41%
4,355	2,561	41%

3769	2215	41%
282	162	43%
6059	3367	44%
2562	1424	44%
798	424	47%
1784	925	48%
1398	716	49%
2200	1105	50%
1319	651	51%
1980	880	56%
736	319	57%
2423	1050	57%
331	136	59%
1473	500	66%
978	322	67%
1013	326	68%
1161	261	78%
635	110	83%
215	23	89%

Of the 153,281 individuals, 56,336, or 36.8% of the population had a recorded diagnosis of hypertension. Ages were grouped for individuals with a recorded diagnosis of hypertension. Among those individuals with a diagnosis of hypertension, the majority was between the ages of 60-69 years, which accounts for 29% of those with a hypertension diagnosis. Table 9 provides a breakdown of the information.

Table 9

MaPCReN 2016: Hypertension Diagnosis Data

Variable	N	Frequency
Diagnosis Hypertension		
Yes	56,336	36.8%
No	96,945	63.2%

## Age of Individuals with Dx HTN

18-29	451	0.8%
30-39	1781	3.2%
40-49	4434	7.9%
50-59	10,890	9.3%
60-69	16,337	29%
70-79	12,248	21.7%
≥80	10,195	18.1%

A review of the data for those with a diagnosis of hypertension was conducted including all of the participating clinics. Clinical practice guidelines, as per the Hypertension Canada, define five tests that are indicated for management of hypertension: blood pressure recording, creatinine, hemoglobin A1C, lipids, and body mass index. The existence of these tests was examined to determine the percent of these values recorded in the patient EMR for the calendar year 2016. Table 10 highlights the frequency of hypertension management tests completed in the 2016 MaPCReN data.

Table 10

## MaPCReN 2016: Hypertension Management Data

Test Name	Test Recorded in EMR
BP	53.8%
Lipids	6.3%
Creatinine	20%
BMI	36.5%

HbA1c

16.3%

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The lipids data was reviewed and the MaPCReN director was consulted. It was noted the lipid dataset was very small with a 6.3% completion rate. On further investigation, the lipid data was found to be distinctly different, and vastly lower than other sources of EMR data. It was identified there were several issues related to the data integrity of the lipids value. MCNHR was also consulted regarding the lipids data set. As such, the MaPCReN director and MCNHR recommended removing the lipids data from the hypertension management indicator and the corresponding decision to remove the variable of lipids from the study.

With the decrease from the five tests for hypertension management to the four as described above, a 25% scoring system was provided when each of the hypertension management tests were present. Therefore, if two of the four tests were completed, the patient would receive a 50% hypertension management rate. This was conducted for each of the 56,336 patients with a diagnosis of hypertension.

**Summary of descriptive analysis.** The above provides insights into the responses to the telephone survey items and MaPCReN data obtained. Almost two-thirds of the clinics surveyed had a RN as part of the team and they are involved in a variety of patient care appointment types (see Table 5). Of the clinics with RNs, three quarters reported the RNs were involved in hypertension screening and a slightly lower number involved in hypertension management (Table 3). The 2016 MaPCReN data included 96,945 individuals without a diagnosis of hypertension who comprised the hypertension screening portion of the study. Screening rates were calculated for each of the 37 participating clinics. There were 56,336 individuals with a diagnosis of hypertension. Blood pressure was the most frequently completed test in relation to management of hypertension, with BMI, creatinine and HbA1c in descending order of frequency.

### **Test of Between Group Differences**

As the first step in determining if there is a statistically significant difference in rates of hypertension screening between geography, hours, funding, team mix and RN scope of practice, an analysis of differences between the groups was conducted.

**Between group differences: hypertension screening.** Data analysis for normality: The Shapiro-Wilk test is recommended with small sample sized of less than 50 participants (Laerd Statistics, 2015b). Shapiro-Wilk test was conducted on all the models for hypertension screening. Geographical location, hours and funding were found to be normally distributed, as assessed by Shapiro-Wilk's test ( $p > .05$ ). There were no outliers with geography, hours or funding. Table 11 details the data.

*Between group differences: geography, funding and hours.*

Table 11

## Data Analysis for Normality: Geography, Funding and Hours

Variable	N	Mean	SD	Levine Score	p value
Winnipeg	23	.513	.146	.072	.569
Outside Winnipeg	14	.478	.231		
Funding - alt	24	.538	.194	.339	.079
Funding - FFS	13	.429	.132		
Daytime Hours	29	.497	.195	.194	.855
Evening Weekend Hours	8	.510	.127		

Table 12 details the results of the t-tests conducted with the depended variable of hypertension screening rates compared with geography, funding, and hours.

Table 12

## Hypertension Screening: T-Test Results

Bivariate comparison	N	Mean	Mean difference (MD) and 95% Confidence Interval MD95%(CI)	Sig. (p)
Geography – Winnipeg	23	.513	.036 (-.09 to .16)	.569
Geography – outside Winnipeg	14	.478		
Funding – alternate funded	24	.538	.109 (-.01 to .23)	.079
Funding – fee-for- service	13	.429		
Hours - regular	29	.497	-.014 (-.16 to .14)	.855
Hours – evenings and/or weekend	8	.510		

As evident from Table 9 and 10, higher rates of hypertension screening were observed in clinics located in Winnipeg, in alternate funding sites and in clinics that are



open extended hours. While there were not statistically significant differences in mean screening scores for geography, funding and hours, the funding variable was the closest to approaching statistical significant level of 0.05 with a p value of .079.

***Between group differences: scope of practice.*** In running a t-test for scope of practice, Levene's test for equality of variances failed; therefore equal variances were not assumed. An outlier was discovered in the scope of practice group where a clinic had much lower documented hypertension screening rates. As such, a Mann-Whitney U test was run for scope of practice (Table 13) to determine if there were differences in hypertension screening rates between sites where nurses worked to full scope of practice compared to those where there was no RN or RNs not working to full scope of practice. The data was checked and determine there was not a data entry error. This was determined to be a genuinely unusual value. Normality assumption for scope of practice is failed. Distribution of the hypertension screening rates was similar, as assessed by visual inspection. The score was not statistically significantly different between clinics with nil scope of practice and clinics where RNs worked to full scope of practice.

Table 13

## Hypertension Screening: Mann-Whitney U Test Results

Variable	N	U	P value	Median	Mean Rank
Scope of practice - nil	24	203	.141	.417	17.04
Scope of practice - advanced	13			.543	22.62

***Between group differences: team composition.*** To analyze team composition, an ANOVA test was used. An ANOVA was chosen because there were more than two

independent variables (Kellar & Kelvin, 2013). In studying the influence of team mix on hypertension screening rates, an ANOVA was conducted to determine if there were statistically significant differences between the means of two or more independent groups. There were no outliers, as assessed by boxplot data; data was normally distributed for each group, as assessed by Shapiro-Wilk test ( $p > .05$ ). There was homogeneity of variances, as assessed by Levene's test for equality of variances,  $p = .080$ . Hypertension screening was not statistically significantly different for clinics comprised of different team members,  $F(3,33) = 2.617$ ,  $p = .067$  (Table 14).

Table 14

## Hypertension Screening: ANOVA Results

Team mix	N	Mean	SD	F	p	Confidence Intervals	
MD only	8	.356	.163	2.617	.067	.220	.491
MD & NP	5	.588	.251			.277	.899
MD & RN	6	.538	.225			.302	.773
Team	18	.527	.124			.465	.589

**Summary hypertension screening data review.** Hypertension screening rates were found to be greater in the following circumstances: clinic inside Winnipeg versus outside of Winnipeg; in alternate funded clinics versus fee-for-service clinics; in clinics with evening and weekend hours versus daytime hours; clinics where RNs worked to a fuller scope of practice than sites with nil scope of practice; and in clinics with more than a physician was part of the team. While these differences in hypertension screening rates were found, no statistically significant differences in hypertension screening were found. Despite the lack of statistically significantly different rates, funding ( $p = .079$ ) and team ( $p = .067$ ) were the closest to

approaching significant values for hypertension screening.

**Between group differences: hypertension management.** Data analysis for normality: The hypertension management data was reviewed and found to be negatively skewed. Transformation for negatively skewed hypertension management data was completed. Analysis of the transformed data indicated the data continued to remain skewed. The MCNHR was consulted and a decision was made to conduct an analysis of the data with non-parametric tests instead of a t-test as was conducted with the hypertension screening data.

The Mann-Whitney U-test is a non-parametric test, as an alternative to the independent-samples t-test, when the data failed the assumptions for a parametric test. The Mann-Whitney U test is used to determine if there are statistically significant differences between two groups (Laerd Statistics, 2015a). As evident from Table 15, the difference in hypertension management rates between geography, funding, clinic hours and nursing scope of practice are not statistically significant.

Table 15

Hypertension Management: Mann-Whitney U Test Results

Variable	N	U	p value	Median
Geography –Winnipeg	23	170	.793	5.104
Geography - outside Winnipeg	14			5.728
Funding – alternate funded	24	185.5	.353	5.166
Funding – fee-for-service	13			5.104
Hours – regular	29	104	.677	5.22
Hours – evenings &/or weekends	8			5.02
Scope of practice nil	27	87.0	.105	5.54
Scope of practice advanced	10			4.96

A Kruskal-Wallis *H*-test was used to determine if there was a difference between

clinics with different team compositions. The Kruskal-Wallis  $H$ -test is a non-parametric alternative to ANOVA, to determine differences in medians between three or more groups (Kellar & Kelvin, 2013). Kruskal-Wallis  $H$  test was run to determine if there were any differences in hypertension screening rates between clinic team compositions: MD only, MD & NP, MD & RN, and greater than above. Distributions of hypertension management rates were similar for all groups, as assessed by visual inspection of a boxplot. As can be found in table 16, the mean rank of hypertension management rates was not statistically significantly different between groups.

Table 16

Hypertension Management: Kruskal-Wallis  $H$ -test

	Mean Rank	p value
Team composition	2.084	.555

**Summary hypertension management review.** Hypertension management rates were found to be greater in clinics under the following circumstances: outside of Winnipeg compared with inside Winnipeg; alternate funded clinics versus fee-for-service clinics; clinics with daytime hours versus those with evening and/or weekend hours; in clinics with nil scope of practice compared with clinics where RNs worked to full scope of practice; and in physician only clinics versus clinics where an RN or other team members were present. While the above differences in hypertension management rates were found, analysis of the hypertension management data indicated there were no statistically significant differences in geography, funding, hours of operation, team mix and scope of practice.

### Multiple Regression Analysis – Results

Regression analysis is used to predict outcomes and understand relationships between variables (Kelvin & Kellar, 2013). Multiple regression determines the overall fit of a model and to help explain the affect of the independent variables in relation to the overall variance (Laerd Statistics, 2015c). For each dependent variable a two-step analysis was used; the first step analyzed the scope of practice as the only predictor of a screening rate, and the second step analyzed all of the independent variables on a screening rate.

**Hypertension screening: scope of practice.** A multiple regression analysis was conducted on the hypertension screening data analyzing scope of practice as the only predictor of screening rate. The first step in multiple regression analysis is to ensure the data can be assessed with this test (Laerd Statistics, 2015c). Assumptions of conducting a linear regression analysis were completed. The assumption of independence of observations is conducted to ensure the observations in a multiple regression are not related. Independence of observations was met. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.489. Overall significance was found to be  $p = .220$  as detailed in table 16.

Table 17

#### Multiple Regression Analysis: Scope of Practice

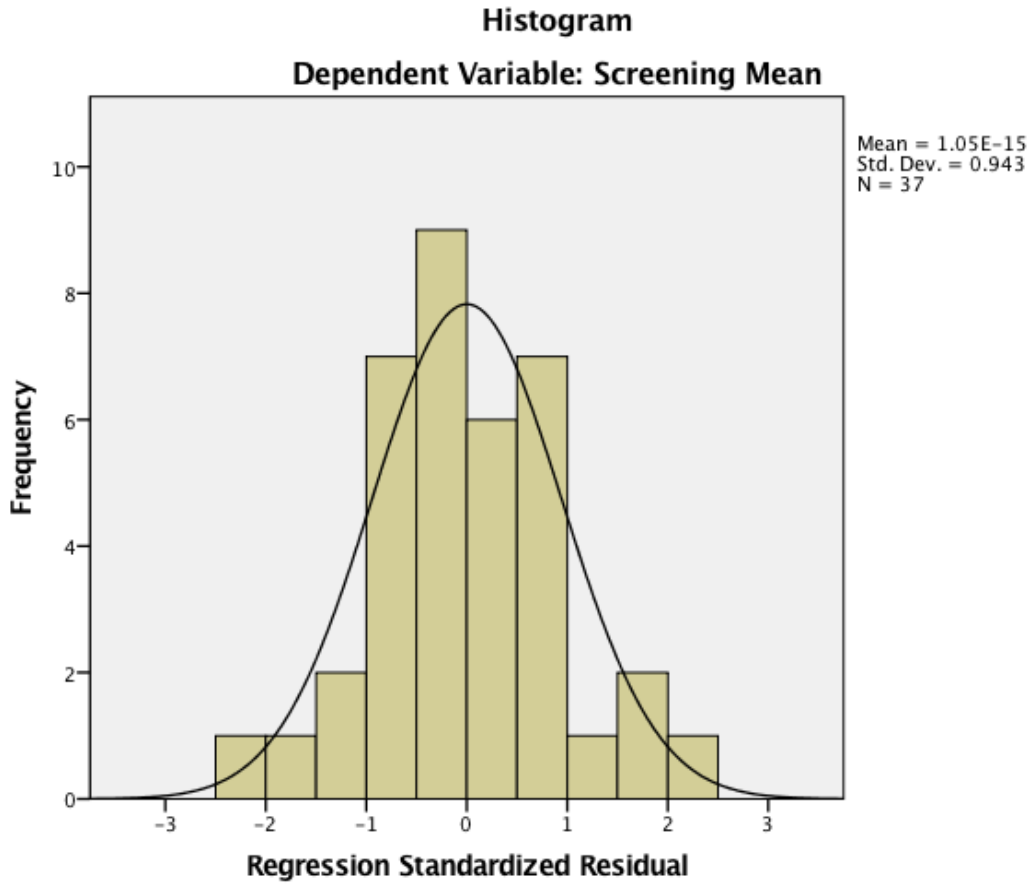
Variable	$SE_{\beta}$	$\beta$	p-value	f-test	Significance level (overall)	$R^2$	Regression	Residual
Intercept	.089		.000	1.559	.220	.043	.050	1.128
Scope of practice	.062	.207	.220					

**Hypertension screening - model 1: scope of practice, geography, funding & hours.** A multiple regression analysis was conducted to predict hypertension screening rates from primary care clinic hours of operation, geography, funding and RN scope of practice. The independent variables were examined in two different models. The first model analyzed geography, funding and hours with scope of practice. The second model analyzed team, funding and hours with scope of practice. The models were limited to four independent variables each in response to the sample size of 37 clinics. A significant problem with multiple linear regression analysis is when there are too many variables for the number of subjects. Ideally there are 10 samples per independent variable (Kellar & Kelvin, 2013). In consultation with the MCNHR, the number of subjects, 37 clinics, and four independent variables was an acceptable ratio.

In multiple regression analysis, there needs to be a linear relationship between the dependent variable and the independent variables. There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized deleted residuals greater than  $\pm 3$  standard deviations and no values for Cook's distance above 1. Although there were two leverage values greater than 0.2 (random clinics 25, 34), the decision was made to continue with the regression analysis as removing the leverage values greater than 0.2 would further compromise the limited sample size. The assumption of normality was met, as assessed by a histogram (Figure 3).

Figure 3.

Hypertension Screening Model 1: Assumption of Normality



The multiple regression model indicated scope of practice did not statistically significantly predict hypertension screening,  $F(1, 35) = 1.559, p = .220$ . Scope of practice, geography, funding, and hours did not statistically significantly predict hypertension screening,  $F(4, 32) = 1.072, p = .386$  (Table 16).

Table 18

Hypertension Screening Model 1: Multiple Regression Analysis

Multiple Regression Analysis – Hypertension Screening Model 1									
Variable	$SE_{\beta}$	$\beta$	p-value	f-test	Significance level (overall)	$R^2$	Regression	Residual	

Intercept	.209		.005	1.072	.386		.118	.139	1.039
Scope of practice	.066	.134	.450						
Geography	.065	-.099	.579						
Funding	.064	-.278	.114						
Hours	.075	-.011	.950						

### **Hypertension screening - model 2: scope of practice, team, funding & hours.**

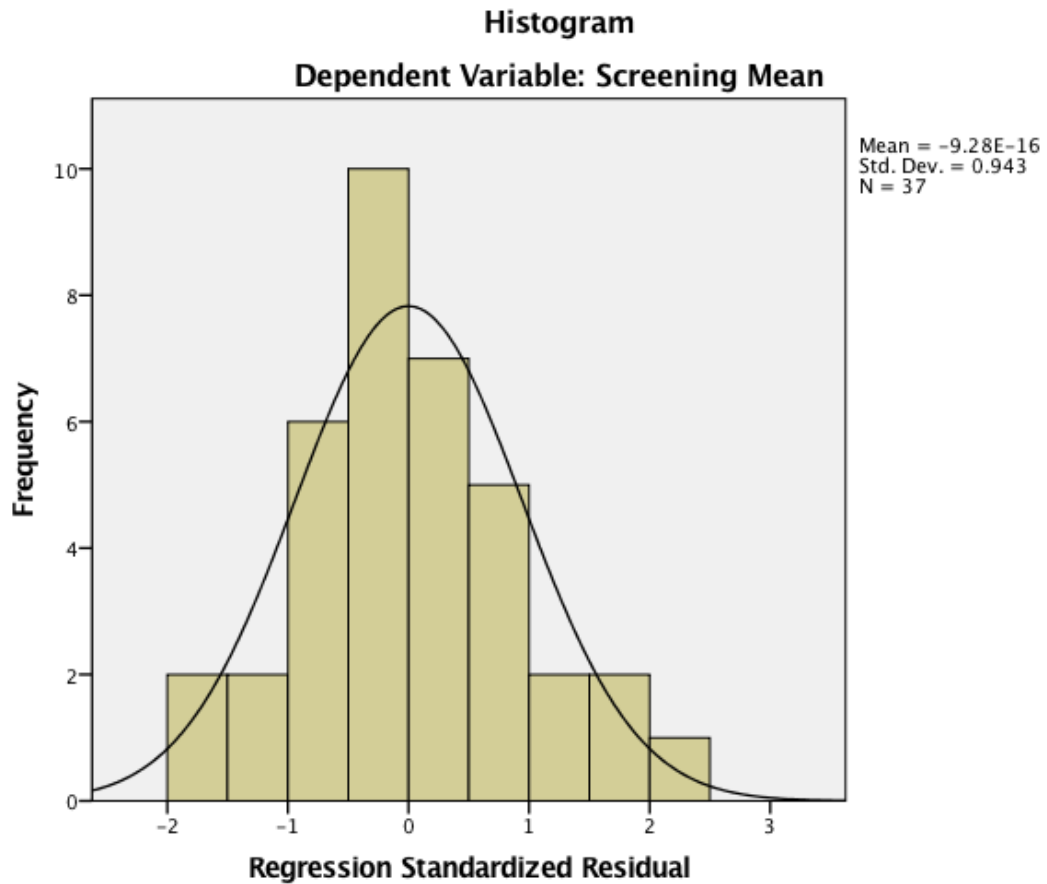
Assumptions of conducting a linear regression analysis were completed. A multiple regression was run to predict hypertension screening rates from primary care clinic hours of operation, funding, team mix and RN scope of practice. The assumption of independence of observations was met. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.361.

There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized deleted residuals greater than  $\pm 3$  standard deviations and no values for Cook's distance above 1. Although there were two leverage values slightly greater than 0.2 (25, 8), the decision was made to continue with the regression analysis as removing the leverage values greater than 0.2 would further compromise the limited sample size. The assumption of normality was met, as assessed by a histogram (Figure 4).

Figure 4

Hypertension Screening Model 2: Assumption of Normality





The multiple regression analysis indicated scope of practice did not statistically significantly predict hypertension screening,  $F(1, 35) = 1.559, p = .220$ . Scope of practice, team, funding, and hours did not statistically significantly predict hypertension screening,  $F(4, 32) = 1.318, p = .284$  (Table 17).

Table 19

Hypertension Screening Model 2: Multiple Regression Analysis

Variable	SE $\beta$	$\beta$	p-value	f-test	Sig level	R <sup>2</sup>	Regression	Residual
Intercept	.154		.003	1.318	.284	.141	.167	1.011
Scope of practice – HTN screening	.072	.056	.773					

Hours	.073	-.014	.935
Funding	.063	.232	.180
Team	.029	.213	.284

---

**Hypertension management - model 1: scope of practice, geography, funding & hours.** A linear regression analysis was planned to examine hypertension management data analyzing scope of practice as the only predictor of hypertension management rate. The first model analyzed geography, funding and hours with hypertension management scope of practice. The second model to be analyzed was team, funding and hours with hypertension management scope of practice.

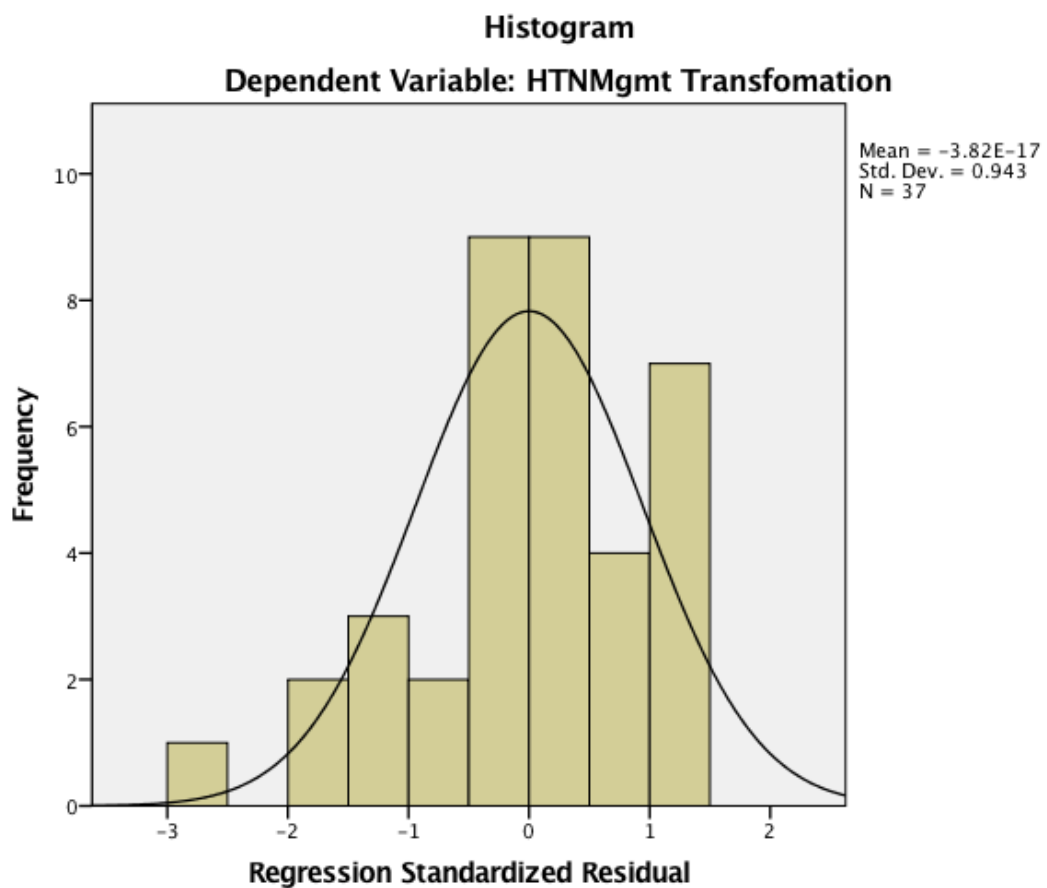
Assumptions of conducting a linear regression analysis were conducted. In order to run multiple regression, the assumptions were checked to validate the data was appropriate for a multiple regression. An analysis was conducted to see if it was feasible to predict hypertension management rates from primary care clinic hours of operation, geography, funding and RN scope of practice for hypertension management. The first assumption, independence of observations, was met. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.173.

There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were no studentized deleted residuals greater than  $\pm 3$  standard deviations and no values for Cook's distance above 1. Although there were two leverage values greater than 0.2 (clinics 37, 21), the decision was made to continue with the regression analysis as removing the leverage values greater than 0.2 would further

compromise the limited sample size. The assumption of normality was not met, as assessed by a histogram (Figure 5). Because the data did not follow the assumptions for linear regression, and the sample size was small, multiple regression analysis was not conducted.

Figure 5

Hypertension Management Model 1: Assumption of Normality



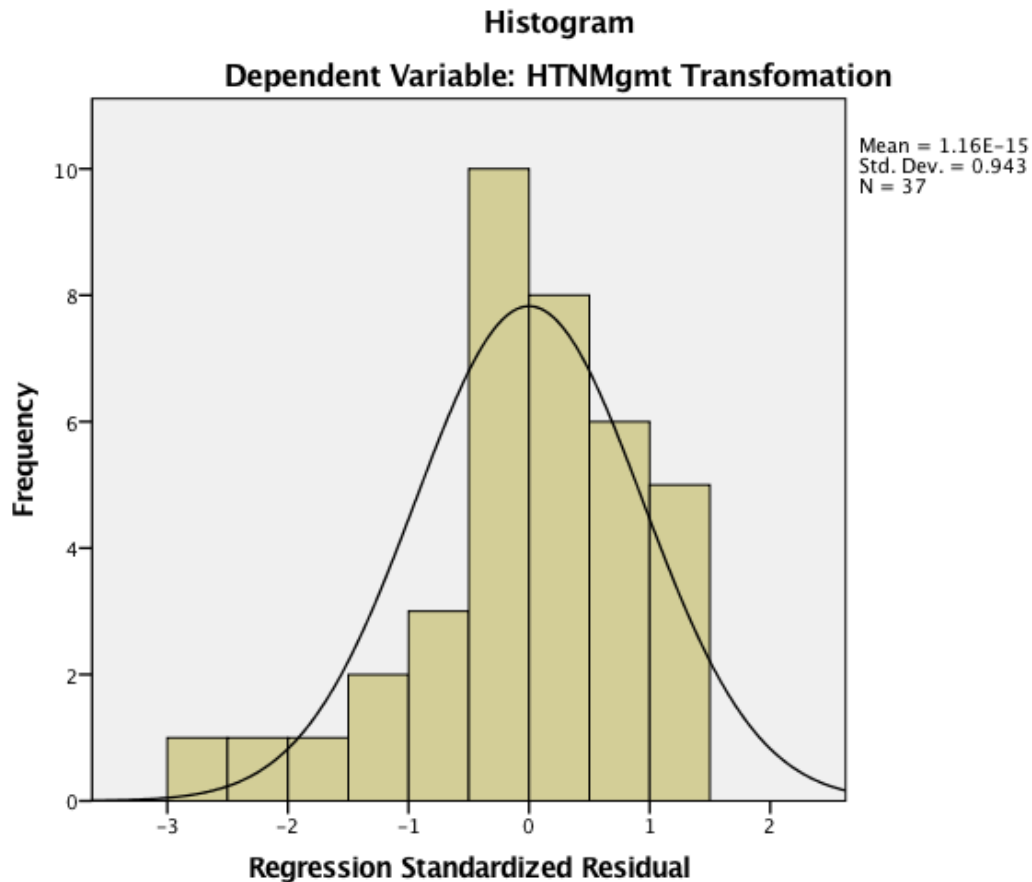
**Hypertension management - model 2: scope of practice, team, funding & hours.** Assumptions of conducting a linear regression analysis were completed in order to validate the data was appropriate for a multiple regression. An analysis was conducted to determine if it was feasible to use multiple regression analysis to predict hypertension

management rates from primary care clinic hours of operation, team, funding and RN scope of practice for hypertension management. The assumption of independence of observations was met. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.284.

There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There was one studentized deleted residuals greater than -3 standard deviations (clinic 26) and none greater than +3. There were no values for Cook's distance above 1. Although there were two leverage values greater than 0.2 (8, 25), and the one studentized deleted residual greater than -3 previously noted; the decision was made to continue with the regression analysis as removing the clinics would further compromise the limited sample size. The assumption of normality was not met, as assessed by a histogram (Figure 6). Because the data did not follow the assumptions for linear regression, and the sample size was small, multiple regression analysis was not conducted.

Figure 6

Hypertension Management Model 2: Assumption of Normality



**Summary of regression analysis.** Two models were run for hypertension screening and management to determine the overall fit of a model and to help explain the affect of the independent variables in relation to the overall variance. Scope of practice was compared with geography, funding and hours in the first model, and funding, hours and team in the second model. The assumptions for linear regression were not met with the hypertension management data, so multiple regression was not conducted on this data. The overall variation in hypertension screening was very small and the multiple regression analyses were not statistically significant.

### Chapter Summary

The majority of RNs in primary care are managing patient appointments independently within a team context as demonstrated by patients booked into the RN schedule. Consistent with the literature, the role of the RN in Manitoba is as a generalist with a vast array of care provided. Manitoba primary care clinics are staffed by a significant variety of health care professionals in addition to the RNs. This could be attributed to the limited numbers of clinics, which would decrease the generalizability of the results.

Analysis of the telephone survey and MaPCReN data was conducted. While the results of the study were not found to be statistically significant, the recorded hypertension screening results approached statistical significance with higher rates found in alternate funded clinic and in sites that were staffed by more than a physician. Further testing with a greater sample size could assist in better understanding of the variables that support the role of the RN and in understanding if the RN role in primary care affects care delivery.

While hypertension screening and management were activities conducted by RNs; there were fewer sites where the RN was involved in hypertension management. In conducting the survey there were several sites who noted hypertension management is not the current role of the RN; however, this was seen as a valuable role and several noted plans to work towards this direction. The role of the RN in hypertension management was almost exclusively related to patient education. The impact of the RN role is perhaps less due to the rather limited nature of the role. The data analysis did not reveal any statistically significant differences in hypertension screening and management rates. Despite the lack of statistically

significantly different rates, funding and team were the closest to approaching significant values for hypertension screening.

## **Chapter 6: Introduction**

As we experience an increase in the number of nurses working in primary care settings, we are faced with the impetus for creating and sustaining practice environments where primary care RNs work to their full scope of practice. When RNs are supported to work to their full scope of practice, then we can reap the benefits this profession can offer. To investigate RNs scope of practice within primary care clinics, this study explored their role, including activities in relation to hypertension screening and management. Since hypertension screening and management can be activities delivered by RNs in a primary care setting, this study examined if, in clinics where RNs were working to a fuller scope of practice, the rates for screening and management were higher. While demonstrating this finding was disappointing, results from this study shed new light on the practice of RNs in primary care within Manitoba.

Investigating RN practice activities within Manitoba primary care setting is novel. In this first study, we considered RN practice activities along with clinic environment characteristics and team composition. The chapter begins with an overview of the RN practice activities within the 37 Manitoba primary care clinics participating in this study, which is followed by addressing various clinic structural characteristics. Next, the results concerning hypertension screening and management rates are addressed. Each of these discussions of study findings is addressed in relation to current literature. Study limitations and a notable strength of the study are considered. Finally, policy and program implications are detailed along with future research ideas.

### **Discussion of RN Practice and Manitoba Clinics**



**RN roles in primary care.** The primary care RN role is emerging as an integral part of multidisciplinary teams available to provide comprehensive care delivery. While completing the telephone survey, and consistent with the literature (Joyce & Piterman, 2011; McCarthy et al., 2012), clinic managers frequently described the role of the RN in primary care as a “generalist” role. The clinic managers cited a substantial list of activities in which the primary care RN was involved. An interesting difference between the study findings and the literature were in how activities were described. The literature refers to the primary care RN as engaged in chronic disease management; however, the activities described by the clinic managers were listed in relation to a disease state such as diabetes, hypertension, lipids or asthma. It was considerably less frequent for the clinic manager to refer to the RN involved in chronic disease management as an entity.

In this study, two of the four most common types of appointments booked with the RN were related to chronic disease management (diabetes and hypertension), which is similar to what has been reported in the literature (Al Sayah, Szafran, Robertson, Bell, & Williams, 2014; Eley et al., 2013; Halcomb et al, 2014; Health Quality Ontario, 2013; McCarthy et al., 2012; Parker, Keleher & Forrest, 2011; Smolowitz et al., 2015; Voogdt-Pruis et al., 2010). The next two commonly reported activities were immunizations and cervical cancer screening. The frequency of RN involvement of cervical cancer screening among the clinics in this study was much higher than was reported previously. Of the clinics included in the study, the percent of RNs involved in cervical cancer screening (36%) was significantly higher than an earlier Canadian study (8%) (Allard et al., 2010), and is closer to the rates (40%) found in Australian studies (Joyce & Piterman, 2011). Finally, well baby/child care was also among the top most frequently reported

type of care, which was not commonly mentioned in the literature. It is difficult to explain this discrepancy between the literature and survey responses, and may simply be that this role has not been captured in previous studies concerning the primary care RN role.

The literature often refers to key primary care RN role of educator (Joyce & Piterman, 2011; McCarthy et al., 2012) and behavior change counselor (Lucky et al., 2011). Further to this, knowledge and understanding of behavior change were deemed essential for the RN to be able to support the patient. In conducting the study, education and lifestyle counseling followed chronic disease management as most frequently cited primary care RN roles. While the RN role of educator was frequently cited in the survey responses, there were no clinics in the study that identified behavior change counseling as a role the RN participated. This could be related to the manager not being aware of this area or it could be that behavior change counseling is not a part of the primary care RN role in the clinics surveyed.

Scope of practice is referred in the literature as working to the outer limits of nursing (Drennan et al., 2014; Health Quality Ontario, 2013; Joyce & Piterman, 2011; Ku et al., 2015; Smolowitz et al., 2015). For RNs to work to their outer limits of nursing, there are clinic supports needed to be in place to enable practice activities. One example of clinic level supports is dedicated administrative team members. Additional supports of time and space will be referred to later. Scope of practice is often cited in the literature in terms of role versus scope (Al Sayah et al., 2014; Eley et al., 2013; Halcomb et al., 2014; McCarthy et al., 2012; Mills et al., 2010; Voogdt-Pruis et al., 2010). Previous studies

indicate there are commonalities and differences between roles, and the differences may be contributing to the challenge in defining scope of practice.

In this study, an attempt to measure scope of practice was conducted to examine the activities of the RN in different clinics and to glean insight into the degree to which they are working to a full scope of practice. Scope of practice was calculated by identifying, and analyzing, the presence of several factors involving the RN. Scope of practice was defined as having scheduled appointments to provide care, involvement, and responsibility in care delivery of hypertension screening and management. Scope of practice was created into a binary number with advanced scope of practice present or not present. The literature review did not find a method to define or measure scope of practice, as such; this approach was utilized in an attempt to quantify scope of practice in the study. Further discussion about the role of the primary care RN and hypertension screening and management will occur.

Of the 24 clinics that had a primary care RN as part of the team, there were two clinics where the RN did not have a schedule and was described as “working alongside the physician”. It is uncertain, in these situations, if the RN was working to full scope of practice, as this study explored the primary care RN role within scheduled appointments. Of the remaining 22 clinics, almost three quarters (73%) of the clinics had primary care RN schedules for greater than three years. In these sites there is the potential for the roles to be well established considering the length of time the RN schedules existed. The test of between group differences did not find statistically significant differences between clinics with nil scope of practice and clinics where RNs worked to full scope of practice.

**Role of team composition in primary care.** Optimizing teamwork in the primary care setting through the efficient use of inter-professional care teams has been suggested to improve quality care delivery (Keleher & Parker, 2013). For this to occur, nurses and other health care providers need to be aware of what constitutes nursing scope of practice (Allard et al., 2010; Halcomb et al, 2013; Parker et al., 2011). Organizational factors cited in the literature refer to a culture of collaborative care that includes clearly defined roles. Clearly defined roles are important in enabling collaborative care with high performing teams, while conversely, a lack of role clarity has been suggested to create barriers to effective teamwork (Al Sayah et al., 2014) and underutilization of the RN role resulting in inefficient use of health care dollars (Allard et al., 2010; Drennan et al., 2014; McCarthy et al., 2012).

Scope of practice can also be impacted due to a lack of role clarity within a team setting (Keleher & Parker, 2013). The primary care RN role is relatively new and the variation that exists between settings is notable (Parker et al., 2011), all of which could contribute to role confusion and clarity issues. While there appeared to be the potential for collaborative care in the Manitoba clinics studied, where an RN is a member of the team composition, this was not consistently demonstrated in the survey responses. Attention to role clarity may further support the primary care RN role to work to a full scope of practice while optimizing the primary care teams.

Primary care reform over the past 40 years has evolved the model of care delivery in Manitoba (MCHP, 2016) to an increase in the number of clinics providing team based care. Staffing models in the Manitoba clinics surveyed are frequently comprised of a team based care model. In Manitoba, the evolution of clinic team composition from a

lone practitioner to care delivered by a team was observed in over 75% of the clinics surveyed. These clinics were operated by a health care professional in addition to the family physician. Interestingly, almost half (48.6%) of the clinics surveyed were comprised of an interdisciplinary team including, the family physician, RN, and other professional designated team members. Of the clinics that indicated they work in a team-based model, the vast majority of the team members were primary care RNs (86.5%). This team composition lends to the impression that RNs are becoming an integral part of Manitoba primary care teams.

**Role of funding model in primary care.** Unlike what has been demonstrated in other countries, the activities in which an RN engages in Manitoba primary care clinics, does not appear to be influenced by funding models (Halcomb et al., 2014; Joyce & Piterman, 2011; Parker et al., 2011). In fact, the majority of the clinics surveyed (65%) receive alternate funding. This distinction is important, as the alternate funded clinics would be less inclined to make decisions based primarily on physician remuneration. The activities the clinic manager described the RN to be engaged in were significantly greater than the few, wound care, cervical cancer screening and immunizations, identified in the literature where remuneration models were suggested to have a greater influence on the role. The RN role was found to be diverse in the clinic settings surveyed.

**Role of systemic structural supports in primary care.** Clinic level structural supports refer to items such as support staff and time dedicated to attend to the work. Further to this, systemic structural supports have been linked with supporting scope of practice (Keleher & Parker, 2013; Tobe et al., 2014). These supports were identified in the clinics studied. All of the surveyed clinics had existing team members to support

clinic operations such as receptionist and clinic manager positions. The study results were positive such that in the primary care clinics surveyed, the RN was used for clinical care purposes, and was not intended to provide administrative or managerial support. Dedicated time and space for appointments are additional examples of clinic supports to facilitate full scope of practice.

In acute care settings, there is a well-established set of indicators including RN level of education, certification status, work environment, staffing models and RN to patient ratio indicators that have been demonstrated to be associated with positive patient outcomes (Aiken, 2014; Aiken et al., 2011a; Aiken et al, 2011b; Aiken, Shang, Xue, & Sloane, 2013; Kelly, McHugh, & Aiken, 2011; Kendall-Gallagher, Aiken, Sloane, & Cimiotti, 2011; Kutney-Lee, Sloane & Aiken, 2013; Lucero, Lake, & Aiken, 2009). In an attempt to gain insight into the indicators that support positive patient outcomes in primary care settings, this study examined the interrelationships between team composition, scope of practice, funding, geography, and hours of operation.

### **Discussion of Hypertension Screening and Management**

**Hypertension screening.** Patients who are cared for by a RN for hypertension screening has equal or better control than the traditional physician care model (Shaw et al., 2014; Vallejo-Torres & Morris, 2011). The literature concerning the RN role in hypertension screening suggests that education delivered by RNs can have a direct influence on prevention (Lucky et al., 2011). In addition to this, Hypertension Canada guidelines (2018) recommend a blood pressure should be taken at all appropriate visits and assessed at yearly intervals. This study investigated if RN involvement in hypertension screening affected rates of screening. In the study, documented screening

blood pressure rates ranged from 9% to 89%. We were curious about the factors that contributed to this variance.

While RNs were frequently involved in hypertension screening, there was a difference between clinics in the degree of independence of actions for this activity. Less than half of the clinics that had RNs involved in hypertension screening provided care independently while one quarter of the clinics reported the RN role did not make any independent decisions. The remaining 25% were a blend where they exhibited a range of independence. In the survey, the role of RNs in hypertension screening demonstrated less of an autonomous role in comparison with that described in the literature.

Hypertension screening was not consistently described as an autonomous role. This was evidenced in statements such as “the provider determines the normal BP for the patient”. These findings suggest there may be inefficient use of health care dollars as a result of underutilization of the RN and potential need for discussion surrounding roles and role clarity.

The study results suggested that there are clinics where RNs are not working to their full scope of practice. Depending on the patient’s blood pressure on first visit, there may be up to four or five visits that follow to determine if the person has hypertension (Hypertension Canada, 2018). The RN, working to their full scope of practice, can be the provider to manage these visits. The study suggests there are missed opportunities for RN involvement and responsibility and further exploration of the concept of substitution may assist in supporting scope of practice to avoid overlap and duplication (Griffiths, Murrells, Maben, Jones & Ashworth, 2010; Martinez-Gonzalez et al., 2014; Pearce et al., 2011). The literature suggests RN substitution in the areas of chronic disease

management result in equal or better patient outcomes (Shaw et al., 2014; Vallejo-Torres & Morris, 2011) and noted further research into substitution is needed to obtain a greater understanding of this. In situations where the family physician and primary care RN are both involved in identical patient care, there is the possibility where one member did not work to their full scope of practice. In these situations, underutilization of roles may exist. Duplication of roles has the possibility of decreasing efficiency and minimizing the RN scope of practice.

In examining the data in relation to funding model, there were differences found based on how the clinic was remunerated. While funding did not appear to influence the activities of the RN, the type of funding model demonstrated differences in the rate of hypertension screening. Greater rates of hypertension screening were observed with clinics that were alternatively funded compared with the fee-for-service clinics. While this difference in hypertension screening rates for fee-for-service and alternate funded clinics was close to approaching statistical significance, the data did not achieve statistically significant differences in the variables studied. Fee-for-service clinics are primarily comprised of a family physician, compared to alternate funded clinics that have a team component that could influence screening rates.

In examining team composition and screening rates, greater hypertension screening rates were observed in clinics with an RN. When examining hypertension screening rates, clinic funding model and team composition both approached statistically significant differences. In the clinics with team members greater than a physician, NP or RN, there was a vast array of other professionals who supported patient care in a clinic context. Clinics with a team composition greater than a just a family physician also



demonstrated higher hypertension screening rates. The similarity of these results is not surprising. Funding model frequently influences the team composition and as such is closely related.

Funding model and team composition appeared to be relatively closely associated. The alternate funded clinics tended to have a more diverse team composition or, at the very least, contained another professional team member. This is quite different when compared with the traditional fee-for-service clinics. Fee-for-service clinics are managed as a private business, most often by a family physician. Historically, in private clinics, there has not been funding for other professional care team members besides support staff. As such, the findings that funding model and team composition were both close to statistically significant would lend support to the validity of the results as these two indicators tend to be interwoven.

**Hypertension management.** Previous research suggests that when RNs are involved in care of chronic disease management, patient control of the disease is equal or better than when no RN is involved in care (Health Quality Ontario, 2013; Voogdt-Pruis et al., 2010). Similar findings have been reported for when RNs are actively managing hypertension as part of an inter-professional care team (Al-Motlaq, Mills, Birks & Francis, 2010; Hoare, Mills & Francis, 2012; Maciejewski et al., 2014; Tobe, Lum-Kwong, Von Sychowski & Kandukur, 2013; Tobe et al., 2014). In this thesis, this type collaborative care approach was less evident with the RN role for hypertension management. While the RN role in hypertension screening was noted, there were considerably fewer clinics reporting RN involvement in hypertension management. As well, the primary care RN role consisted primarily of patient education of topics such as

lifestyle, diet, weight management, medications, laboratory test results and blood pressure.

The study found the primary care RN was involved in hypertension management (68%) less often compared with hypertension screening (86%). When the RN was involved in hypertension management, the role was substantially limited compared to the role in hypertension screening. When the clinic managers described the roles, 10% of the sites surveyed indicated an independent role for the RN in hypertension management. Forty percent of the clinics indicated the primary care provider predetermined the activities the RN would provide with patients. While several sites indicated hypertension management is an area they intend to introduce to their team, many clinics did not have the RNs actively involved in this role.

The literature notes the concerns that inefficient use of health care dollars can occur through underutilization of the primary care RN role (Allard et al., 2010; Drennan et al., 2014; McCarthy et al., 2012). Satisfaction of patients and nurses, as well as patient outcomes are negatively impacted when primary care RNs do not work to their full scope of practice. There were clinics that cited the role the RN played in hypertension management was exclusively restricted to taking a blood pressure. This situation as described is suggestive of underutilization of the primary care RN where the nurse is not working to the outer limits of their scope. The lack of an independent role is very different than the role described in the literature where RN, working to a full scope of practice, would take an active role in assessment, education and behavior change counseling. The findings highlight underutilization of the primary care RN role and the

opportunity for improving care delivery when an RN is part of the clinic team composition.

### **Summary of Findings**

The model of primary care has evolved over the past number of decades to include a variety of health care professionals, with RNs comprising the most common team member. Many activities exist for a primary care RN, within a team environment, to contribute towards supporting comprehensive care delivery. Chronic disease management, particularly hypertension and diabetes, was the most frequently reported role the primary care RN is providing. While the literature noted a robust role for primary care RNs in regards to hypertension, the study findings found this was not consistent in all clinics in the study.

Study findings suggest there are benefits to be gained through further exploration of, and supports for, the primary care RN role and scope as it pertains to hypertension. The areas of role clarity, education and training plus role development are possible areas to be further explored to assist nurses to work to their full scope of practice. Further to this, an emphasis on efficient use of teams, including clearly defined roles, may be needed to support the optimization of quality care. With the end of the RN Act and the move to the RHPA, RN roles have the potential to become more defined and enhanced. The literature refers to the primary care RN substituting the care of another provider as an effective and efficient way to use teams (Shaw et al., 2014; Vallejo-Torres & Morris, 2011). This study highlighted the missed opportunities and duplication of roles where the RN is involved and suggests there are opportunities to minimize underutilization of

resources. This suggests there is an opportunity for optimizing primary care RN roles to improve utilization and efficiency.

### **Study Limitations and Strength**

In designing and conducting a research study, there are many decisions to be made and each will inevitably lead to study limitations and/or strengths. This thesis is no different, and below are four study limitations addressed along with a noteworthy strength.

First, the small sample of clinics that participated influences the power of the statistical analysis. Small sample sizes can lead to Type II errors and also produce inaccurate results (Polit & Beck, 2012). The higher power of the test increases the probability of rejecting the null hypothesis (Kellar & Kelvin, 2013). Thus, while no statistical significance was found with the regression modeling, this may be due to the small sample size rather than actual differences.

Limitations were present with survey instrumentation. The survey was developed for this study and through conducting the study some measurement concerns were identified. The information regarding type of appointment booked at each clinic was possibly not all-inclusive. Responses depended on the clinic manager being aware of the appointment types and to recall and provide them during the telephone survey. Many appointments were specific to the task and there was the potential for overlapping terms such as diabetes and insulin start. Beyond these, there were limitations associated with data collection procedures. The telephone survey was conducted with the manager, not a primary care RN, and it is possible not all of managers had an in-depth understanding of the role of the RNs.

The study focused on clinics that are currently participating in the MaPCReN. This population of clinics may not be representative of all clinics in the province. The clinics in this study tended to be those who were involved in provincial and national initiatives including the MaPCReN which was evident by the percent of fee-for-service clinics received funding from government initiatives (such as MyHealth Team and Inter-Professional Team Demonstration Initiative ITDI). The ratio of alternate funded clinics (65%) compared with fee-for-service clinics (35%) in the study is substantially different when compared with the provincial ratio. In Manitoba, the ratio of fee-for-service clinics is 75% compared to 25% of the clinics with an alternate funding model (personnel communication, Laura Morrison). This discrepancy in representation suggests study findings might have generalizability limitations with primary care clinics in the province.

While data extraction from EMRs can provide information on the contribution of the various members of the health care team (Joyce & Piterman, 2011), challenges with accuracy and quality using EMR data for evaluation have been documented in the literature (Barkhuysen et al., 2014; Maciejewski et al., 2014). Limitations with the MaPCReN data were found with both hypertension screening and management indicators. As the MaPCReN data can only report on test results that have been documented in particular fields, this leaves uncertainly if the test was not completed or not recorded in a location for data extract. The rates of completion of some lab tests were very low and, as such, the accuracy of this data is suspect. Considering documented completion rates for some tests were surprisingly low, this creates uncertainty over the integrity of the data for evaluation purposes. While a large data set is advantageous in

providing sufficient volume of information, a challenge ensues when questions arise about data accuracy.

Even when removing the issues associated with the lab tests as discussed above, the rate of testing that is manually entered into the EMR, such as blood pressure and BMI, remained considerably lower than what was expected based on current guidelines for care. While these questions about the indicators exist, the small number of clinics where RNs were involved further compromised the understanding hypertension management. The small sample size and issues with data prevented a robust analysis of the variables.

Strength of this study was the successful collection (91% of clinics) of information to enhance an understanding of team composition in Manitoba primary care clinics participating in the MaPCReN, information on care provided by RNs, and frequency of involvement in hypertension screening and management. This thesis is the first study known to examine clinic factors to gain a better understanding of primary care settings in Manitoba. These contributions to the literature assist in future studies of organizational attributes and nursing contributions in Manitoba primary care settings.

### **Policy and Program Implications**

The RN role has become more prominent in primary care clinics as demonstrated by 89 primary care RNs working in the study clinics. As this role becomes more common, it is important their role be effective and efficient, applying evidence based care for optimum outcomes and economic value. In conducting the survey, there was limited identification of guidelines and no reference to the use of algorithms to direct hypertension care delivery and support RN scope of practice. The literature suggests

there is a direct effect on the outcomes of care delivered when RNs follow algorithms and guidelines (Clark, Smith, Taylor & Campbell, 2011; Ishani et al., 2011; Keleher & Parker, 2013; Maciejewski et al., 2014; Shaw et al., 2014; Vallejo-Torres & Morris, 2011). The use of guidelines and algorithms could be considered as a to support the scope and role of the primary care RN.

The implementation of guidelines or algorithms needs to be introduced with a consensus surrounding the indicators that the results will be evaluated against. Hypertension Canada suggests a blood pressure should be taken at every appropriate visit. This is the standard that was used for this study. Different guidelines though exist in the literature. The Pan-Canadian Health Care Indicators, for example, utilizes the indicator of blood pressure screening over a two-year period (Canadian Institute for Health Information, 2006). Consistency in agreement on guideline would be imperative to ensure standardized measures for evaluation.

The study findings suggest there is a need for enhanced clarity surrounding roles and role expectations to minimize duplication and underutilization. Role clarity is suggested to lend support to maximizing each health care provider's scope of practice and enhances the inter-professional nature of primary care settings (Keleher & Parker, 2013). RNs and health care professionals may benefit from a better understanding of their respective scope of practice to minimize duplication and facilitate efficient, quality care delivery. With this knowledge, there is an opportunity to further examine the concept of substitution of roles and the benefits that could be achieved with this type of model in primary care in Manitoba. As clinics indicated an interest in developing the RN role to support hypertension management this investigation into substitution is be timely.

The literature suggests key facilitators of role development, professional education, and training are required to optimize skills for primary care RNs as they enter into the primary care environment. A focus on development is suggested to support change in practice and have a positive effect in these settings (Allard et al., 2010; Al Sayah et al., 2014; Eley et al., 2013; Halcomb et al., 2014; Joyce & Piterman, 2011; McCarthy et al., 2012). As we see increasing numbers of primary care clinics staffed by interdisciplinary teams, access to information for team members to support work relationships, will become more important. Enhanced role expectations of RN practice are more likely to occur in settings where leadership supports inter-professional collaboration (Hoare et al., 2012; Keleher & Parker, 2013). It is advantageous for employers and nursing leaders to advocate for work environments where RNs are supported to practice to their full scope of practice, including the time and resources to accomplish this. Leadership can influence organizational structures with role expectations, promote a culture of collaborative care, and advocate for high functioning teams.

The literature suggested government policies that incentivized primary care settings to achieve positive patient health outcomes demonstrated improvements over countries that did not adopt similar policies. In these countries, nurses played a significant part in meeting criteria and these goals (Hoare et al., 2012). It has been suggested the government policies that rewarded practices for achieving set health indicators, and utilized nursing role in this goal setting, demonstrated greater rates of meeting deliverables such as clinical practice guidelines than countries that did not include incentive based policies. These practices need to be used with caution to



minimize unintended consequences and further exploration would be required prior to proceeding.

Studies demonstrate the effectiveness of RNs in primary care. The policy and program implications listed above are worthwhile endeavors to consider. In a time of increased fiscal constraint and focus on accountability, it becomes increasingly important that the primary care RN role is utilized to support quality care delivery and influence positive outcomes. Effort and intention on improvement and are necessary to garner the benefits of RNs in primary care and the benefits associated with this profession.

### **Future Research Directions**

Consideration of examining clinics beyond the province of Manitoba would be helpful to avoid limitations of small sample sizes. Given that the CPCSSN is pan-Canadian, future studies that include another, or several other, provinces would be useful and likely address the limitation of small sample sizes. In addition, the survey instrument could be further developed, in particular, variables that might influence nursing scope of practice. While funding and team composition were nearing statistically significant differences; the other factors of geography, hours and scope of practice were not. Further studies should explore factors that influence care delivery to gain an understanding as we have in acute care settings. The literature suggests culture, education and training, use of algorithms and staffing levels influence outcomes. Further research in these areas could help to better understand these factors and the interplay between them.

The location of the clinics was included in the study. The literature indicated that the role of the RN in screening and chronic disease management role is perhaps more accepted in rural locations where the delivery of care is more frequently provided by RNs

(Al-Motlaq et al., 2010). While almost 38% of the clinics in the study were outside of Winnipeg, the data did not demonstrate statistically significant differences between hypertension screening or management rates based on location. Perhaps further analysis including distance from nearest primary care clinic to a defined urban centre may lend itself to better identifying the impact of location on hypertension screening and management rates.

While the literature did not identify the influence of clinic hours of operation on care delivery and outcomes, it was hypothesized that clinics open outside of the traditional weekday daytime hours could experience greater rates of hypertension screening and management. Nurses historically have worked non-traditional hours and as such, this variable was included. While there were greater rates of hypertension screening when clinics were open evenings and weekends, the results of this study did not demonstrate statistically significant differences between the clinics with extended hours of operation. Further studies into examining the impact of hours of operation may be helpful to better understand the implications of providing primary care in extended hours.

In Manitoba, the nursing profession moved from the RN Act to the RHPA effective May 31, 2018 (CRNM, n.d.). Under the RHPA, primary care RNs will be able to independently provide reproductive health, travel health and sexually transmitted infection testing and treatment. There has been some discussion about the role of the primary care RN in the assessment and treatment of chronic diseases. Further studies into the RN role and factors that influence care delivery will be important as this role expands in the future. This information can be used to inform and direct improvements

to care delivery models. If we could further demonstrate that primary care RN involvement improved rates we would have evidence to support continued presence of the role and ultimately benefit the populations we care for.

### **Conclusion**

Primary care RNs comprise a small but growing proportion of nurses in Canada. As the addition of RNs in primary care settings is becoming more common, there is an increasing need to better understand the role and the factors in the health care setting that support the RN and influence the outcomes. Primary care RNs work in diverse health care settings and as such workplace role expectations vary. This role has the potential to be integral in supporting comprehensive care delivery in this environment. This study takes a unique approach, which had not been found in the literature, to try to gain a better understanding of the primary care setting for the MaPCReN participating clinics. The study presented within this thesis identified the need for further investigation of role clarity, with a focus on minimizing duplication to support utilization of the primary care RN role and teams working in the primary care environment. It is prudent to support primary care RNs to work to their full scope of practice, particularly in times of fiscal constraint and increasing patient care demands. It is essential for health care settings to implement strategies to support primary care RNs and teams. In the future it may be important to examine the primary care RN role with a focus on the factors that shape the practice and outcomes on a larger scale in order to better understand the variables affecting the role of the RN in primary care.

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**Appendix A**  
**Clinic Telephone Survey Script**

**A letter of invitation was sent to you recently regarding a thesis study occurring in Manitoba primary care clinics participating in the Canadian Primary Care Sentinel Surveillance Network. The study is investigating the degree to which RNs are supported to work to a fuller scope of practice is associated with hypertension screening and management rates. As noted in the invitation letter, I am now conducting telephone contact.**

**Is this a good time to discuss this study? If no, what time would be convenient? If yes, proceed.**

**Did you get a chance to review the Letter of Invitation and Consent Form?**

**If no, would you like to review this and we can set up a time for an interview? Or would you like to me to read the letter of invitation now?**

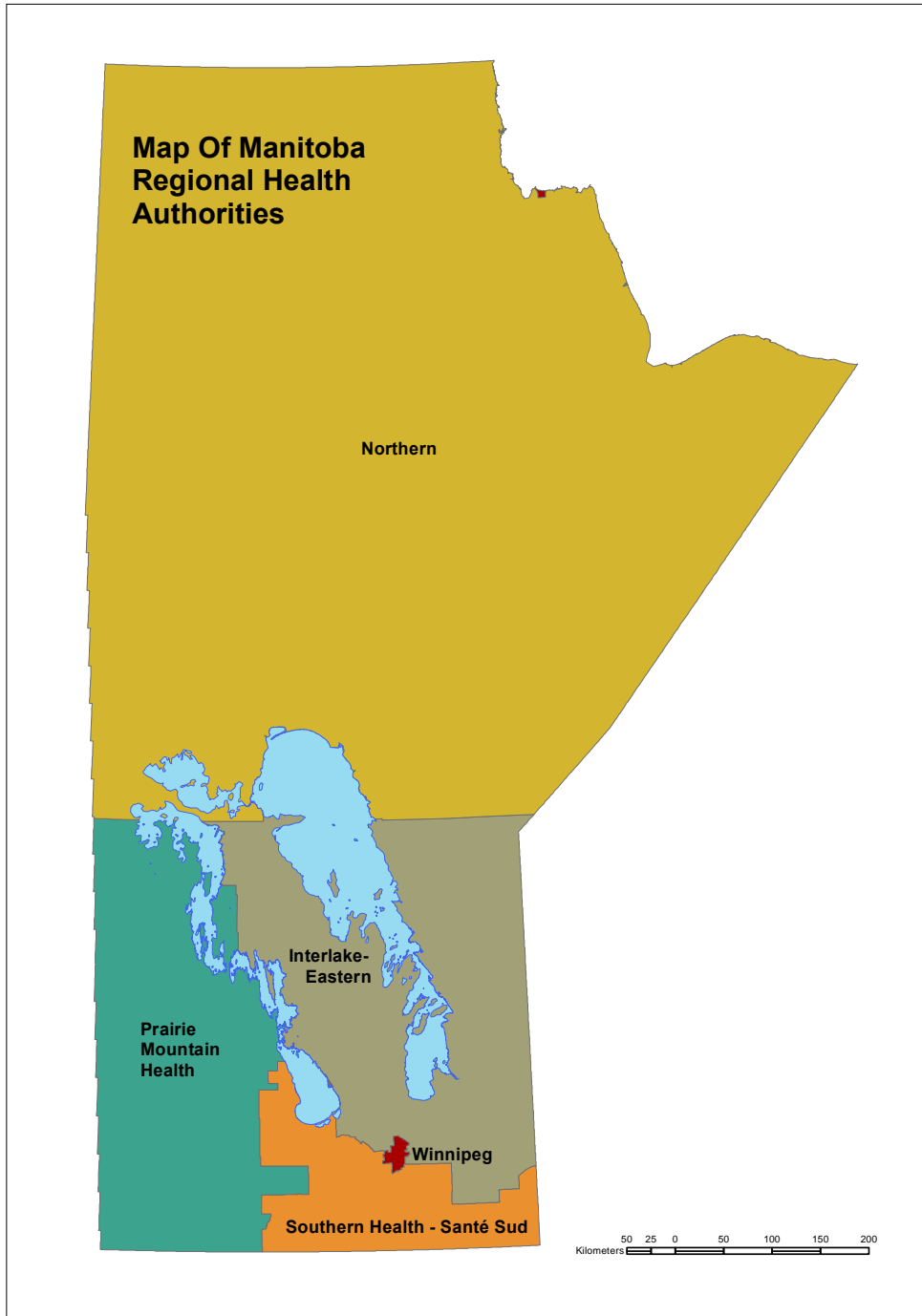
**If yes, do you have any questions? (Read consent form.)**

**Do you consent to complete this survey? Y\_\_N\_\_**

**Confirm Clinic Name: \_\_\_\_\_**

**Role: Manager/Person in Charge/Other: \_\_\_\_\_**

### Appendix B Regional Health Authority Map



## **Appendix C**

### **Letter of Invitation to Participate in Survey**

My name is Jo-Anne Lutz and I am a graduate student in the College of Nursing with the University of Manitoba. This letter is being sent to Manitoba primary care clinics participating in the Canadian Primary Care Sentinel Surveillance Network (CPCSSN).

For my Master's thesis, I am conducting a study to investigate RNs working to a full scope of practice in association with hypertension screening and management rates. Dr. Annette Schultz of the College of Nursing, Faculty of Health Sciences at the University of Manitoba is my advisor for this study. This letter of invitation intends to provide a basic idea of the research study and your participation. If you would like more information or details not included here, you should feel free to ask me or by contacting Dr. Schultz. Please take the time to read the information carefully. This study has been reviewed and granted ethical approval from the University of Manitoba Education and Nursing Research Ethics Board (ENREB).

For Manitoba clinics eligible to participate in my thesis study, the clinic manager or person in charge of participating CPCSSN clinics are being contacted by email invitation. Your clinic has been deemed eligible to participate. Your contribution will entail completing a brief (5-10 minute) telephone survey interview. The survey asks questions about the clinic operations including staff composition, roles, and hours of operation. I have attached a copy of the survey for your information.

Participation in this study may not be directly beneficial to you. The information collected during this study may provide insight into nursing scope of practice and screening rates which will be useful to health care services delivery decisions. Participation in this study is voluntary and you can withdraw at anytime in the study without consequence to yourself or this clinic. There is minimal risk to you or the clinic as a result in participating in this study. Consent to participate in this study includes verbal confirmation prior to completing the telephone survey, and completion of a written statement of consent following the survey.

Confidentiality of your specific responses will be maintained. The only people with access to the actual survey data for the purposes of this study will be Jo-Anne Lutz and Dr. Annette Schultz. Study data will be electronically encrypted and kept for seven years and then destroyed December 2023 using confidential disposal. In addition, the Manitoba Primary Care Research Network (MaPCReN), the local CPCSSN has requested obtaining data collected through this telephone survey method, which will then become data collected from all MaPCReN participating clinics. Beyond this, when reporting study results, under no circumstance will your identity, nor the identity of this clinic, be revealed. Presentation of study findings will be presented in group form so as to protect individual clinic identify.

I will contact you by phone in the near future to either conduct the telephone survey interview (5-10 minutes) or to set a time to conduct the telephone interview. If we do not connect at that time, I will make three additional phone calls and send a final email.

If you have any questions please feel free to contact: Jo-Anne Lutz at [lutzj@myumanitoba.ca](mailto:lutzj@myumanitoba.ca) or [REDACTED]; or Dr. Annette Schultz, PhD, RN, College of Nursing at [annette.schultz@ad.umanitoba.ca](mailto:annette.schultz@ad.umanitoba.ca) or 204 258-1311. If you have any complaints about this project you may contact any of the above named persons or the Human Ethics Coordinator at 204 474-7122 or email [humanethics@umanitoba.ca](mailto:humanethics@umanitoba.ca). The University of Manitoba, Education and Nursing Research Ethics Board (ENREB) may review research related records for quality assurance purposes.

On a final note, if you are interested in receiving a copy of a brief report concerning study findings, please indicate your interest during our telephone contact. I will collect the appropriate contact information, which will be stored separately from your survey responses.

Thank-you for your interest in sharing your information and contributing to the success of this study.

Jo-Anne Lutz, College of Nursing, University of Manitoba, Master's Student, Email:

[lutzj@myumanitoba.ca](mailto:lutzj@myumanitoba.ca) Phone: [REDACTED]

Dr. Annette Schultz, College of Nursing, University of Manitoba, Advisor Email:

[annette.schultz@ad.umanitoba.ca](mailto:annette.schultz@ad.umanitoba.ca) Phone: 204 258-1311

## **Appendix D Informed Consent Form**

**Research Project Title:** Hypertension screening and management: Does primary care nurse involvement affect care delivery?

**Principal Investigator:**

Jo-Anne Lutz, RN, Graduate Student, College of Nursing, Faculty of Health Sciences, University of Manitoba

Email: [lutzj@myumanitoba.ca](mailto:lutzj@myumanitoba.ca)

Cell: [REDACTED]

**Research Advisor:**

Dr. Annette Schultz, Associate Professor, College of Nursing, Faculty of Health Sciences, University of Manitoba (Advisor)

Email: [Annette.Schultz@umanitoba.ca](mailto:Annette.Schultz@umanitoba.ca)

Phone: 204 258-1311

Fax: 204 233-7214

**This consent form is only part of the process of informed consent. It should give you a basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Participation is voluntary and declining to participate will have no negative consequences. Please take the time to read this carefully and to understand any accompanying information.**

**Purpose of Study**

This is a thesis project by a graduate student to investigate RNs working to a full scope of practice in association with hypertension screening and management rates. You were selected to partake in this study as Manitoba clinics participating in the Canadian Primary Care Sentinel Surveillance Network (CPCSSN) clinics are being invited to this survey.

If you agree to participate in this study, you will be asked about basic clinic operations questions such as staff mix, hours of operation and the role of nursing in hypertension screening and management. The questions are not sensitive in nature. Please note you do not need to answer these (or any) questions if you do not want to and you are free to withdraw from the study at any time.

**Risks and Discomforts**

There is minimal risk to you or the clinic as a result in participating in this study.

**Benefits**



Participation in this study may not be directly beneficial to you. The information collected during this study may provide insight into nursing scope of practice and screening rates which will be useful to health care services delivery decisions.

### **Voluntary Participation/Withdrawal**

Participation in this study is voluntary and you can withdraw at anytime in the study without consequence to yourself or this clinic. Consent to participate in this study includes a review of the consent, and completion of a written statement of consent. Your written statement of consent indicates you have understood to your satisfaction the information regarding participation in the research project and agree to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequences.

### **Confidentiality**

Confidentiality of your specific responses will be maintained. The only people with access to the actual survey data for the purposes of this study will be Jo-Anne Lutz and Dr. Annette Schultz. Study data will be electronically encrypted and kept for seven years and then destroyed December 2023 using confidential disposal. In addition, the Manitoba Primary Care Research Network (MaPCReN), the local CPCSSN has requested obtaining data collected through this telephone survey method, which will then become data collected from all MaPCReN participating clinics. Beyond this, when reporting study results, under no circumstance will your identity, nor the identity of this clinic, be revealed. Presentation of study findings will be presented in group form so as to protect individual clinic identify.

### **Study Results**

If you are interested in receiving a copy of a brief report concerning study findings, please indicate your interest during our telephone contact. I will collect the appropriate contact information, which will be stored separately from your survey responses.

**The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way. This research has been approved by the Education and Nursing Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project, you may contact the Human Ethics Coordinator (HEC) at 204 474-7122 or by email at [humanethics@umanitoba.ca](mailto:humanethics@umanitoba.ca) .**

If you have any questions about this research, feel free to phone or email me (see above).

Jo-Anne Lutz, College of Nursing, University of Manitoba, Master's Student

Dr. Annette Schultz, College of Nursing, University of Manitoba, Advisor

**Appendix “E”**  
**Participant Survey - Clinic Telephone Survey**

**Clinic Name:** \_\_\_\_\_

**RHA: Winnipeg, Southern, Northern**

**Do you consent to complete this survey? Y\_\_N\_\_**

1. At your clinic, do you have a receptionist? \_\_\_\_\_ If yes, what are their hours? \_\_\_\_\_
  
2. Is there a full time clinic manager or person in charge role? \_\_\_\_\_ If not full time, is there a part time person in charge? \_\_\_\_\_ Or other? \_\_\_\_\_
  
3. Can you tell me about the staff mix of health care professionals in the clinic? How many of each type of provider:
  - a. MD
    - i. Full time \_\_\_\_\_
    - ii. Part time \_\_\_\_\_
    - iii. Casual \_\_\_\_\_
  - b. NP
    - i. Full time \_\_\_\_\_
    - ii. Part time \_\_\_\_\_
    - iii. Casual \_\_\_\_\_
  - c. RN
    - i. Full time \_\_\_\_\_
    - ii. Part time \_\_\_\_\_
    - iii. Casual \_\_\_\_\_
  - d. Other health care professionals \_\_\_\_\_
  
4. For clinics with RNs - Do registered nurses at your clinic have a schedule to see patients? [yes/no] If yes, for how long have RNs had a schedule to see patients?
  - i. Less than 6 months
    - i. ii. 6 – 12 months
    - ii. 1 – 3 years
    - iii. > 3 years
  
5. For clinics with RNs – What type of appointments are booked?  
 \_\_\_\_\_

6. As you know, this study is interested in hypertension screening and management. Can you please tell me the procedure for hypertension screening at this clinic.
- 

For clinics with RNs:

- a. In your clinic, how often are RNs responsible for hypertension screening in patients age 18 or older? Never (0); Rarely (1); Frequently (2); Usually (3); Always (4)
- b. If RNs are involved in hypertension screening, how often would this be part of their scheduled appointments?  
Never (0); Rarely (1); Frequently (2); Usually (3); Always (4)

7. Please tell me the procedure for hypertension management at this clinic.
- 

For clinics with RNs:

- a. In your clinic, how often are RNs responsible for hypertension management in patient's age 18 or older? Never (0); Rarely (1); Frequently (2); Usually (3); Always (4)
- b. If RNs are involved in hypertension management, how often would this be part of their scheduled appointments?  
Never (0); Rarely (1); Frequently (2); Usually (3); Always (4)

8. What are your clinic hours of operation? \_\_\_\_\_
- a. Do you have scheduled appointments in the evenings? [yes/no]
  - b. Do you have scheduled appointments on the weekends? [yes/no]

9. Type of clinic
- a. Privately operated \_\_\_\_\_
  - b. RHA operated \_\_\_\_\_
  - c. Community agency \_\_\_\_\_

10. Is there anything else you would like to tell me about?

- a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Would you be interested in receiving a copy of a brief report on this study once completed?

Confirm email address to send report to. \_\_\_\_\_

\*Survey developed with committee recommendations and based on literature.

**Appendix F****Written Confirmation of Consent**

Thank you for participating in this study. Written confirmation of consent is necessary for your information to be included in this study.

Please complete the written confirmation of consent, by filling in the two blank sections with your name, and email the completed document back to the principal investigator, Jo-Anne Lutz at [lutzj@myumanitoba.ca](mailto:lutzj@myumanitoba.ca).

I, \_\_\_\_\_, have reviewed the consent form, which has been discussed with Jo-Anne Lutz; based on this, I \_\_\_\_\_ give my informed consent to participate in this study.

Thank you for your participation in this study.

**Table 20. Characteristics of Papers: Scope of Practice**

<b>Author and year</b>	<b>Country</b>	<b>Method and Study Site/Setting</b>	<b>Objectives or Aim Sample</b>	<b>Intervention</b>	<b>Results highlights</b>	<b>Conclusions</b>	<b>Framework S, P, O</b>
Al Sayah, Szafran, Robertson, Bell & Williams, 2014	Canada/ Primary care setting	Qualitative research study	Investigated nurses' roles and perspectives on factors influencing inter-professional teamwork within primary care setting	No intervention	Study highlights need for effective preparation of roles including orientation, role clarity and communication to support increased scope of practice and responsibility	Further research is needed to understand team effectiveness in primary care settings	No framework used; finding is structure related
Allard, Frego, Katz & Halas, 2010	Canada/ Primary care setting	Quantitative research	A review of family practice residency training programs to determine nursing time spent engaged in nursing activities versus non-nursing activities	No intervention	There are opportunities to optimize RN role and standardize practice; employers to maximize time spent in nursing activities; standardization to raise awareness of	RNs in family practice are under-utilized, engaged in non-nursing activities, have limited support for roles and have limited opportunities for continuing	No theoretical framework used; finding is structure related

					the role	education or training	
Drennan, Grant & Harris, 2014	United Kingdom/ Family practice settings	Secondary data analysis	Nurse prescribing has been in effect for over 20 years with increasing scope of prescribing, most recently in 2006.	No intervention	Despite the introduction of nurse prescribing, there has been limited increase in prescribing; potentially due to lack of employer support or access to mentor	Further investigation into nurse prescribing in relation to efficiency, improved access and cost effectiveness for certain patient populations	No framework; structure related finding
Eley, Patterson, Young, Fahey, Del Mar, Hegney, Synnott, Mahomed, Baker, & Scuffham, 2013	Australia/ Family practice setting	Mixed methods (grounded theory)	Trial of nurse-led chronic disease management in general practices	Nurses trained in chronic disease management placed in GP practices	Education supported confidence and capability in role;	Further investigation to determine extent of benefit of nurses supporting patients with chronic disease over a greater number of practices and over longer periods of	No framework; structure related findings



						time	
Halcomb, Peters & Davies, 2013	Australia/ Family practice setting	Qualitative research study/family practice setting	Consumer perception of general practice nursing and satisfaction with care was explored in light of the substantial growth and development in nursing services provided in family practice.	No intervention	This study, consistent with prior research, demonstrates patients' satisfaction with health care delivery by a nurse in family practice setting	There is a need for improved communication with the public about the role and scope of practice; this may lead to further studies about acceptability and satisfaction from consumers	No theoretical framework / structure related finding
Halcomb, Salamonson, Davidson, Kaur & Young, 2014	Australia/ Family practice setting	Quantitative survey of nurses	Understand the increase in family practice nurses and explore trends in role	No intervention	Access to training and education seen as essential to the expansion of the role	Increasing the specialization of nursing in primary care, and promoting inter-professional models important consideration	No framework; structure

						s	
Health Quality Ontario, 2013	Canada/ Primary health care settings	Meta-analysis	Study explored the effectiveness of specialized nursing practice in chronic disease management	No intervention	In relation to coronary artery disease, the study showed significant increase in proportion of patients with controlled blood pressure with family practice nurse role	Unclear whether improved quality of life or physician workload occurs as a result of registered nurses in these roles and settings	No framework; structure and processes included in study
Joyce & Piterman, 2011	Australia/ Primary care setting	Quantitative surveys of nurses and nurse/patient encounters	The role of the nurse in general practice settings is general unknown; this study's aim is to obtain greater understanding of the role	No intervention	Study notes educational strategy required to support development of workforce;	Future studies including the use of electronic medical records could assist with understanding contribution of different health care providers	No framework; process related study
Ku, Frogner, Steinmetz & Pittman,	United States/ Family practice setting	Administrative data review	Factors of site (rural versus urban), team composition	No intervention	Review of administrative data suggests greater use of	Staffing patterns to be further explored to	No framework; structure related

2015			and scope of practice laws form studied to understand important determinants of team composition		non-physician staff could enable more patients to be seen; Barriers are insurers or payment models for nursing care.	obtain greater understanding of the factors that support better patient outcomes or greater patient satisfaction	study
McCarthy, Cornally, Moran & Courtney, 2012	United Kingdom/ Primary care setting	Quantitative/ Descriptive cross-sectional survey	The aim was to explore the role, competence and education or training needs from the nurse and family physician perspective and to highlight any discrepancies	No intervention	Role clarity and role development needed	Global shift from secondary to primary care; implications for training and education for nurses in these settings	No framework; structure and process related study
Mills, Francis, Birks, Coyle, Henderson & Jones,	Australia/ Primary health care settings	Qualitative multiple case study	Study explores the role of the registered nurse working in	No intervention	Role clarity, relationships, and communication were found essential;	Greater understanding between Indigenous health workers and	No framework; structure related

2010			remote or isolated areas in order to describe role and scope of practice			nursing roles are important; in particular, the health workers understanding of the scope of nursing to implement appropriate model of services and care	
Parker, Keleher, & Forrest, 2011	Australia/ Primary care setting	Quantitative and qualitative survey	Scope of nursing role reviewed	No intervention	Greater understanding of scope, including clear definitions of scope, contact with professional bodies	Further studies are needed to clarify scope of practice for roles and how scope relates to educational preparation and competency standards	No framework; structure related study
Smolowitz, Speakman, Wojnar, Whelan, Ulrich,	United States/ Primary care settings	Qualitative	Study to explore the utilization and contribution of RNs in a	No intervention	The addition of RNs who practice to full scope in a primary health	Education to prepare RNs to work in primary health care	Appreciative inquiry framework; structure related

Hayes & Wood, 2015			primary health care setting		care setting provides measurable value specific to quality care and cost savings.	settings to directly affect outcomes of care and the care environment	study
Voogdt-Pruis, Beusmans, Gorgels, Kester, & Van Ree, 2010	Netherlands/ Primary care setting	Prospective pragmatic randomized trial/ primary care setting	To investigate the clinical effectiveness of practice nurses acting as substitutes for GPs in cardiovascular risk management	Patients randomized to practice nurse group in which the Dutch guideline for cardiovascular risk management was used	Nurses achieved results equal to or better than physicians for the management of cardiovascular risk	Nurses were found to be more familiar with guidelines and treatment targets than physicians; application of guidelines resulted in better outcomes	No framework; process related study

**Table 21. Characteristics of Papers: Hypertension Screening and Management**

<b>Author and year</b>	<b>Country</b>	<b>Method and Study Site/Setting</b>	<b>Objectives/Aim Sample</b>	<b>Intervention</b>	<b>Results highlights</b>	<b>Conclusions</b>	<b>Framework S, P, O</b>
Al-Motlaq, Mills, Birks, & Francis, 2010	Australia/ Primary health care	Qualitative multiple case study/primary health care clinics	Obtain a greater understanding about the role of health care professionals in identifying and managing burden of disease	No intervention	Screening provided on a reactive basis; despite understanding preventative primary health care is a priority, the majority of the workload was secondary and tertiary level care.	Educational preparation and development of skills to address health care needs of the population; sufficient resources to assist with addressing burden of illness	No framework; structure related study
Boase, Mason, Sutton, & Cohn, 2012	United Kingdom/ Primary care	Qualitative study Primary care setting	Explore perspectives of nurses in their role of communicating cardiovascular risk to patients	No intervention	Communicating cardiovascular risk was seen to be an important part of the nurse role	Beyond providing a risk score the need was identified to have skills and approach to work with clients identified at risk	No framework; process related study

Hoare, Mills & Francis, 2012	Australia/ Primary care	Modified realist review to synthesize research followed by systematic review	Examination of role of government policy in primary care and the association with nurse-led care	No intervention	A clinical governance approach such as that of the UK has lent support to the scope of nursing role and the resulting outcomes of care	Government policy is insufficient to enhance nursing scope; it must be coupled with education and training and a focus on overall quality improvement in the health of the population	No framework; structure related study
Keleher & Parker, 2013	Australia/ General practice settings	Qualitative study General practice settings	Investigation of primary care nurses' perceptions of current and potential roll in health promotion	No intervention	Education and training important to support range of health promotion in nursing practice;	Nurses to define roles and responsibilities in prevention and health promotion, and scope of practice in relation to educational preparation	No framework; structure related study
Lucky, Turner, Hall, Lefaver & de Werk, 2011	United States/ Community setting	Posttest follow-up/ Community screening program	The study's purpose was to determine the effectiveness of community	Patients with high blood pressure readings, as identified	Nurse operated mass screenings could provide an effective mechanism for	This study did not address the factors of patient education, use	No framework; process related study

			blood pressure screening programs as determined through follow up with their health care provider	through a screening program, were contacted for follow up with their health care provider	identifying those with hypertension and then motivating them to seek care for follow up with their health care provider	of persuasion or approach that nurses utilized to increase follow up rate	
Maciejewski, Bosworth, Olsen, Smith, Edelman, Powers, Kaufman, Oddone, & Jackson, 2014	United States/ primary care	Follow up analysis of 18 month, 4- arm hypertension self-management trial/ Family practice settings	The purpose was to examine clinical and economic outcomes 18 months after an 18 month trial of hypertension patients receiving one of the three interventions or usual care	Intervention included either one of three interventions: behavioral management; medication management or combined intervention (behavior and medication) or usual care	Behavioral and medication management can sustain systolic BP improvements 18 months following an intervention	Further studies examining economic improvements to determine if long term benefits present; identification of interventions with sustained benefits to determine if supports benefiting more patients or high risk patients	No framework; process related study
Tobe, Lum-Kwong, Von	Canada / primary	Qualitative study/ primary care setting	The study's purpose was to	Patients and health care	Inter-professional	Improved inter-	No framework/



<p>Sychowski, &amp; Kandukur, 2013</p>	<p>care</p>		<p>explore patient's perceptions about a hypertension management program and lifestyle behavior change. Providers, physicians and nurses, were consulted about the hypertension management program and resulting inter-professional collaboration</p>	<p>providers participated in a hypertension management initiative</p>	<p>education of and utilization of clinical practice guidelines support team members to attain common goals</p>	<p>professional team functioning was found in addition to increased confidence of the nurses in managing hypertension in patients</p>	<p>process related study</p>
<p>Tobe, Lum-Kwong, Von Sychowski, Kandukur, Kiss &amp; Flintoft, 2014</p>	<p>Canada / primary care</p>	<p>Prospective delayed phase cohort intervention design</p>	<p>The purpose of the study was to compare two groups who receive a hypertension management program using clinical practice guidelines</p>	<p>Patients were recruited by their physician or NP to participate in receiving care by providers who have be</p>	<p>Chronic disease management programs are an effective mechanism to introduce clinical practice guidelines for hypertension management</p>	<p>The implementation of the evidence based inter-professional care model resulted in lower blood pressure for program</p>	<p>No framework / process related study</p>

			integrated into practice for inter-professional care teams	informed by and practice to hypertension clinical practice guidelines		participants at the end of the 9 month program	
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**Table 22. Characteristics of Papers: Outcomes**

<b>Author and year</b>	<b>Country</b>	<b>Method and Study Site/Setting</b>	<b>Objectives/Aim Sample</b>	<b>Intervention</b>	<b>Results highlights</b>	<b>Conclusions</b>	<b>Framework S, P, O</b>
Clark, Horvath, Taylor & Campbell, 2014	United Kingdom/ Clinic setting	Systematic review/studies reporting blood pressure measures by nurses and physicians	To quantify differences between blood pressure readings made by nurses and physicians	No intervention	White coat hypertension effects are smaller with nurses than with physicians	Study finding suggest physician measured blood pressure may introduce bias into clinical decision making	No framework; process related study
Clark, Smith, Taylor, & Campbell, 2010	United Kingdom/ Primary care	Systematic review and meta-analysis/ Primary care	To determine if nurse prescribing is an important intervention through the review of nurse led interventions for hypertension	No intervention	Evidence was found that nurse prescribers had improved outcomes	Further research is needed to support wide-spread use of nurses in hypertension management	No framework; process related
Clark, Smith, Taylor, & Campbell, 2011	United Kingdom/ Unspecified inter-professional clinic care	Systematic review and meta-analysis/ Unspecified inter-professional clinic care	To determine the effectiveness of nurse-led interventions to control high blood pressure in	No intervention	Compared to usual care, nurse-led interventions achieved greater	Further studies are needed to determine which nurse-led	No framework; process related study

	settings		patients with diabetes		reduction in blood pressure	interventions are the most effective	
Dean, Kerry, Khong, Kerry, & Oakeshott, 2014	United Kingdom/ Clinic setting	Randomized trial/family practice settings	Despite greater involvement of nurses in hypertension management there is limited evidence of effectiveness; this study's aim is to evaluate the effect of nurse-led hypertension clinic based on change in systolic blood pressure	Patients received a letter their blood pressure was elevated on last visit and invited them to the clinic to meet with the nurse and family physician and followed up over six months until target blood pressure achieved	For the intervention group there was greater reduction in systolic blood pressure compared to the usual care group	A larger trial could determine the impact result of the intervention as a result of understanding high blood pressure reading – patient initiative for own follow up; improve medication adherence, impact of motivational interviewing and systematic follow up.	No framework; process related study
Griffiths, Maben & Murrells, 2011	United Kingdom/ General practice setting	Administrative data review/ family practice settings	To determine if there is a relationship between quality of care and nurse staffing when	No intervention	Organizational factors (education and training), higher levels of staffing and	Organizational factors of education, training and personal development	No framework; Structure related study

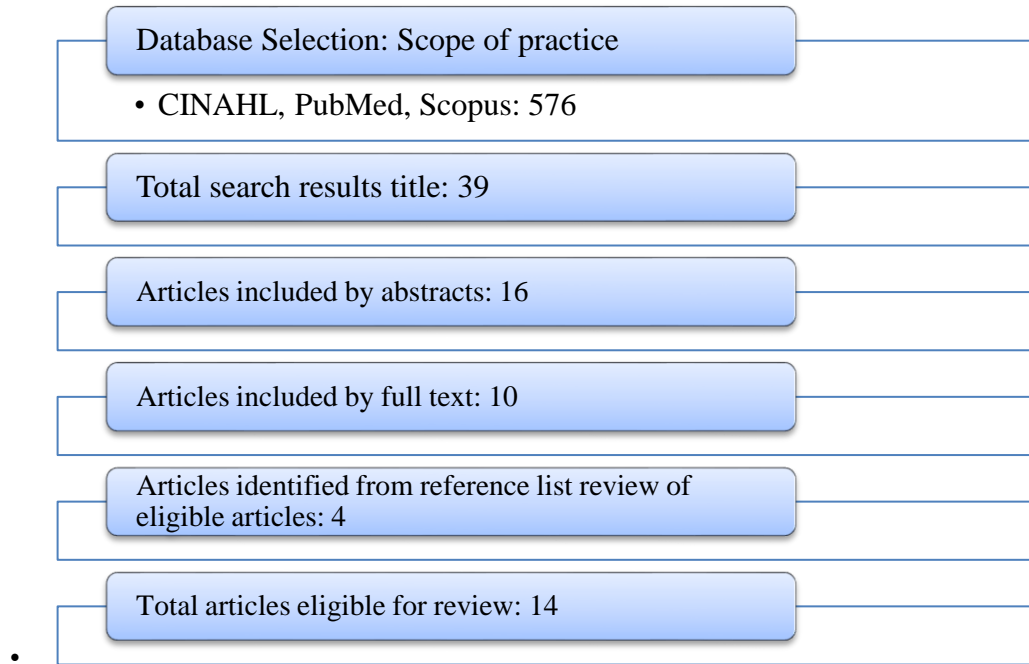
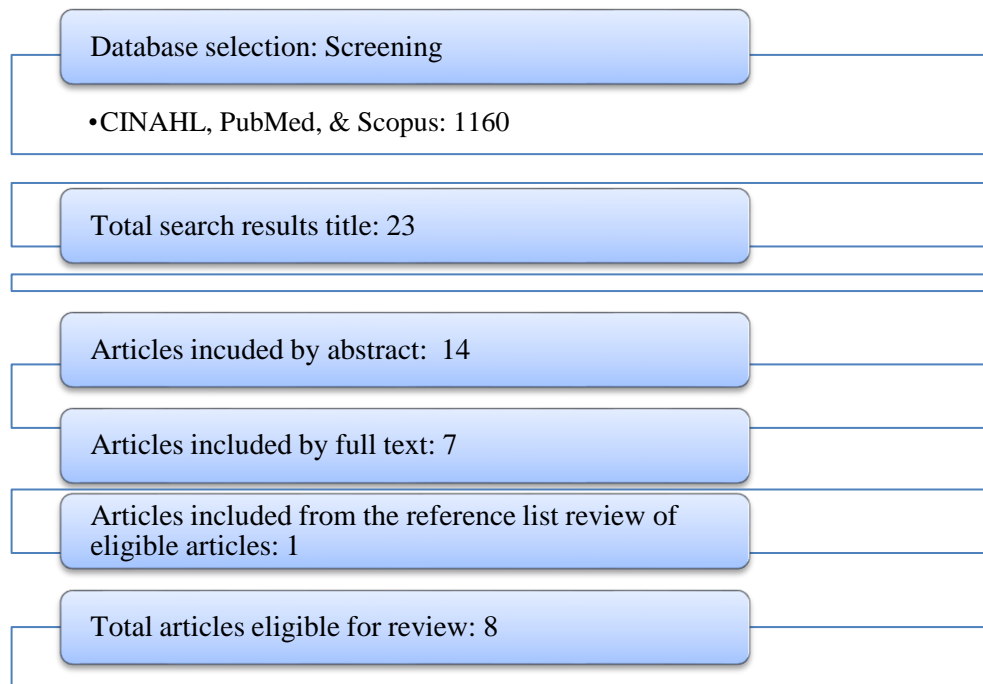
			organizational factors associated with quality care are introduced		reflection of patient's surveys significantly contributed to improvement in outcomes of care	were identified as the strongest predictor of quality clinical care	
Griffiths, Murrells, Jones, & Ashworth, 2010	United Kingdom/ General practice settings	Administrative data review/ family practice settings	To determine the association between the level of nurse staffing and the quality of care	No intervention	Practices that employ more nurses perform better in clinical domains of quality	Further studies are needed to determine if the observed benefits are due to effective substitution, increased capacity, or a combination; obtain a greater understanding of configuration of services;	No framework; structure related study
Ishani, Greer, Taylor, Kubes, Cole, Atwood,	United States/ Primary care settings	Randomized controlled trial / Veterans Affairs clinic	To determine whether nurse case management with therapeutic algorithm could	Intervention group met with a nurse to set goals, institute home	Participants in the intervention group were more likely to	Nurse case mangers can effectively enhance the rate of control	No framework; process related study

Clothier, & Ercan-Fang, 2011			improve hypertension, hyperglycemia and hyperlipidemia control rates versus usual care	monitoring program, and adjust meds as per protocols; f/u by nurse until BP and glucose goals achieved;	achieve target blood pressure, blood glucose and lipid levels; the greatest difference was seen in hypertension control	for three cardiovascular risks combined and individually although a formal cost effectiveness analysis would be beneficial for future studies	
Martinez-Gonzalez, Tandjung, Djalali, Huber-Geismann, Markun & Rosemann, 2014	Switzerland/ Primary care clinics	Systematic review and meta-analysis/ primary care setting	Objective to conduct systematic review and meta-analysis of randomized controlled trials assessing the impact of physician-nurse substitution	No intervention	Nurses appeared better at lowering systolic blood pressure; similar to physicians in lowering diastolic blood pressure	Further research is needed to conclude nurse-led care leads to better outcomes than physician-led care; additional studies should detail range of nurse care an tasks provided and levels of training and clinical autonomy	No framework; structure related study
Pearce,	Australia/	Cross	To describe three	No intervention	Study	Need to	No

<p>Phillips, Hall, Sibbald, Porritt, Yates, Dwan &amp; Kljakovic, 2011</p>	<p>General practice settings</p>	<p>sectional study exploring scope of role and contextual determinants and included twelve month longitudinal study exploring change in nursing role and impact on practice setting</p>	<p>issues in general practice – lack of evidence for incentives; possible untoward impact on inter-professional function; substitution debate</p>		<p>demonstrated that inter-professional relationships and organizational climate influence nursing role and funding mechanisms</p>	<p>develop optimal teamwork between health workers in a practice to optimize role that in turn increases job satisfaction</p>	<p>framework; structure related study</p>
<p>Shaw, McDuffie, Hendrix, Edie, Lindsey-Davis, Nagi, Kosinski, &amp; Williams, 2014</p>	<p>United States/ Literature review of nurse managed hypertension</p>	<p>Systematic review and meta-analysis</p>	<p>To determine whether nurse-managed protocols are effective for outpatient management of adults with diabetes, hypertension or hyperlipidemia</p>	<p>No intervention</p>	<p>Nurse managed protocols had a consistent positive effect on people with chronic disease</p>	<p>Health care systems will need to determine benefits and costs associated with team members to determine who is best suited to take on expanded roles</p>	<p>No framework; process related study</p>
<p>Vallejo-Torres &amp;</p>	<p>United Kingdom/</p>	<p>Bivariate probit</p>	<p>Aim to investigate</p>	<p>No intervention</p>	<p>Finding suggest that</p>	<p>Individuals with chronic</p>	<p>No framework;</p>

Morris, 2011	Primary care settings	regression model with a large set of covariates/ Health Survey of England	factors associated with the use of nurse visits and compare these with factors associated with physician use		nurses treating patients with chronic disease allows physicians to focus on caring for acute illness	disease are more likely to see a nurse than those without; the distance from services is negatively associated with visiting a nurse	structure related study
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**Table 23. Literature Review Scope of Practice****Table 24. Literature Review Screening**

**Table 25. Literature Review Outcomes**

