

USING DATA TO INFORM APPROPRIATENESS IN SASKATCHEWAN'S
HEALTH CARE SYSTEM:
A SNAPSHOT OF LOW ACUITY EMERGENCY DEPARTMENT USE

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Tara Nicole Todd, candidate for the degree of Master of Public Policy in Health Services Research, has presented a thesis titled, ***Using Data to Inform Appropriateness in Saskatchewan's Health Care System: A Snapshot of Low Acuity Emergency Department Use***, in an oral examination held on April 18, 2017. The following committee members have found the thesis acceptable in form and content, and that the candidate demonstrated satisfactory knowledge of the subject material.

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ABSTRACT

Background

Emergency department (ED) use for low acuity medical conditions is widely regarded as a contributor to health system inefficiency. Low acuity conditions are semi-urgent or non-urgent conditions that can safely withstand 60 to 120 minutes prior to physician initial assessment. Low acuity ED attendance diverts limited resources away from patients with urgent conditions and creates increased demand for ED services. Low acuity conditions can also accrue higher costs at EDs than alternative primary care centres due to greater resource consumption and higher specialist fees. Continuity of care is compromised when patients consult EDs for low acuity conditions that have complex or chronic attributes. The objective of this study is to analyse ED utilization data to inform policies that support appropriate use of health care services.

Methods

A sample of 69,782 Regina and Saskatoon ED visits in 2012-13 were analyzed using descriptive analyses. Demographic and socioeconomic characteristics of patients, availability of existing primary care services, main medical problems, time of ED registration, and service provider for ED visit was analyzed. A macro-level comparative analysis was applied to Regina and Saskatoon and a meso-level comparative analysis was applied to communities within Regina and Saskatoon.

Results

In 2012-13, in urban Saskatchewan, 48.5% of ED visits were for low acuity conditions. Males and females used EDs in nearly equal proportions. Patients aged 18-

44 constituted the highest proportion of ED use, at 42% of total visits. Patients using EDs at the highest rate reside in the S7M postal code area in Saskatoon and S4P area in Regina. These areas obtained the lowest median income in each municipality. S7M and S4P also showed the highest rate of existing primary care services in their immediate postal code area. Seventy-three percent of visits occurred during daytime hours (9:00 am to 10:00 pm). Medical conditions presented were largely due to chronic ailments or other family practice sensitive conditions. In Regina EDs, emergency specialists served the majority of patients (76.8%), while in Saskatoon, service was distributed as follows: emergency specialists (34.5%), GPs (25.6%), pediatrics (11.8%), RNs (10.3%), and internal medicine (9.4%).

Discussion

The greatest proportion of patients seeking low acuity ED care reside in low-income neighbourhoods and the presence of existing primary care centres near a patient's residence may not avert the use of EDs. As such, adding primary care services in low-income neighbourhoods may not reduce low acuity ED use. Innovative strategies are required to meet primary care needs outside of the walls of EDs. Policy options are presented that empower patients through health literacy, promote sustainability through economic efficiency by replacing high-cost ED care with lower-cost primary care, and ensure quality and continuity of care for patients who require services beyond the biomedical model observed in EDs.

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DEDICATION

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CHAPTER ONE: INTRODUCTION

Health Care Utilization

In *A Sociodemographic Analysis of Health Care Utilization in the United States*, Elizabeth Dobis states, “[h]ow people use health care is important knowledge for public policy and private business. Understanding where people go for care and how often they demand medical services enables governments and health care providers to produce healthy populations at minimal cost” (Dobis 2011, viii). Health care utilization patterns of patients can assist operational and financial decision-makers in organizing health systems. This research examines low acuity emergency department (ED) visits in Regina and Saskatoon in 2012-13, to identify variation and patterns of use, and to translate empirical findings to health policy decision-makers.

EDs constitute a fundamental fixture of the Canadian health care system. EDs represent a front-line access point in Canada’s health care system beyond primary care and provide a crucial link between pre-hospital, in-hospital, and access to specialist care (Bakarman and Njaifan 2014). Canadians visit EDs frequently for a wide range of health care services. To conceptualize the frequency of national ED use, the Canadian Institute for Health Information (CIHI) report, *Health Care in Canada, 2012: A Focus on Wait Times*, asserts that “Canadians make close to 16 million visits to emergency departments (EDs) each year, and more than 1 million result in in-patient hospital admission” (2012, 27).

While EDs are crucial for providing comprehensive around-the-clock care, the very nature of this open door policy can create bottlenecks in EDs. Patients arriving at

rapid rates with varying medical conditions create congestion in ED waiting rooms due to limited capacity of emergency physicians and finite ED resources (Hall, Belson, Murali and Dessouky 2006). As a result, patient flow becomes impeded and EDs are subject to overcrowding (Fatovich, Nagree and Sprivulis 2005).

Sources of Emergency Department Overcrowding

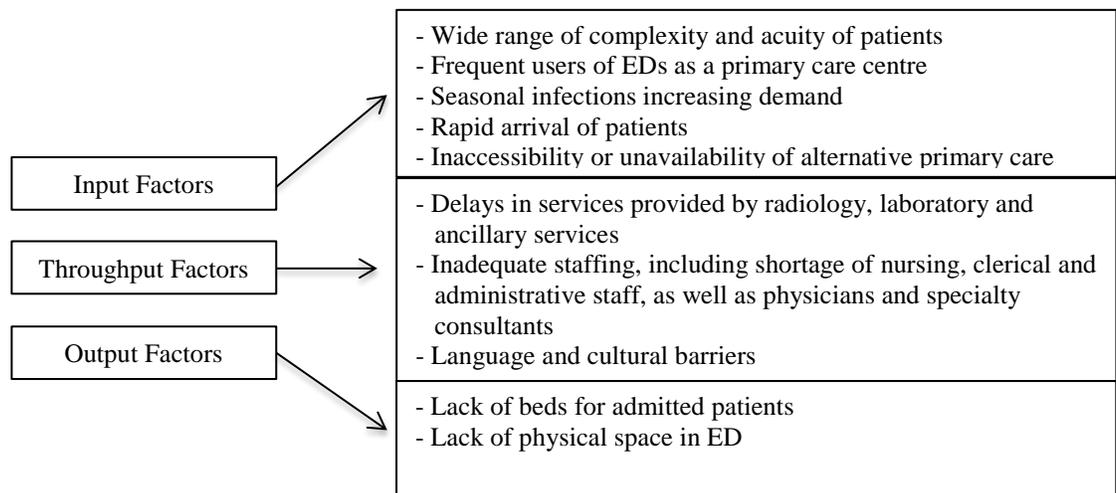
ED overcrowding is defined as “a situation where the demand for emergency services exceeds the ability to provide care in a reasonable amount of time” (Bond, Ospina, Blitz, Friesen, Innes, Yoon et al. 2006, iv). Today, ED overcrowding is an international crisis that affects quality and access to health care services (Hoot and Aronsky 2008). Emergency medical specialist, Daniel M. Fatovich, suggests overcrowding is “the most serious issue confronting emergency departments in the developed world, with quality and timeliness of emergency care being compromised” (2002, 958). A scan of literature indicates that many EDs across Canada have experienced critical levels of overcrowding (Konnyu, Kwok, Skidmore and Moher 2012; Bond, Ospina, Blitz, Friesen, Innes, Yoon et al. 2006; Hoot and Aronsky 2008).

While sources of ED overcrowding are complex and multifaceted, three general themes have been identified as contributing to ED overcrowding – input factors, throughput factors, and output factors (Hoot and Aronsky 2008). Input factors represent the sources of inflow, such as low acuity visits, ED “super users”, and seasonal infections. Throughput factors represent bottlenecks in service delivery, such as limited capacity of physicians and other health care providers. Output factors represent bottlenecks in other areas of the health care system due to limited capacities of finite

resources, such bed shortages, and the effect of extended in-patient boarding (Hoot and Aronsky 2008). **Figure 1.1** outlines themes and contributors to ED overcrowding.

However, additional confounding variables serving as contributors to ED overcrowding may be noted for all instances

Figure 1.1: Factors and Causes of ED Overcrowding

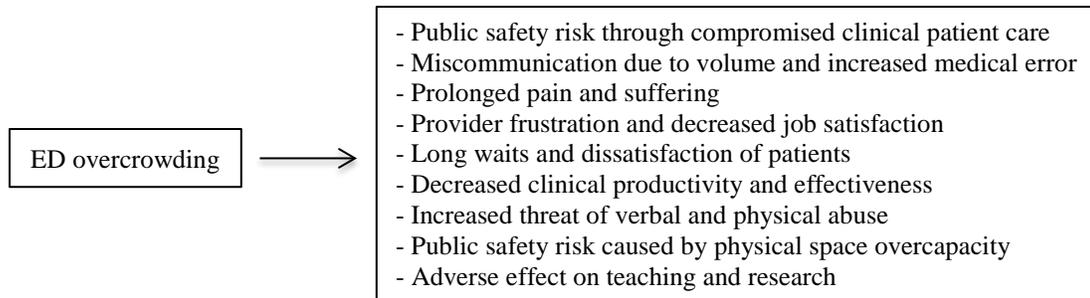


(Derlet and Richards 2000; Fatovich 2002; Hoot and Aronsky 2008)

ED overcrowding has been linked to adverse health outcomes, reduced quality of care, impaired access to health services, unnecessary resource consumption, decreased physician productivity, and increased frustration among health care providers (Hoot and Aronsky 2008; Derlet and Richards 2000). Projections for the future of EDs indicate that, if the determinants for overcrowding are not adequately addressed, EDs will not have the capacity to provide quality and timely emergency care. This will place the general public at risk in the event of emergency care requirement (Derlet and

Richards 2000). Figure 1.2 outlines several effects of overcrowding in EDs, however this again is not perceived to capture all potential consequences of ED overcrowding.

Figure 1.2: Effects of ED Overcrowding



(Derlet and Richards 2000; Fatovich 2002; Hoot and Aronsky 2008)

While all determinants of ED utilization and their corresponding effects on ED overcrowding could be extensively studied in greater detail, this research focuses on input factors; specifically, patterns and variation in low acuity ED attendance. This research identifies low acuity ED attendance as the most serious issue worth investigating because of the substantial proportion of visits in Regina and Saskatoon (NACRS 2012-13). Constituting nearly 50% of total ED visits in Regina and Saskatoon in 2012-13, low acuity conditions are perceived to restrict ED efficiency and adversely affect patient care. Addressing this substantial proportion of low acuity ED use is believed to provide the greatest benefit in increasing the efficiency of ED operation in urban Saskatchewan.

What is Low Acuity?

While there is no widely accepted, validated criteria to determine the clinical appropriateness of ED utilization, the Canadian Triage and Acuity Scale (CTAS) is a standardized method for indexing the severity of conditions presenting at EDs (Grumbach, Keane and Bindman 1993; CTAS 1999). The CTAS guideline outlines five levels of categorization for illness/injury and the recommended time frame to physician initial assessment. The CTAS levels are: Level 1 (resuscitation), Level 2 (emergent), Level 3 (urgent), Level 4 (less urgent), or Level 5 (non-urgent). **Figure 1.3** provides greater detail on CTAS Levels.

Figure 1.3: Canadian Triage and Acuity Scale (CTAS)

Acuity:	CTAS Level:	Severity:	Conditions/Examples:	Ideal Response Time to Physician Initial Assessment
High Acuity	1	Resuscitation	Conditions that threaten life or limb, or pose imminent risk of deterioration (e.g., cardiac/respiratory arrest, major trauma, shock, unconscious patients, severe respiratory distress)	Immediate (<5 minutes) 98% of the time
	2	Emergent	Conditions that potentially threaten life or limb, or require rapid medical intervention or delegated acts (e.g., altered mental states, head injury, severe trauma, neonates, overdose)	15 minutes or less 95% of the time
	3	Urgent	Conditions that could potentially progress to a serious problem requiring emergency intervention (e.g., moderate trauma, acute pain, asthma, gastrointestinal bleeding, vaginal bleeding and pregnancy, acute psychosis, suicidal thoughts)	30 minutes or less 90% of the time
Low Acuity	4	Less urgent (semi-urgent)	Conditions related to patient age, distress, or potential for deterioration or complications that would benefit from intervention or reassurance within 1 to 2 hours (e.g., headache, corneal foreign body, chronic back pain, urinary symptoms, mild abdominal pain, earache)	60 minutes or less 85% of the time
	5	Non-urgent	Conditions in which investigation or interventions could be delayed or referred to other areas of the hospital or health care system (e.g., sore throat, urinary tract infection, conditions related to chronic problems, vomiting alone, diarrhea alone)	120 minutes or less 80% of the time

(CIHI 2012; Canadian Triage and Acuity Scale (CTAS) 1999)

For the purpose of this research, CTAS levels 4 and 5 are understood to be low acuity attendance, or conditions that could be effectively managed at non-emergency primary care clinics. Low acuity conditions are medical ailments that do not require immediate care and can withstand 60 to 120 minutes without a physician initial assessment (Bullard et al. 2008). By this definition, these conditions could be served at walk-in and other physician clinics without compromising patient health.

Literature Review

In Canada, medically necessary health care services fall under the provision of the *Canada Health Act* (CHA) (1984). Federal and provincial governments pay for services under the publicly funded universal health care system Medicare. While the national insurance plan is stated to be universal and comprehensive, there are some limitations to coverage, including non-medically necessary services, private nursing services, select rehabilitation services, and out-patient pharmaceutical coverage (Health Canada 2014). Services are deemed “medically necessary” as per the constraints imposed by the CHA, however, provinces may independently add services to their provincial coverage schedule (Forest 2011). Services may be added depending on the fiscal state of the province and health care needs and demands from residents (Marchildon 2006). Although a province’s “basket of services” is subject to amendments, medically necessary services are composed of acute-care medical treatments that are delivered based on medical need, not a patient’s ability to pay or their desire to obtain the treatment (Emery and Kneebone 2013; Commission on the Future of Health Care in Canada 2002). Provincial schedules for fully-covered services

are publicly available, however, navigating the health system to obtain front-line services is the responsibility of the patient. As patients refer themselves to services, understanding patterns of utilization can help direct Canadians to the most appropriate, cost-reducing care while increasing efficiency and effectiveness of the health care system.

Through a historical lens, over- and misuse of EDs could be viewed as the result of a path-dependent evolution of Canada's *Hospital Insurance and Diagnostic Services Act* (HIDSA) (1957). HIDSA, which formally defined hospitals as universal providers of free laboratory, radiology, and primary care services, has shaped the way many Canadians view and use EDs (Roberge et al. 2010). HIDSA established in-patient coverage that has remained consistent throughout the past near century of health care legislation. The *Medical Care Act* (MCA), passed in 1966, introduced additional coverage for physician costs incurred outside a hospital and established four of the five determining principles of today's present health care system: universality, comprehensiveness, portability, and public administration (Cust 1997). In 1984, the *Canada Health Act* replaced the MCA, however, the basis of HIDSA and MCA has translated into present legislation through the preservation of these founding principles. Arguably, early designation of hospitals as a primary locus for free and comprehensive health services has sustained among public perception over the past several decades. As such, hospitals may be seen as a universal provider for publicly insured health services, without the potential for grey area coverage that may be applicable in other health care settings.

Shaw et al.'s study on decision-making processes of patients who use EDs for primary care needs identifies several factors that contribute to patients seeking low acuity care in EDs (2013). They cite financial, language and cultural barriers, limited availability of alternative care or access barriers to regular source of care, self-defined emergency situation, patient preference, and proximity to ED as determinants for consulting EDs for low acuity care (Shaw et al. 2013). Financial barriers occur when patients are unable to obtain the care they require because of the personal cost assumed by the patient. For many patients, health care can inflict personal costs when obtaining care requires unpaid time away from work, transportation, and/or childcare responsibilities (Health Canada 2001). Language or cultural barriers can lead to ED usage when other avenues of obtaining care are unknown or unfamiliar (Shaw et al. 2013). Emergency centres manifest universality. Many languages and cultures internationally share the same comprehension of EDs as a source of care. Moreover, if other avenues of care are either inaccessible or unavailable, EDs become a presumable route to health care (Shaw et al. 2013). Perception of medical need and patient preferences contribute to ED use in situations wherein patients believe their condition is urgent or complex (requiring additional diagnostic testing) and warrants emergency medical attention (Northington, Brice and Zou 2005). Finally, close proximity to EDs promotes use of those EDs by presenting a more convenient alternative to other primary care options presenting transportation/locational barriers (Chin, Goepp, Malia, Harris and Poordabbagh 2006).

Patients arriving at EDs with low acuity conditions exhibiting complex or chronic attributes may not receive the same level of continuous care that could alternatively be provided by a regular source of care. Family practice sensitive conditions (FPSCs), a set of conditions outlined by the Health Quality Council of Alberta, are ailments where the likelihood of admittance for in-patient hospital care is very low (less than 1%) (CIHI 2014b). FPSCs commonly correspond with low acuity conditions presenting at EDs in Canada. Existing evidence indicates that a key component of effective primary care is the regular visitation of patients with the same family medicine or primary care provider (CIHI 2015). Moreover, that continuity of care establishes a provider-patient relationship built on communication and mutual understanding (CIHI 2015; Starfield 1992; Guthrie, Saultz, Freeman and Haggerty 2008). These elements of continuous care have been linked to improved health outcomes (Adair 2005; Saultz and Lochner 2005), reductions in ED use, and reductions in hospitalizations (CIHI 2015; Saultz and Lochner 2005; Menec, Sirski and Attawar 2006; Ionescu-Ittue, McCusker and Ciampi 2007; Knight, Dowden, Worrall, Gadag and Murphy 2009; Saultz and Albedaiwi 2004).

Primary care providers in low urgency settings are better equipped to manage low acuity conditions for several reasons. First, they are familiar with low acuity conditions and diagnose and treat common ailments daily. Second, they have regularly scheduled hours, which makes providers directly accountable to patients and permits patients to schedule follow-up care with known expectations for those subsequent visit(s) (Guthrie, Saultz, Freeman and Haggerty 2008). Third, primary care clinics do

not operate under the same sensitivity to time in care provision. Also, during care provision, there is not the same potential for physician demand to be diverted due to varying severities of rapidly arriving patients. Fourth, primary care settings provide a less resource-intensive avenue of care for patients, allowing for more control over health care system costs (CIHI 2015). Fifth, low acuity conditions, managed in regular primary care settings, benefit from a physician's familiarity with past medical history, aiding in the accuracy of diagnosis and treatment (Guthrie, Saultz, Freeman and Haggerty 2008). Together, these components improve quality and continuity of care for patients.

What is Appropriate Care?

The Canadian Medical Association defines appropriateness in health care as “the right care, provided by the right providers, to the right patient, in the right place, at the right time, resulting in optimal quality care” (2013, 2). Alternatively, Lavis and Anderson (1996) suggest that there are two distinct branches of appropriateness: appropriateness of the service (effectiveness) and appropriateness of the setting in which care was provided (cost-containment) (321). While the first definition is all-encompassing, and arguably the gold standard of health care provision, it can be unattainable in everyday health care settings. Further, determining adequate criteria of measurement to encompass all of the various components in this definition can be difficult. The latter definition is more easily approachable in practical study, as its two distinct branches can be separated into two scales: effectiveness and cost-containment (Lavis and Anderson 1996).

Regarding effectiveness, appropriate care is considered the health care service that corresponds to the medical requirement. To be effective, the correct treatment should be provided to patients, based on medical need. The correct treatment is determined by clinical research, based on whether the patient's health is expected to improve prior to receiving the service (Lavis and Anderson 1996).

In terms of cost-containment, health care services are efficient when all unnecessary or wasteful steps have been eliminated from the health service process and all resources are utilized at their maximum potential (Kaplan 2013). Appropriate care consumes the least expensive combination of resources required to improve the patient's health (Lavis and Anderson 1996). Appropriate use of medical resources reduces non-beneficial care or "care that increases costs without a concomitant increase in value" (Combes and Arespachoga 2013, 1). For cost-containment, appropriateness represents care provision by the proper service provider in the most suitable health care institution at the right time. To contain costs and operate efficiently, the trained health care worker compensated at the lowest cost able to provide the service should care for the patient. As well, the institution's goals and objectives should align with the needs of the patient. The time of care provision is based on severity of medical need. Acute conditions requiring immediate attention should be provided at any point in time in the institution nearest that has the capacity to provide their required service. Non-acute, non-severe conditions that can bear a longer wait for obtaining care should consult the most suitable institution during a time when services are provided (e.g., within hours of operation).

Achieving appropriateness in health care provision is a shared goal among health care systems. However, for patients to obtain appropriate care, the necessary services (e.g., providers, institutions, treatments) must be readily and equally available. Equitable distribution of health care services means that uniform access is available to all residents seeking care in a health care system. In high-income countries, health systems endorse equity goals by attempting to ensure access to needed health care is equal regardless of socio-economic status (SES) (Allin, Grignon and Grand 2010). Unmet need occurs when individuals are unable to obtain a treatment that could have improved their health. Since resources are scarce, some unmet need may occur among populations. However, it is fundamental in achieving equity in health care systems to determine whether unmet need is because of systemic limitations, such as limited service providers, or related to socio-economic or other personal characteristics, such as language or financial barriers (Allin, Grignon and Grand 2010).

Spatial Patterning and Health Outcomes

The study of geography can be used to identify unmet needs in health care infrastructure and provides a method of observing patterns in health care demand and utilization. Determining which neighbourhoods are using health care services inappropriately can help identify where focus is needed to ensure adequate services, providers and institutions are available for residents.

Neighbourhoods represent a place of relational space where residents share material infrastructure, proximal distance to amenities, and often exhibit collective social functioning (Bernard et al. 2007). Spatial patterning can provide information on

neighbourhood systems and predict health outcomes based on geographic clustering and the shared characteristics of residents (Bernard et al. 2007). In evaluating utilization of health services, the theory of domain suggests that residents of communities share the presence or absence of services and are subject to the same availability and accessibility of those services (Bernard et al. 2007). Using this theory, health system researchers can evaluate what characteristics of neighbourhoods contribute to, or detract from, health system utilization. This investigation is particularly useful when health system use could be avoided or otherwise redirected in a more efficient and effective manner. For this reason, studying geographic patterns of health service utilization and the presence or absence of services is imperative to organizing health care systems and ensuring patients have access to required services.

Bernard et al. (2007) suggest there are both composition and contextual explanations for neighbourhood residents to experience similar health outcomes. Their composition explanation of geographic health outcome clusters suggests that: “[s]imilar people (e.g., similar in terms of SES or education level) tend to aggregate within geographic proximity, whether purposefully to share a common culture, or because they are driven to certain areas because of lack of personal resources, money and others” (Bernard et al. 2007, 1840). This concept can also be described as self-selection, wherein a natural congregation occurs for individuals who share similar characteristics or predispositions (e.g., education, income, culture) that gravitate individuals towards one another and to shared locational proximity (James, Hart, Arcaya, Feskanich, Laden and Subramanian 2015). Evidence for self-selection can be observed in similar health

outcomes for residents of a shared neighbourhood. For example, the Joint Center for Political and Economic Studies conducted a study in Orleans Parish, LA and found that life expectancy in the poorest zip code was 25.5 years lower than the life expectancy in the zip code with the least poverty (2012, 1). As well, heart disease was five times higher and levels of educational attainment were lower in this neighbourhood (Joint Center for Political and Economic Studies 2012, 1).

The contextual explanation suggests that spatial variations in health outcomes are because of the larger environment rather than the individuals themselves (Bernard et al. 2007). By this definition, there are ecological attributes of communities that influence and affect residents' health outcomes more substantially than the contribution of individual characteristics (Bernard et al. 2007; Macintyre, Ellaway and Cummins 2002). Ecological attributes include: economic, employment, education, housing, environmental, medical, and public health (Hillemeier, Lynch, Harper and Casper 2003). Economic influences on health outcomes include: the availability of financial services, the costs of living, and patterns of redistribution through taxes. Employment opportunities, education, and adequate housing can all influence health outcomes. Environmental attributes include the physical and chemical components that residents of shared areas are subject to, including, air and water pollutants, hazardous waste, heavy metals, and excessive noise. Medical services represent the degree to which health care services (i.e., primary care, speciality care, emergency services, and mental health services) are available and accessible in a community. Lastly, public health attributes include the degree to which assessment, policy development, and assurance

are enacted at a local level. For example, programs aimed at prevention, early detection, and health management promote positive health outcomes (Hillemeier, Lynch, Harper and Casper 2003). Thus, by the contextual explanation, the external environment generates similar health outcomes for proximal residents rather than the individuals who make up the pool of residency.

Whether communities represent a melting pot for individuals sharing personal or economic attributes or instead reflect a spatial arena wherein all residents are subject to the same availability of resources and physical environment, research has shown residents of shared communities tend towards similar health outcomes (Bernard et al. 2007). For this reason, neighbourhood studies are particularly important in health services research. The identification of neighbourhoods using health services at high rates and for inappropriate care can aid improved organization of health services towards maximizing efficiency.

The Economic Rule

The economic rule applies to residential units that are obtained because a consumer has paid a price for that commodity (Bernard et al. 2007). Supply within communities is driven by demand and, the value of residential supply is determined by what consumers are willing to pay. Theoretically speaking, the value that is socially and collectively affixed to real estate in a neighbourhood will produce the dollar value for which consumers are willing to obtain this good. Neighbourhoods tend toward similar income brackets for this reason. While outliers exist, insatiability dictates that “no-one would choose to live at the level of basic human needs if he [sic] could enjoy a higher

standard of living. This is because human wants are infinite” (Anderton 2000, 3). Consequently, Canadian cities are becoming increasingly polarized by income (Walks 2013). Consumers tend to rent or purchase real estate within the fiscal capacity of what they are able to afford. As a result, lower income families tend to live in close proximity, commonly near inner-city areas, while higher income families congregate closer to city boundaries where new residences are found (Walks 2013). Walks describes this trend as a “spatial organization of income segregation” (2013, 6). This geographic segregation of residential income levels makes studying location of patient residence particularly important to decision-makers in identifying inequality and organizing health systems.

Using Geography as a Proxy for Socio-economic Status

Canadians of low SES have poorer overall health status and poorer health outcomes than their more advantaged counterparts (VanStone, Belanger, Moore and Caudle 2014). Moreover, they constitute a higher percentage of health care use and consume services more frequently than higher SES populations (VanStone, Belanger, Moore and Caudle 2014). Patients of lower SES groups use more acute hospital care services and less primary care services than patients of higher SES groups (Kangovi, Barg, Carter, Long, Shannon and Grande 2013). These populations face increased barriers in navigating the health care system and are more likely to consult ED services for low acuity conditions since other primary care providers may be unavailable or inaccessible (Khan et al. 2011).

When patients utilize acute emergency care services over primary care services, resources are consumed inefficiently and inappropriately. Coined “low-value use”, Kangovi et al. describe this misuse as the underuse of primary care and the overuse of hospital-care (2013, 1196). Low-value ED use contributes to health disparities when patients are unable to take advantage of the benefits of primary care, such as continuity of care and relationship building with family physicians (Kangovi et al. 2013). Moreover, in a publicly-funded health care system such as Canada’s, where economic efficiency is a core driver of the health care system, patterns of misuse create unnecessary cost to taxpayers and promote inefficient consumption of finite resources.

A study from the National Ambulatory Care Reporting System (NACRS), conducted in Ontario for all ED visits from April 1, 2008 to March 31, 2009, found that low acuity conditions (CTAS levels 4 and 5) account for 47.3% of all ED visits (VanStone, Belanger, Moore and Caudle 2014). Further, this study identified that more than 25% of all ED visits were patients from the most deprived population (VanStone, Belanger, Moore and Caudle 2014, 355). Findings from this study suggest that tailoring health care resources to the needs of a specific population and placing appropriate, upstream primary health services in particular areas will promote access and reduce the burden on EDs, thereby improving ED patient flow (VanStone, Belanger, Moore and Caudle 2014).

As we observe more Canadian cities becoming polarized by income (Walks 2013), studying health service utilization based on geography allows for the inclusion of SES in research. Since evidence shows the congregation of like-income individuals,

Census data on median income allows researchers to assign an approximate SES proxy based on residential area. As Kamal et al. suggest, “if emergency departments are failing, this failure is largely due to system issues beyond the walls of the ED, including patients in hospital beds when care would be better provided elsewhere, shortfalls in the community primary care system, and failure in other parts of the system to provide psychosocial and socioeconomic supports” (2013, para. 1).

Problem Summary

Low acuity ED attendance adversely affects systematic operation when staff and resources are diverted away from essential emergency duties to provide non-acute care (McGuigan and Watson 2010). As a result, scarce ED resources are consumed inefficiently when non-complex, non-acute care is provided and at least some of a finite number of ED beds are occupied for low acuity conditions. Reserving beds for low acuity patients adversely affects resource availability for patients with more urgent needs (VanStone, Belanger, Moore and Caudle 2014). Crowded EDs pose a myriad of problems in our health care system (VanStone, Belanger, Moore and Caudle 2014). These problems are reflected in both the decreased continuity of care that low acuity patients receive in EDs and the inefficient resource consumption that substantial proportions of low acuity ED visits exacerbate.

Research from around the world has observed a strong correlation between life expectancy and SES (Evans, Barer and Marmor 1994; Marmot 1986; Mackenbach et al. 1997; Black, Morris, Smith and Townsend 1982; Marmot 2004). These studies however, have focused largely on individual-level SES rather than neighbourhood-level

SES (Mackenbach et al. 1997; Moy, Arispe; Holmes and Andrews 2005; Dalstra et al. 2005; Lorant et al. 2003; Braveman et al. 2005; Pickett and Pearl 2001; Robert 1999; Sampson, Morenoff and Gannon-Rowley 2002; Yen and Syme 1999). Based on their health care utilization research using postal code data in Saskatchewan, Lemstra et al (2006), indicate that recent studies suggest neighbourhood-level SES may independently influence individual health more significantly than individual SES (435; Braveman et al. 2005; Pickett and Pearl 2001; Robert 1999; Sampson, Morenoff and Gannon-Rowley 2002; Yen and Syme 1999).

While some neighbourhood-level studies have looked at associations between SES and health disparities, there are limitations in their application in other jurisdictions. For example: 1) the majority of peer-reviewed research is American or British; 2) in Canada, when national Census data is applied at the regional level, Census tract boundaries create neighbourhood proxies that may not be meaningful; 3) analysis of regional level data often results in small sample sizes; and 5) health information is usually self-reported (Lemstra, Neudorf and Opondo 2006, 435; Moy, Arispe; Holmes and Andrews 2005; Braveman et al. 2005; Pickett and Pearl 2001; Robert 1999; Sampson, Morenoff and Gannon-Rowley 2002; Yen and Syme 1999; Ross, Temblay and Graham 2004; Pampalon, Duncan, Subramanian and Jones 1999; Tremblay, Ross and Berthelot 2002).

This research intends to fill several gaps. This study uses Canadian-based data, postal code boundaries are meaningful in describing differing SES-levels in each city, sample size is significant (n=69,782 ED visits), and health information for ED visits

was administratively reported. This research adds to limited Canadian- and Saskatchewan-based research in describing low acuity ED usage at individual- and neighbourhood levels.

Research Objectives

The objective of this research is to analyze ED utilization data to inform policies that support appropriate use of health care services. This research seeks to determine the association between individual-level patient characteristics, neighbourhood-level income and existing primary care services, and ED utilization in Regina and Saskatoon, Saskatchewan. Deliverables illustrate who is using EDs, where they live, what existing primary care services they have available, when they seek ED care and for what medical conditions, and who is providing them care in EDs.

Research Questions

The overarching research question – how can low acuity ED utilization data be used to ensure equity in availability and accessibility of primary care services, and to identify actions that might be taken to improve quality and efficiency of front-line care services – is answered through a series of focused aims:

- Aim 1: What is the relationship between demographic characteristics of patients and neighbourhood-level SES of patient residence, and low acuity ED utilization?
- Aim 2: Does the presence or absence of existing nearby primary care centres influence low acuity ED use?

- Aim 3: What is the distribution of low acuity medical conditions presenting at EDs and is there variation in the most prevalent medical conditions based on location of patient residence? Does time of registration at EDs vary by location of patient residence? (daytime versus afterhours)?
- Aim 4: What is the distribution of primary service providers attending to low acuity ED patients in Regina and Saskatoon?

Hypothesis

The overarching hypothesis is that urban Saskatchewan residents use EDs for ailments that could be served at low urgency primary care centres, and that EDs are consulted due to unavailability of required primary care services. Targeted underlying assumptions regarding ED utilization include:

1. Youth and elderly residents in low SES areas in Regina and Saskatoon constitute a higher percentage of low acuity ED attendance.
2. Low SES neighbourhoods use EDs at higher rates and have disproportionately less access to existing primary care services than their higher SES counterparts.
3. For medical determinants of seeking low acuity ED care, conditions that would be better serviced by a regular source of care (e.g., FPSCs) constitute a large percentage of low acuity ED use, and ED visits occur primarily during afterhours, where alternative primary care services are unavailable.
4. Emergency specialists are believed to be the primary provider of care for low acuity medical ailments.

CHAPTER TWO: EMERGENCY DEPARTMENTS IN SASKATCHEWAN

Data Reporting

In Saskatchewan, five hospitals submit administrative ED data to NACRS, a division of CIHI. The submitting hospitals include: Regina General Hospital, Regina Pasqua Hospital, Saskatoon City Hospital, Saskatoon Royal University Hospital, and Saskatoon St. Paul’s Hospital. In 2012-13, NACRS received data for 212,164 total patient visits to these five EDs in Saskatchewan (NACRS 2012-13; CIHI 2014a). Of these visits, 94,670 patients visited one of two EDs in Regina and 117,494 patients visited one of three EDs in Saskatoon (NACRS 2012-13; CIHI 2014a). In comparing total visits (all CTAS levels) against the number of low acuity visits (CTAS levels 4 & 5), a substantially large proportion of ED use is related to non-urgent medical conditions. See **Table 2.1** for ED patient visits by submitting hospital.

Table 2.1: ED Visits by Submitting Hospital in Saskatchewan, 2012-13

Hospital	Low Acuity Patient Visits (CTAS 4 & 5)	Patient Visits (all CTAS levels)	Percent of Low Acuity Visits
Saskatoon Health Region	63,210	117,494	53.8%
City Hospital	11,287	17,936	62.9%
St. Paul’s Hospital	22,850	41,746	54.7%
Royal University Hospital	29,073	57,812	50.3%
Regina Qu’Appelle Health Region	39,779	94,670	42.0%
Pasqua Hospital	18,158	41,210	44.1%
General Hospital	21,621	53,460	40.4%
Total	102,989	212,164	48.5%

(CIHI 2014a; NACRS 2012-13)

As indicated in the above table of ED patient visits for 2012-13 in Regina and Saskatoon, an average of 48.5% of ED visits were related to low acuity conditions. Within Saskatoon, a remarkable 53.8% of visits were categorized as low acuity, and in Regina, 42.0% of visits were for low acuity conditions. The greatest proportion of low acuity visits took place at the Saskatoon City Hospital, where 62.9% of visits were for low acuity conditions.¹

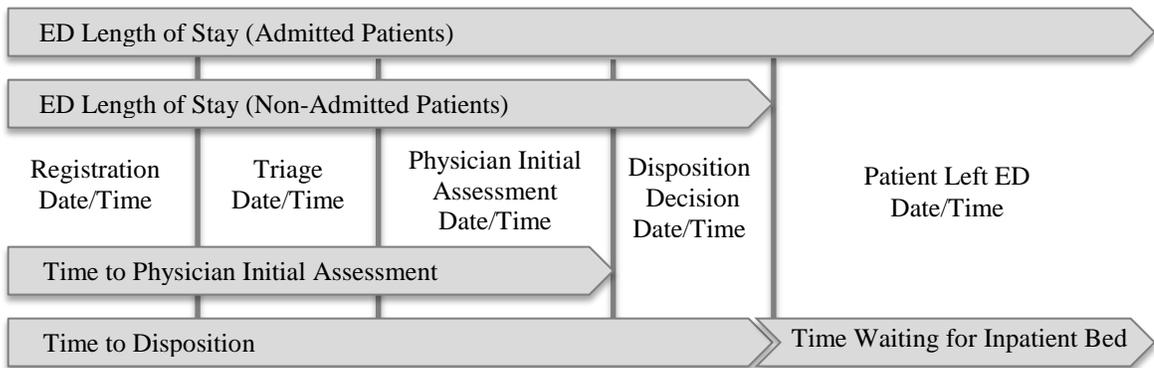
Waits in the Emergency Department

Within EDs, there are a number of different waiting periods that a patient incurs prior to receiving medical care. These include: time to registration, time to triage, time to physician initial assessment, time to disposition, and time to admission to an inpatient bed (if applicable). The time to registration is dependent on the number of patients in line to see the registration clerk upon a patient's arrival to the ED. The time to triage is dependent on the number of patients in line to see the triage nurse prior to them. Once the patient has been registered and triaged, they are required to wait for a physician initial assessment that will determine the course of their care. After a care plan has been formulated, further medical attention is provided to the patient based on their medical requirement and availability of ED staff. The time to disposition is the time from registration to the time that a decision is made whether to admit or discharge the patient.

¹ Hours of operation at the Saskatoon City Hospital ED are 9:00 a.m.- 8:30 p.m. Visits to City Hospital made up 17,936 of the total 212,164 ED patient visits (8.5%). This ED is speculated to be used largely as a primary care centre for Saskatoon residents. This may account for the considerably high percentage of low acuity ED visits.

If the patient is not discharged, the final waiting period in the ED is the time spent waiting to be relocated to an inpatient bed (CIHI 2012). **Figure 2.1** outlines the measurements for ED wait periods.

Figure 2.1: ED Wait Time Measures Reported to NACRS



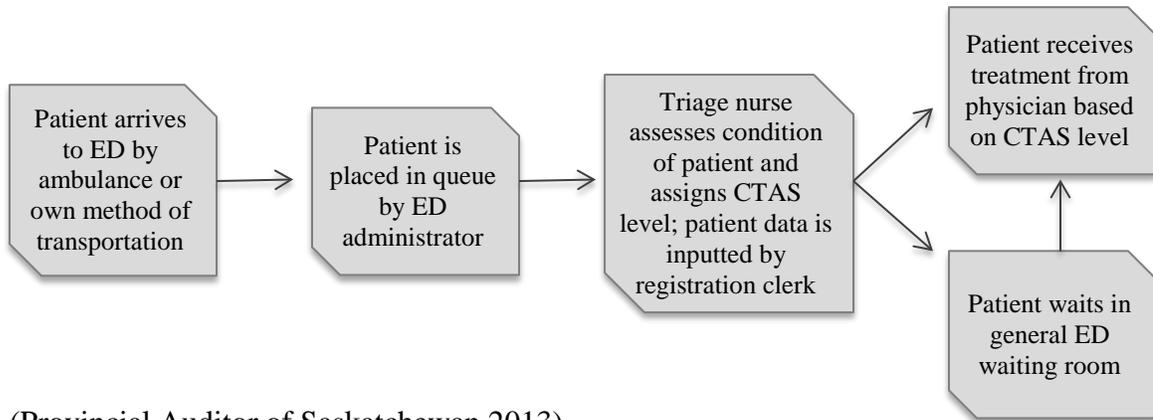
(CIHI 2012)

Patient Flow

In Saskatchewan, ED processes are generally standardized for patient throughput. Unless a patient’s condition requires immediate medical attention, patients arriving to EDs are registered by an administrator, triaged based on CTAS guidelines by a triage nurse, and placed in a queue to wait for a physician to perform an initial assessment to determine the next course of action (Bullard et al. 2008). The categorization of patient’s condition by CTAS level is a required protocol for all Canadian hospitals that submit ED utilization data to CIHI. Once a patient’s CTAS level has been assigned and they have been triaged, based on the severity of all patients present in the ED, the patient is either relocated to await prompt medical attention or

required to resume waiting in the general emergency room for their turn to receive medical attention. This process is presented in **Figure 2.2**.

Figure 2.2: ED Patient Process Cited by Provincial Auditor of Saskatchewan, 2013



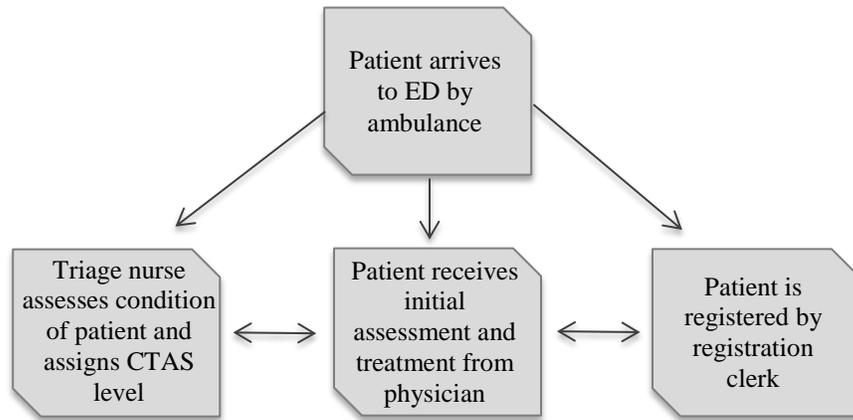
(Provincial Auditor of Saskatchewan 2013)

Patient processes were validated after consultation with Regina’s Pasqua hospital ED staff. The Pasqua ED is one of two EDs in Regina and was consulted on their processes, based on their proximal location to the researcher, availability for consult, and provided they had a greater percentage of low acuity visits (44.1%) than the alternative ED located in Regina (40.4%).

Figure 2.3 illustrates the ED patient process at the Regina Pasqua Hospital for patients arriving by ambulance. Here, patients arriving by emergency medical services (EMS) use a separate entry door and are immediately triaged, registered and provided medical attention. These patients arriving by ambulance are moved to the top of the patient queue and receive emergency physician response. Physician response can range from resuscitation to immediate assessment requiring further diagnostic testing. The emergency medical technician (EMT) who provides transport sees the registration clerk

to complete the patient’s intake forms. In this instance, registration, triage, and medical attention take place near simultaneously.

Figure 2.3: Patient Process at ED, Arriving by Ambulance

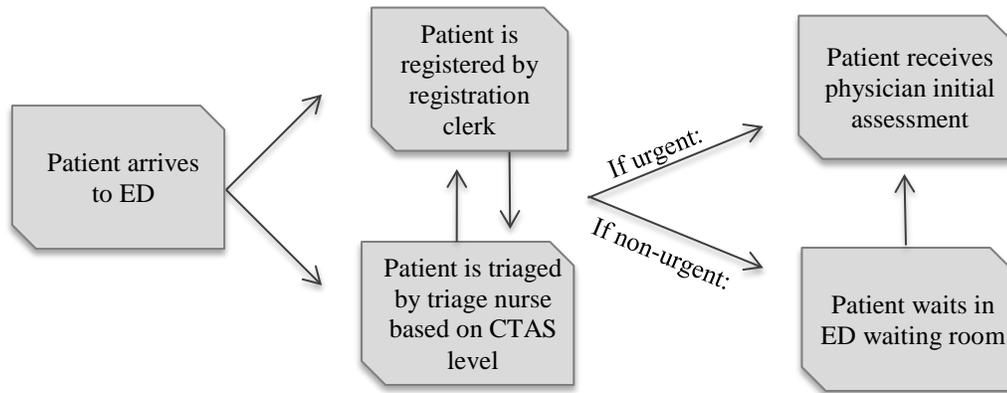


(Consultation with Regina Pasqua Hospital Staff 2014)

Alternatively, patients arriving in the absence of EMS enter through the general ED entry and are presented with separate registration and triage desks. The patient may go directly to triage or they may first consult the registration desk. The patient’s wait time officially begins once the initial time stamp is placed on their patient forms. Patient forms can originate at either the triage or registration desk. Patient forms travel with the patient throughout the duration of their visit to the hospital. Once the patient has been both registered and triaged (in either order), they are either relocated to receive medical attention or are required to wait for their turn to receive medical attention. **Figure 2.4** shows the non-ambulance ED patient process at the Regina Pasqua hospital.²

² Consultation with the registration staff at the Regina General coincided with this process, however staff suggested that the recommended process would be to consult registration prior to triage.

Figure 2.4: Non-Ambulance Patient Process at ED, Arriving by Own Means



(Consultation with Regina Pasqua Hospital Staff 2014)

Consultation with Regina’s Pasqua Hospital staff indicates these processes are fluid and dependent on the nature of demand and the available resources present at the time of accessing care. In sum, patient processes may differ depending on the ED and are largely subjective based on point-in-time circumstances.

Based on the total 212,164 patient visits in Saskatchewan in 2012-13, the average wait time for physician initial assessment (the time elapsed between registration/triage and the first point of contact with a physician for assessment) was 3.4 hours (CIHI 2014a). By comparison, patients who visited EDs in Alberta in 2012-13 waited an average of 3.1 hours, 2.5 hours in British Columbia, and 5.6 hours in Manitoba (CIHI 2014a). See **Table 2.2** for a pan-Canadian comparison of average duration of wait between registration/triage and receiving initial medical attention in the six provinces where comparable data is available.

Table 2.2: Pan-Canadian Comparison of Average ED Wait Times to Physician Initial Assessment, 2012-13

Location	Average Wait Time (hours)
British Columbia	2.5
Alberta	3.1
Ontario	3.2
Saskatchewan	3.4
Prince Edward Island	3.5
Manitoba	5.6
Canada	3.2

(CIHI 2014a)

In Saskatchewan, the average length of time between registration/triage and physician initial assessment doubled in the three fiscal years prior to this assessment. The average wait time was 1.7 hours in 2009-10, 2.5 hours in 2011-12, and 3.4 hours in 2012-13 (CIHI 2014a). Within Saskatchewan, there is a significant variance in these wait time averages between the Saskatoon Health Region (SkHR) and Regina Qu'Appelle Health Region (RQHR).³ Data for patients who visited EDs in SkHR in 2012-13 indicates patients were required to wait an average of 2.4 hours between registration/triage and physician initial assessment, while patients who visited EDs in RQHR waited an average of 4.3 hours (CIHI 2014a). In 2012-13, ED patients in SkHR waited an average of 1.9 hours less than ED patients in RQHR for physician initial assessment. See **Table 2.3** for breakdown of hospitals included in regional calculations for SKHR and RQHR average wait times.

³ SkHR and RQHR calculations are limited to only those hospitals who submit data to NACRS (See Figure 1.7)

Table 2.3: Average Wait Time Between Registration/Triage and Physician Initial Assessment, 2012-13

Hospital	Average Wait Time (hours)
Saskatoon	2.4
City Hospital	1.6
Royal University Hospital	3.2
St. Paul’s Hospital	2.4
Regina	4.3
General Hospital	4.7
Pasqua Hospital	3.9

(CIHI 2014a)

Opportunities for Improvement

In this research, increasingly long wait times in Saskatchewan EDs serve as the visible indication that further inquiry into systemic ED operation is required. As roughly half of the visits to Regina and Saskatoon EDs are for low acuity conditions, it is suspected that EDs are no longer used as a venue for emergency care, but as an alternative to primary care. High percentages of low acuity ED use may suggest inefficiency in urban Saskatchewan front-line care delivery through the consumption of resources, intended for emergency situations, for conditions exhibiting low urgency or non-urgency. From this, changes are believed to be required to achieve appropriateness and cost-containment in front-line care. While long wait times and a high frequency of low acuity ED use are the observed indicators of this problem, two underlying issues have been identified. These two components, a demand-side conflict for patients seeking low acuity ED care, and a supply-side conflict for EDs providing low acuity care, are discussed as follows.

Regarding demand, patients seeking care for low acuity conditions in EDs commonly suffer from conditions that would benefit from the quality and continuity of care provided by primary care centres and a regular source of care. When patients seek low acuity care in EDs, their quality and continuity of care can be compromised. EDs are equipped to manage acute and emergency situations through the application of a traditional biomedical model. Where the biomedical model of illness falls short is in the assumptions that: there is an underlying cause for illness, pathology is directly responsible for illness, and remediating that cause will generate a return to positive health (Wade 2004). There are instances where the traditional biomedical model cannot fully address a patient's requirement for health care service. For example, where social determinants contribute to adverse health status, patients may be better served in settings where physicians apply a comprehensive view of health lens. Continuous care also establishes a patient-provider relationship, aiding the provider in the diagnosis and treatment of conditions based on past medical history. Further, in these settings, patients have the uninterrupted attention of the provider without the potential for a rapidly changing atmosphere. Lastly, patients who use the ED for low acuity conditions may be less likely to receive adequate follow-up care. Particularly for complex or chronic ailments, such as diabetes or chronic obstructive pulmonary disease, follow-up care is fundamental to influencing positive patient outcomes.

From the supply-side, the resource-intensive provision of ED care is inefficient where resources could be more appropriately allocated for emergency situations. Additionally, there are economic implications when low acuity patients receive medical

care at EDs rather than non-emergency primary care centres. As per the Saskatchewan Physician Payment Schedule (October 2013 version), a “continuous personal attendance” billing claim occurs when medically required personal attendance is given to a patient continuously by a physician and is paid per 15 minutes of continuous attendance (62). This service code, 918A, may be billed in conjunction with other service codes when multiple services are provided. For example, for a one-hour continuous personal attendance claim, emergency specialists would receive \$169.20 in remuneration, whereas a general practitioner (GP) would receive \$152.40 for the same service. The difference of \$16.80 may seem inconsequential in this particular instance. However, when applied at a larger scale, the selection of service provider can have an appreciable financial impact on the cost of health service provision. To exemplify, if both an emergency specialist and GP used the same billing code for a four-hour continuous attendance, the difference would be \$67.20. If this occurred 100 times that year, the difference would be \$6,720. While \$7,000 a year may seem inconsequential, if this inefficiency was spread across a provincial system, the cost to that health care system could be substantial.

Two conflicts are noted when comparing Regina and Saskatoon data. First, the substantially longer average wait time in Regina infers cause for concern that emergency services cannot be delivered in a timely manner. Research is required to gain a thorough understanding of contributors to the considerably longer delays at Regina EDs. Second, provided Regina EDs serve a lower percentage of low acuity visits (42.0%) than Saskatoon (53.8%), consideration should be given to the nearly double

wait time in Regina. In a congested ED, low acuity conditions tend to be those patients waiting the longest period of time and thereby prolonging the average wait time to physician assessment. However, in this instance, Regina provides care to a reduced percentage of low acuity visits and reports a longer average wait time. This discrepancy between Saskatoon and Regina suggests that evaluation and comparison of ED utilization in the two urban regions is required.

The Political Agenda

In the *Saskatchewan Plan for Growth: Vision 2020 and Beyond* (2012), Saskatchewan Premier Brad Wall announced that wait times in provincial EDs would be eliminated by March 31, 2017 (59). Wall's five-year goal for Saskatchewan EDs proposed that all patients seeking medical care in Saskatchewan EDs by March 31, 2017 would be immediately assessed and treated as required. This attention to ED wait times reflects the political awareness of the significance of this problem and illustrates the need for policy intervention.

In a March 2014 news release, the Government of Saskatchewan announced an investment of \$4 million to reduce ED wait times and improve ED patient flow. Of this, \$1.7 million was allocated to support the Emergency Department Wait Time Initiative, \$800,000 the First/Quick Response Home Care Program, and \$1.5 million to implement a hotspotting pilot program to identify high-risk high-needs patients (Government of Saskatchewan 2014).

The Emergency Department Waits and Patient Flow Initiative is a broad interdisciplinary initiative wherein a project team and advisory committee were established

to “rethink the complex, interrelationships in our health system that inadvertently create patient backlogs and service bottlenecks” (Government of Saskatchewan 2014, 4:53).

The team includes patient advisors, clinical experts in geriatrics and emergency medicine, and health region representatives and is in partnership with the Saskatchewan Health Quality Council (HQC). Maura Davies, past President and CEO of the Saskatoon Health Region, noted the SkHR’s commitment to the ED Waits and Patient Flow Initiative in their development of a redesigned ED at the Saskatoon Children’s Hospital. The hospital, scheduled to open in 2017, provides separate adult and pediatric ED streams to improve patient flow. Davies announced that the new divided ED was designed to move patients through the system quickly, appropriately and safely (Government of Saskatchewan 2014).

The Connecting to Care Initiative (previously “HotSpotting Pilot Program”) seeks to identify individuals who are repeat users of hospital EDs. Preliminary findings of the province’s hotspotting initiative led Ministry of Health officials to estimate that 1% of patients make up 21% of provincial hospital costs (Standing Committee on Human Services 2014). The goal of Connecting to Care is to better serve these high-cost, high-use patients with appropriate alternate primary care services. As of May 2015, the Connecting to Care initiative had enrolled 25 repeat users of Regina’s EDs for assistance in managing complex and chronic conditions (Government of Saskatchewan 2015a).

The province’s \$800,000 contribution was used to implement the First/Quick Response Home Care Program; a mobile outreach team, made up of physicians, nurse

practitioners (NPs) and other care providers, to offer treatment for complex health issues of senior citizens in their homes (Standing Committee on Human Services 2014). The initiative is intended to reduce hospitalizations and ED visits by elderly patients and allow seniors to remain at home as long as possible (Standing Committee on Human Services 2014). The 2015-16 Plan for the Saskatchewan Ministry of Health and Health System indicates the mobile outreach team will have been in operation for one full year as of March 31, 2016 and will be expanded in the Regina Qu'Appelle and Saskatoon Health Regions (5). However, the report does not indicate what services have been provided. The plan reports a decreased number of ED visits in their client cohort by 50% over baseline (Government of Saskatchewan 2015b, 5); however again, it is unknown what the baseline or observed measures are specifically.

Although inappropriate and overuse of EDs has been identified as problematic and the issue has obtained spotlight in the political arena, decision-makers face complexity in wide-scale policy intervention. In an attempt to mitigate overcrowding and wait time issues faced by EDs, the aforementioned pilot programs were developed. While these interventions represent a step in the right direction, government efforts have so far been narrowly focused, lacking attention to health inequities and unmet need in communities. Intervention has been limited to individual super users, specific age groups (such as elderly patients) and ED resources (such as number of physicians) as the focal point for developing reactive strategies to increase ED efficiency.

In October 2015, the provincial government publicly announced that the five-year goal, originating in 2012, to achieve zero wait times in EDs would not be met by

the March 31, 2017 target date. In highlighting their successes, the Saskatchewan Party noted that an additional 500 physicians and 1,000 nurses are now practicing in Saskatchewan. However, they also indicated that a new timeline for significant reduction in ED wait times was required (CBC News 2015a). In a subsequent news release published on December 2, 2015, Health Minister Dustin Duncan announced a new goal – a 60% reduction in ED wait times to be achieved by 2019, a target set two years later than original deadline to eliminate wait times entirely (CBC News 2015b).

To date, there is no indication of research being conducted in Saskatchewan on low acuity ED utilization. Consideration should be given to the significant gap in research and policy development needed to replace low acuity ED utilization with more appropriate, community-specific care. This research assesses ED utilization and primary care availability, and evaluates communities with high utilization patterns for low acuity ED attendance. This research serves to improve health system efficiency through the promotion of appropriate care provision.

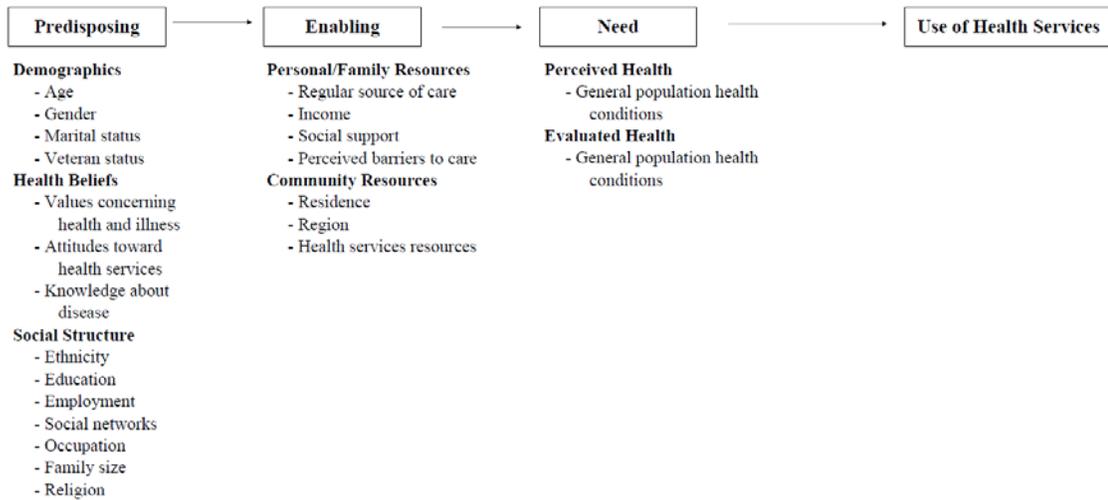
CHAPTER THREE: METHODOLOGY

Health Care Utilization Framework

This research uses Ronald M. Andersen's 1968 Behavioural Model of Health Services Utilization as a framework to conceptualize non-urgent ED attendance. The model was developed in the early 1960s as a theory to describe why some individuals were able to access to health care services and others were not (Andersen 1995; Hauser 2007). Today, Andersen's Behavioural Model is widely considered a standard for measuring health care utilization (Hauser 2007).

Andersen's model identifies three components used to predict an individual or population's utilization of health services. The model, displayed in **Figure 1.4**, illustrates that an individual's use of health care services results from their predisposition to use services, factors that enable or impede service utilization, and their perceived or evaluated need for care (Andersen 1995). This model provides a theoretical framework for studying the precursors to the physical utilization of health care services. The model is also intended to measure equitable or inequitable access to health care and to develop policies that promote equitable access to health care services (Andersen 1968).

Figure 1.4: Andersen’s Behavioural Model of Health Services Utilization



(Adapted from Andersen 1995; Gelberg, Andersen & Leake 2000)

Predisposing factors include demographic information, health beliefs, and social structures. Demographic information, such as age and gender, is used to represent biological elements that aid researchers in understanding conditions for health services utilization (Hulka and Wheat 1985). Social structures are comprised of an individual’s status in the community, their ability to cope with health issues, their likelihood of seeking health care services, and the risks associated with their physical environment. Health beliefs are an individual’s conception of health, their attitude towards health services, and their educational level regarding illness and disease (Andersen 1995).

Enabling factors in Andersen’s model include the personal, family, and community resources that individuals have at their disposal to facilitate utilization of health care services. These include: regular source of care and access to a regular doctor, income, social support, location of residence, availability of health services

resources, and perceived barrier to care (Gelberg, Andersen, Leake, 2000). Enabling factors aid the understanding of physical health system use. For example, whether health care providers and facilities are available and whether the patient has the means and knowledge to utilize these services (Andersen 1995).

The third component in Andersen's model, "need", represents an individual's perceived and evaluated need for health services. Perceived need characterizes how an individual views their general health and how they judge their symptoms, pain, or illness to be of sufficient importance in determining whether to seek medical assistance. Evaluated need represents the patient's understanding of the kind and amount of medical care they will receive based on their symptoms.

While the Andersen model is one of the most widely used conceptual frameworks for health services utilization, few studies have applied the model to address ED use (Shaw et al. 2013). Andersen's model is deemed the model most relevant for application here, given the scope of this research. The variables included in this study are organized within one of the three purviews of predisposing, enabling, or need components, depending on their nature of influence. These components are examined for patterns to determine their role in contributing to the physical utilization of EDs for low acuity conditions. Organizing variables into predisposing, enabling, and need components allows for the consideration of inter-sectoral dynamics (e.g., the role of education, social services, economics) in studying low acuity ED use and permits a systems thinking approach where ministerial boundaries can be explicitly defined and accountable (Kamal et al. 2014).

Research Design

This cross-sectional study was conducted to investigate geographic patterns of low acuity ED use. ED visits were recorded over the 2012-13 fiscal year from four hospitals in Regina and Saskatoon. All low acuity visits (CTAS 4 & 5) occurring in Regina and Saskatoon were included in the dataset. Descriptive statistics were conducted at the macro- and meso-levels and correlation analysis was conducted at the meso-level.

At the macro-level, geographic variation in low acuity ED use was evaluated between Regina and Saskatoon. These two cities represent comparable urban centres with similar population sizes and health care services. In 2011, the census metropolitan area (CMA) population of Regina was 210,556 while the CMA population of Saskatoon was 260,000 (Statistics Canada 2012). Both cities operate two emergency departments on a 24-hour basis, 7 days per week. Descriptive analyses were conducted to describe ED utilization in Regina and Saskatoon by measuring the quantity of services provided, demographic characteristics of patients, neighbourhood-level SES of patients, the demand (amount) and the nature of demand (main medical problem) for low acuity ED services by geography of patient residence, and the responsible service providers for ED care.

At the meso-level, geographic variation in low acuity ED use was evaluated, based on the location of patient residence within Regina and Saskatoon. Patterns in low acuity ED use were evaluated at the neighbourhood level using forward sortation areas (FSAs). FSAs represent the first three digits of the postal code and signify areas in the

city that share similar proximity. At the meso-level, a comparison of the following variables was descriptively analysed within Regina and Saskatoon: quantity of ED visits by FSA, age and gender of patients, median income of FSAs, availability of existing primary care centres, and main medical problem presented. Further, at the meso-level, correlation analysis was conducted to evaluate relationships between the following variables collected from FSAs: ED visits, population, median income, and number of existing primary care centres.

Data Sources and Inclusion Criteria

Data for this research was collected using a variety of sources. A comprehensive dataset of all CTAS levels 4 and 5 ED visits in Regina and Saskatoon in 2012-13 was procured from NACRS, a division of CIHI. For inclusion in this study, Regina and Saskatoon EDs must have operated 24 hours per day, 365 days per year, and have submitted administrative data to NACRS in 2012-13. For Regina, ED visits occurred at either the General or Pasqua Hospital. In Saskatoon, ED visits occurred at either the Royal University Hospital or St. Paul's Hospital.⁴ Visits were excluded if the patient's residence was located outside the formal boundaries for the city wherein the hospital visit took place (i.e., Regina or Saskatoon). Obtaining this data required the completion and submission of a comprehensive application to CIHI outlining the purpose of this research. The application was reviewed to determine necessity of the data and

⁴ Because of the restricted hours of Saskatoon's City Hospital (9:00 a.m.-8:30 p.m.), unlike the 24 hours per day/7 days per week schedule consistent with other EDs, visits to the City Hospital were not included in the dataset for analysis.

justification for the research. The application was also reviewed for ethical considerations in releasing the data. The data elements for each record-level visit to the ED included: patient age and gender (as per CIHI classification), CTAS level, date of visit, time of visit, main problem presented, responsible service provider, and FSA of patient residence. The initial application requested full postal codes for each patient visiting the ED, however this was not approved. All ED records were required to be de-identified prior to being released. As such, full postal codes of patients were not released. To meet de-identification standards, postal codes were reduced to the first three digits. The first three digits represent a subsection of areas in close proximity, also known as FSAs. Further, identifiers indicating repeat visits were not authorized for release. Resultantly, some visits may be repeat users.

Population data for each FSA were obtained from eHealth Saskatchewan. eHealth is a Crown Corporation that facilitates the development, coordination, and use of information and technology to support continuing improvements in health care delivery in Saskatchewan (eHealth Saskatchewan 2016). They are responsible for vital statistics, health registries, and other key information electronic systems for public health care organizations. Population figures were collected for FSAs in Regina and Saskatoon, based on the number of persons who held Saskatchewan health coverage on June 30, 2012 residing in each area. FSAs located outside the city boundaries for Regina and Saskatoon were removed from the dataset. This applies to the removal of the following FSAs: Regina: S4L (nearby towns: White City, Pilot Butte, Emerald Park) and S4M (Grand Coulee); and Saskatoon: S7P (green space north of Saskatoon) and S7T (south

of Saskatoon: Dundurn, Blackstrap). The final FSA areas included in this study are as follows: Regina (10): (S4N, S4P, S4R, S4S, S4T, S4V, S4W, S4X, S4Y, and S4Z), and Saskatoon (10): (S7H, S7J, S7K, S7L, S7M, S7N, S7R, S7S, S7V, and S7W).

Median income data for economic families by FSA were obtained from the 2006 Census of Canada. Due to the discontinuation of the long-form Census in 2011, median income figures by FSA were unavailable more recently. Median income figures for FSAs published in the 2006 Census were self-reported, based on the 2005 income tax fiscal year. As it was important to capture geographic variation in income within Regina and Saskatoon, Census income data was deemed the most representative figures available at the FSA level. In the 2006 census year (for 2005 income tax reporting), two FSAs (Regina n=1; Saskatoon n=1) did not report median income data since sample sizes were too small to meet reporting standards for data sensitivity. These ED visits were included in descriptive analyses for age, gender, time of visit, main medical problem, and service provider, however were removed for the correlation analysis. The final sample size of FSAs with median incomes reported for are n=18 (Regina n=9; Saskatoon n=9). Removal of these two FSAs in the correlation analysis reduced the record-level visit weights for Saskatoon by n=603 and Regina n=222, for a total of n=825. This represents approximately 1.2% of the dataset that was removed to complete the correlation. Removal of these visits was not deemed to be a limitation to this analysis. To adjust income data for inflation from 2005 to the 2012 study year, Statistics Canada was consulted on the percent increase in municipal income between the 2005 and 2012 income tax years. Median incomes reported by Statistics Canada,

encompassing the entire city of Regina and of Saskatoon for 2005 and 2012, were obtained. Using the percentage increase of median income in Regina and Saskatoon between 2005 and 2012, as reported by Statistics Canada, Census 2005 median incomes were extrapolated. The resulting percent increase for Regina was 33.1% and 37.4% in Saskatoon. Depending on the city of the FSA, a 33.1 or 37.4% increase was applied to each median income of FSAs obtained from the 2006 Census.

Data for existing primary care services in Regina and Saskatoon were collected using 2012-13 Regina and Saskatoon phonebooks. Inclusion was limited to clinics accepting patients on a walk-in basis, where previous registration with the clinic was not required. Where the advertisement did not indicate if the clinic operated on a walk-in basis, clinics were phoned to confirm that they accepted all patients regardless of previous registration. Clinics that did not accept new patients on a walk-in basis were excluded from the dataset. A full list of clinics included in this analysis can be found in Appendix 1.

As this research did not use human participants as research subjects, the University of Regina Ethics Board deemed ethics approval not required, indicating no foreseeable harm was deemed to arise from the use of requested CIHI data. As all identifying features were removed from the data set, there were no perceived implications for subjects of whom the records represent. As well, health facilities are not directly associated with individual record-level ED visits in this analysis, except for high-level utilization descriptors at a municipal level.

Statistical Analyses

Once data collection was complete, data was entered into IBM Statistical Package for the Social Sciences (SPSS) software. Descriptive and correlation analyses were conducted to identify characteristics of low acuity ED users and patterns of ED utilization between and within the cities of Regina and Saskatoon. Descriptive statistics were conducted for age, gender, location of patient residence, geographic SES, main medical problem presenting, time of ED visit, and responsible service provider. Pearson's correlation analysis was conducted to identify relationships between the following variables representative of FSAs: ED visits, population, median income and number of existing primary care centres. Variables included in descriptive and correlation analyses are summarized in **Figure 3.1**.

Table 3.1: Data Sources, Elements and Analysis

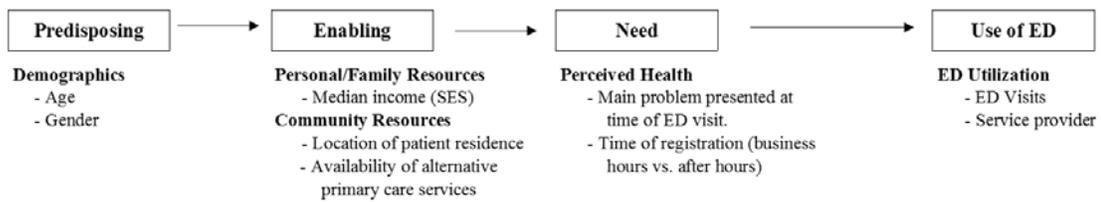
Source	Data	Data Elements	Analysis ^{5,6}
NACRS (CIHI)	ED visits (record-level)	Age	Descriptive – macro- & meso-level
		Gender	Descriptive – macro- & meso-level
		FSA of residence	Descriptive – meso-level
		Time of visit	Descriptive – macro- & meso-level
		Main medical problem	Descriptive – macro- & meso-level
		Service provider for visit	Descriptive – macro-level
eHealth Saskatchewan	Population Totals (by FSA)	Covered population of FSAs in Regina (as of June 30, 2012)	Descriptive – meso-level Correlation – meso-level
		Covered population of FSAs in Saskatoon (as of June 30, 2012)	Descriptive – meso-level Correlation – meso-level
Census (2006)	Median income (by FSA)	Median income of FSA (self-reported in 2006 for 2005 fiscal year)	Descriptive & correlation – meso-level
Statistics Canada	Median income of city (percent change)	Median income of Regina (2005 & 2012)	Extrapolation of 2005 incomes (no direct analysis)
		Median income of Saskatoon (2005 & 2012)	Extrapolation of 2005 incomes (no direct analysis)
Phonebooks	Walk-in clinics (Regina and Saskatoon by FSA)	Walk-in clinics per FSA (Saskatoon)	Descriptive – meso-level Correlation – meso-level
		Walk-in clinics per FSA (Regina)	Descriptive – meso-level Correlation – meso-level

⁵ Macro-level analysis indicates a comparative analysis of utilization data between Regina and Saskatoon.

⁶ Meso-level analysis indicates a comparative analysis of utilization data within Regina and Saskatoon.

Variables were grouped according to Andersen’s Behavioural Model, based on whether they served as predisposing, enabling, or need factors in contributing to health service utilization. **Figure 3.2** outlines study variables according to the model.

Figure 3.2: Andersen’s Behavioural Model as Applied to Low Acuity ED Utilization



(Adapted from Andersen 1995; Hauser 2007)

Age and gender serve as predisposing factors, or biological elements, used in this research to describe ED utilization. Age and gender variables were collected as data elements recorded at the time of ED visit and are submitted by EDs annually to CIHI as part of its administrative data reporting practice. Record-level patient visits were descriptively analysed between Regina and Saskatoon to identify patterns in age and gender as predisposing variables of ED utilization.

Main medical problem and time of ED registration represent need variables. These variables act as the rationale for utilizing health services and indicate the time when medical assistance was deemed necessary. The main medical problem reported for all ED visits was included as a data element obtained from NACRS. Main problems are classified using the *International Statistical Classification of Diseases and Related Health Problems* (ICD) at the time of ED visit. Using the World Health Organization’s ICD-10, CIHI has developed a national standard for use in Canadian hospitals. The

ICD-10-CA coding scheme is used as a method for administratively tracking medical rationale for health care services utilization. Main problems were recorded for all ED visits, based on the primary medical condition for which emergency services were sought. The ten most prevalent main problems were analysed for Regina and Saskatoon and further descriptively compared between the highest and lowest comparable utilization areas in Regina and Saskatoon.

Visits were categorized, based on whether they occurred during daytime hours when alternative primary care is commonly available (9:00 a.m. to 10:00 p.m.), or after hours when alternative primary care is largely unavailable (10:01 p.m. to 8:59 a.m.). A comparative analysis of time of registration was undertaken between Regina and Saskatoon and within Regina and Saskatoon.

Services providers represent the physical utilization of health services in Andersen's model. The service provider is the actor who provides care to the patient in the ED. The primary service provider for ED visits was descriptively compared between Regina and Saskatoon. The service provider who is directly responsible for care provision is reported by hospitals in Regina and Saskatoon and is submitted to NACRS as an element of administrative data. A descriptive analysis was undertaken at a macro-level between Regina and Saskatoon to compare service providers.

CHAPTER FOUR: PATIENT DEMOGRAPHY

Aim #1: What is the relationship between demographic characteristics of patients and neighbourhood-level SES of patient residence, and low acuity ED utilization?

Age and Emergency Department Usage for Low Acuity Conditions

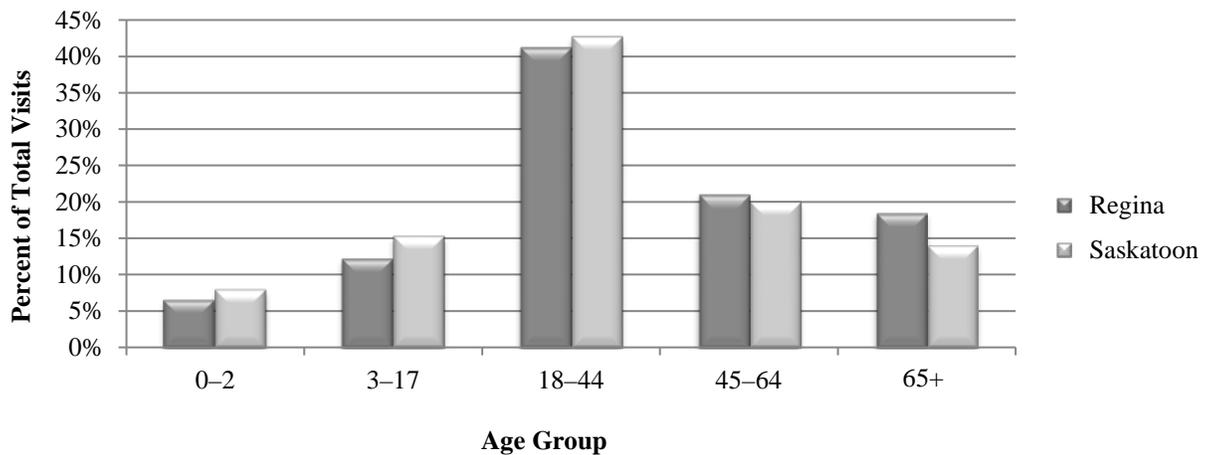
To evaluate patterns of nonessential and avoidable ED use, it was necessary to identify age groups of users. Age groups were broken down into the following CIHI replicated categorizations used to inform policy: 0-2, 3-17, 18-44, 45-64, and 65+. In 2012-13, patients between 18 and 44 years of age made the most trips to the ED for low acuity conditions (42.1% of total visits). This was consistent for patients visiting both Regina EDs (41.2% of total visits) and Saskatoon EDs (42.7% of total visits). For both urban centres, the second highest percentage of visits were made by patients between the ages of 45-64, at 21.1% of total visits in Regina and 20.0% of total visits in Saskatoon. Seniors aged 65 and over made up 16.0% of total ED visits. The age group constituting the lowest percentage of low acuity ED visits was infants aged two and under. **Table 4.1 and Figure 4.1** outline the percentages of total low acuity ED visits made by each age group in Saskatchewan in 2012-13.

Table 4.1: Frequency and Percent of ED Visits in Regina and Saskatoon, by Age Group, 2012-13

Age	Frequency of Visits (Regina)	Percent of Total Visits (Regina)	Frequency of Visits (Saskatoon)	Percent of Total Visits (Saskatoon)	Frequency of Visits (Regina & Saskatoon)	Percent of Total Visits (Regina & Saskatoon)
0-2	2,061	6.7%	3,108	8.0%	5,169	7.4%
3-17	3,844	12.4%	5,928	15.3%	9,772	14.0%
18-44	12,777	41.2%	16,581	42.7%	29,358	42.1%
45-64	6,543	21.1%	7,756	20.0%	14,299	20.5%
65+	5,765	18.6%	5,419	14.0%	11,184	16.0%
Total	30,990	100%	38,792	100%	69,782	100%

(NACRS 2012-13)

Figure 4.1: Percent of ED Visits by Age Group, Regina and Saskatoon, 2012-13



The next observable patient characteristic is gender. In both Regina and Saskatoon, males and females were found to use EDs for low acuity conditions in nearly equal proportions. **Table 4.2** examines the frequency and percent of total ED visits made by gender.

Table 4.2: Frequency and Percent of ED Visits in Regina and Saskatoon, by Gender, 2012-13

Age	Frequency of Visits (Regina)	Frequency of Visits (Saskatoon)	Frequency of Visits (Regina & Saskatoon)	Percent of Total Visits (Regina)	Percent of Total Visits (Saskatoon)	Percent of Total Visits (Regina & Saskatoon)
Male	15,802	19,518	35,320	51.0%	50.3%	50.6%
Female	15,188	19,274	34,462	49.0%	49.7%	49.4%
Total	30,990	38,792	69,782	100%	100%	100%

(NACRS 2012-13)

Location of Patient Residence and Low Acuity Emergency Department Use

Communities in Regina and Saskatoon were evaluated based on the prevalence that residents of each area were using EDs. This study found the S4P postal code area in Regina and S7M postal code area in Saskatoon to be highest utilization areas during the 2012-13 fiscal year. Areas using EDs at the lowest rate were S7V in Saskatoon and S4Y in Regina. **Figure 4.2** compares the distribution of rates of ED use across postal code areas in Regina and Saskatoon. Thematic postal code maps are presented in **Figures 4.3** and **4.4** to outline FSA areas in Regina and Saskatoon.

Figure 4.2: Rates of ED Utilization by Postal Code area (per 1,000 population), Regina and Saskatoon, 2012-13

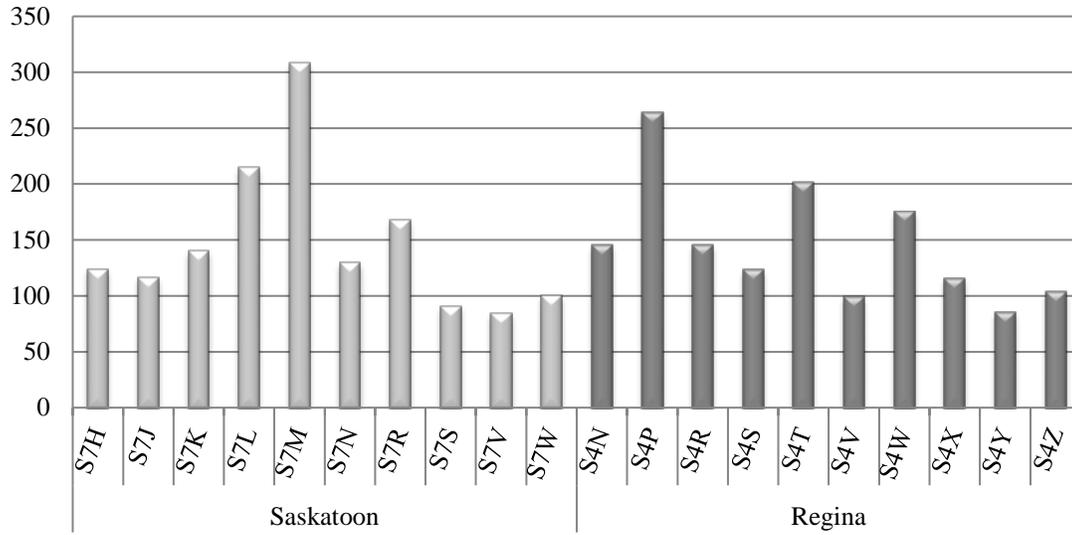
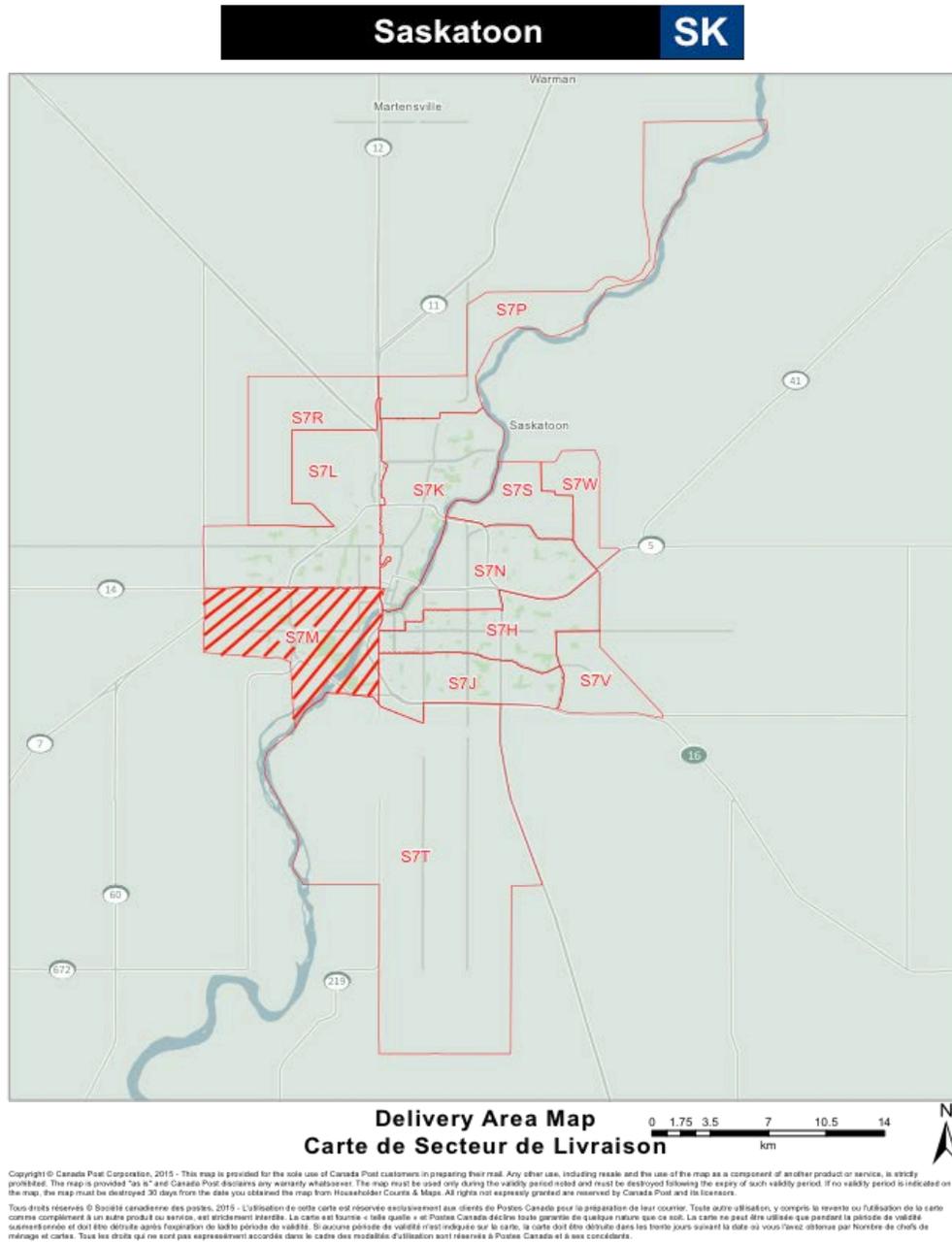


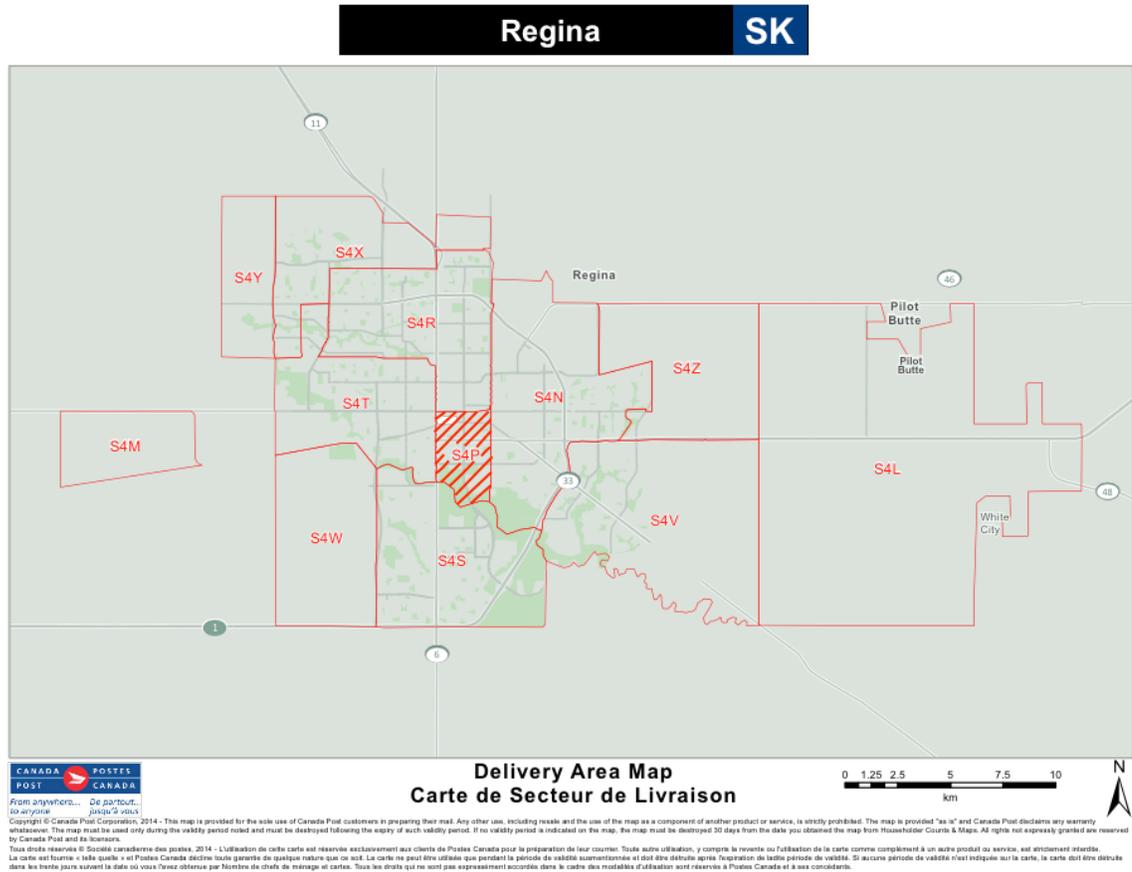
Figure 4.3: Postal Code Map of Saskatoon,⁷ 2015



(Canada Post 2015)

⁷ S7T and S7P were removed as they fall outside the city boundaries. Only those FSAs located within city boundaries met the inclusion criteria for this study.

Figure 4.4: Postal Code Map of Regina,⁸ 2015



(Canada Post 2015)

While the frequency of ED visits in **Table/Figure 4.1** show that the majority of ED visits are made by users between 18 and 44, **Figure 4.5** and **4.6** findings suggest different trends. **Figures 4.5** and **4.6** illustrate the rate of ED use by age and gender within FSAs. In Saskatoon, S7M exhibits a peak above other areas for the rate of utilization, however infants aged two and under consistently appear as the population

⁸ S4L and S4M were removed as they fall outside the city boundaries. Only those FSAs located within city boundaries met the inclusion criteria for this study.

with the highest rate of use. Regina's figure shows more variation between FSAs, however, infants again appear as consistently high user group. Seniors aged 65 and over also appear to exhibit high patterns of utilization.

Figure 4.5: Rate of ED Use (per 1,000 pop), in Saskatoon by Age, Gender and Location of Patient Residence, 2012-13

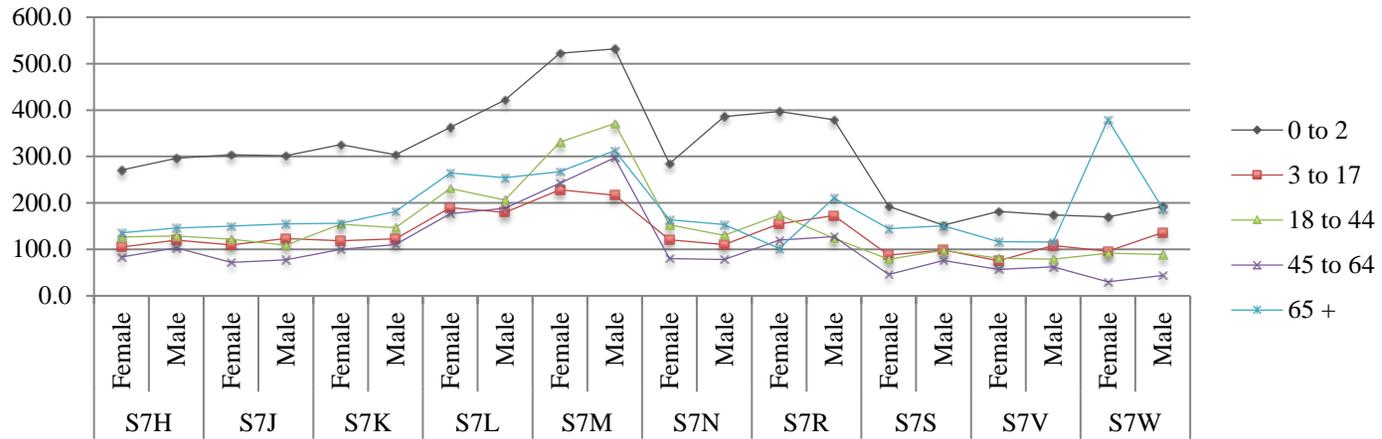
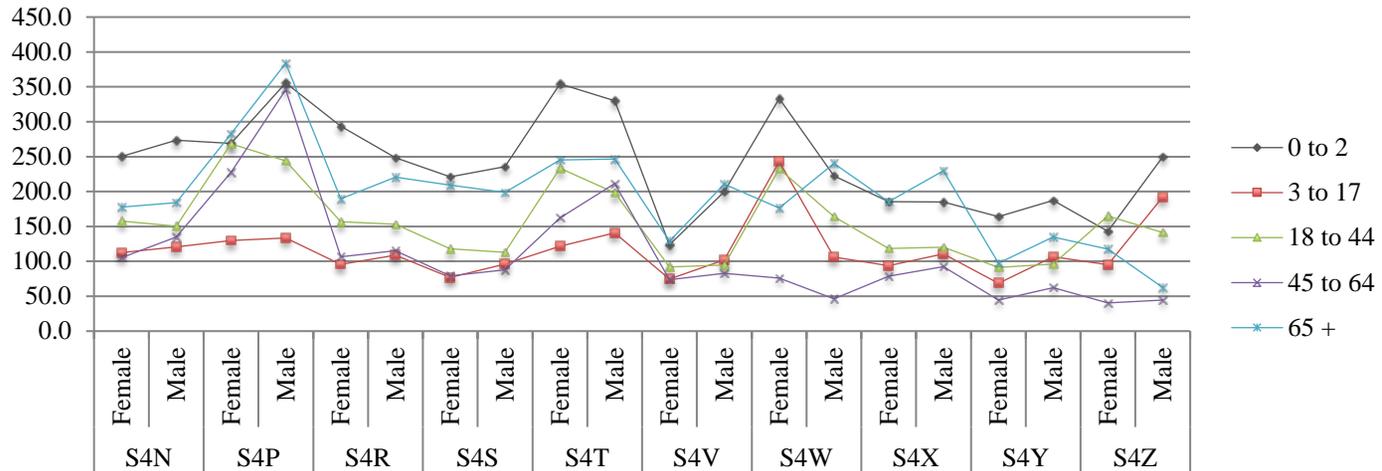


Figure 4.6: Rate of ED Use (per 1,000 pop) in Regina by Age, Gender and Location of Patient Residence, 2012-13



Socio-Economic Status and Low Acuity Emergency Department Utilization

Within both urban centers, the highest utilization areas corresponded with those areas obtaining the lowest median income. Neighbourhoods with higher annual median incomes were found to use EDs for low acuity conditions at considerably lower rates. In Saskatoon, the highest rate of ED usage belonged to neighbourhoods falling within the S7M forward sortation area. This area corresponded with the lowest reported median income in Saskatoon, at \$68,481 per annum. In Regina, the highest utilization area, S4P, corresponded with the lowest reported median income at \$70,040 (see **Table 4.3**). Areas found to use EDs the least were S7V in Saskatoon and S4Y in Regina. These areas corresponded with median incomes of \$114,316 and \$153,647 per annum, respectively.

Table 4.3: ED Visits, Covered Population, ED Usage Rate and Median Income¹, by FSA, Regina and Saskatoon, 2012-13

City	Neighbourhood (FSA)	Annual ED Visits (2012-13)	Covered Population (as of June 30, 2012)	ED Usage Rate in 2012-13 (rate per 1,000)	SES Proxy (median income)
Saskatoon	S7H	4,390	35,474	123.80	\$86,787
	S7J	3,743	32,079	116.70	\$102,824
	S7K	5,208	37,147	140.20	\$104,852
	S7L	9,056	42,102	215.10	\$74,388
	S7M	10,471	33,943	308.50	\$68,481
	S7N	3,599	27,784	129.50	\$104,117
	S7R	603	3,592	167.90	n/a ²
	S7S	541	5,947	91.00	\$123,872
	S7V	605	7,183	84.20	\$114,316
S7W	576	5,741	100.30	\$119,023	
Regina	S4N	4,501	30,860	145.90	\$80,119
	S4P	3,701	14,034	263.70	\$70,040
	S4R	5,402	37,020	145.90	\$93,487
	S4S	4,325	34,985	123.60	\$108,887
	S4T	7,116	35,207	202.10	\$71,776
	S4V	2,513	25,266	99.50	\$140,750
	S4W	222	1,264	175.60	n/a ³
	S4X	2,853	24,656	115.70	\$114,248
	S4Y	303	3,564	85.00	\$153,647
S4Z	54	521	103.60	\$133,711	

¹ Adjusted using Statistics Canada average annual increase for median incomes in Regina and Saskatoon from 2005 to 2012

² Median income for S7R not available because of population size of area and issues with confidentiality

³ Median income for S4W not available because of population size of area and issues with confidentiality

Discussion

Identifying categories of high frequency users allows policymakers to develop targeted interventions to improve health system efficiency. Understanding the demographic and economic characteristics of high frequency users is a key component in reducing the overall influx of patients seeking low acuity care at EDs (VanStone, Belanger, Moore and Caudle 2014). In this research, 50% of total low acuity ED visits were made by patients in young adulthood to late-middle age. Seniors aged 65 and over

made up a relatively small frequency of low acuity ED use, however, showed high rates of use in some areas. The lower frequency of senior visits conflicts with other studies that identify seniors as a high user group of low acuity ED services (McCusker et al. 2013). The age group using EDs at the lowest frequency was children under the age of two, however, exhibited high rates of use in some areas. Although the data indicates a lower number of visits for infants, this may be because of heightened perceived urgency resulting in a higher acuity score at the time of ED presentation, or that many infants receive regular primary care and therefore constitute fewer ED visits due to routine care.

In comparing frequencies of visits to rates, there is potential for misinterpretation. While seniors and infants show a lower number of ED visits, they use EDs at high rates in some areas, given their decreased population size. Alternatively, individuals between 18 to 44 constitute a substantially higher number of ED visits, however, they also showed lower rates of utilization because of their increased population size. Interpreting these findings with caution is imperative. For more detailed analysis of specific areas, substantially high rates of use should be the focus of inquiry, such as where the objective is to identify frequent users of EDs (i.e., “superusers”). However, in this research, where the objective is to understand patterns of ED utilization so health policy-makers know where to direct their intervention efforts, patients aged 18 to 44, who make up the majority of visits, are the focus for intervention. While high rates are concerning, a repeat number of visits by the same individual in a small population pool can easily misconstrue findings.

Patients living in lower SES areas, closer to the inner city, were found to use EDs for low acuity conditions at the highest rate. This finding supports extensive research previously undertaken across Canada that identifies patterns of increased health service requirement and health service use among lower income populations (VanStone, Belanger, Moore and Caudle 2014; Beattie, Gorman and Walker 2001; Glazier, Badley, Gilbert and Rothman 2000; Stewart, Reutter, Makwarimba, Rootman et al. 2005). Conversely, the areas using EDs in the lowest proportions were found along the outskirts, or suburban areas, of the cities.

Interventions to reduce nonessential ED use and to replace EDs as low acuity primary care centres should target patients living in inner city, low SES neighbourhoods aged 18 to 64 years of age. To improve health system efficiency, primary care services should be tailored to those living in the lowest SES areas, as these patients are likely to have difficulty obtaining care outside EDs. Lower SES populations are likely to face greater barriers to accessing health services because of many social and environmental constructs (e.g., transportation, language or cultural suitability of alternative care, unavailable or unaffordable child care, lower educational attainment, and increased difficulty navigating the primary health system (Shaw et al. 2013)). To be effective, policy development and programming should consider all variables, both those easily apparent (e.g., inaccessibility or unavailability of primary care centres) and those less evidently apparent (e.g., language barriers to accessing care) in decision-making.

CHAPTER FIVE: EXISTING SOURCES OF PRIMARY CARE

Aim #2: Does the presence or absence of existing nearby primary care centres influence low acuity ED use?

Key Findings

In this research, availability of care was quantitatively measured by the rate of existing walk-in clinics located in each area in Regina and Saskatoon. Prevalence rates of existing primary care services (per 1,000 population) were calculated using the number of services and corresponding population of each area. This ensured rates were standardized for comparison of primary health infrastructure between neighbourhoods. Findings show ED use is prevalent among areas with a high rate of existing primary care services per population. Moreover, the two areas identified as having high rates of existing primary care centres (S7M and S4P) also coincide with those areas obtaining the lowest median income. Areas using EDs at substantially lower rates were S7V in Saskatoon and S4Y in Regina. Both areas did not have an existing walk-in or medi-centre located within their proximal neighbourhood in 2012-13. **Table 5.1** outlines the availability of existing primary care services corresponding with each neighbourhood.

Table 5.1: ED Visits, Covered Population, ED Usage Rate, Existing Primary Care Centres Available, and Rate of Existing Primary Care Centres, by FSA, Regina and Saskatoon, 2012-13

City	Neighbourhood (FSA)	Annual ED Visits (2012-13)	Covered Population (as of June 30, 2012)	ED Usage Rate in 2012-13 (rate per 1,000)	Total Primary Care Centres Available	Primary Care Centres Available (rate per 1,000 pop)
Saskatoon	S7H	4,390	35,474	123.80	3	0.08
	S7J	3,743	32,079	116.70	0	0.00
	S7K	5,208	37,147	140.20	4	0.11
	S7L	9,056	42,102	215.10	3	0.07
	S7M	10,471	33,943	308.50	8	0.24
	S7N	3,599	27,784	129.50	2	0.07
	S7R	603	3,592	167.90	0	0.00
	S7S	541	5,947	91.00	2	0.34
	S7V	605	7,183	84.20	0	0.00
	S7W	576	5,741	100.30	0	0.00
Regina	S4N	4,501	30,860	145.90	4	0.13
	S4P	3,701	14,034	263.70	2	0.14
	S4R	5,402	37,020	145.90	1	0.03
	S4S	4,325	34,985	123.60	4	0.11
	S4T	7,116	35,207	202.10	3	0.09
	S4V	2,513	25,266	99.50	1	0.04
	S4W	222	1,264	175.60	0	0.00
	S4X	2,853	24,656	115.70	1	0.04
	S4Y	303	3,564	85.00	0	0.00
	S4Z	54	521	103.60	0	0.00

(NACRS 2012-13)

Pearson's correlation analysis was used to examine the association between population of FSA, median income of FSA, ED visits from residents of FSA, and number of existing primary care centres located within the FSA. The null hypotheses are there is no association between population, median income, ED visits and availability of existing primary care centres. Pearson's correlation results are presented in **Table 5.2**.

Table 5.2: Pearson’s Correlation Analysis

	ED Visits	Population	Median Income	Primary Care Centres
ED Visits				
Pearson Correlation	1	.835**	-.805**	.787**
Sig (2-tailed)		.000	.000	.000
N	18	18	18	18
Population				
Pearson Correlation	.835**	1	-.639**	.587*
Sig (2-tailed)	.000		.004	.010
N	18	18	18	18
Median Income				
Pearson Correlation	-.805**	-.639**	1	-.638**
Sig (2-tailed)	.000	.004		.004
N	18	18	18	18
Primary Care Centres				
Pearson Correlation	.787**	.587*	-.638**	1
Sig (2-tailed)	.000	.010	.004	
N	18	18	18	18

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

The Pearson’s correlation indicates that the null hypotheses for no relationship between the variables can be rejected. As can be seen, significant associations were found between ED visits and population, ED visits and median income, ED visits and primary care centres, population and median income, population and primary care centres, and median income and primary care centres.

Positively associated variables include: ED visits and population ($r=.835$, $p\leq 0.01$), ED visits and primary care centres ($r=.787$, $p\leq 0.01$), and population and primary care centres ($r=.587$, $p\leq 0.05$). As would be expected, as population increases, ED visits and primary care centres both increase. Interestingly, however, as ED visits increase so do primary care centres. This study’s preliminary hypothesis suggested that

primary care centres may not be available in areas where ED utilization is high.

However, the data here indicates the opposite.

Inverse associations were found between the following variables: ED visits and median income ($r=-.805$, $p\leq 0.01$), population and median income ($r=-.639$, $p\leq 0.01$), and median income and primary care centres ($r=-.638$, $p\leq 0.01$). In summary, as ED visits increase, median income decreases; as population increases, median income decreases; and as median income increases, primary care centres decrease. These findings show support for this study's preliminary hypothesis that lower SES areas use EDs in higher proportions, however contradicts the theory that lower SES areas suffer from a lack of availability of primary care centres.

Discussion

In a 2006 study, Lasser, Himmelstein, and Woolhandler found that Canadians in higher income quintiles had better access to care than did their lower income counterparts (1303). Based exclusively on availability of primary care and not other measures of accessibility (e.g., barriers of access), findings from this research suggest otherwise. In both Regina and Saskatoon, the two most impoverished neighbourhoods were found to use EDs in greater proportions. However, both areas were also found to have a high rate of existing primary care services proximally located within their geographic communities. Thus, while primary care services may be available, they may not be equally accessible by all.

This disparity prompts the further inquiry of how access to care can be adequately measured. This study's findings suggest that a greater number of facilities

providing primary care does not exclusively indicate greater access to care. If the presence of alternate primary care alone constituted access, health service users in these areas would, in all likelihood, seek ED services less for non-urgent and uncomplicated medical conditions. However, as findings show, ED services are used at higher rates by residents with greater availability at nearby existing primary care. This poses several policy-related inquiries, some of which require further research to answer. For example, if existing primary care services are available, further research on the utilization of these clinics could indicate if they are being used at their full potential. It is possible these services are inundated with patients and therefore do not have the operational capacity to provide additional care. Other components of these clinics (e.g., hours of operation, resources available) could also be evaluated to determine if other barriers are present in accessing care. A complementary study of primary care services in these areas could provide a comprehensive view of low acuity primary care utilization. Decision-makers should acknowledge the importance of this complimentary data in policy development.

Access to care may be more accurately measured in segregated terms of availability, utilization, relevance, and equity of services (Gulliford, Figueroa-Munoz, Morgan, Hughes, Gibson, Beech and Hudson 2002). Availability of care is traditionally measured by the frequency of clinics, doctors, or beds available within a particular dimension, such as per capita. Availability may further be evaluated by hours of operation. In this thesis, availability of care is measured based on the presence or absence of primary care centres. However, this measure may be limited by the potential for utilization to be impacted by personal, financial, and organisational barriers

(Gulliford et al. 2002). Personal barriers stem from how a patient views their necessity to obtain care and how they perceive their benefit from obtaining care; themes which are largely subjective among individuals and populations. Financial barriers exist when the cost of obtaining a service outweighs the perceived benefit of that service. In Canada's universal system, there is no direct patient cost for acute and ED care, however, the cost of transportation or time away from work is the responsibility of the patient. Organisational barriers are observable in systemic deterrents to obtaining care, such as prolonged wait times or EDs operating over capacity. The relevance of available services also directly impacts access to care. Services should be strategically located and supplied where the corresponding types of care are demanded. To investigate health seeking demand, medical determinants and time of ED visit is discussed in the next chapter.

CHAPTER SIX: MEDICAL DETERMINANTS

Aim #3: What is the distribution of low acuity medical conditions presenting at EDs and is there variation in the most prevalent medical conditions based on location of patient residence? Does time of registration at EDs vary by location of patient residence? (daytime versus afterhours)?

Distribution of Medical Need

Patients arriving to EDs are administratively coded based on the medical condition presented. Where multiple symptoms/conditions are indicated, the main medical condition for which services are rendered is coded on the patient's ED record. Medical conditions are categorized using the ICD-10-CA coding scheme. This data is submitted annually to CIHI as part of a standard data reporting practice.

The following tables outline the main medical conditions for which emergency consultation was sought in Regina and Saskatoon. A descriptive comparative analysis of the highest and lowest comparable utilization areas within each city is also provided. To simplify this analysis, ICD-10-CA codes were reduced to three digits to generalize the specificity of condition and ease the identification of patterns of use. The lowest comparable utilization areas (S7J in Saskatoon and S4V in Regina) were determined by the population size and annual ED visits made by areas using EDs at reduced rates. In both Regina and Saskatoon, the true lowest utilization areas included only 605 annual visits in Saskatoon (S7V) and 303 annual visits in Regina (S4Y). For comparative purposes, areas with significantly low rates of utilization, however similar population sizes and annual ED visits were selected for further illustration. See **Table 6.1** for a

breakdown of the most prevalent medical problems presenting in all of Regina and **Tables 6.2 and 6.3** for main problems presenting in the highest and lowest comparable utilization areas in Regina, respectively.

Table 6.1: Medical Problems Presenting at EDs, Regina, 2012-13

Main Problem	Frequency	Percent of Visits
1. Other medical care, including: radiotherapy or chemotherapy session, blood transfusion, palliative care, desensitization to allergens, pain management, somatic, neurogenic or visceral pain (Z51)	1848	6.0%
2. Open wound of wrist and hand (S61)	1162	3.7%
3. Open wound of head (S01)	1144	3.7%
4. Abdominal and pelvic pain (R10)	751	2.4%
5. Cellulitis (L03)	644	2.1%
6. Other disorders of urinary system, including UTI, proteinuria, incontinence (N39)	573	1.8%
7. Other soft tissue disorders, including: rheumatism, myalgia, neuralgia and neuritis, panniculitis, residual foreign body in soft tissue (M79)	553	1.8%
8. Dorsalgia (M54)	538	1.7%
9. Mental and behavioural disorders due to use of alcohol (F10)	528	1.7%
10. Other joint disorders, including haemarthrosis, fistula, flail or other instability of joint, effusion, pain, stiffness, osteophyte, joint disorder (M25)	490	1.6%

(NACRS 2012-13)

In Regina, “other medical care”, comprised of conditions pertaining to chronic ailments, was the highest frequency code, constituting 6.0% of total low acuity ED visits. Minor trauma, including open wound to the wrist/hand and head cumulatively made up 7.4% of visits. Pain management was also present as a common theme in low acuity visits. Abdominal and pelvic pain and dorsalgia (back pain) cumulatively

represented 4.1% of total visits. Other conditions appear to have been assigned generalized coding, as the condition may not accurately reflect an explicitly defined ICD-10-CA code (e.g., other disorders of the urinary system, other soft tissue disorders, other joint disorders). These conditions made up 5.2% of total visits. Skin infection (cellulitis) represented 2.1% of total visits and mental and behavioural disorders due to use of alcohol made up 1.7% of total visits.

The following **Tables 6.2** and **6.3** compare the ten most prevalent medical problems for ED visits from the highest utilization area (S4P) and the lowest comparable utilization area⁹ (S4V) in Regina.

Table 6.2: Medical Problems Presenting from Highest Utilization Area (S4P), Regina, 2012-13

Main Problem	Frequency	Percent of Visits from FSA
1. Other medical care, including: radiotherapy or chemotherapy session, blood transfusion, palliative care, desensitization to allergens, pain management, somatic, neurogenic or visceral pain (Z51)	256	6.9%
2. Open wound of wrist and hand (S61)	110	3.0%
3. Cellulitis (L03)	106	2.9%
4. Mental and behavioural disorders due to use of alcohol (F10)	97	2.6%
5. Other soft tissue disorders, including: rheumatism, myalgia, neuralgia and neuritis, panniculitis, residual foreign body in soft tissue (M79)	95	2.6%
6. Open wound of head (S01)	87	2.4%
7. Abdominal and pelvic pain (R10)	86	2.3%
8. Other disorders of urinary system, including UTI, proteinuria, incontinence (N39)	81	2.2%
9. Dorsalgia (M54)	80	2.2%

⁹ S4V was found to be the area in Regina using EDs at the second lowest rate (99.5 visits per 1,000 population).

10. Persons encountering health services in other circumstances, including: requiring repeat prescription, health supervision, candidate awaiting transplant availability (Z76)	62	1.7%
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(NACRS 2012-13)

Table 6.3: Medical Problems Presenting from Lowest Comparable Utilization Area (S4V), Regina, 2012-13

Main Problem	Frequency	Percent of Visits
1. Other medical care, including: radiotherapy or chemotherapy session, blood transfusion, palliative care, desensitization to allergens, pain management, somatic, neurogenic or visceral pain (Z51)	177	7.0%
2. Open wound of head (S01)	113	4.5%
3. Open wound of wrist and hand (S61)	109	4.3%
4. Special examinations without complaint or reported diagnosis, including: eyes, ears, dental, blood pressure, gynaecological, skin, radiological, laboratory (Z01)	55	2.2%
5. Other soft tissue disorders, including: rheumatism, myalgia, neuralgia and neuritis, panniculitis, residual foreign body in soft tissue (M79)	53	2.1%
6. Cellulitis (L03)	53	2.1%
7. Abdominal and pelvic pain (R10)	50	2.0%
8. Other and unspecified injuries of head, including: blood vessels, muscle and tendon, rupture of ear drum (S09)	41	1.6%
9. Other joint disorders, including haemarthrosis, fistula, flail or other instability of joint, effusion, pain, stiffness, osteophyte, joint disorder (M25)	41	1.6%
10. Other disorders of urinary system, including UTI, proteinuria, incontinence (N39)	40	1.6%

(NACRS 2012-13)

Other medical care, open wounds, pain, and other disorders (joint, urinary system, soft tissue) were reoccurring themes responsible for low acuity visits. In Regina’s highest utilization area, the main medical problem that presented at the fourth highest frequency was mental and behavioural disorders due to the excessive

consumption of alcohol. In the lower utilization area, this code was not observed among the most prevalent main problems responsible for seeking care. Moreover, in the lower utilization area, the code for special examinations without complaint or reported diagnosis occurred as the fourth main medical problem.

The same outline of tables is presented for the main medical problems in Saskatoon. **Table 6.4** displays the ten most prevalent medical problems for all of Saskatoon, while **Tables 6.5** and **6.6** present the ten prevalent medical problems for the highest and lowest comparable utilization areas, respectively.

Table 6.4: Medical Problems Presenting from in all of Saskatoon, 2012-13

Main Problem	Frequency	Percent of Visits
1. Other medical care, including: radiotherapy or chemotherapy session, blood transfusion, palliative care, desensitization to allergens, pain management, somatic, neurogenic or visceral pain (Z51)	1997	5.1%
2. Abdominal and pelvic pain (R10)	1396	3.6%
3. Open wound of head (S01)	1059	2.7%
4. Surgical follow-up care, including dressings and sutures, drains (Z48)	1032	2.7%
5. Acute upper respiratory infections of multiple and unspecified sites (J06)	987	2.5%
6. Dorsalgia (M54)	944	2.4%
7. Open wound of wrist and hand (S61)	941	2.4%
8. Other soft tissue disorders, including: rheumatism, myalgia, neuralgia and neuritis, panniculitis, residual foreign body in soft tissue (M79)	867	2.2%
9. Other disorders of urinary system, including UTI, proteinuria, incontinence (N39)	775	2.0%
10. Other gastroenteritis and colitis of infectious and unspecified origin (A09)	704	1.8%

(NACRS 2012-13)

The most frequently presented medical conditions in both Saskatoon and Regina EDs showed both similarities and differences. Similarly, “other medical care”, which defines a range of chronic ailments, presented at the highest frequency, constituting 5.1% of total visits. Visits because of pain (abdominal/pelvic pain and dorsalgia) made up 6% of total visits and open wounds (head and wrist/hand) constituted 5.1%. Conditions that did not appear among Regina’s most prevalent medical determinants for low acuity ED care seeking included: surgical follow-up care (2.7%), acute upper respiratory infections of multiple and unspecified sites (2.5%) and other gastroenteritis and colitis of infectious and unspecified origin (1.8%). **Table 6.5** and **6.6** compare the most prevalent medical problems for ED visits from the highest utilization area (S7M) and the lowest comparable utilization area¹⁰ (S7J) in Saskatoon.

Table 6.5: Medical Problems Presenting from Highest Utilization Area (S7M), Saskatoon, 2012-13

Main Problem	Frequency	Percent of Visits
1. Other medical care, including: radiotherapy or chemotherapy session, blood transfusion, palliative care, desensitization to allergens, pain management, somatic, neurogenic or visceral pain (Z51)	546	5.2%
2. Surgical follow-up care, including dressings and sutures, drains (Z48)	435	4.2%
3. Abdominal and pelvic pain (R10)	321	3.1%
4. Acute upper respiratory infections of multiple and unspecified sites (J06)	318	3.0%
5. Open wound of head (S01)	300	2.9%
6. Mental and behavioural disorders due to use of alcohol (F10)	274	2.6%
7. Dorsalgia (M54)	260	2.5%

¹⁰ S7J was found to be the area in Saskatoon using EDs at the fourth lowest rate (116.7 visits per 1,000 population).

8. Other soft tissue disorders, including: rheumatism, myalgia, neuralgia and neuritis, panniculitis, residual foreign body in soft tissue (M79)	252	2.4%
9. Open wound of wrist and hand (S61)	228	2.2%
10. Cellulitis (L03)	202	1.9%

(NACRS 2012-13)

Table 6.6: Medical Problems Presenting from Lowest Comparable Utilization Area (S7J) – Saskatoon, 2012-13

Main Problem	Frequency	Percent of Visits
1. Other medical care, including: radiotherapy or chemotherapy session, blood transfusion, palliative care, desensitization to allergens, pain management, somatic, neurogenic or visceral pain (Z51)	157	4.2%
2. Abdominal and pelvic pain (R10)	126	3.4%
3. Other disorders of urinary system, including UTI, proteinuria, incontinence (N39)	100	2.7%
4. Open wound of head (S01)	91	2.4%
5. Dorsalgia (M54)	91	2.4%
6. Open wound of wrist and hand (S61)	89	2.4%
7. Surgical follow-up care, including dressings and sutures, drains (Z48)	88	2.4%
8. Acute upper respiratory infections of multiple and unspecified sites (J06)	88	2.4%
9. Other soft tissue disorders, including: rheumatism, myalgia, neuralgia and neuritis, panniculitis, residual foreign body in soft tissue (M79)	82	2.2%
10. Other gastroenteritis and colitis of infectious and unspecified origin (A09)	70	1.9%

(NACRS 2012-13)

Comparing high and low utilization areas in Saskatoon illustrates both similarities and differences. Again, “other medical care” occurred at the highest frequency in both areas. Surgical follow-up care also presented in both areas. In Saskatoon, surgical follow-up care was the second main medical problem in Saskatoon’s high utilization area. As with other areas, pain and open wounds were

common conditions. In Saskatoon’s highest utilization area, mental and behavioural disorders represented the sixth most common medical condition.

Time of Registration

The following table (6.7) examines the number of ED visits made during daytime hours (9:00 a.m. to 10:00 p.m.), when alternative primary care services are available, and visits made after hours (10:01 p.m. to 8:59 a.m.), when alternative services are either scarcely available or unavailable.

Table 6.7: ED Visits by Time of Registration, Regina and Saskatoon, 2012-13

City	Total Visits	Time of Registration	Visits	Percent of Total Visits
Saskatoon	38,792	Daytime Hours	26,667	68.7%
		After Hours	12,125	31.3%
Regina	30,990	Daytime Hours	22,588	72.9%
		After Hours	8,402	27.1%
Total	69,782	Daytime Hours	49,255	70.6%
		After Hours	20,527	29.4%

(NACRS 2012-13)

In Regina, low acuity visits occurring during daytime hours made up 72.9% of total visits. While in Saskatoon, low acuity visits occurring during daytime hours made up 68.7% of total visits. A more detailed analysis of time of registration by neighbourhoods in Regina and Saskatoon is depicted in **Table 6.8**

Table 6.8: ED Visits by FSA and Time of Registration, Regina and Saskatoon, 2012-13

City	Neighbourhood (FSA)	Population	Time of Registration	ED Visits	Rate of ED Utilization (per 1,000 pop)
Saskatoon	S7H	35,474	Daytime Hours	2881	81.21
			After Hours	1509	42.53
	S7J	32,079	Daytime Hours	2623	81.77
			After Hours	1120	34.91
	S7K	37,147	Daytime Hours	3547	95.49
			After Hours	1661	44.71
	S7L	42,102	Daytime Hours	6258	148.64
			After Hours	2798	66.46
	S7M	33,943	Daytime Hours	7286	214.65
			After Hours	3185	93.83
	S7N	27,784	Daytime Hours	2476	89.12
			After Hours	1123	40.42
	S7R	3,592	Daytime Hours	414	115.26
			After Hours	189	52.62
	S7S	5,947	Daytime Hours	369	62.05
			After Hours	172	28.92
	S7V	7,183	Daytime Hours	413	57.50
			After Hours	192	26.73
S7W	5,741	Daytime Hours	400	69.67	
		After Hours	176	30.66	
Regina	S4N	30,860	Daytime Hours	3239	104.96
			After Hours	1262	40.89
	S4P	14,034	Daytime Hours	2642	188.26
			After Hours	1059	75.46
	S4R	37,020	Daytime Hours	4007	108.24
			After Hours	1395	37.68
	S4S	34,985	Daytime Hours	3221	92.07
			After Hours	1104	31.56
	S4T	35,207	Daytime Hours	5137	145.91
			After Hours	1979	56.21
	S4V	25,266	Daytime Hours	1844	72.98
			After Hours	669	26.48
	S4W	1,264	Daytime Hours	163	128.96
			After Hours	59	46.68
	S4X	24,656	Daytime Hours	2062	83.63
			After Hours	791	32.08
	S4Y	3,564	Daytime Hours	228	63.97
			After Hours	75	21.04
S4Z	521	Daytime Hours	45	86.37	
		After Hours	9	17.27	

(NACRS 2012-13)

In all areas in Regina and Saskatoon, ED use was higher during daytime hours than afterhours. The highest utilization areas in Regina (S4P) and Saskatoon (S7M) had higher rates of use during daytime hours (188.26 per 1,000 population and 214.65 per 1,000 population, respectively) than any other area. The same is true for afterhours where S4P had a rate of 75.46 visits per 1,000 population, and S7M of 93.83 visits per 1,000 population.

Discussion

This chapter identified low acuity medical conditions presenting at EDs. The objective was to evaluate geography-specific patterns of ED use, focusing specifically on the exploration of variation in medical problems presented by location of patient residence. Consideration was also given to the time of required care (day time hours versus after hours).

The first and foremost medical condition responsible for the highest frequency of low acuity ED visits in Regina and Saskatoon from all areas was for “other medical care”. This umbrella categorization includes several illness/disease/ailment services, such as: radiotherapy or chemotherapy session, blood transfusion, palliative care, desensitization to allergens, pain management, somatic, and neurogenic or visceral pain. This is a broad overarching categorization for several medical conditions, although all conditions have some degree of chronic nature. For example, radiotherapy and chemotherapy are used as cancer control treatments, blood transfusions (low acuity) are often in response to cancer and other illnesses such as liver disease, and palliative care is the specialized care that focuses on relief from pain and symptoms or serious illness

(Mayo Clinic 2016). The significant proportion of ED visits occurring under this code presents an opportunity to improve patient services for chronic disease, illness, and pain management. Patients suffering from chronic ailments benefit from the availability of care-specific programming and health literacy. The promotion of health literacy among individuals with chronic impairment will better equip patients with the knowledge of when and where health services should be consulted and how to best self-manage their condition independently. Moreover, patients suffering from chronic conditions experience decreased continuity of care when health service provision occurs in EDs (CIHI 2014b). Policy-makers can improve patient care by implementing services promoting chronic condition management and ensuring patients with chronic ailments have access to continuous care. As a result, patients' quality of care and health outcomes for chronic conditions can be improved. As well, EDs function more efficiently in providing urgent, acute care through the removal of demand for complex chronic conditions (CIHI 2014b).

A substantial volume of ED visits was for FPSCs. Examples of these include: respiratory infections, acute pharyngitis, surgical follow-up care, and the requirement of a repeat prescription (CIHI 2014b). These conditions could effectively be managed in an alternative primary care setting, such as a primary care clinic or GP's office. An additional benefit of management of FPSCs by a regularly visited practitioner is the improvement in continuity of care. A physician familiar with a patient's history has improved accuracy in diagnosis based on patient and family medical history and a higher likelihood of foreseeing the potential for adverse drug reactions (CIHI 2014b).

Various types of pain were observed among the prevalent low acuity conditions presenting at EDs in Regina and Saskatoon. Abdominal and pelvic pain, dorsalgia (back pain), and joint and tissue pains were consistently noted as a primary medical condition responsible for seeking emergency care. Whether these conditions were due to acute trauma or chronic pain is unknown, however, consideration is given to the potential for pain management clinics or increased resources regarding pain management to reduce non-essential ED use.

“Mental and behavioural disorders due to alcohol consumption” appeared as a medical determinant for low acuity ED consultation in the two highest utilization areas in Regina and Saskatoon. Again, these areas correspond with those areas obtaining the lowest median income. This finding represents a multi-sectoral challenge with two perceived issues: 1) EDs are being used inappropriately for a social service or mental health care requirement (i.e., where a mental or behavioural disorder has resulted from acute intoxication); and 2) collectively, the social service and health care system may have failed to inform residents of these areas what services are available for alcohol abuse and when to appropriately utilize health care services. This warrants further inquiry as EDs are being utilized in a manner not intended of the system. To ensure efficiency and sustainability of our health care system, social services must be available to provide appropriate avenues of care and support, particularly in these two areas.

In Regina’s lowest utilization area, 55 ED visits were for special examinations without complaint or reported diagnosis. This finding is particularly concerning as ED services are being utilized for conditions either non-existent or not significantly

hindering the patient. This finding is indicative of ED misuse. Whether the same individual or multiple individuals conducted these visits is unknown. As such, further inquiry is needed to reduce this type of non-acute ED use. This finding also exemplifies the need to look at utilization patterns from all areas, as misuse is not restricted to areas using EDs the most.

An important component in the assessment of low acuity ED utilization is the time at which services are required. Understanding when ED services are consulted for low acuity medical conditions allows policy-makers to tailor health care services more specifically, based on medical requirement and time of medical need. As per this study's findings, patients in all areas sought low acuity care during daytime hours, when alternative primary care services are available, at a higher rate than during after hours, when alternative primary care services are either scarcely available or unavailable. Moreover, the highest utilization areas in Regina and Saskatoon consulted EDs for care during daytime and after hours at higher rates than any other area in their respective cities. This implies residents of these two areas are consulting EDs more than other areas regardless of the time of day/night.

As a substantial proportion of low acuity visits are made during daytime hours, these finding suggest that EDs are being consulted as a foremost method of obtaining care, not because of unavailability of alternative care services. A shift in public perception may be required to inform Regina and Saskatoon residents when to appropriately seek care at EDs and when to seek care at a primary care centre, such as a walk-in clinic or family physician's office. Further inquiry into health seeking

behaviours from a patient's perspective could identify what deterrents are present for patients who choose to seek care at EDs prior to consulting alternative primary care centres.

CHAPTER SEVEN: SERVICE PROVIDERS IN EMERGENCY

DEPARTMENTS

Aim #4: What is the distribution of primary service providers attending to low acuity ED patients in Regina and Saskatoon?

Service Provision

An analysis of primary service providers in EDs for low acuity medical conditions provides valuable information to health systems research. Under Canada's universal Medicare system, physicians bill representatively according to their qualifications and level of specialization. When emergency specialists provide care that could otherwise be provided by a GP or NP a billing code associated with a higher degree of pay is accorded (Saskatchewan Physician Payment Schedule 2013). The following tables (**Table 7.1** and **7.2**) compare the primary service provider responsible for ED visits in Regina and Saskatoon in 2012-13. Service providers responsible for frequency of ED patient visits in 2012-13 are presented in ascending order.

Table 7.1: ED Visits in Saskatoon and Service Provider Responsible for Care, 2012-13

Physician Specialty	Frequency of Visits (After Hours)	Frequency of Visits (Daytime Hours)	Total Visits	Percent of Visits
Unknown	0	1	1	0.003%
Pediatric Otolaryngology	1	0	1	0.003%
Geriatric Medicine	0	1	1	0.003%
Neonatal-Perinatal Medicine	0	1	1	0.003%
Oral Surgery	1	0	1	0.003%
Dermatology	0	2	2	0.005%
Clinical Pharmacology	0	2	2	0.005%
Anatomical Pathology	1	1	2	0.005%
Unknown (code not defined)	0	3	3	0.007%
Radiation Oncology	0	3	3	0.007%
Endocrinology and Metabolism	1	7	8	0.020%
Pediatric Psychiatry	1	8	9	0.023%
Hematology	2	11	13	0.034%
Nephrology	4	10	14	0.036%
Medical Oncology	1	18	19	0.049%
Pediatric General Surgery	3	17	20	0.051%
Thoracic Surgery	7	14	21	0.054%
Vascular Surgery	1	22	23	0.059%
Gastroenterology	5	24	29	0.075%
Anaesthesiology	3	27	30	0.077%
Rheumatology	6	26	32	0.082%
Urology	22	36	58	0.149%
Infectious Diseases	4	58	62	0.159%
Neurosurgery	6	64	70	0.180%
Obstetrics and Gynaecology	12	64	76	0.195%
Respirology	13	64	77	0.198%
Cardiology	11	108	119	0.306%
Otolaryngology	15	111	126	0.324%
Plastic Surgery	27	104	131	0.337%
Neurology	20	191	211	0.543%
Psychiatry	32	196	228	0.587%
Critical Care Medicine	222	272	494	1.273%
General Surgery	90	473	563	1.451%
Orthopaedic Surgery	101	664	765	1.972%
Internal Medicine	1,159	2,478	3,637	9.375%
RN Nursing	1,482	2,526	4,008	10.332%
Paediatrics	727	3,871	4,598	11.853%

Family Practice/General Practice Medicine	3,555	6,392	9,947	25.642%
Emergency Medicine	4,590	8,797	13,387	34.509%
Total	12,125	26,667	38,792	100%

(NACRS 2012-13)

In Saskatoon, patient care was more proportionately distributed among many providers. Emergency medicine specialists provided the highest frequency of care, serving 34.5% of total patient visits, followed by family medicine at 25.6%, paediatrics at 11.9%, registered nurses (RNs) at 10.3%, and internal medicine at 9.4%. Various other specializations, including orthopaedic surgery, general surgery, critical care medicine, and psychiatry, provided care to low acuity ED visitations at lesser proportions.

Table 7.2: ED Visits in Regina and Service Provider Responsible for Care, 2012-13

Physician Specialty	Frequency of Visits (After Hours)	Frequency of Visits (Daytime Hours)	Total Visits	Percent of Visits
Endocrinology and Metabolism	0	1	1	0.003%
Rheumatology	0	1	1	0.003%
Maternal-Fetal Medicine	1	0	1	0.003%
Oral Surgery	0	1	1	0.003%
Unknown (code not defined)	0	2	2	0.006%
Critical Care Medicine	0	2	2	0.006%
Diagnostic Radiology	0	2	2	0.006%
Infectious Diseases	2	2	4	0.013%
Cardiac Surgery	0	10	10	0.032%
Vascular Surgery	4	11	15	0.048%
Paediatric General Surgery	0	15	15	0.048%
Ophthalmology	1	17	18	0.058%
Haematology	1	19	20	0.064%
Medical Oncology	3	21	24	0.077%
Nephrology	2	35	37	0.119%
Cardiology	19	32	51	0.164%
Anaesthesiology	0	51	51	0.164%
Neurology	4	53	57	0.183%
Otolaryngology	15	48	63	0.203%
Neurosurgery	3	61	64	0.206%
Urology	32	53	85	0.274%
Gastroenterology	39	56	95	0.306%
Respirology	5	102	107	0.345%
Psychiatry	18	146	164	0.529%
General Surgery	18	154	172	0.555%
Plastic Surgery	73	117	190	0.613%
Obstetrics and Gynaecology	32	172	204	0.658%
Internal Medicine	38	168	206	0.664%
Paediatrics	16	268	284	0.916%
Orthopaedic Surgery	46	312	358	1.155%
Family Practice/General Practice Medicine	74	383	457	1.475%
RN Nursing	1,470	2,965	4,435	14.311%
Emergency Medicine	6,486	17,308	23,794	76.779%
Total	8,402	22,588	30,990	100%

(NACRS 2012-13)

Care provision was less equally distributed in Regina. Emergency medicine specialists represented the greatest frequency of care provision at 76.8%, followed by RN nursing at 14.3%, family medicine at 1.5% and orthopaedic surgery at 1.2%. Various other specializations attended to low acuity ED patients, but at significantly low percentages.

Discussion

In Regina, 76.8% of low acuity ED patients were seen by emergency medicine specialists. Meanwhile, in Saskatoon, 34.5% of low acuity ED visits were seen by emergency medicine specialists, while a collective 48.7% of other visits were managed by GPs, paediatricians, and RNs. This significant finding suggests that care provision in Saskatoon EDs is more appropriately distributed based on the medical need of patients. The distribution of care providers in Saskatoon EDs may also contribute to the lower wait times that patients experienced, as various care providers provide service in EDs. Patients in Regina EDs may be subject to longer wait times as emergency specialists appear to be the primary provider of care. To substantiate this claim however, further research should evaluate the number of practicing care providers available at each institution, as Regina possibly struggles with a more limited number of GPs, RNs, and paediatricians. Given Saskatoon's greater population size, Saskatoon may have additional practitioners to satisfy additional demand. Further research into the association between low acuity ED visits, variation in care providers in EDs and corresponding effects (e.g., wait times, quality of care, patient satisfaction) is recommended as a result of these preliminary findings.

In Regina, GPs/family physicians were responsible for providing care to 457 ED visits, compared with 9,947 visits in Saskatoon. This is a substantial discrepancy between these two similar urban centres. As many low acuity conditions are categorized as FPSCs, consideration should be given to the inefficiency, both on the supply and demand side, of health provision that results from these patients being seen by emergency medicine specialists. This presents a significant concern for the operation of Regina EDs. In rural Saskatchewan, a high ratio of GPs to emergency specialists is expected, as recruitment and retention is difficult in these areas (Wasko, Jenkins and Meili 2014). However, in Saskatoon's urban setting, findings show a high ratio of practicing GPs in EDs. Saskatoon's distribution of health care providers is an ideal model that Regina EDs would benefit from replicating. Prolonged wait times in Regina EDs, compared to Saskatoon EDs, are potentially the result of patients being required to wait for finite emergency specialists to provide care. Regina wait times may decrease if additional service providers (GPs, RNs, NPs) are also responsible for ED care provision in a more distributed manner.

An additional finding in this breakdown is the minimal proportion of visits noting RN nursing as the primary service provider. Only 10.3% of Saskatoon visits and 14.3% of Regina visits were served by RNs. This represents a foregone opportunity in the utilization of allied health professionals; particularly NPs. NPs are formally trained to provide care in more complex medical situations than traditional RNs or registered practical nurses. In 2014, there were more than 3,300 regulated NPs practicing across Canada, upholding diverse roles in NP-led clinics, hospitals, physician-led clinics,

community care centres, and other primary care facilities (Canadian Medical Protective Association 2014). In Saskatchewan, the range of clinical duties that NPs are authorized to perform is vaguely defined. The Saskatchewan Registered Nurses' Association Interpretation of RN(NP) Primary Care Scope of Practice enlists RNs and NPs may provide care in situations where “mean health problems, conditions, diseases or disorders that the RN(NP) sees with regularity within the context of their practice” (para. 2). This interpretation is problematic in its declaration that judgement lies with the RNs and NPs themselves to define their current competencies in determining appropriate care provision within their scope of practice.

To heighten efficiency, workforce planning should review and explicitly redefine roles and responsibilities for professions, based on the adequacy of workforce supply in urban Saskatchewan EDs, to develop a twenty-first century workforce plan for each institution (Duckett 2005). Through a workforce redesign, NPs could effectively be utilized in emergency scenarios to replace or supplement finite medical professionals, such as emergency specialists or GPs. Roles that could undergo reevaluation of responsibility transfer in EDs include those pertaining to: noncomplex minor trauma (e.g., sutures, abscess drains), ordering tests (e.g., laboratory, ultrasounds, x-rays), prescribing and dispensing in line with treatment guidelines, the authority to admit or discharge in line with treatment guidelines, and health education on injury prevention and health promotion (Duckett 2005; Saskatoon Health Region 2015). Permitting NPs to provide care within their areas of expertise could improve ED patient flow and economic efficiency of ED operation.

CHAPTER EIGHT: DISCUSSION AND POLICY IMPLICATIONS

Discussion

This study's objective was to identify patterns and variation in low acuity ED attendance in Regina and Saskatoon in 2012-13, and translate empirical findings to health policy decision-makers. In doing so, this study utilizes a replicable epidemiological methodology to evaluate and compare ED utilization between and within jurisdictions to inform geography-specific health care policy in the two largest urban centres in Saskatchewan. Analysis of the sample of 69,782 ED visits occurring in Regina (n=30,990) and Saskatoon (n=38,792) provided a comprehensive assessment of ED utilization. Synthesizing evidence yielded from analysis, this discussion explores potential interventions to reduce nonessential ED visits and/or redirect low acuity conditions to suitable primary care centres.

In Regina and Saskatoon in 2012-13, roughly 49% of total ED visits were for low acuity conditions that could effectively be managed by other non-urgent primary care centres. In Regina, low acuity visits made up approximately 42% of ED visits and in Saskatoon, 54%. To put this into perspective, more than 30,000 annual visits to EDs in Regina in 2012-13 were for low acuity medical conditions and more than 38,000 annual visits in Saskatoon. This amounts to more than 80 visits per day to one of two Regina EDs for low acuity conditions, and more than 100 visits per day to one of two EDs in Saskatoon. An analysis of ED visits identified a number of patterns in patient utilization. Between males and females, there was no significant variation in ED use identified. Patients between 18 and 44 years of age constituted the greatest proportion of

ED visits, at 42% of total visits. Of these visits, 73% were found to occur during daytime hours when alternative existing sources of primary care were available. Neighbourhoods using EDs at the highest rate corresponded with those obtaining the lowest median income, however having the highest rate of existing primary care services proximally available. The main low acuity conditions presenting at EDs constituted over 25% of annual visits to EDs in Regina and Saskatoon. Patterns of low acuity medical conditions presenting at EDs showed that patients largely sought ED care for the management or treatment of chronic conditions. As well, other medical conditions were noted to be ailments that could more appropriately be routed to primary care centres, such as FPSCs. Lastly, mental and behavioural disorders due to acute alcohol consumption appeared as a common medical condition, presenting from the two lowest SES areas of Regina and Saskatoon.

Between Regina and Saskatoon, notable variation was identified for: utilization rates, wait times, main medical problems, and distribution of service providers in EDs. Regina exhibited a lower frequency of low acuity visits than Saskatoon; however, reported a nearly double average wait time to physician assessment. Saskatoon's highest utilization area (S7M) showed a lower median income than Regina's (S4P), and used EDs at a higher rate (308.5 visits per 1,000 population versus 263.7). Saskatoon's S7M was found to have substantially more primary care centres available (8 clinics) than Regina's S4P (2 clinics). However, S7M housed more than double the population of S4P. For medical conditions presenting to EDs, both Saskatoon and Regina saw patients for chronic ailments and acute injury frequently. However, Saskatoon saw more patients

seeking surgical follow-up care, respiratory infections and gastroenteritis and colitis. In Regina, mental and behavioural disorders due to alcohol consumption was observed at a higher frequency. Service providers in EDs varied between Regina and Saskatoon. Service providers in Regina were primarily emergency specialists, while Saskatoon showed a diverse group of providers; including emergency specialists, GPs, paediatrics, and RNs.

Provided this is the first study identified by this author to make descriptive comparisons between Regina and Saskatoon ED visits, any explanation beyond speculation is difficult to garner. In an attempt to provide insight as to why variation exists between Regina and Saskatoon, select comparators are examined in **Table 8.1**.

Table 8.1: Comparators Between Regina and Saskatoon

Indicator (Year)	Regina	Saskatoon
Prevalence of Diabetes (2014)	5.6%	5.1%
Prevalence of high blood pressure (2014)	16.3%	10.4%
Family medicine physicians per 100,000 population (2015)	107	119
Unemployment (2015)	4.2%	5.4%
Children living in low-income families (2011)	13.9%	13.6%
Household food insecurity (2011-12)	8.5%	7.3%
Post-secondary educational attainment (2011)	61.4%	65.1%
Have a regular doctor (2014)	81.4%	80.4%
Repeat hospital stays for mental illness (2014-15)	12.6%	10.6%
High users of hospital beds (per 100 population) (2015-16)	5.1%	5.5%
Perceived health (2014)	62.6%	68.4%
Hospitalization due to self-injury (2015-16)	72	53
Hospitalization due entirely to alcohol (2015-16)	339	193
Heavy drinking (2014)	21.2%	19.1%
Obesity (2014)	24.7%	20.7%
Smoking (2014)	22.5	13.3%

(CIHI 2017)

In 2014, Regina reported higher rates of residents with diabetes and high blood pressure. Regina also showed higher rates of repeat hospital stays for mental illness. Further, Regina showed a significantly higher frequency of hospitalizations due entirely to alcohol (339 hospitalizations) than Saskatoon (163 hospitalizations). Hospitalizations due to self-injury were also found to be higher in Regina (72 hospitalizations) than Saskatoon (53 hospitalizations). Together, these findings may suggest that Regina residents suffer from addiction and mental health illness at a disproportionately higher rate, or that residents lack addiction and mental health services. This is particularly notable as CIHI indicators were collected three years after ED utilization data used in this study's analysis and exhibits a similar trend. However, without examining this relationship further, any association could only be considered speculative.

Saskatoon residents have access to a greater number of family medicine physicians per 100,000 population, whereas Regina reports a slightly higher percentage of patients with a regular physician. Anecdotally, it is noted that Saskatoon has previously led non-traditional initiatives to deliver care. For example, a nurse practitioner and paramedic provide care via a mobile health bus in a different area of the city each day of the week. The goal of the health bus is to create health equity and close the disparity gap for people who are geographically, socially, economically and/or culturally isolated. This perspective could contribute to an inter-disciplinary approach to care provision that is observed in Saskatoon EDs. The distribution of service providers in EDs in Saskatoon versus Regina is perceived to be the most significant discrepancy between the two centers identified in this research. It is speculated that Saskatoon's

more equally distributed range of providers contributes to the reduced average wait times in Saskatoon since patients are not required to wait for limited emergency specialists to receive care. That said, it is unknown whether Saskatoon's ED is organized using greater variance in provider types than Regina EDs, or if providers are instead utilized at their maximum potential in providing services consistent with their training capacity in Saskatoon, and that the same is not occurring in Regina EDs (e.g., RNs providing low acuity care). In either case, Saskatoon's model of distributed care provision is an ideal model that could potentially provide more timely care to low acuity ED patients.

Social determinants of health are important indicators in understanding health outcomes, and could potentially play a role in observed variation between Regina and Saskatoon. While both centers struggle with poverty in inner city neighbourhoods, confounding variables could contribute to improved or worsened health outcomes. Between Regina and Saskatoon, Saskatoon reported higher rates of unemployment and high users of hospital beds. However, Saskatoon had higher post-secondary educational attainment. Alternatively, Regina reported higher rates of children living in low-income families, household food insecurity, obesity, and smoking. Saskatoon's population reported a higher perceived health status. In both centers, heavy drinking was highly reported, at 21.2% of Regina's population and 19.1% of Saskatoon's population. A more thorough analysis of confounding variables and social determinants could provide stronger insight to the variance observed between Regina and Saskatoon.

Overall, findings conflicted with this study's initial hypotheses that youth and elderly patients living in low SES neighbourhoods utilized EDs at higher rates, since these areas lacked the primary care infrastructure to meet the health care needs of residents. While lower SES neighbourhoods did use EDs at higher rates than higher SES neighbourhoods, youth and elderly were not found to make up the greatest proportion of ED visits. Instead, middle-aged patients, between 18 and 44, constituted the largest percent of annual ED visits. Further, lower SES neighbourhoods were found to have greater existing primary care services available. EDs were expected to be primarily consulted for low acuity conditions after hours, when alternative sources of primary care are unavailable. However, findings show nearly three quarters of visits occurred during daytime hours, when alternative services are available. Lastly, emergency specialists were thought to be the primary service providers in EDs, and while true for Regina, in Saskatoon it was observed that a blend of service providers with a wide range of scope provided low acuity ED care.

Other confounding elements that have been associated with low acuity ED utilization include: geographic proximity to EDs (Mattson 2011), consumer preferences (Durand et al. 2012), and complexity of condition (Nagree et al. 2013). These variables are perceived to fit within the "evaluated need" category of Andersen's Behavioural Model and may contribute to the physical utilization of EDs.

Geographic Proximity to Emergency Departments

For both Regina and Saskatoon, the highest utilization areas corresponded with areas that shared FSA codes with a hospital, meaning that a hospital was located within

or in close proximity to their area of residence. Although this study did not collect evidence directly associated with patient attitudes and expectations towards EDs versus GP care settings, previous research has suggested that shorter travel distance and greater transportation methods play a role in health seeking behaviours (Mattson 2011). As a result, proximity to EDs is suspected to be a driver in low acuity ED use.

Consumer Preferences

Patients, acting as health care consumers, have traditionally indicated convenience of EDs and exhibited preference for EDs for several reasons (Durand et al. 2012; Field and Lantz 2006). Reasons include: a wide range of services are provided, potential for a referral to an additional service located within hospital settings (e.g., laboratory, radiology) and the ability to jump a queue to access that service, and comprehensive 24 hours per day/7 days per week/365 days per year availability (Berchet 2015; Field and Lantz 2006). Additionally, in-patient medication not requiring initial prescription is generally provided at no cost as part of universal Medicare coverage. These components may persuade patients to obtain care in EDs prior to consulting a walk-in or physician clinic.

Throughout our health care system, middle-aged populations are increasingly making decisions for both themselves and their younger and aging family members (Forkner-Dunn 2003). Bos, Carroll and Marsh (2008) describe modern health care systems as undergoing a “paradigm shift towards a needs-led and consumer-oriented healthcare” (1). This present generation acts spontaneously in their health seeking behaviours, a phenomenon referred to as the “impatient patient” (Forkner-Dunn 2003).

Increasingly, “patients demand immediate, convenient access to a high level of personalized health care: they want it their way, and they want it now” (Forkner-Dunn 2003, 2). Patients confronted with the possibility of waiting hours or days for an appointment may seek health services in EDs in order to obtain immediate care (Health Council of Canada 2014). As per the 2013 Commonwealth Fund International Health Policy Survey, fewer than half of Canadians (41%) are able to obtain a same-day or next-day appointment with a doctor (Health Council of Canada 2014, 21). Of all countries surveyed, Canada ranked as the worst for securing timely doctor appointments and had shown no improvement since 2004 (Health Council of Canada 2014, 21). Because of the “impatient patient” phenomenon, plus systemic issues in obtaining same day appointments, patients may exhibit preference for EDs. While obtaining patient participation as a component of this research project was not possible, documenting patient preferences would aid the ability to describe *why* the ED is consulted for low acuity conditions in such high proportions.

Complexity of Condition

While CTAS levels provide a standardized method for categorizing urgency, complex conditions can lead patients to EDs for more intensive consultation. The CTAS was developed as a scale of urgency, not complexity. High urgency conditions can be of non-complex nature; just as low urgency conditions can be of complex nature (Nagree et al. 2013). For example, an infant with high fever and rash should be urgently tested for meningitis. However, upon a negative diagnosis, may be discharged as a non-complex common virus (Nagree et al. 2013). Alternatively, an elderly individual who

has suffered a minor fall may be categorized as non-urgent, however because of chronic ailments and assisted living requirements, may be considered complex and require an allied health team. As such, conditions that are complex, but non-urgent, can still warrant more intensive consultation from a range of health care providers as provided in EDs (Nagree et al. 2013). For this reason, if a patient's medical condition is evaluated and perceived as being of complex nature, ED services may be preferred.

Strengths and Limitations

In this research, there are both strengths and limitations. Positively, this research is aligned with the provincial government's strategic priorities. Further, this study contributes to current gaps in research on low acuity ED utilization and is particularly beneficial in describing the landscape of ED use in urban Saskatchewan. In terms of research design, findings from this research are strengthened by the substantial sample size and comprehensive list of all ED visits in Regina and Saskatoon by municipal residents. Lastly, all data for ED visits was administratively reported and therefore was not subject to self-reporting bias.

While this study adds to the limited body of research on low acuity ED use in Saskatchewan, there are several limitations. First, as this study is a cross-sectional research design, findings should be interpreted as associative and not causal. Second, as findings are based on community-level income data and not individual-level, generalization of SES for all residents making up the pool of residency of a neighbourhood is in effect. Outliers for SES cannot be addressed by this research due to the lack of individual-level income data. Third, median income data was reliant on self-

reporting practices. As such, median income may be subject to self-reporting bias when more desirable income levels are reported. Fourth, because of the disruption in the administration of the long form census in 2011, obtaining median incomes by FSA closer to this study's target year was not possible. As a result, income data may not be accurately representative of 2012-13 income figures. Fifth, while standardized triage levels are objective in their denotation, subjectivity may impact triage assignment based on circumstances at the time of ED presentation. The variation in training and experience of triage nurses is also considered a limiting factor. As with most categorizations, and particularly due to the rapid nature of triaging under stressful circumstances, some degree of misrepresentation is expected. Sixth, as NACRS data for ED visits were de-identified, it was not possible to determine the number of repeat visits by a same user. As such, one user may account for multiple ED visits. The ability to conduct predictive quantitative modelling was also limited by this omission. Additionally, due to the time constraints of this study, it was not possible to obtain patient participation to compliment the ED utilization analysis. Patient input describing their decision-making processes in choosing EDs for low acuity care would strengthen this analysis. Future research may also benefit from the inclusion of ED use on weekdays compared to weekends, and could include environmental conditions (e.g., temperature) to gain a more comprehensive understanding of low acuity ED use. Finally, Saskatoon City Hospital provided care to the greatest proportion of low acuity visits (62.9%); however was removed from this analysis (17,936 visits) based on the concern that assumptions could not appropriately be extended to City Hospital since its

organization does not mirror the other EDs (hours of operation restricted to 9:00 a.m. – 8:30 p.m.). Future research could use City Hospital as a case study to conduct a thorough analysis of low acuity ED use and this may yield valuable information on one hospital's experience with low acuity visits.

Policy Recommendations

Like many other provinces, decision-making in Saskatchewan's health care system operates largely from a top-down approach. Federal involvement is limited to financial support and some funding and/or delivery of health services to certain groups (Health Canada 2012). Provincial involvement includes the allocation and distribution of funding to hospitals and other facilities, manages some data procurement, develops strategic plans, and negotiates fee schedules for health professionals (Health Canada 2012). Territorial health regions support and organize services and front-line providers carry out practice-level duties. To improve the front-line care system in urban Saskatchewan, several policy changes are required at the provincial- and territorial health region-levels. Establishing collective leadership across levels of government can aid the design and delivery of care that is safe, high-quality and cost-effective (West, Eckert, Steward and Pasmore 2014).

Provincially, lateral communication between ministries should guide collaborative priority setting. Strategic plans and policies should be streamlined between the Ministry of Health and non-health departments (e.g. social services, education, advanced education, economy) to establish interconnected objectives. For example, the Ministry of Health strategic plan should coordinate with the Ministry of

Social Services to outline priorities for patients who require care not directly associated with the biomedical model of care. As social determinants often lead to health care requirement (e.g., income or housing), priorities between the Ministry of Health and Ministry of Social Services should align to mitigate instances where a social service issue transitions to a health care requirement. Supports should be in place so health care professionals can identify when these conflicts arise and have a method of connecting with a social service representative to assist individuals, families or communities in coping with the social issue. Lateral communication between ministries should promote health and other social and educational outcomes for Saskatchewan residents through comprehensive collaborative initiatives.

Provincial and organizational bodies (i.e., health regions) should work together to support primary care infrastructure through human resource planning. Ensuring patients have access to a regular family physician and are able to obtain a same-day or next-day appointment should be a priority for primary care human resource planning. Health regions must work with the provincial government to clearly outline the resource requirements for adequate staffing and service delivery to meet health care demand. In response, the provincial government must support organizations through funding and resource allocation to provide a high quality of care, particularly in low SES neighbourhoods where health care utilization is high. Targets to improve access to same-day or next-day appointments should be indicated in provincial strategic plans. In the future, population surveying can identify improvement in primary care accessibility.

The aforementioned directional policy goals are presented at a high-level to the Ministry of Health and Regina Qu'Appelle and Saskatoon Health Regions to outline a consistent provincial approach for change. The following operational policy recommendations flow from the directional policies and identify key strategies and actions needed to achieve change; in this case, to maximize ED efficiency and improve alternative pathways to obtain primary care. These recommendations were drawn from the empirical results presented in this paper, in concert with evidence-based strategies consistently identified by relevant literature based on the experiences in other jurisdictions.

Using the same organizational strategy, as outlined in OECD Working Paper No. 83, recommendations have been separated into two categories based on the lever used to intervene in ED attendance: interventions that improve alternative pathways of care while reducing ED costs for low acuity use; and interventions aimed at reducing demand for ED care, both urgent and non-urgent (Berchet 2015, 21). The following options contain a combination of universal and targeted approaches to comprehensively improve systemic ED operation and optimize access to primary care services.

1. Interventions that improve alternative pathways of care and reduce ED costs for low acuity use

1.1. Develop cost-control strategies in EDs

Based on findings from this research that show a large proportion of low acuity patients are served by high-cost ED specialists, cost-control strategies are recommended

for Regina and Saskatoon EDs. Cost-control strategies should be developed for EDs in collaboration with primary care physicians, specialists, and allied health care professions. Formally organizing and outlining roles and responsibilities of service providers can improve the systemic operation of primary care provision in EDs. While this recommendation does not serve to keep low acuity patients out of the ED, it seeks to realign the roles of primary care physicians, specialists, and allied health professions to increase teamwork and collaboration in EDs, reduce independence and uncoordinated sources of patient care, and enable each professional to provide care in situations most suited to their specialities (Katon et al. 2001).

This strategy would include the evaluation of ED institutional workforce policies and professional policies (e.g., Saskatchewan Registered Nurses Association Bylaws) that regulate roles and responsibilities of health professionals. Institutional policies must be evaluated to ensure that ED roles reflect and fulfill professional scope of practices. The further integration of NPs into ED care provision can aid in a coordinated approach to care (Canadian Medical Protective Association 2014). Registered nurses and NPs can manage low acuity patient care, enabling physicians to be available to complex and urgent patients. ED institutional policies should be developed on a case-by-case basis to ensure that roles and responsibilities are reflective of legislated scopes of practice and institutional policies and practices. Strategies should also promote the mitigation of potential conflict between overlapping skills of care providers. Standard processes can be developed to determine the most responsible care provider for each patient, including methods to communicate to patients who their

responsible care provider is and for what care (Canadian Medical Protective Association 2014).

The implementation of a cost-control strategy is particularly important in Regina EDs, where emergency specialists are providing care to the majority of low acuity conditions (76.8%). Saskatoon's more equally distributed range of care providers should be the model upon which cost-control strategies are developed (i.e., the lowest-cost health care provider trained to provide the service should be responsible for the patient). Redefining the roles and responsibilities of ED service providers and implementing an effective strategy for communication will promote collaboration among the ED team. As well, doing so is expected to result in cost savings to our health care system through the provision of care by appropriate providers. An interdisciplinary team made up of ED and hospital managers, human resources, professional affiliation representatives (e.g., College of Physicians and Surgeons, SRNA), physicians, NPs, RNs, and administrative staff should be consulted to develop cost-control strategies.

1.2. Enhance non-traditional primary care services in low SES areas.

Leveraging the experiences of other jurisdictions in employing allied health professionals to control health care expenditures, the utilization of EMTs and NPs in the provision of care is recommended in Regina and Saskatoon. EMTs and NPs are specialized in the provision of urgent and emergency medical care and can provide a cost-effective alternative to emergency specialists for treating low acuity medical conditions. The implementation of a pilot clinic is recommended in the highest

utilization areas in Regina and Saskatoon, staffed by EMTs and NPs with physician oversight when required. Clinics can maximize efficiency by operating out of existing facilities in transitional neighbourhoods where ED utilization is high (e.g. community clinics). Pilot clinics could provide a non-discriminatory, open door service for patients to receive timely non-acute care. Clinics can improve accessibility by providing a nearby outlet for primary care and can enhance interactions with individuals struggling with poverty by providing additional information for relevant programs and services (e.g., mother-baby programs, mental health and addictions services) (Stewart et al. 2005). Moreover, the potential for additional services to reduce exposure to confounding variables in accessing care should be evaluated. For example, providing free childcare services during patient consultation or public transportation subsidies will reduce socio-economic barriers to accessing care.

Staffing an interdisciplinary primary care team in these settings can promote high-quality comprehensive care provision and continuity of care, particularly where conditions require inter-sectoral expertise (e.g., history of substance abuse plus pre-existing medical conditions and minority status). Using regional health authorities as a vehicle to raise awareness, clinic hours of operation and location should be disseminated using existing clinics and media facets. This public information could promote utilization when low acuity primary care or complex inter-sectoral services are required. The demand for late-night (e.g., 10:00 p.m. to 2:00 a.m.) operation might be explored after a defined period of operation has elapsed. Findings from this research

have indicated the greatest demand for low acuity care occurs between 9:00 a.m. and 10:00 p.m.

Subsequent evaluation of pilot clinics should be undertaken to determine program success. This evaluation would determine if the program serves as a replacement for low acuity ED services. If successful, pilot clinics provide a lower cost alternative to ED services and this inter-disciplinary framework should be applied to additional clinics in other high utilization and/or high health care demand areas with intent to replicate findings.

1.3. Conduct primary care utilization analysis

The greatest proportion of patients seeking low acuity ED care reside in low-income neighbourhoods and the presence of existing primary care centres near patients' residences may not avert the use of EDs for low acuity medical conditions. Hence, while services appear to be available, there is speculation as to whether they are truly accessible and utilized. While findings from this study reveal that simply adding additional primary care services may not avert low acuity ED attendance, there is potential to explore the role of traditional (physician-based) primary care services in neighbourhoods and improve on existing services.

Based on the counterintuitive findings from this research, a provincial-level initiation of enhanced primary care data analytics is recommended to better understand how traditional primary care services are supporting the needs of Regina and Saskatoon residents. This utilization analysis of primary care services is required to assess the

frequency of services provided and the demographic characteristics and medical determinants of patients seeking care. This data is important for low SES neighbourhoods that have ample primary care services, however, appear to utilize EDs at substantially high rates. Understanding how clinics are being used and the length of wait for care is required to improve primary care services. Moreover, enhanced data sharing between clinics, health regions, and the provincial government can enhance communication and aid in the development of comprehensive strategic priorities to provide a high quality primary care network in Saskatchewan. Should this evaluation conclude that barriers are present in obtaining care from traditional primary care services (e.g., time spent waiting, limited hours of operation), provincial authorities should consider regulatory standards or potential incentives for clinics to improve accessibility of their services.

1.4. Implement patient-reported primary care performance measurements

Traditional analyses of health system efficiency have focused on identifying variations in the production of health care (Devlin and Appleby 2001). The opposing view of this measure is the outcomes and experiences that patients report. Patient perspective data redefines the variable of interest as the production of *health*, rather than health care (Devlin and Appleby 2001). Patient-reported outcome and experience data provides a method of measuring primary care efficiency based on the extent that the service achieved improvements in health, as per the patient's perspective, given the inputs and resource use (Devlin and Appleby 2001).

Patient reported experience and outcome measures are commonly used in other areas of care (e.g., chronic and continuing); however, they are not widely used in primary care settings. The implementation of patient-reported outcome and experience measures post-primary or ED care is recommended to evaluate the performance of front-line care services. The implementation of patient-reported measures in primary care utilization is “part of a general movement toward the idea that the patient, properly queried, is the best source of information about how he or she feels’ (Bren 2006, p. 27). Patient questionnaires can capture a patient’s satisfaction with or experience of a health care service they received, and, in their opinion, how successful the service and/or treatment was (Devlin and Appleby 2010). Collecting patient-reported data is a bottom-up knowledge translation approach to reforming the delivery of health care services.

For individual assessment, linking the patient-reported data to the patient’s utilization data using the patient’s unique health care number can aid decision-makers in economically evaluating the service that was provided against the experience of the patient. For institutional assessment, comparing patient-reported data for an identical service (e.g., urinary tract infection consult) enables the comparison of efficiency of the institution in producing health. Patient-reported outcomes and experiences can also be examined for the same service between EDs and traditional primary care clinics (e.g., walk-in clinic) to evaluate the value-for-money between institutions to aid the allocation of resources between budget programs (Devlin and Appleby 2001). Monitoring (and acting on) variations in patient health outcomes revealed by age, gender, or sociodemographic characteristics can inform optimal service provision for particular

sub-groups to reduce health disparities (Devlin and Appleby 2001, p. 36). A generic, standardized measurement tool for both samples of patients should be used for comparison purposes.

As this data would require patient identifiers (i.e., health care number) for linkage purposes, it is believed this initiative would best be conducted under a provincial lead to ensure patient confidentiality. From an economic standpoint, efficiency in the production of health care will continue to be of fundamental importance. However, linking the production of health care with patient-reported outcome and experience data permits the assessment of efficiency of providers in the production of health (Devlin and Appleby 2001). In the future, patient-reported outcome and experience measures could strengthen system reform incentives (e.g., Payment by Results) (Devlin and Appleby 2001), to improve not only the efficiency with which health care is produced, but also the performance of providers.

1.5. Review NACRS data for ED visits in Regina post- the implementation of Meadow Primary Health Care Centre

This research suggests that additional primary care services may not avert low acuity ED use. However, reviewing NACRS data for ED visits post-implementation of Meadow Primary Health Care Centre can act as a case study to support or refute this finding. On July 2 2013, Meadow Primary Health Care Centre, a primary health facility funded and operated in collaborative partnership by a group of physicians, RQHR and the Saskatchewan Ministry of Health, opened across the street from Regina's Pasqua Hospital. The centre, intended to cater to inner city populations with high health care

demand, has cited difficulty in retaining physicians and providing extended hour care (Kaul 2014). One doctor cited that 80-hour workweeks were not uncommon and that the “unique clientele” frequenting the clinic add to physician workload in their high demand medical care requirements (Kalu 2014, para. 3-4). Despite these difficulties, Meadow Primary Health Care Centres continues to provide walk-in primary care services from 9:00 a.m. to 8:00 p.m. daily. Being in such close geographic proximity, the centre functions similar to a fast-track system for low acuity patients in seeking to reduce low acuity ED demand.

To evaluate the effectiveness of a primary health centre in close proximity to one of the EDs assessed in this study, a comparative analysis is recommended for low acuity ED visits to the Pasqua Hospital for the 2012-13 fiscal year, prior to the centre’s implementation, and the 2014-15 fiscal year, one-year post-implementation.

Additionally, an analysis of the centre’s utilization data would supplement this research in identifying the effect of fast tracking low acuity patients to a nearby primary care facility. This review serves as a case study in the evaluation of care seeking behaviours when patients are presented with both an ED and a primary care centre for service.

2. Interventions aimed at reducing demand for ED care

2.1. Further develop HealthLine 811 online services

Dialling 811 in Saskatchewan to reach the provincial health information system, HealthLine, provides patients with immediate telephone advice for their medical concern(s). Since patients aged 18-44 years of age constitute the highest proportion of

low acuity ED users, as well as a population likely to have access to and knowledge of the Internet, this study recommends that virtual health services be evolved to satisfy the needs of an increasingly online generation. Prior to arriving at this recommendation, a brief scan of the online HealthLine system was conducted. The search term “high fever with rash” yielded zero search results. Additionally, the search term “alcohol poisoning” yielded one result titled “Preventing Poisoning in Young Children”. These brief online queries suggest that the online HealthLine system is presently unable to accommodate the primary care information needs that would be expected of a health information system.

Wide-spread national and international uptake of virtual care signifies the removal of access barriers and the mitigation of unmet health care need based on patient location or time. Transitioning from traditional face-to-face care to virtual care services presents an opportunity to provide real-time health services and advice to patients anywhere in the province. In alignment with this trend, it is recommended that the provincial government implement a “live chat” function on the existing online HealthLine interface. This will enable patients to obtain personalized health advice, consistent with which they would receive by dialling 811, using their mobile or desktop devices. Further, easily accessible virtual advice could promote triaging patients to an appropriate care setting and could reduce nonessential ED use. As operators for HealthLine are already established, this change would require minimal fiscal and training resources. As noted by Snowden, Shell and Leitch (2011), “[n]ow is the time to introduce online health services that provide medically accurate information, patient

support mechanisms and more informed and effective interaction with practitioners” (23).

2.2. Appropriate Care Campaign

Health literacy is the “degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Paasche-Orlow et al. 2005, 980). By promoting an individual’s capacity to make informed health decisions, health systems can reduce inappropriate and overuse of health care services.

Promoting health literacy is possible using several communication methods and by integrating successful practices implemented by other jurisdictions. For example, in July 2012, the Washington State Health Care Authority implemented the “ER is for Emergencies” initiative, a best practices system that committed to the electronic sharing of patient information among EDs to identify frequent users of the system. This change enabled administrators and physicians to identify and manage “super users” and where required, assist them with scheduling primary care appointments. At the same time, EDs began providing patients with brochures and discharge instructions detailing the most appropriate setting to obtain follow up care. A March 2014 progress report for the initiative showed that the rate of ED visits had declined by 9.9%, the rate of frequent users (five or more visits annually) dropped by 10.7%, the rate of visits resulting in a scheduled drug prescription fell by 24%, and the rate of visits with a low acuity diagnosis decreased by 14.2% (Washington State Health Authority 2014).

Following the lead of other jurisdictions, a public awareness campaign to enhance patients' health literacy is recommended. This serves as a communication strategy between the residents of Saskatchewan and the government. In developing an appropriate care campaign, multiple stakeholders should be consulted to determine what information and messaging should be communicated to patients. These stakeholders include: the ministries of health, education and social services, as well as the health regions and physician-run clinics. This represents a highly publicized campaign to inform Saskatchewan residents where they should seek care services in the event of health care or other (e.g., social service, addictions, mental health) requirement. By increasing Saskatchewan residents' health literacy regarding appropriate care, this strategy can effectively reduce unnecessary health service utilization and redirect health-seeking behaviours to the most efficient avenue of care. This recommendation represents a comprehensive, wide-reaching approach to clarify the role of the ED and other primary care services, while providing educational awareness regarding when each service should be consulted.

To reduce health disparities, extra action should be taken to ensure vulnerable populations receive information on appropriate care practices. A list of vulnerable populations likely to use EDs for low acuity conditions should be outlined and action should be taken to ensure these populations are educated in appropriate health-seeking behaviours. Vulnerable populations, including single mothers, social assistance recipients, shelter residents, new Canadians, and senior citizens, should be targeted since they may be less likely to absorb information provided by the campaign. The

campaign should also develop tools and methods tailored to each vulnerable population in order to adequately share information and educate these at-risk groups (e.g., public lectures in women's shelters).

This study recommends that resources to support the appropriate care campaign be obtained through a mixed funding model with fiscal resources allocated from each identified stakeholder group. Stakeholders in this campaign are primarily provincial governments, territorial health regions, and physicians. Stakeholders should acknowledge that demand-side actors comprehensively play a role in informing the public where to appropriately seek primary care services to maximize health system efficiency.

2.3. Evaluate primary care health literacy in Grades 1-12 educational curricula.

In collaboration with Saskatchewan school boards, this study recommends the review of health literacy content included in standard educational curricula. Health education courses are a core inclusion in Saskatchewan curriculum throughout grades 1-9 and wellness courses throughout 10-12. These courses afford the opportunity to educate students on health literacy and health seeking behaviours. This represents an extension of the Appropriate Care Campaign delivered to students at age-appropriate levels. Through this, the campaign is a comprehensive intervention, not limited by age or socio-economic characteristics. Empowering the next generation to self-manage health conditions and to consult appropriate care services is an immediate investing with long-term return in the efficiency and sustainability of our health care system.

Since health education is a multi-sectoral and inter-disciplinary concern, this initiative must engage various stakeholders (e.g., workforce planning, education ministries, regional education officials, nurse educators). As the educational infrastructure is already in place, this resource requirement is minimal. This options requires the development of grade-specific educational material (to be included in pre-existing health courses) and training for educators, where required.

2.4. Expand Connecting to Care Initiative to all patients

The push for programming that provides patient navigation assistance is a recent health system trend to meet the needs of diverse populations in various settings (Valaitis, Carter, Lam, Nicholl, Feather and Cleghorn 2017). Initially developed in the 1990s in the United States to address cancer care needs, the model has diffused internationally and expanded to include older adults with complex conditions, and to address complex health and social services needs of younger patients in primary care (Valaitis et al. 2017). The goal of patient navigation programs is to connect patients and families with primary care services, specialist care, and social services to provide patient-centred care (Valaitis 2017).

Implemented in Saskatchewan in 2014, the Connecting to Care initiative (previously “Hotspotting Pilot Program” seeks to identify high frequency users of EDs and connect them with required care (e.g., regular primary care, psychiatric care, addictions services). As of May 2015, the program had enrolled 25 participants. Based

on the analysis of main problems presenting to EDs, this study recommends this initiative expand in order to provide open-access service for all patients that require assistance in making connections to care. Since many patients are presenting to EDs in Regina and Saskatoon for indications not directly related to acute care, this is viewed as a necessary requirement to connect patients with appropriate providers. Of particular importance is the high rate of new Canadian's arriving to Saskatchewan, patients with complex needs that fall outside the traditional primary care system, and rosters of patients that are orphaned due to retiring or relocating family physicians. Such expansion could ensure all patients are able to navigate the health system and obtain necessary health care services. An open-access patient navigation program that links patients to a regular source of care (e.g., family physician) or other required form of care (e.g., addictions, mental health) would benefit new residents, patients with complex needs, and orphaned patients. Connecting patients with family physicians promotes relationship-building and long-term continuity of care, while linking patients with alternative sources of care (e.g., secondary, tertiary, community-based and social services) enhances the efficiency and effectiveness of the health system and provides patient-centred care based on individual needs. Expansion of the Connecting to Care initiative will require an increase in provincial health care spending.

CHAPTER NINE: CONCLUSION

Synthesis of Research and Findings

The efficiency of emergency and primary care services is a fundamental component in controlling health care costs in Canada. How patients use EDs and other primary care centres is of central importance to policy makers, workforce planning, health care providers, strategic planning managers, and health service users (Berchet 2015, 34). When costly ED resources are utilized for low acuity conditions where alternative lower-cost options are available, health care resources are consumed inefficiently (Burnett and Grover 1996). Low acuity visits to EDs accrue high costs by consuming an increased combination of health care providers (i.e., registration clerk, triage and other nurses, emergency physician) and using high-cost equipment (i.e., stretchers, medical imaging). Creating economic efficiency in EDs requires eliminating unnecessary or wasteful steps from the health delivery process and using resources at their maximum potential (Kaplan 2013).

In low acuity cases, “the needs of elective patients compete with those for emergency both in terms of facilities and staff” (Cooke 2001, 2). Redirecting low acuity patients away from EDs serves as a management strategy to mitigate crowding in EDs (Afilalo et al. 2004).

In this research, low acuity conditions are medical conditions categorized as CTAS Levels 4 and 5. A sample of 69,782 ED visits in Regina and Saskatoon in 2012-13 underwent analysis to identify who was using EDs, at what time, for what conditions, where they live, and who is providing them care. This study suggests two

policy levers through which health system improvement can be achieved: interventions that improve alternative pathways of care and reduce costs for nonessential ED use, and interventions aimed at reducing overall demand for ED care (Berchet 2015, 21).

Recommendations put forth are a combination of interventions based on findings from this study and interventions consistently mentioned in relevant literature as methods for improving ED efficiency. Recommendations flowing from the findings of this research and relevant literature include strategies to empower patients through health literacy, improve navigation of the health system through patient assistance initiatives and education on self-management skills, and increase accessibility to primary care through tailored programming. These recommendations are presented as a supplements or replacements to the current Connecting to Care (Hotspotting Program), House Calls Program, and the ED Waits and Patient Flow Initiative, based on alignment with Saskatchewan's social and economic realities and preferences of residents. All recommendations are believed to be economically efficient, feasible to implement, and effective in achieving greater health equity and reducing health disparities in Saskatchewan.

Significance

Canada's health care system is undergoing a transformative shift where physicians are no longer acting as the primary manager of patient care (Bos, Carroll and Marsh 2008). Instead, a consumerist model is emerging where care is increasingly self-referred by patients (Bos, Carroll and Marsh 2008). Patients are increasingly making decisions regarding their health care needs and are navigating the health care system in

a similar manner to that of a consumer market place. Because of this, it is important that patients be educated and aware of their health care needs and have access to the most appropriate venues to receive care.

As with all research pertaining to patients, caution must be exercised in upholding ethical considerations. In reducing nonessential ED use, this study does not stand to dissuade patients from accessing EDs where care is required. However, as can be seen in this study, conditions that fall outside the realm of both emergency and primary care systems, such as mental and behavioural disorders due to acute alcohol consumption, may be appropriately redirected away from biomedical models of care. For example, these conditions may be more appropriately provided care at mental health, addictions, and social service venues. This shift is a positive redirection that contributes both to the efficiency with which front-line care services operate, as well as the quality of patient care.

This research builds on previous studies conducted in Canada regarding low acuity conditions and ED use (Afilalo et al. 2004; VanStone, Belanger, Moore and Caudle 2014; Burnett and Grover 1996; Field and Lantz 2006). Findings contribute to the body of knowledge on national low acuity ED use, and provide a contextualization of ED utilization in Saskatchewan. A review of published literature suggests that this is the first known study to assess low acuity ED use in Saskatchewan at a municipal and community level. Further, it is perceived to be the first of its kind to evaluate ED use in urban Saskatchewan and compare descriptive findings between Regina and Saskatoon.

This methodology may be replicated in other Canadian centres, building on the strengths and contribution of this research.

The Big Picture

Health care is one of Canada's largest economic sectors (Snowdon 2010; Snowdon, Shell and Leitch 2011). It is a primary source of government spending, as well as a chief employment industry (Conference Board of Canada 2012). Unlike other sectors however, the demand for health care is not reduced during a recession (Conference Board of Canada 2012). Between 1997 and 2007, annual health care spending in Canada rose from \$79 billion to \$160 billion (Health Council of Canada 2010; Snowdon, Shell and Leitch 2011). When compared with inflation and growth in the Canadian gross domestic product (GDP), health care expenditures increase at a higher rate annually (Conference Board of Canada 2006; Snowdon, Shell and Leitch 2011). As a result, Canada is continually spending an increasing proportion of its wealth on health care delivery (Snowdon, Shell and Leitch 2011).

Dating back to the 2001 Romanow Commission, the Canadian Association of Emergency Physicians (CAEP) outlined the "acute need for the issues of overcrowding, emergency department information systems, and national standards for hospital emergency services to be addressed" (2). In CAEP's submission to Commissioner Romanow, a comprehensive list of recommendations was outlined. Drawing particular attention to the research required in emergency medicine, CAEP recommended the placement of emergency medicine higher on the Federal Minister of Health's agenda. Although federal data benchmarking has improved substantially with the creation of the

Canadian Institutes of Health Research (CIHR) and data monitoring has improved through CIHI, initiatives to improve emergency services nationally are lacking. While provincial systems have developed varying policies and programs to improve emergency services, initiatives are largely siloed and knowledge transfer is limited in its ability to elicit change cross-borders.

Nationally, provinces can learn from one another in developing new methods to deliver front-line care and their strategies to educate residents on health seeking behaviours. Since emergency systems across Canada are struggling with overcrowding (Affleck et al. 2013), addressing the entrenched roots of ED inefficiency should be a priority for all provinces. Disseminating information regarding what is working in various provincial systems can better aid all Canadian residents and improve health system efficiency on a national scale. Robust knowledge sharing between provinces can promote healthy public policies through the dissemination of innovative practices that have proven effectiveness. Effective policies can improve quality of patient care and cost savings to Canada's health care system. Developing resilience to ever-increasing health care costs through innovation must be a central objective on Canada's priority roster.

To function as robust systems, countries must continuously develop new technologies, innovations, and cost-effective ways to deliver health care services. Globally, Canada ranks within the top four Organisation for Economic Co-operation and Development (OECD) nations in knowledge creation, however, ranks last among OECD countries in "the transfer of new knowledge into innovative health care

technologies and solutions” (Snowdon, Shell and Leitch 2011, 6). As such, we must focus our attention and efforts on translating knowledge from present-day research into practice. Saskatchewan’s health system capability is obstructed by finite economic capacity. In response, this thesis presents several policy options that promote sustainability of a health care delivery service that is likely to be subject to continuous instability of economic capacity.

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APPENDICES

Appendix 1: Existing Primary Care Services in Regina, 2012-13

Primary Care Centres (Traditional Walk-In Clinics) – Regina

1. Albert Park Family Medical Centre
3992 Albert Street, S4S 3R1
M-F 8:00 a.m. to 10:00 p.m.
Sat & Sun 9:00 a.m. to 7:00 p.m.
2. Broad Street Clinic
2210 Broad Street, S4P 4V6
M-F 8:00 a.m. to 8:00 p.m.
Sat, Sun & Holidays 12:00 p.m. to 4:00 p.m.
3. Core Medicentre (584-8880)
1635-11th Ave, S4P 0H5
M-T 9:30 a.m. to 4:00 p.m.
W,R,F 9:00 a.m. to 12:00 p.m.
4. Dewdney East Medical Clinic
1689 Dewdney Ave, S4N 4N6
M-F 10:00 a.m. to 7:00 p.m.
Sat 10:00 a.m. to 12:00 p.m.
5. Dr. Rajni L. Patel Medical Clinic
2625 Dewdney Ave, S4T 0X4
M-F 9:00 a.m. to 6:00 p.m.
6. Golden Mile Medi-Clinic
3806 Albert Street, S4S 3R3
M- R 9:00 a.m. to 6:00 p.m.
F 9:00 a.m. to 12:00 p.m.
S 10:00 a.m. to 5:00 p.m.
SN 12:00 p.m. to 5:00 p.m.
7. Harbour Landing Medical Clinic
4500 Gordon Road, S4S 4G0
M-F 9:00 a.m. to 7:00 p.m.
Sat 10:00 a.m. to 5:00 p.m.
8. Landmark Medical Centre
4150 Albert Street, S4S 3R8
M-F 10:00 a.m. to 7:00 p.m.
Sat 10:00 a.m. to 12:00 p.m.
9. Normanview Mall Medical Clinic
330 McCarthy Blvd. N., S4R 7M2
M-Sun 9:00 a.m. to 8:00 p.m.
10. Park Plaza Medical Centre
2036 Park Street, S4N 2G6
M-F 10:00 a.m. to 7:00 p.m.
Sat 10:00 a.m. to 12:00 p.m.
11. Prince of Wales Medical Clinic
Superstore East, #1-2055 Prince of Wales Drive, S4V 3A3
M-R 8:30 a.m. to 8:30 p.m.
Fri 8:30 a.m. to 4:30 p.m.
Sat & Sun 10:00 a.m. to 2:00 p.m.
12. Quance East Medical Clinic
Victoria Square, 49-2223 Victoria Ave E., S4N 7L2
M-F 8:00 a.m. to 4:30 p.m.
Sat & Sun 10:00 a.m. to 2:00 p.m.
13. Rochdale Crossing Medical Clinic
#7-5875 Rochdale Blvd, S4X 4C6
M-F 9:00 a.m. to 6:00 p.m.
Sat 10:00 a.m. to 5:00 p.m.
14. Transcona Medical Clinic
4936-4th Ave, S4T 0J6
M-F 8:00 a.m. to 7:30 p.m.
Sat 10:30 a.m. to 4:30 p.m.

Alternative Primary Care Centres (e.g., Community Health Centres) – Regina

- | | |
|---|--|
| 15. Al Ritchie Health Action Centre
325 Victoria Ave, S4N 0P5
Services: Baby's Best Start (pre and post natal) program, Food Bank referrals, seniors' programs, nutrition counselling, dads' group, primary care nurse practitioner services, parenting programs. | 3510-5 th Ave, S4T 0M2
Services: Aboriginal community development coordinator, chronic conditions nurse educator, speech language pathologist, additions counsellors, primary care services.
M-F 8:00 a.m. to 4:30 p.m. |
| 16. Four Directions Community Health Centre | |

Appendix 2: Existing Primary Care Services in Saskatoon, 2012-13

Primary Care Centres (Traditional Walk-In Clinics) – Saskatoon

- | | |
|--|---|
| <p>1. 20th and Q Family Walk-In Medical Clinic
1631-20th St. W, S7M 0Z7
M-F 9:30 a.m. to 5:30 p.m.</p> | <p>M-F 8:00 a.m. to 10:00 p.m.
Sat & Sun 9:00 a.m. to 9:00 p.m.</p> |
| <p>2. Blairmore Medical Clinic
225 Betts Ave, S7M 1L2
M-F 10:00 a.m. to 6:00 p.m.</p> | <p>10. Pinehouse Medical Centre and Walk-In Medical Clinic
#147-211 Pinehouse Dr., S7K 7Z9
M-F 10:00 a.m. to 12:00 p.m., and 1:30 p.m. to 7:00 p.m.</p> |
| <p>3. Erindale Health Centre (Minor Emergency Clinic – separate from family practice)
2 50 Kenderdine Road, S7N 3A1
M-F 8:30 a.m. to 8:00 p.m. (minor emergencies)
Sat & Sun 10:00 a.m. to 4:00 p.m. (minor emergencies)</p> | <p>11. Riversdale Medical Clinic
314 20th Street W., S7M 0W9
M-F 9:00 a.m. to 5:00 p.m.
Sat & Sun 10:00 a.m. to 4:00 p.m.</p> |
| <p>4. Greystone Medical Clinic
B 29218th St., S7H 0V4
M-F 9:15 a.m. to 5:00 p.m.</p> | <p>12. Saskatoon Minor Emergency Clinic
3110 Laurier Dr., S7L 5J7
Daily (7 days/wk) 8:00 a.m. to 10:00 p.m.</p> |
| <p>5. Idylwyld Mediclinic
2 1216 Idylwyld Dr. N., S7L 0Z9
M-F 9:00 a.m. to 5:00 p.m.
“Some Saturdays” 10:00 a.m. to 2:00 p.m.</p> | <p>13. Saskatoon City Hospital Emergency Department
701 Queen St, S7K 0M7
Daily (M-S) 9:00 a.m. to 8:30 p.m..</p> |
| <p>6. Kenderdine Medical Clinic (Minor Emergency Clinic – separate from family practice)
1804 McOrmond Dr., S7S 0A6
M-R 8:30 a.m. to 8:00 p.m.
Fri 8:30 a.m. to 5:00 p.m.
Sat & Sun 10:00 a.m. to 1:00 p.m.</p> | <p>14. Walk-In and Family Medicine
1108 Central Ave, S7N 2H1
M-F 9:00 a.m. to 5:00 p.m.</p> |
| <p>7. Lakeside Medical Clinic
3919-8th St. E., S7H 5M7
M-F 8:00 a.m. to 10:00 p.m.
Sat & Sun 9:00 a.m. to 9:00 p.m.</p> | <p>15. Walk-In and Medical Clinic
411 Confederation Drive, S7L 5C3
M-F 9:00 a.m. to 7:30 p.m.
Sat 10:00 a.m. to 3:30 p.m.</p> |
| <p>8. Lenore Medical Clinic (plus Minor Emergency Services)
#4-123 Lenore Drive, S7K 7H9
M-F 9:00 a.m. to 10:00 p.m.
Sat, Sun & Holidays 10:00 a.m. to 6:00 p.m.</p> | <p>16. Westgate Medical and Minor Emergency Clinic
#18-2410-22nd St. W., S7M 5S6
M-F 8:30 a.m. to 5:00 p.m.
Sat & Sun 9:00 a.m. to 4:00 p.m.</p> |
| <p>9. MediClinic
#101-3333-8th St. E., S7H 4K1</p> | <p>17. West Winds Primary Health Centre (Academic Family Medicine – includes both traditional primary care + alternative, such as child health, NP, pharmacist educator, postpartum, prenatal, public health, population health services) (306 655-4250)
3311 Fairlight Drive, S7M 3Y5
M-F 8:00 a.m. to 5:00 p.m.</p> |

18. Willowgrove Medical Group
527 Nelson Rd, S7S 1P4
M-F 8:30 a.m. to 8:00 p.m.

19. Victory Medical Associates
329 20th ST. W. S7M 0X1
M-F 9:30 a.m. to 4:30 p.m.

Alternative Primary Care Centres¹¹ (e.g., Community Health Centres) – Saskatoon

20. Westside Community Clinic (includes SWITCH)(Sister clinic to Saskatoon Community Clinic Downtown)
1528 20th St. W., S7M 0Z6
M-F: 9:30 a.m. to 12:00 p.m.
M: 1:00 p.m. to 4:30 p.m.
T, R, F: 1:00 p.m. to 5:00 p.m.
W: 2:00 p.m. to 4:30 p.m.
SWITCH Hours: M & W: 5:30 p.m. to 8:00 p.m.

21. Saskatoon Community Clinic
455 Second Ave N., S7K 2C2
M-F 8:30 a.m. to 5:30 p.m.
Sat 9:00 a.m. to 1:00 p.m. Drop-in clinic for urgent care
After-hours number provided to reach doctor on call

22. Our Neighbourhood Health Centre (306 655-3250)
1120 20th Street W., S7M 0Y8
M-R 8:00 a.m. to 4:30 p.m.

¹¹ Locations staffed by “Primary Health Teams” were not included in this data, as the extent of their clinical capacity varied by location and they did not accept all patients on a walk-in basis (e.g., high school and university primary health teams were restricted to students only).