UNMET NEED FOR COMMUNITY BASED PHYSIOTHERAPY IN CANADA

UNMET NEED FOR COMMUNITY BASED PHYSIOTHERAPY SERVICES IN CANADA

By SARAH WOJKOWSKI, H.B. Kinesiology, M.Sc. (Physiotherapy)

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AUTHOR: Sarah Wojkowski, H.B. Kinesiology, M.Sc. (Physiotherapy)

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LAY ABSTRACT

Physiotherapy is a health profession that works with people to help them stay healthy and maintain physical function. There are many people with chronic conditions who would benefit from receiving physiotherapy treatment, but are not able to do so. Three reasons that may explain why people do not receive physiotherapy are they: cannot afford to pay; cannot find a physiotherapist close to where they live or work; or they do not believe a physiotherapist will improve their health. This thesis includes four papers aimed at better understanding the reasons why people in three Canadian provinces, Ontario, Alberta and British Columbia, do not see a physiotherapist when their health would benefit from doing so. The results suggest that cost and the location where physiotherapy services are provided are reasons why some people do not receive physiotherapy care - even if they believe physiotherapy is needed. The findings from this thesis may help to inform the future organization and delivery of physiotherapy services.

ABSTRACT

This thesis includes four manuscripts with overarching objectives to identify if Canadians experience unmet need for physiotherapy. McIntyre et al.'s framework was utilized across the manuscripts to explore reasons why unmet need may exist.

The first manuscript presents a scoping review investigating unmet need for physiotherapy across Canada. The objective was to describe current evidence for unmet need for community-based physiotherapy services (CBPTS). Adults with chronic conditions versus those without, or who lived in rural versus urban communities were more likely to report unmet need for CBPTS. Availability and affordability were identified as reasons for unmet need.

The second manuscript presents a secondary data analysis of three Canadian Community Health Survey (CCHS) cycles (2001, 2003, 2005) for three provinces: Ontario (ON), Alberta (AB), British Columbia (BC). This study investigated factors that explain variations in self-reported unmet needs of individuals with specific chronic conditions. Unmet need for treatment of a physical health problem (PHP) was the most common type of need in all three cycles. Affordability was the only domain with significant differences between cycles in two provinces. Women were less likely than men, and older persons less likely than persons 40 – 45 years, to report unmet need for treatment of a PHP.

The third manuscript analyzed CCHS data for ON, AB and BC to investigate which socio-demographic variables were associated with reporting a visit to a physiotherapist in three cycles. People with lower income were less likely to report a physiotherapy visit compared to people with higher income. Women, and individuals with an injury or physical activity limitation were more likely to report a physiotherapy visit.

The fourth manuscript presents themes from key informant interviews that explored the partial removal of physiotherapy from the Ontario Health Insurance Plan (“delisting”). Partial delisting contributed to increased unmet need immediately following, and more than ten years post implementation. Longstanding unmet need due to affordability and availability was identified.

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List of Abbreviations

Alb.	ALBERTA
AB	ALBERTA
BC	BRITISH COLUMBIA
CBPTS	COMMUNITY BASED PHYSIOTHERAPY SERVICES
CCHS	CANDIAN COMMUNITY HEALTH SURVEY
CHA	CANADA HEALTH ACT
CI	CONFIDENCE INTERVAL
COPD	CHRONIC OBSTRUCTIVE PULMONARY DISEASE
n	SAMPLE SIZE
nd	NO DATE
OHIP	ONTARIO HEALTH INSURANCE PLAN
Ont.	ONTARIO
ON	ONTARIO
OR	ODDS RATIO
PT	PHYSIOTHERAPY
PTS	PHYSIOTHERAPY SERVICES
RA	RHEUMATOID ARTHRITIS
SDH	SOCIAL DETERMINANTS OF HEALTH
SE	STANDARD ERROR

List of Symbols

≥	GREATER THAN OR EQUAL TO
≤	LESS THAN OR EQUAL TO
>	GREATER THAN
<	LESS THAN

DECLARATION OF ACADEMIC ACHIEVEMENT

For each of the chapters included in this thesis, Sarah Wojkowski conceptualized the purpose and, where applicable, the research questions; led the collection of data and was responsible for writing and revising each chapter based on feedback. The contributions of each contributor to the published and /or prepared for publication manuscripts are presented below.

Chapter 2 – Dr. Julie Richardson, Dr. Michael Boyle, Dr. Stephen Birch all reviewed and helped to refine the research objectives, and provided feedback on the manuscript. Dr. Richardson, and Jenna Smith consulted on methods for data collection, and manuscript preparation. Jenna Smith participated in the study review process and selection of studies included in the scoping review.

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CHAPTER ONE: INTRODUCTION

1.1 Health Equity

Equity in health is the absence of systematic disparities in health between groups with different levels of underlying social disadvantage (Braveman & Gruskin, 2003). Health inequities are differences in health that are unnecessary, avoidable, unfair and unjust (Whitehead, 1992). Inequities in health can systematically place groups of people who are already disadvantaged (e.g. individuals with low socioeconomic status) at further disadvantage with respect to their health (Braveman & Gruskin, 2003). The Rio Political Declaration on Social Determinants of Health affirms that health inequities between and within countries are unacceptable, largely avoidable and that the promotion of health equity is essential to sustainable development and to a better quality of life and well-being for all (World Health Organization, WHO, 2011)

Health inequalities, in contrast, are differences in health status or in the distribution of health determinants between different population groups (WHO, 2017). Health inequalities can be attributed to biological variations or free choice and the external environment and conditions outside the control of the individual (WHO, 2017). Biological variations or personal choice, create unavoidable inequalities – as changing the social determinants of health (SDH), or the conditions in which people are born, grow, work, live and age (WHO, 2017b), can be impossible or ethically unacceptable. However, addressing the SDH have been identified as one-way to reduce inequalities that are unnecessary and avoidable (i.e. due to the external and environmental conditions outside of individual control) and lead to inequity in health (WHO, 2017). Health services are among the fourteen SDH identified to be key factors in influencing the health of individuals and populations (Public Health Agency of Canada, 2013). An underlying premise of the SDH is that health services, especially those designed to maintain and promote health, prevent disease and restore health and function, contribute to the overall health of a population (Public Health Agency of Canada, 2013). Thus, it is important to determine if health services are designed, and distributed, in a manner most likely to equalize the health outcomes of disadvantaged social groups with their more advantaged counterparts given the same conditions and treatments (Braveman & Gruskin, 2003).

1.2 Access and Use of Health Services

"Access" has been defined as both the *opportunity* to use health services (Thiede, Akweongo & McIntyre, 2007), as well as the *freedom* to use health services (Thiede, 2005; Institute of Medicine, IOM, 2002). Despite the lack of a standard definition for "access" in the literature, many authors agree that "access" to health services may or may not, translate into service "use" (IOM, 2002; Thiede, 2005; Thiede, Akweongo & McIntyre, 2007). However, there is not consensus in the literature about which concept - "access to health services" or "use of health services" - is the most important to research in relation to equity Layte &Nolan, 2004). Advocates of "access" argue the use of health care by an individual is determined by a range of factors that often have little to do with health care services, and more to do with factors that shape the individual's demand for health care (i.e. the perceptions of the benefits of treatment) (Layte & Nolan, 2004). An increasingly used measure of access in the literature is "perceived unmet health care needs", or the difference between the care felt to be necessary and the services actually received (Socias et al, 2016). Conversely, advocates of "use" make an explicit assumption that persons in equal need may consume different levels of health care, but argue it is important to understand *why* demand differs in order to identify if there are factors that can explain use (i.e. income, education) (Layte & Nolan, 2004).

1.3 Thesis Objectives

The overall objective of this thesis is to determine if inequities exist, and what the potential source(s) of the inequities may be, in relation to community based (CB) physiotherapy services (PTS) in Canada. To achieve this objective, the thesis explores both the concepts of "access" and "use" in relation to PTS in Canada. A secondary objective of this thesis is to explore what actions can be taken by individual physiotherapists, provincial and national physiotherapy associations, as well as provincial policy makers to minimize inequities in health and health services through maximizing access to and use of PTS in Canada. In this thesis, the term "community-based physiotherapy" reflects a holistic approach to physiotherapy treatment and management, which include physical, psychological, financial and social contexts (Rajan, 2017). When possible, research was conducted specific to community physiotherapy services (Rajan, 2017).

The sections below provide an overview of the framework selected to guide this thesis, as well as the concepts of need and unmet need and their relation to PTS access and use in Canada. The final section of this introduction describes the methodologies used in this thesis and provides an overview of each chapter.

1.4 Frameworks to Understand Access to Health Services

A theory is a set of interrelated concepts, definitions, or propositions that specify relationships among variables and represent a systematic view of specific phenomena (Portney & Watkins, 2000). Theories are commonly used to form a frame of reference that is the basis for observations, definitions of concepts, interpretations and generalizations (LoBiondo & Haber, 1988). The laws and principles that arise from theories promote comprehension and generalizability of what can be complex material (Cooper &Saarinen-Rahikka, 1986). In ‘theory framed research’ a theory is used to frame the investigation and provides the researcher with a perspective for interpreting the data so that facts can be woven together in a meaningful pattern (McKenna, 1997).

Theories are composed of building blocks known as ‘concepts’ and statements of relationships between concepts, known as ‘propositions’ (McKenna, 1997). Concepts are abstractions that allow the classification of natural phenomena and empirical observations (Portney &Watkins, 2000), often appear as key words or vocabulary, and are used to facilitate communication (Kreftin, 1985). Concepts that represent non-observable behaviours or events are called "constructs". When no existing theory fits the concepts to be studied, a conceptual framework is used to describe, and begin to explain the relationships of the concepts being researched. A theoretical framework is the image of the phenomena to be studied developed by the researcher (McKenna, 1997).

A variety of conceptual and theoretical frameworks have been proposed and researched to facilitate understanding and discussion on access to and use of health services (Taylor, Aday & Andersen, 1975; Goddard & Smith 2001; Andersen & Newman, 2005, McIntyre, Thiede & Birch, 2009). In general, there is consensus amongst these frameworks that access to health services is a multidimensional concept (Thiede & McIntyre, 2008). However, each framework expresses these concepts differently – and these differences can make comparisons across and between researchers and policy makers difficult (Thiede & McIntyre, 2008). To be able to communicate research clearly across and between frameworks, it is important to understand the dimensions, as well as the similarities and differences, of each framework.

The most common framework identified in the literature to understand individuals' access to health care is the behavioural model of service use (also known as the socio-behavioural model and the Andersen model) (Derose, Gresenz & Ringel, 2011). This model, established in 1968, considers an individual's use of health services to be the function of three factors (Derose, Gresenz & Ringel, 2011):

- *predisposing* (i.e. demographics, health beliefs);
- *enabling* (i.e. presence of health insurance, income, community resources);
- *illness level / need* (i.e. health status)

The model has been adapted and expanded over time to incorporate concepts such as: equity, efficiency, and effectiveness; the importance of variables at the community or neighbourhood; and conceptual role of factors beyond the individual level (i.e. changes in health policy) (Derose, Gresenz & Ringel, 2011). However, critiques of this framework include the observation that most empirical applications of the behavioural model focus on individual level factors that affect care-seeking behaviors (Derose, Gresenz & Ringel, 2011) and do not consider cultural and contextual factors (Meade, Mahmoudi & Lee, 2014). Additionally, the Anderson model has been associated with a considerable body of research in which the quantity or type of service used is adopted as the indicator of access (Derose, Gresenz & Ringel, 2011). However, this research has not addressed differences in healthcare *quality* (Meade, Mahmoudi & Lee, 2014). Quality health care is directly related to care that is safe, effective, patient centered, timely, efficient and equitable (IOM, 2001). Thus, while this model provides a foundation for researching the concept of explaining access, it does so from a limited perspective.

Penchansky & Williams (1981) established a barrier-focused framework to understand health care disparities. This framework has not been used as frequently as the behavioural model to assess health care access, but similarly acknowledges that individual level factors (i.e. income) can facilitate or impede use of health services (Derose, Gresenz & Ringel, 2011). Unlike the behavioural model, this model identifies that the use of service depends on the 'degree of fit' between individuals and the health care system (Derose, Gresenz & Ringel, 2011). This fit is measured in terms of five different dimensions (Penchansky & Williams, 1981):

- *availability* - the relationship of the volume and type of existing services to the clients' volume and types of needs (i.e. adequacy of supply of health care practitioners, facilities, and specialized programs);
- *accessibility* - the relationship between the location of the supply and the location of the clients taking into consideration transportation resources, travel time, distance and cost;
- *accommodation* - the relationship between the manner in which the supply of resources are organized to accept clients, the clients' ability to accommodate these factors, and the client's perception of their appropriateness*;*
- *affordability* - the cost of health care services to potential clients, as well as the degree to which the health care system is organized to accommodate

clients, and the acceptability of particular health care providers to potential clients; and

- *acceptability* - the relationship of clients' attitudes about personal and practice characteristics of providers to the actual characteristics of existing providers and vice versa

However, Penchansky & Williams' (1981) definition of availability is restricted to the volume and type of services in aggregate.

McIntyre, Thiede & Birch (2009) proposed a conceptual framework for access to health care that builds on the work of Penchansky & Williams (1981) by combining the dimensions of accommodation, accessibility and availability into a comprehensive definition of "availability" (McIntyre, Thiede & Birch, 2009). McIntyre et al's (2009) framework defines access as the empowerment of an individual to use health care, which reflects the individual's capacity to benefit from services, given their circumstances and experiences in relation to the health care system. The framework (Figure 1) acknowledges that individual differences may result in differential use of health services (McIntyre, Thiede & Birch, 2009). It also identifies that differences in access may also occur when individuals make different choices in relation to using health services (McIntyre, Thiede & Birch, 2009).

McIntyre et al (2009) note that policy makers not only have an obligation to make health services available, but to also empower individuals to use the health services when needed. To do this, a participatory process involving the exchange of information between health system decision- makers at various levels and community members is required (McIntyre, Thiede & Birch, 2009). The framework provides an understanding of how the *opportunities* and *constraints* are integrated and influence health care seeking behaviours of different individuals in different settings (McIntyre, Thiede & Birch, 2009). Specifically, the framework focuses on three domains of access (McIntyre, Thiede & Birch, 2009):

- *availability* - the physical access to services (i.e. are primary care clinics open during the hours that people are able to seek care – such as before or after 'work' hours or on weekends);
- *affordability* - the financial access to, or the ability to pay for, services (i.e. those who require the services have the means to pay the provider for the services considering aspects such as third-party insurance coverage and costs of transportation to seek service);
- *acceptability* - the cultural access to services (i.e. the fit between the provider and the patient including attitude towards and expectations of each other)

The three domains interact to provide a systematic method of evaluating how existing health care services are delivered.

Compared to other frameworks, McIntyre et al (2009) propose a limited set of access dimensions - which may be argued make the framework less precise due to each dimension encompassing more concepts. However, the dimensions in this framework are clearly defined, and each dimension provides an entry point where factors and issues underlying each access dimension are considered to identify root causes of access deficiencies (McIntyre, Thiede & Birch, 2009). In addition, this framework also helps to critically evaluate how change in one or more of the domains may impact individuals' health seeking behaviors, and thus may facilitate the focus of policy actions on specific systemic issues that hinder service delivery (Shengelia et al, 2005).

The framework by McIntyre et al (2009) was selected to frame the research completed for this thesis. Specifically, McIntyre et al's (2009) framework was used in this thesis to structure the data from a national, cross sectional survey - the Canadian Community Health Survey (CCHS). The framework facilitated the organization of the data from the CCHS to be organized in a manner that allowed for secondary data analysis; provided standardized definitions for key concepts related to access to health services across the chapters; and provided the foundation on which research questions in chapters were generated. Additionally, McIntyre's framework (2009) facilitated integration of results across the multiple studies in this 'sandwich thesis' and provided a mechanism for discussion across the chapters of this thesis through the use of common 'language'.

1.5 Need and Unmet Need for Healthcare

Need for healthcare can be defined differently based on who identifies the need. For example, an individual may perceive a need for a health care service, but a health professional may determine the service is not needed. Bradshaw (1972) proposed a taxonomy of social need that included 4 domains:

- *normative* - when an individual and or group fall(s) below an identified standard;
- *felt* - when the population and or individual is asked if they feel they require a service;
- *Expressed* - an individuals' demand for a service;
- *comparative* - compares characteristics of those who receive a service and recognizes that if people with similar characteristics need a service but do not receive it, need exists.

Unmet need for health care is the difference between the health services deemed to be necessary to address a particular health problem, and the actual services received (Sanmartin et al, 2002). Similar to the concept of need, the perception of unmet need may be different depending on who identifies the unmet need, and the reason for unmet need may differ between individuals. For example, unmet need may arise as a result of health system features (i.e. waiting times for service), or as a result of personal circumstances of the individual(s) seeking care (i.e. socioeconomic factors). Unmet need is a subset of all, or total need. Together, an individual's unmet need and met need combined comprise an individual's total need (total need is referred to as 'need' throughout the remainder of the thesis). Both the concepts of need and unmet need relate to the inequities in the delivery and receipt of PTS across Canada. Specifically, these concepts are central to shaping an understanding of which individuals cannot, or do not, access or use PTS. However, the current literature related to need and unmet need specific to PTS is limited. This thesis will contribute to a small, but expanding body of literature that is exploring use of and access to PTS. The unique contribution of this thesis is the integration of the concepts of need and unmet need with the concepts of use of and access to PTS.

1.6 Rehabilitation: A Critical Health Service

The WHO (2010) has identified that timely access to health services, which includes promotion, prevention, treatment and rehabilitation, is critical to promote and sustain health. Rehabilitation is a “health service that aims to restore / maximize function and maintain independence of individuals” (Landry, Sudha & Hamdan, 2010). Rehabilitation services are an essential aspect of health service delivery (Landry, Sudha & Hamdan, 2010). Timely rehabilitation can increase an individual’s function and occupational performance, as well as improve the overall efficiency of the health care system by increasing the number of health care providers (i.e. physiotherapists) who are directly able to address the growing demands of an aging population (Landry, Sudha & Hamdan, 2010). Difficulties in functioning related to ageing and many health conditions can also be reduced with rehabilitation (WHO, no date). However, lack of access to, or underutilization of, rehabilitation services can increase effects and consequences of disease or injury, limit activities, restrict participation, cause deterioration in health, decrease quality of life and increase use of health and rehabilitation services (WHO, no date). Specifically, underutilization of cardiac and post stroke rehabilitation services have been identified in multiple high income countries including Canada, United States of America, Australia, New Zealand, where the workforce densities of rehabilitation providers is several times higher than low and middle income countries (WHO, 2017c). Reasons for underutilization of rehabilitation in high-income countries include lack of accessibility and transportation barriers, especially for those who live in rural areas, the costs of services, long wait times, and lack of awareness (WHO, 2017c). Women and individuals ≥ 65 years have been specifically identified as being less likely to complete rehabilitation programs (WHO, 2017c). In addition, program level and system level barriers have been identified, and include lack of infrastructure resources (i.e. equipment, space, beds) and absent or inadequate national guidelines or information systems respective (WHO, 2017c).

Many health disciplines, including physiotherapy (PT), fall under the scope of rehabilitation. Physiotherapy, also referred to as physical therapy (here after PT is used to represent both physiotherapy and physical therapy in this thesis), is a service that assists individuals to “develop, maintain, and restore maximum movement and function throughout the lifespan” (World Confederation for Physical Therapy, WCPT, 2017). Physiotherapy encompasses the spheres of health prevention, treatment / intervention, habilitation and rehabilitation related to maximizing quality of life and movement potential (WCPT, 2017). There is mounting evidence to support the application of physiotherapy services (PTS) to yield better health outcomes (Landry, Sudha & Hamden, 2010). Evidence ranging from high quality systematic reviews to case reports, support use of physiotherapy in the management/treatment of chronic musculoskeletal conditions such as hip and knee osteoarthritis (Hernandez-Molina et al, 2008; Fransen et al 2015; Sampath et al, 2016); chronic neurological conditions such as stroke (Schneider et al, 2016) and chronic cardiorespiratory conditions such as chronic obstructive pulmonary disease (COPD) (McCarthy et al, 2015). Evidence also supports use of physiotherapy in the management of other chronic diseases such as diabetes (Umpierre et al, 2011) and hypertension (Fagard & Cornelissen, 2007). Physiotherapy is a health service, which maintains and promotes health, prevents disease and restores health and function – an underlying premise of the health service SDH. Therefore, understanding what factors individuals experience difficulty with to access PTS is imperative to understand how to address inequities to maximize function and quality of life for all.

1.7 Access to and Need for Physiotherapy Services: An International Perspective

Data that has been aggregated and analyzed related to the need for rehabilitation, and estimates of unmet need across multiple countries does not exist (WHO, no date). However, national-level data reveal large gaps in the provision of and access to rehabilitation services in many low and middle-income countries (WHO, no date). Rehabilitation services have also been identified as inadequate to address the needs of the population in many countries (WHO, no date; WHO 2017). Despite the lack of synthesized data from multiple countries, single studies completed at the regional or local level, provide a limited starting point for understanding and evaluating the impacts of policies and programs on need and unmet need for PTS (Oxman et al, 2009).

International studies have explored both the concept of “use of health care services” and “access to health care services” in relation to need and unmet need for PTS. In general, international studies report that there are subsets of the population who are *less likely* to use PTS (Siqueria, Facchini & Hallal, 2005; Freburger, Carey & Holmes, 2011; Iversen, Chhabriya & Shadick, 2011). In terms of use, Siqueira et al (2005), Freburger et al (2011) and Iversen et al (2011) provide international examples that have identified individual level factors associated with lower use of PTS. Siqueria et al (2005) completed a cross sectional study in the urban area of Pelotas, Brazil in 2003. The study sampled households within all urban census tracks of Pelotas (Siqueria, Facchini & Hallal, 2005. Interviews (n=3,100) were completed with all residents ≥20 years in each sampled household to investigate lifetime physiotherapy use, and physiotherapy use in the last 12 months (Siqueria, Facchini &Hallal, 2005). The analyses in this study did not control for need (i.e. women may have a greater need than men, so differences would not be considered an inequity) (Siqueria, Facchini & Hallal, 2005). The results from Siqueria et al’s (2005) research identified that in this Brazilian community, the prevalence of use of physiotherapy in the year preceding the interviews was greater for women (prevalence 1.49, 95% CI 1.08-2.06, p value = 0.02) compared to men. Respondents with a higher socioeconomic level (prevalence for wealthiest respondents 2.36, 95% CI 0.92 – 6.03, p=0.07), and who were ≥60 years (prevalence 3.35, 95% CI 1.96 – 5.72, p <0.001) had increased use of PTS compared to individuals with lower socio-economic status and who were 20 – 29 years of age, respectively, in the 12 months preceding the interview (Siqueria, Facchini & Hallal, 2005). The results of this study identify sex, income and age as potential individual factors associated with use of PTS (Siqueria, Facchini & Hallal, 2005). While these factors are consistent with the literature related to factors associated with unmet need for health care services in general (WHO & The World Bank, 2016; Agency for Healthcare Delivery and Quality, 2011), further research is required to understand why these factors may have been associated with higher prevalence of PTS use.

Similar to Siqueria et al (2005), Iverson et al (2011) identified socioeconomic factors were associated with PT use. For example, Iverson et al (2011) reported that individuals who were diagnosed with rheumatoid arthritis (RA), living in the USA, who reported higher income (i.e.>$70,000) (OR 2.0, 95% CI 1.2-3.1) were more likely to use PT, in the twelve months following a physical examination by a rheumatologist compared to individuals with RA who reported lower incomes (i.e. <$70,000) or who did not have disability insurance (Iversen, Chhabriya & Shadick, 2011). Iversen et al (2011) also identified an association between education and receipt of disability support and use of PT in the past 12 months. Specifically, individuals with RA and less than a college education were less likely than individuals with RA and who had a college or postgraduate education to use PTS (OR 0.5, 95% CI 0.3-0.8) and individuals with versus without disability support were more likely to use PTS (OR 2.4, 95% CI 1.4-4.3) (Iversen, Chhabriya & Shadick, 2011). Freburger et al (2011) identified an association between private insurance and use of PTS through the evaluation of cross sectional data for 588 individuals with chronic low back pain who sought care in the previous year. Specifically, the survey asked individuals with low back pain, living in North Carolina, United States of America (USA) about use of health services in the past year (Freburger, Carey & Holmes, 2011). The results of the analysis demonstrated that respondents who had private insurance were more likely to have seen a physiotherapist than individuals without private insurance *($P=0.02$)* (Freburger, Carey & Holmes, 2011). Thus, these studies support the concepts that given need for PTS, use will be related to higher income and higher levels of education. These studies also highlight the role for health insurance (i.e. through publicly funded insurance coverage such as disability support or private insurance) in facilitating PTS use.

International studies have also indicated that individual wait times to access PT can vary depending on how PTS are funded (i.e. publicly funded PTS or privately paid). Casserley-Feeney et al (2008) noted differences in wait time, number of treatments and treatment duration between individuals receiving PTS for low back pain (LBP) received in publicly funded practices and private practice in Ireland. Specifically, individuals with LBP who seek PTS in a publicly funded hospital had longer wait times (i.e. median waiting time 10 weeks compared with no waiting time for PTS at a private practice, p<0.001) compared to privately funded settings (Casserley-Feeney, 2008). Additionally, Goddard (2008) noted that some individuals who were referred to free physiotherapy services in England chose to pay privately for the service in order to be seen more quickly. Thus, access to different types of PTS (i.e. private versus publicly funded services) may not only result in differences in how quickly an individual can receive services, but also in differences in the frequency and intensity of service use.

In general, the literature reporting need and unmet need for PTS is limited. Individual studies completed at a regional and /or national level identify that some individual factors are associated with use of in relation to need for PTS and these factors may contribute to need and unmet need for PTS (Casserley-Feeney et al, 2008; Freburger, Carey & Holmes, 2011; Iversen, Chhabriya & Shadick, 2011). These factors include age, sex (Siqueria, Facchini & Hallal, 2005), income (Freburger, Carey & Holmes, 2011; Iversen, Chhabriya & Shadick, 2011), education (Iversen, Chhabriya & Shadick, 2011), presence of health insurance (Freburger, Carey & Holmes, 2011) and long wait times for physiotherapy services (Casserley-Feeney et al, 2008). However, these factors are country and region specific. The factors must now be examined in the context of Canadian data (Oxman et al, 2009) to identify whether similar factors influence need and unmet need in relation to PTS in Canada.

1.8 An Overview of Physiotherapy Services in the Context of the Canadian Healthcare System

In Canada, the responsibility for most health services falls under provincial / territorial jurisdiction, supported by the federal government and directed by the principles of the Canada Health Act (CHA) (Government of Canada, 1985). The CHA states that the "…primary objective of Canadian Health Policy is to…. facilitate reasonable access to health services without financial or other barriers" (Government of Canada, 1985). However, the CHA does not specifically define access (Health Canada, 2001).

The CHA was based on two earlier pieces of Canadian legislation: *Hospital Insurance and Diagnostic Services Act (est. 1957)* and the *Medical Care Act* (est. 1966) (Gildiner, 2007). The Canada Health Act, CHA, at the time of writing restricted insured services to "medically necessary services" provided by hospitals and physicians (Gildiner, 2007). However, over the past three decades technological developments have made it possible to move many healthcare services from hospitals into the community, where the services no longer meet the conditions for the CHA (Gildiner, 2007). As a result, in cases where provincial ministries do not cover any or all of the services, these services are now provided at some cost to the consumer (Gildiner, 2007) - who may, or may not, have extended health coverage benefits that will reimburse the cost for the services. In addition, the restriction of “medically necessary services provided by hospitals and physicians” within the CHA has skewed subsequent patterns of service delivery in Canada (Hurley et al, 1996). For example, the language in the CHA has reinforced the position of acute care and institutional services at the expense of community and preventive services, and defined care by who provides it, and where it takes place, rather than whether care is needed (Hurley et al, 1996).

Inequities in provision of non-insured services in Canada, which include dental services, vision correction, prescription drugs and counseling or mental health services, and rehabilitation services have been highlighted as areas of growing concern (The Federal, Provincial & Territorial Advisory Committee on Population Health, 1999). Canadians who do not have supplementary insurance coverage (through employee plans or social assistance programs, for example) may experience difficulty in paying for these health services, and may be required to make financial choices (i.e. paying for PTS instead of enrolling children in organized activities) to afford the associated costs not required by individuals with supplementary insurance.

In Canada, PTS are provided in many settings, including in hospitals and in communities. However, similar to other health care services, there has been an emphasis on transitioning PTS out of hospital and into the community. Ontario provides an example of how PTS transitioned from hospital settings to community based services. In the early 1990s, fiscal constraints were a factor in downsizing and, in some cases fully closing outpatient rehabilitation units in hospitals

(Gildiner et al, 2007). The downsizing and closure of physiotherapy departments was followed by some hospitals outsourcing any remaining rehabilitation services to private companies by the mid-1990s (Gildiner et al, 2007).

The downsizing, closing and outsourcing of publicly funded PTS in Ontario between 1999-2009 (Gildiner et al, 2007) was further confounded by the policy decision to delist (or remove) PTS from the Ontario Health Insurance Plan (OHIP) (Gordon et al, 2007). Prior to this decision, Ontario residents were able to access community based PTS at little to no cost from designated clinics in Ontario (Gordon et al, 2007). The fees for the PTS received at these designated clinics were covered under the OHIP (Gordon et al, 2007). However, the policy decision to remove OHIP funding for PTS delivered in these designated community clinics meant all individuals became responsible for covering all costs associated with accessing PTS in the designated and privately funded clinics (Gordon et al, 2007).

The decision to delist PTS was announced in the 2004 Ontario budget, with a plan to fully delist PTS starting April 1, 2005 (Gordon et al, 2007). However, a week before the proposed delisting, the Ministry of Health and Long Term Care (MOHLTC) opted to restrict the eligibility criteria for OHIP –funded PTS (partial delisting) starting April 1, 2005 instead of fully delisting PTS from the OHIP (Gordon et al, 2007). As a result, to be eligible for publicly funded PTS after April 1, 2005, Ontario residents had to meet one or more of the following criteria: 1) ≥65 years 2) ≤19 years 3) reside in a long-term care facility 4) require PT at home post hospitalization or 5) receive social benefits (Gordon et al, 2007). These criteria remain in place today for access to OHIP funded PTS in community physiotherapy clinics.

The logic behind the decision to partially delist PTS from OHIP was that individuals who were no longer covered for PTS and who needed publicly funded PTS would 1) use other publicly funded services, such as homecare or hospital outpatient services; 2) use supplemental services to pay for use of PTS; 3) decide to pay out of pocket for services and /or 4) reduce the use of PTS (Gordon et al, 2007). However, it is not known if this logic was actualized (i.e. was PTS use funded through supplemental health benefits to cover the costs of the services) or, if the decision to partially delist PTS created inequities in the form of unequal use among residents with equal needs.

The erosion of publicly funded services increased individual cost to access and use of PTS in Ontario. International research related to increasing costs of other ambulatory services has demonstrated decreased use and increased dependency on inpatient services as a result of these costs (Trivedi, Moloo & Mor, 2010). For example, Trivedi et al (2010) note that in response to the rapidly increasing costs of health care, many public and private insurers have reduced the amount of reimbursement that they will provide to an individual to cover the costs of ambulatory care services. They examined the consequence of increasing co-payments for ambulatory care in a large sample of elderly Medicare enrollees in managed care plans in the United States of America (Trivedi, Moloo & Mor, 2010). The findings of this study demonstrated that compared to matched control plans in which co-payments were unchanged for ambulatory services, Medicare plans that increased co-payments resulted in reduced outpatient visits and increased hospital use (Trivedi, Moloo & Mor, 2010). Specifically, outpatient visits were reduced by an average of 95% for primary care, compared to specialty care which had a 74% reduction in outpatient visits, but increased hospital admissions (2.2 additional annual hospital admissions per 100 enrollees; 95% CI 1.8 to 2.6); and the number of days in hospital (13.4 more annual inpatient days per 100 enrollees; 95% CI 10.2 to 16.6) (Trivedi, Moloo & Mor, 2010). This increased use of inpatient services calls into question the effectiveness and efficiency of increasing consumer costs for health services. However, it is unknown how or if current funding models for PTS in Canada have resulted in increases in inpatient or other healthcare services.

Current research related to access and use of PTS in Canada is varied and does not provide a comprehensive understanding about who does not receive needed PTS, or the reasons why unmet need for PTS exists. There is also substantial variation in how community based health services, including PTS are publicly financed across the Canadian provinces and territories, as the CHA provides direction only for physician and hospital related services. This thesis builds on the existing literature related to access and use of community based PTS in Canada (Gordon et al, 2007; Landry et al, 2007) to explore how these concepts have influenced unmet need; explores what factors are associated with unmet need for PTS; and whether, and if so how, public funding model for community based PTS in Ontario contributed to an increase in unmet need for PTS in that province. In addition, this thesis explores where opportunities may exist to address these needs through an improved understanding of the delivery of PTS in Canada.

1.9 Methodological Approaches Integrated in the Thesis: Scoping Review, Secondary Data Analysis & Health Policy Analysis

The research approaches used within this thesis include a scoping review, secondary data analyses and a health policy analysis that focuses on the evaluation of the health policy to partially delist PTS in Ontario. The scoping review explores need and unmet need for community based physiotherapy services in Canada. The secondary data analyses explore unmet need for health services and PTS use through a national, cross sectional survey, the Canadian Community Health Survey, over a time period when the survey was relatively stable (i.e. did not have major changes to variables and /or administration techniques) in three Canadian provinces. The health policy analysis, focuses on the stage of “policy evaluation” in the policy making process (Walt, 1994). Specifically, this chapter investigates if the policy decision to partially delist PTS in Ontario had unintentional consequences related to changes in unmet need for PTS. Below, each methodological approach is explored in more detail.

Scoping Review

A scoping study is an approach that can be used to review health research evidence (Levac, Colquhoun & O'Brien, 2010). A scoping study differs from a systematic review, in that the quality of the included studies is not assessed, but rather an emphasis is placed on comprehensive coverage of the evidence (McColl et al, 2009; Levac, Colquhoun & O'Brien, 2010). Additionally, a scoping review can be used when the level of scientific inquiry is not as developed or focused in a certain area of research. A scoping study requires analytical reinterpretation of the literature, allowing for high-level conceptual observations to be made (McColl et al, 2009).

The second chapter presents a scoping study on unmet need for community based PTS in Canada, using the methodology proposed by Arksey & O'Malley (2005) and the recommendations to advance the methodology of scoping studies proposed by Levac et al (2010) Specifically, the stages in this scoping study were to: 1) identify a research question, 2) identify relevant studies, 3) select studies for detailed analysis 4) chart the data 5) collate, summarize the results.

As the current status of need and unmet need for PTS in Canada is unknown, a scoping review was used to determine whether need and unmet need for PTS exists across Canada. The scoping review provides a current perspective of what dimensions of access to health care, based on the McIntyre et al (2009) conceptual framework, provide opportunities and constraints to use of PTS across Canada. Additionally, the results from the scoping review challenge physiotherapists to think about how as individuals and a profession, they can take steps to minimize unmet need and maximize health within their own communities.

Secondary Data Analysis

Secondary data analysis is the re-examination of previously collected data, where the data that are being used were originally collected for some purpose other than to answer the current research question (Finlayson, Egan, Black, 1999). Secondary data analysis can produce important, policy relevant research in a timely manner, and can be used to initiate and support health care policy recommendations (Finlayson, Egan, Black, 1999). Secondary data analysis also has limitations. For example, the quality of a research project using secondary data analysis is related to the quality of the original data, the extent and quality of the data set's documentation, and the limitation of only using variables that currently exist in the dataset (Finlayson, Egan, Black, 1999). However, the use of secondary data analysis to explore topics that are not well understood, such as use of and access to PTS is an efficient means to obtain data for preliminary analyses that may support funding for primary data collection (Freburger & Konrad, 2002).

In this thesis, secondary data analysis is used to explore a national, cross sectional survey, the Canadian Community Health Survey (CCHS). Data collection for the CCHS began in 2001 and was completed every two years until 2005 with a sample of approximately 130,000 respondents (Freburger & Konrad, 2002; Statistics Canada, 2016). In 2007 annual administration of the CCHS began with a reduced sample size of 65,000 (Freburger & Konrad, 2002; Statistics Canada, 2016). The CCHS underwent further modification in 2012 and 2015, which included content revisions (i.e. stages of change for physical activities), a new data collection strategy, and organizing data differently to reflect changes to Health Region geography (Statistics Canada, 2012; Statistics Canada, 2015).

The secondary data analysis of the CCHS for this thesis was limited to CCHS respondents who were ≥19 years, and who reported one or more specific chronic conditions (hypertension, and/or diabetes, and /or arthritis/rheumatism and /or heart disease) and resided in Ontario (ON), Alberta (ALB) or British Columbia (BC). Adults were selected as the population of interest due to the fact that most provinces have provisions for healthcare services for children not covered under the provisions of the CHA (≤18 years). In addition, the specific chronic conditions that were identified not only represent conditions with a high prevalence in Canada (Stabile & Ward 2005), but there is also evidence to support the effectiveness of physiotherapy interventions with these conditions (Hernandez et al, 2008; Umpierre et al, 2011; Fransen et al, 2015). The three Canadian provinces included in this analysis all introduced policy changes that reduced provincial insurance coverage for PTS, Specifically, ALB reduced coverage in 1995 (Collins, 2005); BC reduced coverage in 2002 (Dales, 2005); and ON reduced coverage in 2005 (Gordon et al, 2007). The analysis was conducted, and is presented in, two parts: part one investigates unmet need for treatment of a physical health problem and reasons for this need; part two investigates individual factors associated with physiotherapy use in three CCHS cycles.

Health Policy Analysis

Health policy “embraces courses of action that affect the set of institutions, organizations, services and funding arrangements of the health care system” (Walt, 1994, p. 41). It goes beyond health services, and includes actions, or intended actions by public, private or voluntary organizations that have an impact on health (Walt, 1994). Policymaking is complex. The most common framework used to simplify the process describes policy making by a series of stages or phases (Walt, 1994). The stages/phases are defined differently by different authors, but in general they include: problem identification and issue recognition, policy formulation, policy implementation and policy evaluation (Walt, 1994).

Similar to the concepts of access and need, the concept of health policy analysis does not have a published standard definition. For example, health policy analysis has been defined as: a multidisciplinary approach to public policy that aims to explain interactions between institutions, interests and ideas in the policy process (Walt, 1994); or the generic name for a variety of techniques and tools used to study the characteristics of established policies, how they came to be and what their consequences are (Collins, 2005). Generally, however, health policy analysis is intended to allow policy makers to learn from policy failures and successes to inform the future design and implementation of policies (Hankivsky, 2012).

There has also been little attention paid about how to 'do' health policy analysis (Walt, 1994). Techniques range from step-by-step linear models to specialized tools – (e.g. the tool proposed by Daniels et al (2000) to assess health system reform in developing countries). These techniques and tools are organized around the concepts of the policy making processes and /or problem definition, to specific questions about the nature and types of policy, the process of making policies and the effects of policy in the everyday world (Hankivsky, 2012). Regardless of how health policy analysis is done, however, there is an increasing demand to improve the measurement, analysis and monitoring of policies in order to better capture the differential and distributional health impacts of policies on diverse populations (Hankivsky, 2012). Evidence, actual or asserted facts intended for use in support of a conclusion (Hankivsky, 2012) can inform the development and implementation of policy in a number of different ways, including: evidence of the likely effectiveness of policy options in order to inform decisions about what policy action to take; and evidence from evaluations of policies as implemented to inform decisions on whether to continue or how to adjust and improve policies (Sanderson, 2002).

To complete the policy analysis that focuses on evaluation included in this thesis, the results from the secondary data analysis are combined with directed content analysis of data from interviews. The interviews were completed with purposively sampled key informants who have expertise related to the partial delisting of PTS in ON. The policy analysis is restricted to ON, where preliminary research was completed to investigate the impact of delisting on PTS (Gordon et al, 2009). This work builds on the preliminary research completed by others (Landry et al 2006; Gordon et al, 2009) at the time of delisting in ON. In addition, this work discusses the current status of and unmet need for PTS in ON. Prior to this thesis, there has been no published work that explores the broad concept of need and unmet need for PTS across multiple Canadian provinces or territories.

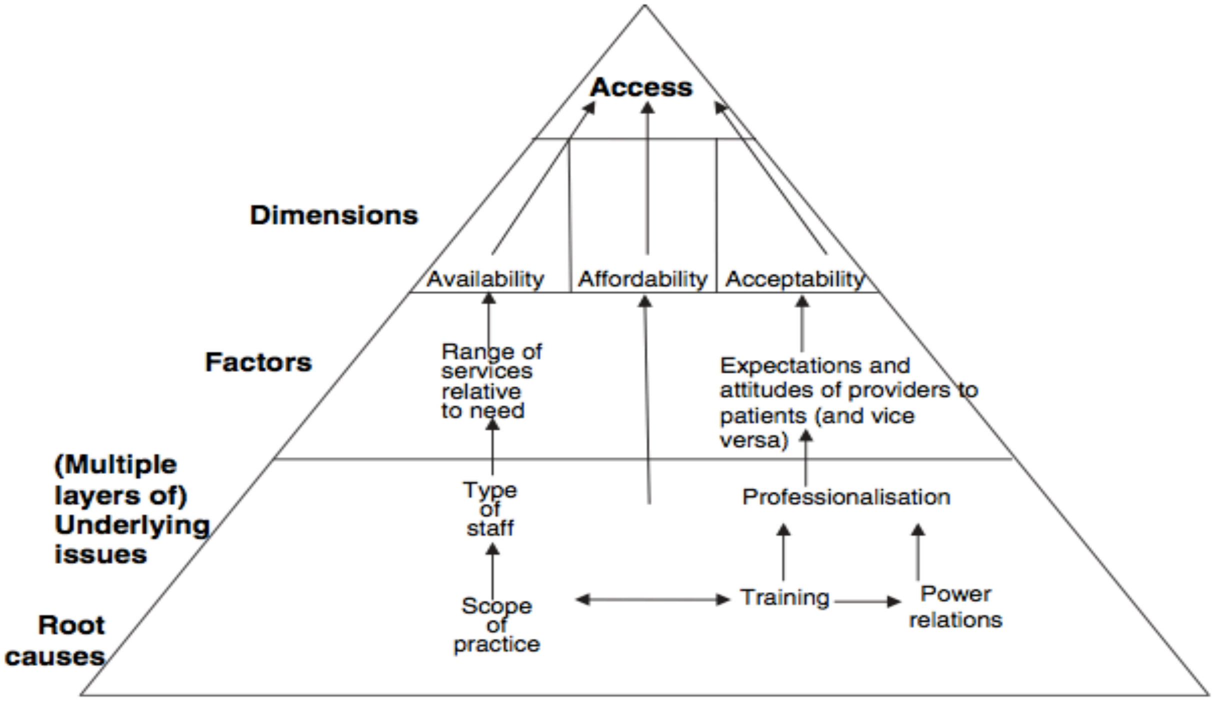
2.0 Structure of Thesis

This thesis consists of six chapters. Chapter two presents the scoping review (Wojkowski et al, 2016) – a published manuscript that explored the extent of need and unmet need for community based PTS across Canada. The identification of need for community based PTS in Canada sets the foundation for the thesis and the following chapters. Chapter three presents the published manuscript of the descriptive results of the secondary data analysis of CCHS which examined the concept unmet need for treatment of a physical health problem for adults with one or more of the following chronic conditions: diabetes, hypertension, arthritis / rheumatism, and heart disease (Wojkowski et al, 2016b).

Chapter four is a manuscript prepared for submission, and presents results of an analysis of the CCHS that examines use of PTS in three Canadian provinces. This chapter examines the associations between socio-demographic variables (i.e. age, sex, income, presence of one of more chronic conditions, immigrant status) and a physiotherapy visit over twelve months in three CCHS cycles (Wojkowski et al, unpublished). Chapter five, also a manuscript prepared for submission, consists of a policy analysis that evaluates the policy decision to partially delist PTS in ON (Wojkowski et al, unpublished b). Specifically the policy analysis explored unintended consequences of the policy decision related to changes in unmet need for community based PTS in Ontario; and the current status of need for community PTS in the province. Directed content analysis was used to analyze the results of the interviews. Interview themes were also triangulated with the existing literature on PTS delisting. The final chapter, chapter six, summarizes the main contributions of this thesis. This chapter also highlights the overall thesis conclusions and implications for future research in this area.

This thesis addresses gaps in the literature - and substantially contributes to the knowledge of unmet need for PTS in Canada. Chapters 3, 4 and 5 are restricted to specific provinces with similar policy trajectories related to the public funding of PTS. To our knowledge the data analyses presented in Chapter 4, are the first to use of PTS across multiple Canadian provinces using the CCHS; in addition, Chapter 5 presents the first research exploring the long-term consequences of partial delisting of PTS in ON. As a result, this work sets the foundation on which large-scale comparisons can be made between provinces to identify if, and where, access and use inequalities exist across Canada for PTS, and how the physiotherapy profession can mobilize to address these inequities.

Figure 1 – McIntyre et al (2009) Conceptual Framework



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McIntyre, D, Thiede, M, Birch, S. Access as a policy-relevant concept in low- and middle- income countries. Health Economics, Policy, and Law. 4(2): p.190. Reproduced with permission.

CHAPTER TWO

A SCOPING REVIEW OF NEED AND UNMET NEED FOR COMMUNITY BASED PHYSIOTHERAPY IN CANADA

Authors:
SARAH WOJKOWSKI, PT, PhD (Candidate)
School of Rehabilitation Science, McMaster University

JENNA SMITH, PT, PhD (Candidate)
School of Rehabilitation Science, McMaster University

JULIE RICHARDSON, PT, PhD
School of Rehabilitation Science, McMaster University

STEPHEN BIRCH, D. Phil.
Department of Clinical Epidemiology and Biostatistics, McMaster University

MICHAEL BOYLE, PhD
Department of Psychiatry and Behavioural Neuroscience, McMaster University

Corresponding Author:
Sarah Wojkowski, PT, PhD(Candidate), McMaster University
wojkows@mcmaster.ca
School of Rehabilitation Science, IAHS Rm. 432
McMaster University, 1400 Main St. West,
Hamilton, Ontario, Canada
L8S 1C7
Ph. 905-525-9140 ext. 27814
Fax: 905-524-0069

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ABSTRACT

Purpose: To investigate need and unmet need for community based physiotherapy services (CBPTS) for Canadian adults. **Methods**: The scoping review was completed between May - September 2015. The methodology proposed by Arksey & O'Malley and the recommendations to advance scoping studies by Levac *et. al*. were followed. The definitions of normative, felt, comparative, and expressed need were used to categorize need and the dimensions of availability, affordability, and acceptability were used to categorize unmet need. **Results:** Two reviewers (SW, JS) independently reviewed 2265 abstracts and selected 191 articles for full text review. Data extraction and thematic analyses were completed on 24 articles. Comparative need and service availability were the most frequent type and reason identified for need and unmet need respectively. Individuals from rural communities and persons living with chronic conditions more frequently identified barriers to accessing CBPTS. **Conclusions:** Unmet need for CBPTS exists in Canada. Physiotherapists must consider innovative service delivery models in order to maximize population health outcomes and minimize stress on health care systems as the Canadian population ages.

Key Words: unmet need, access, service delivery, health care equity, scoping review

INTRODUCTION

Health equity is the absence of systematic disparities in health between groups with different levels of social advantage / social disadvantage [1]. The Rio Political Declaration on Social Determinants of Health affirms that health inequities between and within countries are unacceptable and largely avoidable [2]. The promotion of health equity is essential to sustainable development, quality of life, and well-being for all [2]. Rehabilitation services are an essential aspect of health service delivery, and the application of physiotherapy services (PTS) yields better health outcomes [3]. Timely access to health services, which include promotion, prevention, treatment and rehabilitation, is critical to promote and sustain health [4]. Globally, approximately 50% of people with a disability cannot afford needed health care [5], 150 million people incur financial catastrophe as a consequence of seeking health services, and another 100 million are pushed below the poverty line [4].

Physiotherapy (PT) is a health profession that assists individuals to "develop, maintain, and restore maximum movement and function throughout the lifespan" [6]. PT encompasses health prevention, treatment / intervention, habilitation and rehabilitation related to maximizing quality of life and movement potential [6]. Evidence to support the effectiveness of PTS ranges from high quality systematic reviews to case reports in the management and treatment of musculoskeletal, neurological and cardiorespiratory conditions [7-10] as well in acute injury and chronic disease management [11-13]. It is important to determine who requires, and who has access to, PTS in order to achieve equitable access to health services

Need for healthcare can be defined differently based on who identifies the need. For example, an individual may perceive a need for a health care service, but a health professional may determine the service is not needed. Bradshaw [14] proposed a taxonomy of social need that included 4 domains: normative (when an individual and or group fall(s) below an identified standard), felt (when the population and or individual is asked if they feel they require a service), expressed (when individuals demand a service), and comparative (compares characteristics of those who receive a service and recognizes that if people with similar characteristics need a service but do not receive it, need exists). However, the framework by Bradshaw [14] does not explain why need was not addressed. McIntyre *et. al.* [15] proposed an access framework to understand the opportunities and constraints that influence health care seeking behaviours of individuals in different settings [15]. This framework identified three access domains: availability (physical access to services), affordability (ability to pay for services) and acceptability (fit between provider and patient). When considered together, these frameworks may provide a comprehensive understanding of unmet need (i.e. who is reporting unmet need, and why is it being reported).

In Canada, the percentage of people reporting an unmet need (UN) for health care rose from 4.2% in 1994/1995 to 12.5% in 2000/01 [16]. Canadian studies have identified population groups with increased likelihood of reporting UN for health care. These groups include: women, people in worse health, persons <69 years, persons with higher education, persons with lower income, and individuals without prescription drug coverage [16-19]. Current research related to access and use of PTS in Canada is varied and does not provide a comprehensive understanding about who does not receive needed PTS or the reasons why UN for PTS exists. The objective of the present study was to describe the current evidence for unmet need for community based physiotherapy services (CBPTS) for Canadian adults, and why this need exists. To achieve this objective a scoping study was conducted.

METHODS

A scoping review maps key concepts within a research area by assembling multiple sources and types of available evidence [20-21]. The emphasis of a scoping study is on comprehensive coverage, and includes identifying high-level conceptual observations [20-21]. To complete this scoping study the methodology proposed by Arksey & O'Malley's [22] and the recommendations to advance the methodology of scoping studies by Levac *et. al*. [20] were followed. Specifically, the stages followed were: 1) identify a research question, 2) identify relevant studies, 3) select studies for detailed analysis 4) chart the data 5) collate, summarize the results [20,22].

Identify the Research Question

The questions that guided this scoping review are, “Who is reporting need for CBPTS in Canada?” and “What types of unmet needs are being reported for CBPTS by Canadian adults?”

Identify Relevant Studies

A systematic search of the literature was used to identify a comprehensive set of articles related to unmet need for CBPTS in Canada.

Keywords. Electronic key word searching was completed in each database using each of the following words independently: “physiotherapy” “physical therapy” “rehabilitation” “unmet need” “unmet health care need” and “perceived need”. The individual searches were then combined and results further limited with the parameters of “adult” (defined as individuals who were 19 years of age or older), “English language” and “Canada”

Databases. Seven electronic databases AMED (1985-May 2015), CINAHL (1987-2015), MEDLINE (1946 to May Week 1 2015), EMBASE (1996-April 06, 2015), Ovid Healthstar (1966 – April 2015), PEDro and Health System Evidence (http://www.mcmasterhealthforum.org/healthsystemsevidence-en) were searched in May 2015.

Years. The electronic search of the literature was limited to articles published in 2004 or later in an effort to gain a current perspective on unmet need.

Study Selection

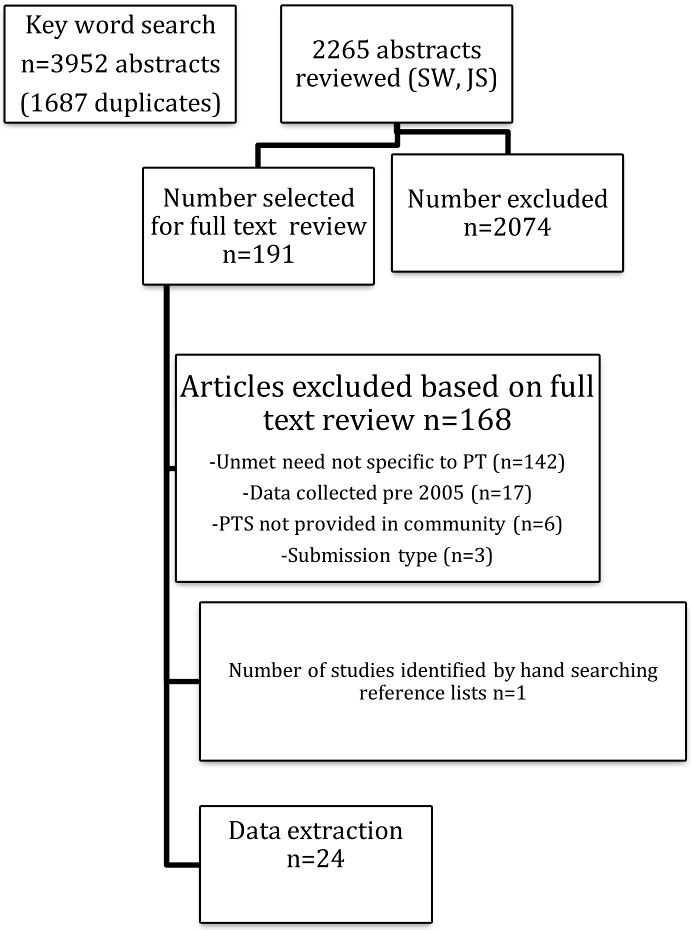
A total of 3952 abstracts were identified (AMED n=192, CINHL n=180, EMBASE n=1782, HealthStar n=919, MEDLINE n=879, PEDro = 0, Health Systems

Evidence = 0), with 1687 duplicates, leaving 2265 for review. Two reviewers (SW, JS) independently reviewed each abstract to determine if the article should be considered for subsequent review. To be included in full text review, the abstract had to describe original research and report need or UN for CBPTS specifically in Canada. Articles that identified a needed health service that could be addressed by physiotherapy (i.e. within physiotherapy's scope of practice in Canada), but did not clearly indicate a role for a physiotherapist were excluded. Studies that reported on physiotherapy services for children only or in institutions were also excluded to increase sampling specificity.

The reviewers did not screen for level of evidence [21]. To ensure agreement and consistency in application of the inclusion criteria during abstract review, two reviewers (SW, JS) compared results of the first 300 abstracts. Kappa (k), a chance-corrected measure of agreement between the two reviewers on their selection of abstracts [23] was k= 0.91 (95% CI 0.85-0.98) for the first 300 abstracts. Overall kappa was calculated to be k=0.89 (95% CI 0.85 – 0.92).

The two reviewers initially disagreed on the inclusion of 43 abstracts in the full text review. Differences were resolved with discussion related to the inclusion criteria (18/43 included). The final number of articles selected for full text review was 191 (Fig. 1). Of the articles selected for full text review, 23 were selected for data extraction based on the stated inclusion criteria. A hand search of the reference list from the 23 articles identified one additional article that was included in the data extraction for a total of 24 included articles.

Fig. 1 Study Selection



n = number of articles

Chart the Data

Three reviewers collaboratively developed a data extraction form (SW, JS, JR) [20]. The context of need, and where available the reason for restricted access [15], was captured on this form for 24 studies using the categories identified by Bradshaw [14] and McIntyre *et. al*. [15]. The three reviewers (SW, JS, JR) then independently completed data extraction for the first five full text reviews. The data extracted from this process by each reviewer was compared to ensure the consistent capture of concepts. Discussion between the three reviewers during this phase of the data extraction led to a revised data extraction form, and the decision to include only articles that discussed outpatient physiotherapy services to facilitate comparing themes between articles (Appendix 1). One reviewer (SW) completed the data extraction for all 24 studies using the revised data extraction form. Table 1 describes the included articles.

Table 1: Description of Included Studies

Author & Date	**Study Design**	**Intervention**	**Location**	**Condition**	**Bradshaw Type(s) of Need [14]**	**Access Domain [15]**	**Rural vs. Urban**
Bassel *et. al*. [42]	CS	Online survey - individuals with systemic sclerosis	Canadian wide	Systemic sclerosis	Comp. Normative	Afford.	n/a
Bowen *et. al.* [46]	CS	Online survey - facilities with pulmonary rehab	Ontario	Those eligible for pulmonary rehab	Comp. Normative Expressed	Avail.	n/a
Brooks *et. al.* [43]	CS	Mail survey - facilities with pulmonary rehab	Canada wide survey excluding 3 Territories; PEI and NFLD; responses indicated no programs	Those eligible for pulmonary rehab – i.e. Chronic Obstructive Pulmonary Disease (COPD)	Comp. Expressed	Avail. Afford.	n/a
Canestro *et. al.* [44]	CS	Online survey - facilities with cancer rehab	Canada wide survey – no responses from BC and NS	Cancer	Comp. Normative	Avail. Afford.	Rural
Cott *et. al.*	CS	1. Key	Ontario	Not specific	Comp.	Avail.	Rural

[24]		informant interviews with experts in primary care and rehabilitation in Ontario 2. Mail survey - to Primary care providers to investigate use /barriers to using rehabilitation			Normative Expressed	Afford.	
DeLaurir *et. al* .[34]	CS	Telephone survey - wait times using mock client case	Quebec	OA RA	Comp. Normative Expressed	Avail. Accept.	n/a
Easley *et. al.* [35]	QUAL	Interviews with breast cancer survivors	Atlantic Canada (PEI, New Brunswick, Nova Scotia, NLFD)	Breast Cancer	Comp. Felt Expressed	Avail. Afford.	Rural
Feldman *et. al.* [36]	CS QUAL	Review of paper cases –(RA and OA) by physicians & rheumatologists Patient interviews about experiences of health care and perceived need for OT / PT services and other	Quebec	Arthritis	Normative Felt Expressed	Avail. Accept.	n/a
Goodride *et. al.* [37]	Chart review	Identified patients who had COPD / lung cancer as underlying cause of death and analyzed service	SASK	COPD / lung cancer – palliative stages	Comp.	Avail.	Rural

		provision					
Gordon, *et. al.* [48]	Health policy	Semi structured interviews with 33 physical therapists from different settings across Ontario	Ontario	Not specific	Normative	Afford.	n/a
Hollis *et. al.* [38]	CS QUAL	Four staged study: focus groups with therapists, analysis of workload statistics, interviews and survey	SASK Alberta	Not specific	Comp.	Avail.	n/a
Johnson *et. al.* [47]	CS	Mail survey - patients with scleroderma	Canada wide	Scleroderma	Comp.	Avail.	n/a
Landry *et. al.* [25]	Two phase, Prospective cohort	Telephone interviews with individuals who were receiving physiotherapy prior to and following partial delisting	Ontario	Not specific	Comp. Felt	Afford.	n/a
Landry *et. al.* [26]	Policy analysis	Triangulated multiple sources to develop an overview of PT funding in Ontario	Ontario	Not specific	Comp.	Avail. Afford.	n/a
Landry *et. al.* [27]	Policy analysis	Literature search to explore factors that influence service demand in Ontario, Canada, international context	Ontario	Not specific	Comp.	Avail.	n/a

		Key informant interviews - people who had knowledge and experience in Ontario's rehabilitation sector					
Landry *et. al.* [28]	CS	Mail survey - hospitals with designated rehab beds in Ontario	Ontario	Not specific	Comp. Normative	Avail. Afford.	n/a
Ma *et. al.* [29]	CS	Online survey - dialysis facilities to investigate available rehabilitation	Ontario	Chronic kidney disease	Comp.	Avail. Afford.	n/a
Miedema *et. al.* [39]	QUAL	Patient interviews with breast cancer survivors	Atlantic Canada (PEI, New Brunswick Nova Scotia, NFLD)	Breast Cancer	Comp. Felt	Avail. Afford.	Rural
Miller Mifflin *et. al.* [45]	Program Evaluation	Creation and pilot testing of a wait list prioritization tool	Baffin Region, Canadian Artic	Not specific	Comp. Expressed	Avail.	Rural
Passalent *et. al.* [30]	Cohort	Mail survey - community rehabilitation managers, professional practice leaders, or senior therapists of all publicly funded outpatient and community sites that provide OT / PT services to adults >	Ontario	Chronic conditions (general)	Comp. Expressed	Avail. Afford.	

		19yrs of age					
Passalent *et. al.* [31]	CS	1. Semi structured interviews with key informants who were working in management positions in OT / PT settings 2. Same as Passalent [30]	Ontario	Chronic conditions (general)	Comp. Expressed	Avail. Afford.	Rural
Paul *et. al.* [32]	Cohort	Interviews with clients and providers one year after delisting PT services	Ontario	Not specific	Comp. Normative Felt	Afford.	n/a
Randall *et. al.* [33]	Health policy analysis	1. Key informant interviews with individuals familiar with homecare reform 2. Telephone surveys with CCAC and agencies who provided home care	Ontario	Not specific	Comp.	Avail. Afford.	Rural Diff. to hire HCP
Roots *et. al.* [40]	QUAL Cohort	Interviews with HCP who practice in rural northern BC	Northern Rural BC	Not specific	Comp.	Avail.	Rural

Avail. = Availability
Afford. = Affordability
BC = British Columbia
CS = cross sectional
Comp = Comparative
CCAC = Community Care Access Centre
DIFF = Difficult
HCP = health care providers
NFLD = Newfoundland
NS = Nova Scotia
n/a = not applicable
OA = osteoarthritis
OT = occupational therapy
PT = physiotherapy
PEI = Prince Edward Island
QUAL = qualitative

RA = rheumatoid arthritis SASK = Saskatchewan yrs. = years

Collate and Summarize Findings

Each article was reviewed and categorized into one or more of the 4 domains from Bradshaw's taxonomy [14]. The articles were reviewed for a second time and categorized according to the domains of access presented in McIntyre *et. al.'*s framework [15]. Themes that emerged related to classifying the articles using the taxonomy and framework were summarized and discussed between all authors. Descriptive numerical summaries, and qualitative analysis [20] were also used to summarize findings.

RESULTS

Geographic distribution: Unmet need for CBPTS was identified across Canada. Of the 24 articles selected for full text review, the majority (n=12) described unmet need in the province of Ontario [24-33]; seven described unmet need in other provinces [34-41]; four included data from multiple provinces [42-44]; and one was from Nunavut (a Canadian Territory) [45].

Gender differences: None of the articles investigated gender differences related to unmet need for CBPTS.

Themes identified using Bradshaw's Taxonomy [14]

*Comparative Need***.** Articles that compared populations or geographic concerns related to accessing CBPTS were grouped together under the theme of comparative need (Table 1). Comparative need was the most common theme (n=21) (Table 2) [24-35,37-38, 40-44,46-47] identified when the articles were reviewed using the concepts from Bradshaw's Taxonomy [14]. A number of studies (n=5) [29,38,43,44,46] identified that where an individual with a specific chronic condition lived could impact access to CBPTS. Four of the articles compared access to specific services across Ontario [29-31, 46]. One article [38] combined data from Alberta and Saskatchewan. In general, the delivery of CBPTS for individuals with chronic conditions was identified as being inconsistent within and between provinces. In addition, individuals with chronic conditions were disadvantaged in access to CBPTS compared to individuals without a chronic condition (CC) [30-32, 38].

A statistically significant association between access to services and self-rated health (SRH) was also identified in a study from Ontario [25]. In this study, participants who required physiotherapy services and received them were more likely to report good health (OR 10.72, 95% CI 2.20 – 52.25) compared to individuals who had previously received, but no could no longer access physiotherapy services- despite a self-reported need for the service [25].

Table 2: Article Counts According to Bradshaw's Taxonomy [14] and McIntyre *et. al.* Access Framework [15]

	Bradshaw's Taxonomy [14]				**McIntyre *et. al.'s* Access Framework [15]**		
Dimension	**Comp.**	**Norm.**	**Felt**	**Expressed**	**Avail.**	**Afford.**	**Accept.**
N (%)	21 (88%)	9 (38%)	5(20%)	6(25%)	20 (83%)	15 (63%)	2 (8%)

Note: Total number of articles is >24 as many included multiple concepts

Accept. = Acceptability Afford. = Affordability Avail.= Availability
Comp. = Comparative Norm. = Normative

Felt Need. Articles where individuals reported a perceived need for CBPTS were grouped together under the category of felt need [14]. In total, five articles (Tables 1 and 2) were identified: two were from Ontario [25,32], two from the Atlantic Provinces (Prince Edward Island, New Brunswick, Nova Scotia, and Newfoundland) [35,39] and one from Quebec [36]. Cost and lack of service availability were the two common themes identified as reasons why individuals with chronic conditions reported difficulty in relation to accessing PTS [32,35,36,39]. One study also identified a lower level of self-efficacy was associated with perceived need for rehabilitation services (adjusted odds ratio 0.84, 95% CI 0.72 – 0.99, p value 0.04) [36].

Expressed Need. Expressed need exists when an individual takes action in order to address their perceived need (i.e. booking an appointment with a health care provider) [14]. In health services, waiting lists are often used to measure expressed need [14]. Nine articles (Tables 1 and 2) included in this scoping review discussed expressed need [24,30,31,34,35,36,43,45,46]. Eight of the nine articles identified a waiting list for CBPTS in different regions of Canada [24,30,31,34,35,43,45,46]. Additionally, all of the articles identified that adults with chronic conditions were a part of the waiting lists. However, differences in wait times between adults with and adults without a chronic condition were not specifically investigated. A theme related to specific chronic conditions or geographic areas within the articles was not identified.

Normative Need. Normative need exists when need is defined by an expert such as a health professional, or when an individual or group of individuals falls below an identified standard [14]. Normative need is dynamic, and may change with new knowledge or changed societal views [14]. In this scoping study, the main factors associated with normative need were policy change, and changes in funding models [24,27,32,38]. These factors were typically identified through key informant interviews with physiotherapists (PTs), other health care providers and/or individuals with knowledge about the health care system to with a focus on service access. Physiotherapists specifically commented on the policy decision to partially delist PTS in Ontario (n=5) that impacted individuals' ability to access CBPTS (Tables 1 and 2) [25-27,32,48].

One paper also identified that normative need differed depending on the practice patterns of specific providers. Feldman [36] used simulated cases to examine differences in referral patterns by family physicians and rheumatologists to PTS. For example, younger, female family physicians practicing in cities that had rehabilitation centers referred patients diagnosed with osteoarthritis more frequently to rehabilitation [36]. In addition, university affiliated, rheumatologists who were female and who trained in Quebec referred patients with rheumatoid arthritis more frequently to rehabilitation [36].

Themes identified using McIntyre *et. al.'*s Framework [15]

Availability. Availability is the physical access to CBPTS (i.e. are clinics open when people are able to seek care – such as before or after work or on weekends) [15]. Availability was the most common domain when the studies were categorized using McIntyre *et. al.*'s Framework (n=20) (Tables 1 and 2) [24,26-31,33-40,43-47]. The main theme identified in relation to availability was that individuals from rural communities reported CBPTS were not available [24,31,33,35,37,39,40,44,45]. This finding was reported in different rural communities, across different provinces and was not population specific.

*Affordability**.*** Affordability, or the ability to pay for services including consideration of third party insurance coverage [15], was identified in 15 articles (Tables 1 and 2) [24-26, 28-33, 35, 39, 42-44, 48]. Eight of the articles identified adults with a chronic condition reported affordability as a barrier to receiving CBPTS [28, 29-32, 34, 41-43]. These studies included data from multiple provinces and for a variety of chronic conditions. One study from Ontario also reported individuals with a chronic condition were four times more likely to receive PTS in publicly versus privately funded settings [24].

Acceptability. Acceptability, or the fit between the provider and patient, including attitude towards and expectations of each other [15], was the least frequently identified category identified when the articles were sorted according to McIntyre *et. al.*'s framework (n=2) (Tables 1 and 2) [34,36]. Acceptability was primarily identified through asking health care providers if they perceived a need for rehabilitation (including PT) for a specific client [36], or by asking clinical sites if they would provide PT services for individuals with specific conditions [34]. None of the articles asked clients, or potential clients, about their expectations of physiotherapy or their attitude towards CBPTS. A consistent theme related to geographic area or condition was not identified between the papers.

DICUSSION

Canada has thirteen provincial and territorial health care systems that operate within a national legislative framework, the Canada Health Act [49]. An underlying premise of the delivery of health care in Canada is that access to medically necessary health care should be based on need rather than on the ability to pay [26]. In practice “medically necessary” need is broadly defined, and covers the vast majority of physician services [49]. Provincial governments are not required to insure health services provided outside the hospital, and have the flexibility to make funding changes to community-based services [48]. Thus, the extent of public coverage for CBPTS varies across provinces and territories [49].

This scoping review identified that need for CBPTS exists in Canada for adults with a variety of health conditions and in different geographic regions. Need was also identified by different perspectives (i.e. the individual vs. a health care provider). The most common barriers to accessing CBPTS noted in this scoping study were service availability and affordability. Despite national variation in the organization, delivery, and funding of health care, this scoping review identified that individuals with chronic conditions and from rural communities more frequently reported unmet needs for CBPTS across Canada. For example, individuals with a CC had longer wait times for CBPTS compared to persons without a CC [30-32, 38] and affordability was frequently identified as a reason why adults with a CC did not receive CBPTS [29,30-33,35,42-44]. In addition individuals from rural communities were more likely to report a lack of service availability [24,31,33,35,37,40,41,44,45].

These findings highlight systematic disparities between groups of Canadians related to access to CBPTS which may be wide reaching. Three of every five Canadians aged 20 years or older have a chronic disease, and four of every five persons are at risk of developing a chronic condition [50]. Chronic diseases are also a major contributor to reduced quality of life, loss of productivity, and increased hospitalization and health care costs, as well as premature death in Canada [50]. In addition, in 2011, approximately 18.9% of Canadians lived in rural areas [51]. Thus, pan-Canadian opportunities exist to reduce unmet need for CBPTS for specific populations and reduce health disparities across the country. Specifically, an evaluation of how CBPTS are provided within the context of each provincial and territorial health care system in order to identify innovative solutions for addressing unmet need is required.

Two papers [34, 36] in this scoping review identified acceptability as a barrier to access CBPTS. However, neither of these studies directly involved current or potential clients of physiotherapy services. The importance of understanding clients' perspectives related to use health care services, and exploring if these preferences are addressed in the delivery of rehabilitation services has been previously noted. For example, Van Til *et. al.* [52] highlighted the need to understand the barriers patients experience in relation to rehabilitation and how to overcome these barriers. The profession of physiotherapy values client centered care, however, by not investigating acceptability from the client's perspective, a fundamental component of client-centered care is being overlooked. This oversight may result in system changes that do not match client expectations and could instead increase existing unmet need in specific populations.

One paper [25] also reported an association between self-rated health (SRH) and access to physiotherapy services. This finding is a concern as SRH is an independent and strong predictor of mortality, morbidity and health outcomes, and is an indicator of a population's overall well-being [41]. As a result, differences in SRH between individuals who can and cannot access CBPTS may provide rationale for addressing access barriers to facilitate improved overall health for Canadians. More research is required to better understand this potential association.

Implications for Future Policy and Research Development

Additional research is required to better understand unmet need for CBPTS in Canada. Future research should focus on understanding the specific context of unmet need for CBPTS by individuals with chronic conditions, and persons who reside in rural communities. Gender difference related to unmet need has been established in previous research for other health services, and future analyses should also determine whether this difference exists in relation to CBPTS. The results of this research will assist with future planning of health care resource distribution to ensure equitable access to CBPTS for Canadians regardless of geographic location and medical history. Future policy decisions and health system planning related to CBPTS should also consider what type of need exists as well as how need and access interact. This consideration will ensure services are not only available to individuals in need, but that the services are delivered in a manner acceptable to the end user and reflects their ability to use those services [15].

LIMITATIONS

There are limitations to the findings of this study. First, the inclusion criteria identified papers reviewed in this study may have excluded studies that would have contributed to a broader understanding of need and UN for PTS in Canada. For example, this scoping review did not consider services for children or persons requiring institutional care. In addition, a complete assessment of the grey literature was not undertaken, and as a result, the data presented are limited to findings published in academic journals. However, only 24 articles identified in the academic literature specifically discussed unmet need for CBPTS in Canada. This is consistent with other findings, which also note a lack of global data about need for rehabilitation services [2,4,5,53]. Thus, it is possible that need and UN for PTS in Canada is broader than has been captured by this research. The results of this scoping review should be considered an exploratory attempt to understand unmet need and the reasons why need exists. It will form the foundation for additional research.

CONCLUSIONS

This scoping review has identified that there are different types of need [14], and different reasons why [15], unmet need exits for CBPTS across Canada. Adults with chronic conditions and adults who lived in rural communities frequently reported unmet need for CBPTS. The access domains of availability and affordability [15] were the most frequent reasons to explain why adults were not able to access CBPTS. This scoping review is the first to explore reasons for need and unmet need for access to CBPTS for adults in Canada across multiple populations and conditions. The findings provide a foundation for future research investigating need and unmet need for PTS to achieve health care equity.

KEY MESSAGES

What is already known on this topic?

In Canada, the percentage of people reporting an unmet need (UN) for health care rose from 4.2% in 1994/1995 to 12.5% in 2000/01 [16]. Canadian studies have identified population groups with increased likelihood of reporting UN for health care. These groups include: women, people in worse health, persons <69 years, persons with higher education, persons with lower income, and individuals without prescription drug coverage [16-19]. Studies to date related to access and use of PTS in Canada have not undertaken a consistent approach and do not provide a comprehensive understanding about who does not receive needed PTS – or the reasons why UN for PTS exists.

What this study adds?

This study is the first scoping review to investigate need and UN for community based physiotherapy services (CBPTS) across multiple populations and conditions in Canada. The findings from this scoping review identify opportunities for physiotherapists to modify and enhance service delivery to work towards achieving health care equity for all Canadians.

Recommendations

Future research by scientists, clinicians and policy makers at the provincial / territorial level is required with a focus on understanding the context of unmet need for CBPTS by individuals with chronic conditions; persons who reside in rural communities and gender differences. For example, focus groups could be conducted with individuals diagnosed with a chronic condition in order to understand past experiences with CBPTS and explore any barriers to access. In addition, CBPTS utilization statistics could be collected at the provincial level to investigate the number of women compared to men, and individuals with compared to individuals without a chronic condition who access CBPTS.

Future investment in CBPTS by funders and policy makers must consider, and address inequities in access to CBPTS

Conflict of interest: The authors do not have any conflict of interest

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CHAPTER THREE

UNMET NEEDS REPORTED BY ADULTS WITH CHRONIC CONDITIONS: AN ANALYSIS OF DATA FROM THE CANADIAN COMMUNITY HEALTH SURVEY

Authors:
SARAH WOJKOWSKI, PT, PhD (Candidate)
School of Rehabilitation Science, McMaster University

JULIE RICHARDSON, PT, PhD
School of Rehabilitation Science, McMaster University

JAMES CHOWHAN, PhD
DeGroote School of Business, McMaster University

STEPHEN BIRCH, D. Phil.
Department of Clinical Epidemiology and Biostatistics, McMaster University

MICHAEL BOYLE, PhD
Department of Psychiatry and Behavioural Neuroscience, McMaster University

Corresponding Author:
Sarah Wojkowski, PT, PhD(Candidate), McMaster University
wojkows@mcmaster.ca
School of Rehabilitation Science, IAHS Rm. 432
McMaster University, 1400 Main St. West,
Hamilton, Ontario, Canada
L8S 1C7
Ph. 905-525-9140 ext. 27814
Fax: 905-524-0069

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ABSTRACT

Background: Maximizing function in daily life is a primary goal for persons with chronic conditions. Persons with chronic conditions have reported moderate to severe disability in daily living and frequently use complex and costly healthcare services. Unmet rehabilitation needs can limit activities, restrict participation, cause deterioration of health, increase dependence on others and decrease quality of life. **Purpose:** To analyze self-reported unmet needs of adults with one or more of a specific list of chronic conditions who resided in Ontario, Alberta or British Columbia, Canada (the study population) using data from the Canadian Community Health Survey (CCHS) (Cycles 2001, 2003, and 2005). **Methods:** Public use microdata files were downloaded for each CCHS cycle. Patterns of missing data were investigated and accounted for by multivariate imputation using chained equations. The dependent variables of availability, affordability, and acceptability (three dimensions of access to care), were derived from existing data. Descriptive analysis and logistic regressions were completed to identify relationships between each dependent variable and independent variables. **Results:** Unmet need for treatment of a physical health condition (physical unmet need) was the most common type of need reported by adults in the study population in three CCHS cycles. Significant associations were identified for age (> 50 years) and sex (female) with each of the dimensions of access to care. **Conclusions:** Physical unmet need associated with availability, affordability and acceptability of care was identified in the study population in each of the survey cycles. Physiotherapists are well positioned to address this unmet need.

Key words: Unmet need, physical health problem, physiotherapy, secondary data analyses

INTRODUCTION

Physical function is recognized in rehabilitation research and practice as a key component in the evaluation of an individual's wellbeing. Functional status and wellbeing are essential outcomes of medical care due to the high value placed on these concepts by patients. [1] There is also mounting evidence that functional status data are vital to clinical practice to determine patient outcomes and substantiate health system performance.[2] However, people with chronic conditions often have poorer physical health.[3]

Maximizing function in everyday life is a primary goal for patients with chronic conditions. [1,4] Changes in physical function can predict the loss of self-management skills better than chronological age. [4] Persons with chronic conditions have reported moderate to severe disability in daily living[4] and frequently use complex and costly healthcare services.[5] Persons with chronic conditions also struggle to access required health services, and health services often fall short of meeting patients' with chronic conditions ongoing needs.[5] Impairments related to many health conditions, and general function improve with rehabilitation.[6] Evidence supports the use of physiotherapy (PT) in the management of chronic conditions, including hypertension,[7] diabetes,[8] arthritis/rheumatism[9-11] and heart disease.[12] In addition, PT management of chronic diseases, such as osteoarthritis, alleviates wait times for physician services by addressing pain and functional issues and reduces the need for more costly surgical interventions. [13] For example, a systematic review by Jansen et al

(2011)[14] found that exercise therapy and manual mobilizations combined had a moderate effect size (0.69, 95% CI 0.42 – 0.96) on pain reduction as measured by the Western Ontario McMaster Universities Index (WOMAC), Lequesne Index and / or visual analogue scale (VAS), in people with knee osteoarthritis. Physiotherapists help persons restore or maintain mobility and independence, as well as maintain or improve strength and function. [15]

Unmet need is "…any need for health care that remains because appropriate care was not received,"[16] although "need" may be defined differently based on who identifies it.[17] Unmet rehabilitation needs, which may include PT, can limit activities, restrict participation, cause deterioration of health, increase dependence on others and decrease quality of life.[6] These outcomes can have social and financial implications for persons, families and communities. Analysis of three Canadian Community Health Survey (CCHS) cycles (2001, 2003, 2005) identified that persons with chronic conditions were more likely to report an unmet need for health care, than persons without a chronic condition (OR 1.51, 95% CI 1.45 – 1.59).[18] In addition, data from the 1998 -1999 National Population Health Survey (NPHS) identified more persons who were high users of the health care system (i.e. 8 or more visits to a family physician over the last 12 months) reported an activity limitation with heavy household chores (29.6%) compared to low to moderate users (6.2%) and non-users (2.0%)($p<0.0001$). More high users of the health care system also reported having a chronic illness (85.2%) compared to low to moderate users (61%) and non-users (37.3%) ($p<0.0001$).[19]

The same persons reported the highest rate of unmet needs (18%), compared to low to moderate users (6.4%) and non-users (3.9%) ($p<0.0001$). [19] The most common service needed, but not received, by high users of the health system was care for a physical health problem (68.6%) compared to care of a mental health problem (15.7%), care of an injury (8.3%) or need for a regular check-up (5.2%).[19]

McIntyre et al (2009)[20] propose a framework that describes access to care as an influence on an individual's health care seeking behaviours in various settings. The three determinants of access in this framework are: availability, affordability, and acceptability of care [20]. Table 1 defines the three determinants. Understanding the opportunities and constraints of health care use by persons with chronic conditions who have physical unmet needs is essential for physiotherapists who are well positioned to address this need.

Purpose

The purpose of this paper is to investigate the self-reported unmet needs in the CCHS (2001, 2003, and 2005) using cross-sectional analyses of Statistics Canada's public use micro data files (PUMF). A PUMF provides anonymous, primarily non-aggregated survey responses and allows the investigation of relationships between variables using different statistical methods.[21] The PUMF version of the CCHS provides data for health regions on a wide range of topics including presence of chronic health conditions, use of health care services, socio-demographic, income and labour force characteristics.[22]

Three research questions guided the analysis:

1. What is the level of physical unmet need (defined by the respondent) compared to other needs (i.e. injury, regular check-up, emotional health problems) for adults with one or more specific chronic conditions?
2. How are the reasons for physical unmet need attributed to issues of affordability, availability, acceptability of services?
3. What variables associated with physical unmet need can be attributed to affordability, availability, and acceptability?

Methods

The analyses for this study were completed as part of a larger secondary data analysis investigating the impact of public policy decisions on access to physiotherapy services. The results identified from these analyses will contribute to a growing body of literature exploring unmet need for physiotherapy services in Canada.

Study Population

The CCHS is a cross-sectional survey that collects information related to health status, health care utilization and determinants of health for Canadians.[23] The CCHS began collecting data in 2001 and was completed every two years until 2005 with a sample of approximately 130,000 respondents.[22-23] In 2007 the sample size was reduced to 65,000 and the survey was completed annually. [22-23] Further changes that included the creation of new optional and core modules (i.e. stages of change for physical activities) and merging health regions to reflect changes to Health Region geography were initiated in 2012. [24] The CCHS was further redesigned to include a new collection strategy as well as to undergo major content revisions for the 2015 cycle.[25] As the CCHS cycles 2001, 2003 and 2005 used the same survey questions, associations between physical unmet need and affordability, availability and acceptability within and between each of these cycles can be investigated.

A description of the methods used to conduct the CCHS in 2001, 2003 and 2005, including how the sampling frame was established, has been described elsewhere.[23] In summary, the CCHS covers the population ≥12 years living in each Canadian province and territory, excluding Aboriginal peoples, full time members of the Canadian Forces, the institutionalized population and two rural Quebec health regions.[23] For the purposes of this paper, CCHS respondents were included if the following inclusion criteria were met: adults >19 years, reported a diagnosis of one or more of the chronic conditions of interest (hypertension, and/or diabetes, and /or arthritis/rheumatism and /or heart disease) and resided in Ontario, On., Alberta, Alb., or British Columbia, BC. These three Canadian provinces were selected for this analysis as all three provinces decreased the available provincial insurance coverage for physiotherapy services, but at different points in time. Specifically, decreased provincial insurance for physiotherapy services were made in Alb. in 1995[26]; in BC in 2002[27]; and in Ont. in 2005.[28]

Study Variables

An approach similar to Chen & Hou (2002)[29] was used to derive the variables of availability, affordability, and acceptability. Respondents were initially identified as having an unmet need if they: responded ‘yes’ to the question “during the past 12 months, was there ever a time when you felt that you needed health care but you did not receive it”. Respondents who indicated ‘yes’ were then asked to identify the type of care needed but not received: “treatment of a physical health problem” (physical unmet need), “treatment of an emotional health problem” (emotional unmet need), “care for an injury” (injury care), “a regular check-up”, or “other”. The variables of availability, affordability and acceptability were then derived for respondents who indicated an unmet need for a “physical health problem”

Statistical Analysis

The 2001, 2003, and 2005 CCHS PUMFs were downloaded from Ontario Data Documentation, Extraction Service and Infrastructure.[30] A pooled dataset was generated by combining the 3 CCHS cycles. From this pooled dataset, a new database was generated which contained the variables required to derive the variables of interest in addition to the other socio demographic variables from each of the three provinces. Following assembly of the dataset, patterns of missing data were investigated.[31] Multivariate imputation using chained equations were used for the imputation process.[32] This replaces missing values for multiple variables iteratively.[33] To obtain 10 imputations, the total number of iterations performed was 100 (using a burn-in of 10 to converge to a stationary distribution).

Multiple imputation (10 imputations) by province and survey cycle was used to account for missing data for household income, highest level of education completed, number of visits to a physiotherapist, usual number of hours worked per week, and visible minority status. Full response variables used to inform the imputation were: gender, age, marital status, self-perceived health and self-perceived health compared to one year ago. Descriptive analysis of key variables to identify proportions, standard error and 95% confidence intervals (CI) for the variables of availability affordability and acceptability were completed. Means from each sample were compared for significant differences using a 95% level of confidence.[34] Logistic regression was used to determine the relationship between each of the access dimensions and the independent variables of age, sex, total household (income), highest level of education attained (education), work and immigration status, visible minority status, and types of self-reported unmet need. Definitions for each of the independent variables are available from Statistics Canada.[35] The general equation for the logistic regressions is:

Logit(pi) = *intercept* + *age* + *sex* + *income* + *education* + *employment status*+ *immigrant status* + *visible minority status* + *type of self reported unmet need* + *province of residence* + *time of survey completion* + *the random error term for the* i^{th} *individual*

All analyses used the CCHS master survey weight that take into account the survey designs, cycles and nonresponse.[35] This adjusted weight estimates unbiased coefficients given the complex survey design used in the CCHS cycles.[35] All analyses were completed using STATA 13.1 SE

Results

Table 2 displays the total sample response rates at the household and person level, as reported by Statistics Canada for the 2001,[36] 2003[37] and 2005[38] CCHS Cycles. The total sample sizes (non-weighted) were 130,827, 134,072 and 132,947 for 2001, 2003 and 2005 cycles respectively. The combined total sample size of all three PUMF CCHS cycles was 397,846. Table 3 identifies the sample size by province and CCHS cycle based on the stated inclusion criteria.

Missing data

There were 63,497 (16%) respondents with some missing data in the study population. Missing responses were imputed for income (n=57,079), education (n=7023), number of consultations with a physiotherapist (n=459), total usual hours worked per week (n=8396) and visible minority status (n=9310). Missing data for the variables that were used to derive the dependent variables were found to be not missing completely at random.[39] Data were missing more frequently for men compared to women (OR 0.49, p= 0.004, 95% CI 0.31 – 0.80) and for persons with lower compared to higher income (OR 0.60, p<0.0001, 95% CI 0.47-0.76). In addition to using variables that had no missing data (i.e. age, gender, marital status, self-perceived health and self-perceived health compared to one year ago), variables that were imputed were also used in the imputation regressions where appropriate; in other words, most full response and imputed variables would contribute to the estimation of imputed values

Descriptive Analysis

Table 4 summarizes demographic characteristics for the study population in the un-weighted data set.

Research Question 1: What is the level of physical unmet need (defined by the respondent) compared to other needs (i.e. injury, regular check-up, emotional health problems) for adults with one or more specific chronic conditions?

In each CCHS cycle among persons with one or more specific chronic conditions who reported an unmet need in the previous 12 months, a larger proportion reported a physical unmet need (71.8%, 95% CI 70.4% - 73.2%) compared to any other unmet needs (i.e. other, injury, regular check-up, and emotional health problem). Residents of Alb. and BC had significantly higher proportions of people reporting a physical unmet need compared to On. in 2005 (Table 5).

Research Question 2: How are the reasons for physical unmet need attributed to issues of affordability, availability, acceptability of services?

A summary of the results is presented below by province, dependent variable, and by time; Figure 1 presents the means and Table 6 presents the mean differences and test statistics of the mean differences over time comparisons.

Ontario

No significant difference between means were found between cycles (i.e. 2001 vs. 2003, 2003 vs. 2005 and /or 2001 vs. 2005) related to the proportion of respondents who reported availability, affordability or acceptability as reasons for physical unmet need.

Alberta

A significant difference between the means was identified for the domain "affordability". A smaller proportion of Alb. respondents reported physical unmet need due to affordability in 2005 ($\bar{x}$= *0.09, SE 0.02,* 95%CI 0.05-0.12) compared to 2001 ($\bar{x}$= 0.19, *SE* 0.03, 95%CI 0.14 – 0.25) and in 2005 ($\bar{x}$= *0.09, SE 0.02,* 95%CI 0.05-0.12) compared to 2003 ($\bar{x}$= 0.17, SE 0.04, 95% CI 0.10 – 0.24).

British Columbia

An increased proportion of BC respondents reported unmet physical need due to affordability in 2003 ($\bar{x}$= 0.28, *SE* 0.03, 95%CI 0.23 – 0.34) compared to both 2001 and 2005 ($\bar{x}$= 0.18*, SE* 0.02*,* 95%CI 0.14-0.22; $\bar{x}$= 0.19*, SE* 0.03*,* 95%CI 0.14-0.24, respectively).

In summary, the analysis identified that the affordability dimension had significant differences in Alberta and British Columbia in 2005 and 2003 respectively. Significant differences for acceptability and availability were not identified for any province.

Research Question 3: Which variables associated with physical unmet need can be attributed to affordability, availability, and acceptability?

Logistic regression was used to determine which variables are associated with self-reported physical unmet needs for adults with specific chronic conditions. Consistent and significant associations were found between each of the access dimensions and the independent variables age and sex. In particular, adults with one or more of the specific conditions who were > 50 years were significantly less likely than adults 40 – 49 years (reference group), and men were less likely than women to report a physical unmet need due to each of availability, affordability and acceptability. Other significant findings with the independent variables were also identified for each of the access dimensions (see Table 7).

Availability

Persons ≥ 50 years old reported significantly less physical unmet need compared to adults 40 – 45 years due to availability (Table 7). Persons who worked part time, full time, or who responded to the survey in 2003 or 2005 were also significantly less likely to report a physical unmet need due to availability compared to persons who were not employed and who responded to the CCHS in 2001 respectively. However, women, recent immigrants (≥9 years), and persons with an unmet emotional health need, unmet check-up needs or unmet injury care were significantly more likely to report an unmet need due to availability than men and persons with a physical unmet need respectively. Province of residence and income were not significant.

Affordability

Similar to the findings for availability, persons who were ≥50 years of age or persons who worked full time were significantly less likely to report a physical unmet need due to affordability compared to persons 40 – 49 years or persons who did not work respectively (Table 7). Women, persons with unmet mental health unmet need, unmet check-up need, or unmet injury need, were also significantly more likely to report an unmet need due to affordability then men or persons with physical unmet needs (Table 7). Unlike the findings for availability, a significant positive association was identified for income. In this analysis, all income categories had an increased likelihood of reporting an unmet need due to affordability compared to persons with the highest annual income (>=$80,000) (reference category) (Table 7). In addition, immigrants and BC residents were significantly more likely to report a physical unmet need due to affordability compared to non-immigrants and residents of On. (Table 7). Time of survey completion, education and visible minority status were not significant.

Acceptability

The analysis where acceptability was the dependent variable identified the fewest significant associations (Table 7). Persons >/=50 years were significantly less likely to report a physical unmet need due to acceptability compared to persons 40 – 49 years. Women were also significantly more likely to report a physical unmet need due to acceptability compared to men. Unlike the previous analyses, persons < 39 years were also significantly more likely to report a physical unmet need due to acceptability compared to persons 40 – 49 years.

Income had a positive significant association with physical unmet need for persons who reported an income <$49,999 compared to persons with an income ≥ $80,000. In addition, persons who completed some ‘other’ post-secondary education (i.e. trades certificate), or had mental health unmet needs, or injury unmet need were significantly more likely to report an unmet need due to acceptability compared to persons with no education or physical unmet needs respectively (Table 7). Persons who completed the CCHS in 2003 were less likely to report an unmet need due to acceptability compared to persons in 2001. Employment, immigrant and visible minority status as well as province of residence were not significant factors.

Discussion

Kasman & Badley (2004)[40], Law et al (2005)[41], Wu et al (2005)[42] and Ronksley et al (2012)[18] have all identified population groups with increased likelihood of reporting unmet need for health care in Canada. These groups include persons with the following characteristics: in worse health, <69 years, with higher education, with lower income, without prescription drug coverage and who are female.[40-43] In Canada, the percentage of people reporting an unmet need for health care rose from 4.2% in 1994/1995 to 12.5% in 2000/01.[43] However, it is not known how many Canadians have an unmet need for PT services.

The descriptive analysis in this study identified physical unmet need as the most common type of need reported in three CCHS survey cycles (2001, 2003, and 2005) by adults >19 yrs. with one or more specific chronic condition (hypertension, and/or diabetes, and /or arthritis/rheumatism and /or heart disease) from On., Alb. or BC. This finding is consistent with other research investigating unmet needs in Canada. For example, Shortt & McColl (2006)[19] found that treatment for a physical health problem was the most common need identified, but treatment not sought for, in an analysis of the 1998/1999 Canadian National Population Health Survey (NPHS). Statistics Canada also reported that in 2014, approximately 3.4 million Canadians ≥ 12 years old reported that they did not receive health care when they felt that they needed it, and the largest proportion of unmet need was for the treatment of physical health problems (65.1%) compared to any other type.[44] The trend of unmet need for treatment of a physical health problem for adults with chronic conditions is concerning. In 2014 the Centre for Chronic Disease Prevention, at the Public Health Agency of Canada, identified at least 21.4% of the population ≥20 years in Canada has at least one major chronic disease, and 38.4% have at least one of ten main chronic diseases (heart disease, stroke, cancer, asthma, chronic obstructive pulmonary disease, diabetes, arthritis, Alzheimer's or other dementia, mood disorder [depression], and anxiety).[45] In addition, Elmslie (no date)[46] noted that there is a 14% increase in chronic diseases annually and treatment of chronic disease costs the Canadian economy $190 billion annually, with $68 billion attributed to treatment and the remainder to lost productivity.[46] Thus, if physical health problems continue to be inadequately addressed, the implications may impact the health of many Canadians and may contribute to the costs associated with lost productivity. Additional analyses are required to understand how existing health services may be mobilized to address this long-standing gap in the care of adults with chronic conditions.

The descriptive analyses completed as part of this study also identified affordability as the only domain of access that demonstrated significant changes between CCHS Cycles. Specifically, this analysis identified significant differences in Alb. between 2001 and 2005 and 2003 and 2005, and in BC between 2001 and 2003 and 2003 and 2005. The nature of descriptive analyses in this study do not allow for the direct determination of why differences between cycles for specific provinces exist. However, it is possible that the provincial differences may be attributed to the fact that the oversight of health care in Canada is provincially driven.[47] Each province independently decides the extent to which services not considered "medically necessary" are funded.[46] Thus, the unique health care structures with each of the provinces studied may have created environments that impact unmet need differently. In addition, as most Canadian health systems have been in a state of transformation or reform over the past 20 years, health care resources available to persons with chronic conditions may have changed between CCHS cycles. It was beyond the scope of this paper to investigate the health policies that existed within each of the three provinces across the CCHS cycles, or to determine whether the provincial variations account for the identified differences in affordability. Thus, additional research is required to determine what, if any, policies either contribute to, or protect persons with chronic conditions from, reporting affordability as the rationale for unmet health care needs.

The regression analyses in this study also identified significant associations between age and sex and each of availability, affordability, and acceptability dependent variables. Specifically, the results from this study indicated women were more likely than men, and older persons were less likely than persons 40 –

45 years, to report a physical unmet need due to any of the three dimensions of access to care. These findings are consistent with the existing literature. For example, multiple studies have demonstrated that in Canada women report more unmet need for health care than men,[42, 43, 47, 49] despite accessing health services more frequently than men.[48] Levesque et al (2008) [48] identified that a higher proportion of women (53.2%, 95% CI 50.3 – 56.0) compared to men (46.8%, 95% CI 44.0 – 49.7) reported an unmet need for health services in a survey of 9,206 adults who resided in Montreal or Monteregie, Quebec, Canada in 2005. However, Bryant et al (2009)[50] have also identified that women tend to assume the responsibility of primary caregiving of family members, and women who work outside the house may have increased responsibilities that threaten their own health.[50] These responsibilities may affect women's health directly through the stress of greater responsibilities, or indirectly through difficulties with scheduling and meeting medical appointments.[50] Despite the volume of research documenting disparities in women's access to health services, most services are neither funded nor delivered with gender or sex based considerations.[51] Thus, physiotherapists are challenged to consider if current delivery systems could be modified to address concerns related to availability, affordability and acceptability in order to ensure that structural and health system barriers do not prevent women with chronic conditions from achieving their health potential.[51]

This study also identified that adults (> 50 years) are less likely to report physical unmet need due to any of the three dimensions of access to care. This is also consistent with existing research. For example, Sanmartin & Ross (2006)[52] identified significant factors associated with having difficulties accessing first contact healthcare services using population data from two Canadian surveys – the Health Services Access Survey and the CCHS (2003). Sanmartin & Ross (2006)[52] noted that among persons who had trouble accessing routine care, younger persons (< 65 years) had significantly higher odds of reporting difficulties than older persons (> 65 years) (OR= 1.95 for persons < 35 years, CI 1.41 – 2.72, p<0.05 and OR= 1.90, 95% CI1.43-2.56 p < 0.05 for persons 35-64 years).[52] This difference in unmet need may be due to older persons having increased support from the health system as their need for services increases.[48] Levesque et al (2008)[48] identified that older adults may have less unmet need because very few older adults do not have a family physician. However, it is possible that certain barriers related to the use of health care, including older adults' perceived acceptability of services, and/or if the availability of publicly funded services meet older adults' needs, have not been explored sufficiently. As the prevalence of chronic conditions and associated comorbidities continues to rise, it is imperative for physiotherapists to consider how they can contribute to the delivery of quality care for all persons through identifying strategies to address the unmet health care needs of younger persons with chronic conditions. A number of significant associations between the independent variables and each of the three dimensions of access to care consistent with other findings in the literature were also identified in this study. For example, Ronksley et al

(2012)[18] reported an association between income and unmet need. In the current study income was also significantly associated with affordability. Specifically, the results from this study found persons who reported lower income had significantly higher unmet needs due to affordability compared to persons with an income > $80,000. However, affordability was the only access dimension with significant findings in both the descriptive and regression analysis. Additionally, an analysis of the '2000 Medical Expenditure Panel Survey', a set of large scale surveys of individuals and families, their medical providers and employer across the United States of America (USA), by the Centre on an Aging Society at Georgetown University, identified that relative to people in similar age groups, people with multiple chronic conditions are more likely to have incomes of =/< $20,000 and less likely to have incomes of > $50,000.[53] This same analysis identified that among adults < 65 years, with two or more chronic conditions, more than 25% are not working because they have a disability.[53] However, the findings from this study are also different from other research that has identified availability as the most commonly reported reason for unmet need across Canadian provinces.[43] It is possible that the specific population selected in this secondary data analysis, adults with chronic conditions who resided in one of three Canadian provinces, may have unique characteristics related to income that contribute to these differences. Persons with chronic conditions may have limited resources that can be allocated to seeking health care. It is feasible to consider that persons with chronic condition's limited resources for health care, could be perceived as either influencing the perceived of affordability of services if only private, fee for services are available, or the perceived availability of subsidized or publicly funded services, depending on persons' experiences with the health system. Thus, as provinces continue to consider, and implement, health care reform physiotherapists need to be engaged in finding cost effective solutions for the delivery of health care which maximize the opportunities for adults with chronic conditions to be able to access, and benefit from, physiotherapy services.

Limitations

The data used to explore physical unmet need in this analysis are cross sectional (i.e. persons are not followed across time), and as such do not allow for causality between physical unmet needs and availability, affordability and acceptability to be assessed.[54] Only adults with specific chronic conditions for which there is evidence to support a role for physiotherapy interventions were included in the analyses. As a result, it is possible that these results may not be generalizable to the unmet needs of the general population. However, unmet need for treatment of a physical health problem was identified as the most common service needed but not received when type of need was compared in each CCHS cycle analyzed in this study and more recently by Statistics Canada in 2014.[43]

Conclusions

This study has shown that unmet need for treatment of a physical health problem was the most common type of need reported in three CCHS survey cycles (2001, 2003, and 2005) by adults >19 yrs. with one or more specific chronic condition (hypertension, and/or diabetes, and /or arthritis/rheumatism and /or heart disease) who resided in On., Alb. and BC. In addition, significant associations between sex and age were identified for each of availability, affordability and acceptability. However, affordability was the only access dimension found to have significant results through the analyses used to answer each of the three research questions guiding this paper. These results contribute to a consistent theme within the literature of unmet health care needs associated with physical health problems for persons with chronic conditions.[5,7] The analyses also provide physiotherapists and policy makers, who are well positioned to address physical health problems, with evidence about which barriers may prevent adults with chronic conditions accessing services. As physical function is an essential aspect to an individual's well-being, this data can inform policy and practice changes in order to enhance the delivery of physiotherapy services for persons in need. As the delivery of health care services continues to evolve, physiotherapists are encouraged to seize the opportunity to demonstrate the professions' expertise and value in maximizing physical function and preventing functional decline for adults with chronic conditions.

Table 1: Definitions of Availability, Affordability, Acceptability[20]

Availability: Physical access to services (i.e. are clinics open when people are able to seek care – such as before / after 'work' hours or on weekends)

Affordability: *Financial* access to, or the ability to pay for, services (i.e. those who require the services can pay the provider considering aspects such as third-party insurance coverage)

Acceptability: Cultural access to services (i.e. the fit between the provider and the patient including attitude towards and expectations of each other)

Table 2: Response Rates at the National and Provincial Level (On., Alb., and BC) for the 2001, 2003, and 2005 CCHS cycles

	Total Sample Response Rate (%)		
CCHS Cycle	Household	Person	Combined
2005[34]	84.9	92.9	78.9
2003[33]	87.1	92.6	80.7
2001[32]	91.4	91.9	84.7

Table 3: Sample Size by Province and CCHS Cycle Based on Stated Inclusion Criteria

	CCHS Cycle			
	2001	**2003**	**2005**	**TOTAL**
On.	12933	15391	15141	**43465**
Alb.	4016	4265	3639	**11920**
BC	5266	5259	4978	**15503**
Total	22215	24915	23758	**70888**

Table 4: Demographic Data for Sample of Interest in CCHS *

Variables									
Cycle	**Age (yrs.) (%)**			**Gender (%)**		**Chronic Condition (%) ***			
	20 – 49	50-79	80+	M	F	A&R	HBP	Diabetes	Heart Disease
Ontario									
2001	24.8	64.4	10.8	40.6	59.4	63	47.5	15.5	20.1

2003	19.0	69.8	11.2	40.8	59.2	65.2	50.9	16.09	20.1
2005	19.4	68.7	12.0	41.0	59.0	63.4	53.0	17.2	18.6
Alberta									
2001	29.3	60.7	9.9	43.2	56.8	65.8	44.3	14.5	14.9
2003	23.5	65.0	11.4	41.4	58.6	66.0	48.5	14.9	15.3
2005	22.3	65.3	12.3	42.6	57.4	64.0	51.7	16.2	15.4
British Columbia									
2001	23.9	64.1	11.9	41.9	58.1	62.0	45.7	15.4	18.8
2003	19.3	7.4	13.3	42.3	57.7	62.4	49.5	16.8	18.5
2005	17.3	67.6	15.0	41.0	59.0	61.0	49.9	17.0	17.2

A&R = arthritis & rheumatism
HBP = high blood pressure   *n* = un-weighted sample for each CCHS cycle

****Note: clients can have multiple chronic conditions - so totals may be > 100%***
*Based on: respondents > 19 yrs., with one of the specific chronic conditions who live in On., Alb. or BC

Table 5: Proportion (Prop) of respondents 19 years of age or older with one or more specific chronic condition(s) who reported unmet needs in On., Alb., and BC in 2001, 2003 and 2005

	Other		**Injury**		**Regular Check Up**		**Emotional Health Problem**		**Physical Health Problem**	
	Prop	**95% CI**	**Prop**	**95% CI**	**Prop**	**95% CI**	**Prop**	**95% CI**	**Prop**	**95% CI**
Ontario										
2001	0.06	0.05 - 0.07	0.07	0.05 - 0.09	0.05	0.03 - 0.06	0.06	0.05 - 0.08	0.73	0.70 - 0.80
2003	0.09	0.06 -	0.04	0.03-	0.06	0.04 -	0.06	0.04 -	0.70	0.67 -

		0.11		0.05		0.08		0.08		0.74
2005	0.09	0.07 - 0.11	0.03	0.02-0.04	0.06	0.05 - 0.08	0.04	0.03 - 0.06	0.71	0.68-0.74
Alberta										
2001	0.06	0.04 - 0.09	0.07	0.04 - 0.1	0.04	0.02 - 0.06	0.05	0.03 - 0.08	0.72	0.67 – -0.77
2003	0.06	0.03-0.08	0.05	0.03-0.08	0.04	0.01 - 0.07	0.07	0.03 - 0.12	0.7	0.63 - 0.77
2005	0.05	0.02 - 0.07	0.07	0.02-0.12	0.05	0.02 - 0.08	0.04	0.01 - 0.06	0.75	0.69 - 0.81
British Columbia										
2001	0.07	0.05 - 0.09	0.08	0.05-0.10	0.05	0.03 - 0.07	0.05	0.03 - 0.07	0.71	0.67 – -0.75
2003	0.09	0.07 – -0.12	0.04	0.03-0.06	0.02	0.00-0.03	0.05	0.03-0.75	0.73	0.69-0.78
2005	0.07	0.05 – -0.09	0.05	0.02-0.08	0.03	0.02-0.05	0.05	0.03-0.08	0.75	0.70-0.79

Figure 1: Provincial Means for Each CCHS Cycle for Availability, Acceptability and Affordability

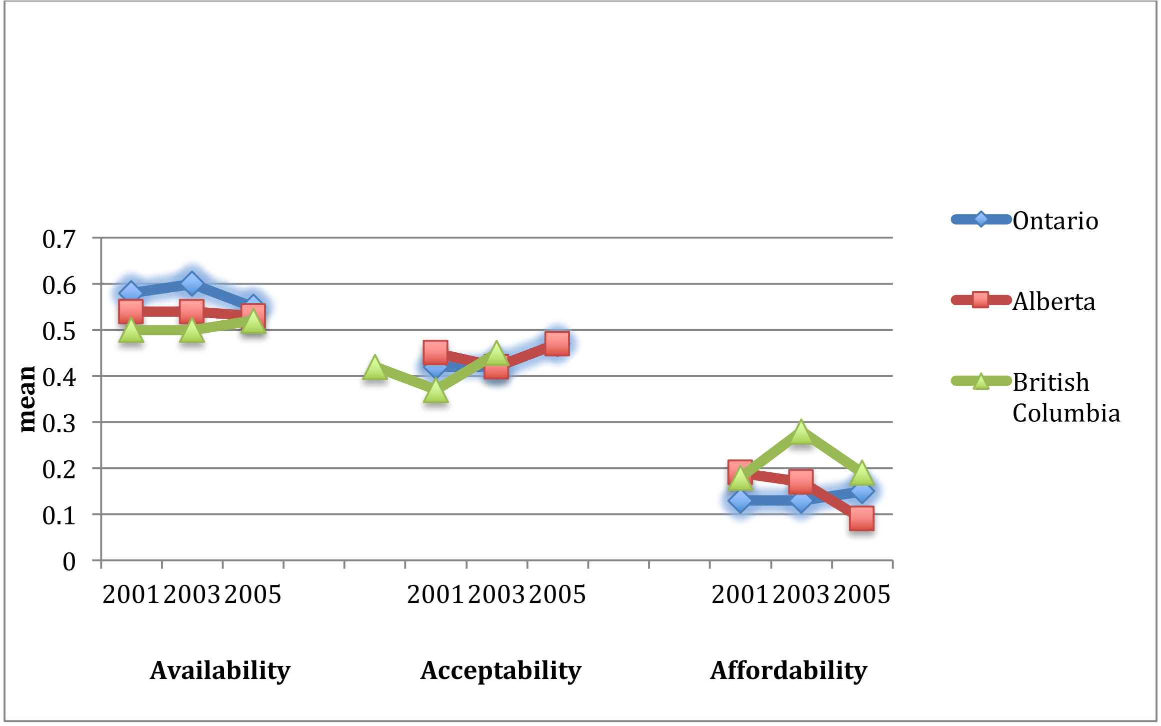

Table 6: Mean differences over time comparisons for availability, affordability, and acceptability

	Ontario			Alberta			British Columbia		
	Avail.	Afford	Accept	Avail.	Afford	Accept	Avail.	Afford	Accept
Mean									
2001	0.58	0.13	0.42	0.54	0.19	0.45	0.50	0.18	0.42
2003	0.60	0.13	0.42	0.54	0.17	0.42	0.50	0.28	0.37
2005	0.55	0.15	0.47	0.53	0.09	0.47	0.52	0.19	0.45
Mean Difference									
2001 vs. 2003	-0.02	0.00	0.00	0.00	0.02	0.03	0.00	-0.10	0.05
2001 vs. 2005	-0.03	-0.02	-0.05	0.01	0.10	-0.02	-0.02	-0.01	-0.03
2003 vs. 2005	0.05	-0.02	-0.05	0.01	0.08	-0.05	-0.02	0.09	-0.08
Test Statistic									
2001 vs. 2003	-0.05	-0.04	-0.06	-0.12	-0.07	-0.08	-0.08	0.03*	-0.02
2001 vs. 2005	-0.03	-0.02	-0.01	-0.09	0.04*	-0.09	-0.05	-0.06	-0.06
2003 vs. 2005	-0.02	-0.03	-0.01	-0.11	0.01*	-0.07	-0.06	0.02*	-0.004

* = significant at 0.05 based on $((x_1-x_2)-1.96*\sqrt{(SE_1^2 + SE_2^2)})$ [34]

Avail. = availability Afford. = affordability Accept. = acceptability

Table 7: Logistic regression results for the three dimensions of access to care (availability, affordability, acceptability) for physical unmet need

Dependent Variable	**Availability**						**Affordability**						**Acceptability**					
	OR	SE	t	P-Value	95% CI		OR	SE	t	P-Value	95% CI		OR	SE	t	P-Value	95% CI	
Variable					Lower	Upper					Lower	Upper					Lower	Upper
Age (yrs)																		
20 - 29	1.13	0.14	0.97	0.33	0.88	1.44	1.50	0.33	1.86	0.06	0.98	2.31	2.23	0.33	5.39	0.00*	1.67	2.99
30 - 39	1.12	0.10	1.17	0.24	0.93	1.34	0.83	0.15	-1.02	0.31	0.59	1.18	1.30	0.15	2.32	0.02*	1.04	1.63
50 - 59	0.81	0.06	-2.58	0.01*	0.70	0.95	0.64	0.10	-2.71	0.01*	0.47	0.89	0.79	0.07	-2.63	0.01*	0.66	0.94
60-69	0.55	0.05	-7.20	0.00*	0.47	0.65	0.36	0.06	-6.18	0.00*	0.26	0.49	0.47	0.05	-7.49	0.00*	0.39	0.57
70 - 79	0.40	0.04	-9.20	0.00*	0.33	0.49	0.27	0.06	-6.16	0.00*	0.17	0.41	0.44	0.05	-7.04	0.00*	0.35	0.55
> 80	0.30	0.04	-10.19	0.00*	0.24	0.38	0.25	0.06	-6.02	0.00*	0.16	0.39	0.35	0.05	-7.85	0.00*	0.27	0.46
Sex																		
Female	1.31	0.07	5.10	0.00*	1.18	1.45	1.40	0.16	3.02	0.00*	1.13	1.75	1.14	0.07	2.15	0.03*	1.01	1.30
Household Income ($)																		
0 -14999	1.06	0.10	0.61	0.55	0.88	1.28	5.34	1.17	7.65	0.00*	3.47	8.21	1.85	0.25	4.53	0.00*	1.42	2.43
15000-29999	1.05	0.09	0.57	0.57	0.88	1.25	3.05	0.65	5.21	0.00*	2.00	4.64	1.48	0.17	3.38	0.00*	1.17	1.85
30000 - 49999	0.99	0.08	-0.13	0.90	0.85	1.16	2.68	0.58	4.58	0.00*	1.76	4.09	1.30	0.14	2.40	0.02*	1.05	1.60
50000 -79999	0.99	0.08	-0.18	0.86	0.85	1.15	1.75	0.38	2.58	0.01*	1.14	2.67	1.05	0.11	0.44	0.66	0.85	1.28
Education																		
Little secondary	0.88	0.07	-1.64	0.10	0.75	1.03	1.09	0.18	0.55	0.58	0.79	1.51	1.00	0.10	0.04	0.97	0.83	1.21
Other Post Secondary	1.10	0.12	0.89	0.37	0.89	1.36	0.87	0.16	-0.75	0.45	0.61	1.25	1.39	0.18	2.54	0.01*	1.08	1.80
Post Secondary Graduate	1.15	0.08	2.09	0.04*	1.01	1.32	1.15	0.16	1.04	0.30	0.88	1.51	1.14	0.10	1.39	0.16	0.95	1.36
Employment Status																		
Part time	0.80	0.07	-2.48	0.01*	0.67	0.95	1.06	0.22	0.29	0.77	0.71	1.60	0.88	0.09	-1.18	0.24	0.72	1.09
Full time	0.80	0.06	-3.15	0.00*	0.70	0.92	0.65	0.09	-3.10	0.00*	0.50	0.85	0.91	0.08	-1.16	0.25	0.77	1.07
Years since Immigrating to Canada																		
0 - 9	1.53	0.29	2.20	0.03*	1.05	2.23	1.74	0.46	2.08	0.04*	1.03	2.92	1.42	0.34	1.49	0.14	0.89	2.27
>10	0.95	0.06	-0.81	0.42	0.84	1.08	1.32	0.17	2.19	0.03*	1.03	1.70	0.89	0.07	-1.53	0.13	0.76	1.03
Visible Minority																		
Yes	0.96	0.10	-0.39	0.70	0.79	1.17	1.31	0.22	1.62	0.11	0.95	1.80	0.89	0.10	-1.03	0.31	0.72	1.11
Type of Unmet Need																		
Unmet mental health need	1.69	0.31	2.93	0.00*	1.19	2.41	3.09	0.73	4.74	0.00*	1.94	4.92	2.81	0.44	6.57	0.00*	2.06	3.82
Unmet need for a check-up	1.66	0.32	2.63	0.01*	1.14	2.43	2.17	0.66	2.54	0.01*	1.19	3.94	1.27	0.27	1.12	0.26	0.84	1.94
Unmet need for care of an injury	2.25	0.37	4.86	0.00*	1.62	3.12	3.42	0.88	4.77	0.00*	2.06	5.66	1.74	0.37	2.65	0.01*	1.16	2.63
Other unmet need	0.71	0.16	-1.51	0.13	0.45	1.11	1.69	0.49	1.81	0.07	0.96	2.99	1.11	0.32	0.38	0.71	0.64	1.95
Province of Residence																		
Alberta	0.93	0.06	-1.06	0.29	0.81	1.06	1.21	0.17	1.39	0.16	0.93	1.58	1.01	0.08	0.14	0.89	0.86	1.19
Bristish Columbia	0.92	0.06	-1.40	0.16	0.82	1.03	1.58	0.17	4.24	0.00*	1.28	1.94	1.00	0.07	-0.01	1.00	0.88	1.14
Time of Survey Compeltion																		
2003	0.82	0.05	-3.44	0.00*	0.73	0.92	0.98	0.12	-0.16	0.87	0.78	1.24	0.81	0.06	-2.82	0.01*	0.70	0.94
2005	0.86	0.05	-2.47	0.01*	0.76	0.97	1.02	0.13	0.18	0.86	0.80	1.30	1.05	0.08	0.68	0.50	0.91	1.21
Constant	0.09	0.01	-18.93	0.00*	0.07	0.12	0.01	0.00	-17.48	0.00*	0.00	0.01	0.05	0.01	-20.19	0.00*	0.04	0.07

OR = odds ratio SE = standard error 95% CI = 95% Confidence Interval yrs. = years

*Indicates significant at $p < 0.05$
Referent categories:
Age 40 – 49 years
Income > $80,000
Education – high school completed
Employment –not employed
Non-immigrant
Not a visible minority
Unmet need for treatment of a physical health problem
Province of residence – Ontario; Time of Survey completion 2001

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CHAPTER FOUR

USE OF PHYSIOTHERAPY SERVICES BY ADULTS WITH SPECIFIC CHRONIC CONDITIONS: AN ANALYSIS OF THE CANADIAN COMMUNITY HEALTH SURVEY

Authors:
SARAH WOJKOWSKI, PT, PhD (Candidate)
School of Rehabilitation Science, McMaster University

JULIE RICHARDSON, PT, PhD
School of Rehabilitation Science, McMaster University

JAMES CHOWHAN, PhD
DeGroote School of Business, McMaster University

STEPHEN BIRCH, D. Phil.
Department of Clinical Epidemiology and Biostatistics, McMaster University

MICHAEL BOYLE, PhD
Department of Psychiatry and Behavioural Neuroscience, McMaster University

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Abstract

Introduction

Physiotherapy (PT) is an effective health service for many chronic conditions. Socio-demographic variables (i.e. age and sex) are associated with use of, and unmet need for, health services. It is not known how the same variables are associated with PT use by adults with specific chronic conditions in Canada.

Purpose

To investigate associations between socio-demographic characteristics and health-related variables and PT use in three Canadian Community Health Survey Cycles (2001, 2003, 2005) for three Canadian provinces (ON, AB, BC).

Methods

Logistic regression examined associations between the dependent variable "PT visits" and independent variables that included sex and income.

Results

Some socio-demographic characteristics (sex, income, education), and health-related variables (unmet injury needs, activity limitation) were positively associated with PT use. Persons with low income were less likely to report a PT visit compared to persons with higher income (>$79,999).

Conclusions

Access to physiotherapy in the studied provinces is subject to barriers related to affordability (income or the ability to pay) and availability (injuries or physical activity limitations). This analysis provides an important perspective on variables associated with access to PT over time for Canadian adults with chronic conditions.

Key words

Physiotherapy, chronic disease, Canada, health services use

Highlights Box

- Women were ***more likely*** to report a PT visit in all three provinces and Canadian Community Health Survey (CCHS) cycles
- In general, people who reported an unmet need for treatment of an injury, or who reported a physical activity limitation, ***were more likely*** to report a PT visit in ON, AB, BC
- People who reported a lower total household income (<$15,000) ***were less likely*** to report a PT visit

Introduction

In 2014, 21.4% of Canadians aged > 20 years were living with at least one of four major groups of chronic diseases: cardiovascular diseases, cancer, chronic respiratory diseases and diabetes [1]. The annual associated costs to the Canadian economy of managing chronic diseases has been estimated to be $190 billion, with $68 billion attributed specifically to treatment, and the remainder to lost productivity [2]. The prevalence of chronic diseases is also rising. For example, by 2025, 6.4 million (23.2%) Canadians > 20 years are predicted to have diabetes, compared to 5.7 million Canadians in 2015 (22.1%) [3]. The rising incidence of chronic disease, as well as projected increases in health care costs and total health care expenditures have resulted in concern about the sustainability and quality of health care [4].

Evidence supports the use of physiotherapy (PT) in the management of chronic diseases, including hypertension [5], diabetes [6], arthritis/rheumatism [7-9] and heart disease [10]. In addition, PT management of chronic diseases, such as osteoarthritis, alleviates wait times for physician services by addressing concerns about pain and functional loss and reducing the need for more costly surgical interventions [11]. Physiotherapists also help individuals restore or maintain mobility and independence, as well as maintain or improve strength and function [12].

Despite the presence of evidence supporting PT use in the management of chronic conditions, Canadians have suboptimal access to community based care, including physiotherapists [13]. A recent scoping review on need and unmet need for community based physiotherapy services (CBPTS) for Canadian adults reported adults with chronic conditions were disadvantaged in terms of accessing CBPTS compared to individuals without a chronic condition [14]. Specifically, cost and lack of service availability were identified as common reasons why access to CBPTS was limited for people with chronic conditions [14]. A descriptive analysis of three cycles (2001, 2003, 2005) of the Canadian Community Health Survey (CCHS) identified the most common type of health care need reported by adults with specific chronic diseases (hypertension, and /or diabetes, and /or arthritis / rheumatism and /or heart disease) was treatment for a physical health problem in Ontario (ON), Alberta (AB), and British Columbia (BC) [15]. This same study reported that adults with specific chronic diseases and a total household income (THI) < $80,000 had a significantly increased likelihood of reporting an unmet health care need due to affordability compared to individuals with a THI >$80,000 [15]. Additionally, women with specific chronic conditions were significantly more likely than men to report a physical unmet need due to factors associated with the availability, affordability and acceptability of care [15]. Unfortunately, this lack of access to community based care represents lost opportunities to improve quality of life and prevent costly hospital admissions [13].

In Canada, the responsibility for most health services falls under provincial / territorial jurisdiction, supported through financial transfer payments from the federal government contingent on satisfying the principles of the Canada Health

Act (CHA) [16]. The CHA states that the "…primary objective of Canadian Health Policy is to…. facilitate reasonable access to health services without financial or other barriers" [16]. However, the CHA does not specifically define access [17], and the provisions of the CHA are limited to 'insured services defined as medically necessary services provided by hospitals and physicians [18]. Over the past three decades technological developments, and provincial need to control spending on healthcare, have driven many healthcare services, and in particular services provided by non-physicians, from hospitals into the community [18,19]. Hence these services no longer fall under CHA provisions [18].

Health services not defined by CHA provisions are left to each province to determine if that service will be provided under the provincial plan (i.e. part of the publicly funded system in that province). Thus, not only does degree of coverage for a health service vary between provinces, it might also change within a province over time as provinces seek to remove (i.e. delist) services from the scope of provincial plans [19]. Delisting is often done to achieve savings in provincial health care expenditures. In the instance of physiotherapy, three provinces (ON, AB, BC) delisted this service from public funding at different points in time (2005 [20], 1995 [21], 2003 [22] respectively). However, few studies have investigated if, and how, PT use differed prior to and post delisting [20,23]. Landry et al [20] identified the majority of clients (81/113, 71.7%), in a small cohort (n=113) followed pre- and post partial delisting of physiotherapy services in Ontario, continued to use PT post partial delisting implementation. Of the individuals in the same cohort who required, but did not continue to use PT post delisting (n=20, 17.7%), lack of use was reported to be due to not being able to pay for the associated costs [20]. However, it is also unclear how service use, or lack thereof, subsequently translates into unmet need for physiotherapy.

Path dependency suggests that what happened in the past directly influences, and limits the possibilities of institutional change today [24]. Path dependence can also demonstrate how processes that have similar starting points can lead to different outcomes, even if they follow the same 'rules' [25]. An analysis of previously collected data to explore how physiotherapy service (PTS) use has varied in three provinces that have applied similar policy decisions related to public funding for physiotherapy, provides an opportunity to gain insight into factors that may have influenced current use of this health service. This historical perspective may also help to inform future initiatives aimed at enhancing equitable access to PTS, or access to PTS based on need for care without financial or other barriers, and improving overall health care quality.

Purpose

A secondary analysis of data related to PTS use in three Canadian provinces (ON, AB, BC) was completed. The purpose of this study was to determine how self-reported PTS use based on socio-demographic characteristics (age, sex, total household income, level of education, employment status, immigrant status, visible minority status) and two health related variables (presence of an activity limitation, type of self-reported unmet need) in ON, AB, BC varied across three different cycles (2001, 2003, 2005) of the CCHS. The three Canadian provinces selected for this analysis have all introduced policy changes that reduced public insurance coverage for PTS. The reductions in public insurance coverage were made in AB in 1995 [20]; in BC in 2002 [21]; and in ON in 2005 [22].

Thus, an exploratory analysis of the impact of the policy decisions to change insurance coverage in ON and BC related to physiotherapy services was completed by comparing how the likelihood of reporting a visit to a physiotherapist varied between CCHS cycles. The target population was adults (> 19 years) with one or more of the following specific chronic conditions: hypertension, diabetes, arthritis / rheumatism and heart disease. The research questions that guided this analysis were:

1. Are specific socioeconomic and health related variables associated with reporting a physiotherapy visit in the past 12 months in the 2001, 2003 and 2005 time periods across provinces?
2. Are specific socioeconomic and health related variables associated with reporting a physiotherapy visit in the past 12 months in pooled data containing the 2001, 2003 and 2005 CCHS?
3. Does the likelihood of reporting a visit to a physiotherapist in the past 12 months vary between CCHS cycles for each province?

Methods

Cross-sectional analysis of the public use micro data files (PUMF) for three CCHS cycles (2001, 2003, 2005) was completed. A PUMF provides anonymous, primarily non-aggregated survey responses and allows the investigation of relationships between variables using different statistical methods [26]. The PUMF version of the CCHS provides data for health regions on a wide range of topics including presence of a chronic health condition(s), use of health care services, socio-demographic, income and labour force characteristics [27]. This analysis was completed as part of a larger secondary data analysis investigating unmet need for treatment of a physical health problem [15].

Study Population

The CCHS is a cross sectional survey that collects information related to health status, health care utilization and determinants of health for Canadians [27]. The CCHS began data collection in 2001 and was completed every two years until 2005 with a sample of approximately 130,000 respondents [27-28]. The CCHS underwent revisions in 2007, 2012, and 2015 that included a new data collection strategy and content revisions [29-30]. Most relevant to this study was the changes to CCHS section related to health care utilization in 2007 compared to 2001 – 2005. Thus, the consistency in the construction and administration of the 2001 – 2005 CCHS provides an opportunity to investigate associations between self-reported use of a physiotherapist in the last 12 months and independent variables at different points in time.

A description of the methods used to conduct the 2001, 2003 and 2005 CCHS, including how the sampling frame was established, has been described elsewhere [27]. In summary, the CCHS covers the population 12 years of age and over living in each Canadian province and territory, excluding Aboriginal peoples, full-time members of the Canadian Forces, the institutionalized population and two rural Quebec health regions [27]. For the purposes of this paper, CCHS respondents were included if the following inclusion criteria were met: adults >19 years, who reported a diagnosis of one or more of the following chronic conditions: hypertension, diabetes, arthritis/rheumatism, heart disease; and resided in ON, AB or BC. The chronic conditions were selected due to their elevated prevalence in Canada in individuals >20 years (i.e. 2011/ 2012 prevalence of hypertension: 24.9%; diabetes: 9.8%; arthritis: 17.9%; 2014 prevalence of cardiovascular disease 6.2%) [1] and evidence to support physiotherapy in the management of these conditions [5-10].

Study Variables

Dependent Variable

The dependent variable for the analysis was “a self-reported PT visit over the last 12 months.” This was derived from the CCHS question, “In the past 12 months how many times have you seen or talked on the phone about your physical, emotional or mental health with a physiotherapist.” Respondents provided a numeric answer that was categorized between zero and ≥31 visits (defined as occurring either in office or via telephone consultations). For the purposes of this analysis, the responses were dichotomized (0 = no visits; 1 = one or more visit(s) in the past 12 months).

Independent Variables

A theory driven approach was used to identify the independent variables included in this study. Specifically, the independent variables identified and selected for inclusion in the analysis were based on a literature review related to use of health services in Canada [15, 31-46]. The independent variables used in this analysis were: age, sex, total household income, education, employment, visible minority status, time since immigrating to Canada, presence of a self-reported activity limitation, self-reported unmet need for health care by type. Due to the nature of the PUMF data, all the independent variables were categorical (i.e. continuous data was not provided). The grouping for each variable is presented in Table 1. A brief summary of the literature supporting the inclusion of each variable follows below.

Age

An analysis of the 2002 – 2003 Joint United States of America (US)/ Canada Health Survey identified an age sex interaction related to doctor contact [31]. Specifically, women 18 – 44 years were more likely to contact a doctor than older women, and men ≥65 years were more likely to contact a doctor than younger men in both countries [31]. Additionally, an analysis of three CCHS cycles (2003-2008) linked to health use data, identified age had the strongest association with increasing levels of health care utilization compared to other socio-demographic variables (i.e. Individuals > 75 years OR 501.66, 95% CI 283.42 – 887.95 compared to individuals 18 – 34 years) [32].

Sex

Women are, on average, higher users of health care than men [33, 34]. Proposed reasons for the differences between use of health services between men and women have included: the reproductive and biology conditions specific to women, higher rates of morbidity in women compared to men, differences in health perceptions and symptom or illness reporting, and an increased likelihood that women seek help for illnesses and prevention [35].

Income

The literature related to income and health services utilization is varied. van Doorslaer et al [36] examined equity in physician utilization in 21 Organization for Economic Cooperation and Development (OECD) countries, including Canada, for the year 2000. The Canadian data utilized was the CCHS 2001, from which the number of visits to a general practitioner or medical specialist over the previous 12 months was extracted. After standardizing for need, the likelihood of a visit to a general practitioner was slightly in favour of individuals with higher incomes [36,37]. However, the number of visits among those who visited a doctor at least once was slightly in favour of individuals with lower income [36,37]. Individuals with higher income were also more likely to visit a specialist and to have more visits with a specialist [36,37]. The differences in accessing and using specialist visits for individuals with higher incomes in Canada may be due to the concentration of specialists around academic health science centers, which tend to be located in relatively wealthy areas; differences in physician recommendations according to patients' income levels, socioeconomic status and ethnicity; or improved navigation of the health care system [37].

Education

Blackwell et al [31] identified that individuals with less than high school education were less likely to have used a doctor in the past 12 months compared to those with a university or college degree (OR 0.60, 95% CI 0.41 – 0.89) in an analysis of the 2002 – 2003 Joint US / Canada Health Survey. An analysis of the 2003 CCHS data also identified the association between higher education and health service use varies across provinces [38]. Higher education was associated with a significant increased probability of visiting a general practitioner, specialist and dentist in the Canadian provinces of AB, Manitoba, Nova Scotia, Quebec and ON [38]. However, in provinces of BC and Prince Edward Island, higher education was found to only be associated with increased probability of visiting a dentist or specialist [38].

Employment

Precarious employment can be described along four main dimensions that include high job insecurity, low wage level, lack of or limited social benefits and sense of powerlessness [39], and has also been identified as affecting health service use [39, 40]. Loignon et al [40] reported that even if an individual has a job, financial limitations to accessing care may not be resolved – as those who are paid minimum wages may still live in poverty. Allin [38] noted private insurance was associated with an increased probability of seeking care from a specialist and /or general practitioner in all Canadian provinces except Newfoundland, New Brunswick, and the three territories.

Immigrant Status

Gee et al [41] identified new immigrants to Canada used less health care compared to Canadian born individuals, but as time in Canada increased, use more closely approximated that of Canadian born individuals [41]. Differences in use and unmet need for new immigrants, compared to Canadian born individuals, has been attributed to healthier, younger, better educated individuals self-selecting into the immigration process; and the health requirements in relation to immigration into Canada [41]. However, health status of immigrants has been noted to decline with increased length of time in Canada due to the adoption of Canadian beliefs, attitudes, and lifestyle behaviours [41].

Visible Minority Status

Understanding uptake of services by visible minorities in Canada has been limited by a relative absence of data and research [42]. One study [43] compared health service use in the 2001 CCHS by members and non-members of visible minority groups in Canada. The analysis identified individuals who were visible minorities were more likely than non-visible minority individuals to have contact with a general practitioner (OR 1.28, 95% CI 1.14 – 1.42), but were less likely to use the preventative care services of mammograms (OR 0.64, 95% CI 0.52-0.79) or Pap tests (OR 0.47, 95% CI 0.39 – 0.56) [43]. Barriers to accessing health care services for visible minority older adults have been identified to include language, cultural beliefs and practices [42].

Presence of Self-Reported Activity Limitations

The presence of a chronic disease in conjunction with an activity restriction has been defined as a disability [44]. In an analysis of the 1998-1999 National Population Health Survey (NPHS), McColl et al [44] identified individuals with a disability were significantly ($p<0.001$) more likely to be high users of the health system (i.e. in the top 10% of utilization of general practitioner services) compared to non-users and /or low to moderate users. Blackwell et al [31] also reported Canadians who “often” reported restriction of activities were more likely to use physician services in the last 12 months (OR 1.92, 95% CI 1.0 – 3.65) and be hospitalized in the last 12 months (OR 1.63, 95% CI 1.03 – 2.57) compared to those who did not report a restriction in activity.

Unmet Health Care Need

Kasman & Badley [45] reported a higher proportion of individuals who had consulted with a general practitioner (≥3 times) (OR1.85, 95% CI 1.73 - 1.97, $p\leq0.01$), a specialist (at least once) (OR 1.80, 95% CI, 1.67-1.93, $p\leq0.01$) or a physiotherapist (at least once) (OR 1.99, 95%CI 1.79 – 2.20) were more likely to report health care was not received when needed compared to individuals who did not report a visit. An analysis of the CCHS 2003 also identified that, after controlling for health and socioeconomic characteristics, individuals who reported an unmet need due to a waiting list had a 22% increase ($p < 0.05$) in the average probability of visiting a general practitioner in the last 12 months, and a 16% increase ($p < 0.05$) in the average probability of visiting a specialist in the same period [46].

Statistical Analysis

Public use microdata files (PUMF) for the 2001, 2003, and 2005 CCHS were downloaded from Ontario Data Documentation, Extraction Service and Infrastructure (Odesi) [47]. A pooled dataset was generated through combining the three cycles. From this pooled dataset, a new database was generated which contained the variables required to derive the variables of interest in addition to the other socio-demographic variables from each of the three provinces. Following assembly of the dataset, patterns of missing data were investigated [48]. Multivariate imputation by chained equations were used for the imputation process [49]. This replaces missing values for multiple variables iteratively [50]. To obtain 10 imputations, the total number of iterations performed was 100 (using a burn-in of 10 to converge to a stationary distribution).

Multiple imputation (10 imputations) by province and survey cycle was used to account for missing data for total household income (THI), highest level of education completed, visit to a physiotherapist (PT visit), usual number of hours worked per week, and visible minority status. Full response variables used to inform the imputation were: gender, age, marital status, self-perceived health and self-perceived health compared to one year ago. Descriptive analyses of key variables to identify proportions, SE, and 95% CI were completed. As the outcome variable of interest was dichotomous, logistic regression was used to determine the relationship between a self-reported PT visit in the past 12 months and the independent variables. Definitions for each of the independent variables are available from Statistics Canada (See supplementary Table 1) [51]. The general equation for the logistic regressions used in this analysis is:

Logit(pi) = *intercept* + *age* + *sex* + *income* + *education* + *employment status*+ *immigrant status* + *visible minority status* + *type of self-reported unmet need* + *presence of a self-reported activity limitation* + *province of residence* + *time of survey completion* + *the random error term for the* i^{th} *individual*

Health inequities have been shown to develop from the clustering of disadvantage (i.e. education, employment), and unmet need may be explained by the interrelated nature of many variables [35]. Three separate analyses were completed to explore the interrelated nature of the variables across province and time. Initially, one regression equation that forced all variables into the model was used (i.e. interacting all variables with province and time). This approach was used to capture the influence of all the variables on physiotherapy use, as well as maximize the possibility of identifying short-term differences between provinces and cycles [52]. Although this analysis established a model that closely resembles the health care delivery environment, the main referent category was complex – as it was heterogeneous, and difficult to interpret. The second analysis ran separate regression equations for each CCHS cycle (2001, 2003, 2005) by province (Table 3). This step made the referent category province specific (i.e. less specific), and facilitated interpretation of the findings by province and time. Finally, to explore potential differences in use across provinces and time (i.e.

cycles) in the context of known policy changes (i.e. delisting), data from the three cycles was pooled data and an abridged model, which included all of the variables of interest but only interacted province and time was developed (Table 4). Coefficient estimates generated from the abridged model for the province and time interaction were then compared between cycles for each province to test for significant differences (i.e. ON 2001 vs., 2003, 2001 vs. 2005, 2003 vs. 2005). The CCHS master survey weight that takes into account each survey's complex design and nonresponse, and adjusts the coefficient estimates for potential bias due to the complex survey design, was used in all analyses [52]. All analyses were completed using STATA 13.1SE

Results

Descriptive Data

The total sample sizes (non-weighted) were 130,880, 134,072, and 132,221 for 2001, 2003 and 2005 cycles respectively. The total (non-weighted) sample size used for imputation was 213,715 which included only respondents from ON, AB, and BC, but was not restricted to only individuals with one of the specific chronic conditions. The total (unweighted) sample sized used in the regression analysis, based on the inclusion criteria (more than or equal to 20 years of age, lived in ON, AB or BC, presence of one or more specific chronic conditions) was 70,888.

After the survey weights were applied, the population size of the sample of interest was 501,135 with more women than men (Table 1). In the weighted sample, the majority of respondents were from ON (65.1%), between 50-54 years of age (13.5%), reported a THI ≥ $50,000 (47%), and had arthritis and /or rheumatism (60%) (Table 1). A majority of respondents did not report a PT visit in the last 12 months (88%) (Table 1). Of the respondents who did report a PT visit in the last 12 months, a majority were female (60%), reported a THI ≥ $80,000 (28%) and had arthritis/rheumatism (74%) (Table 2).

Table 1: Weighted Descriptive Data for Sample of Interest (n=501,135)

	Proportion (%)* (95% CI)**	Standard Error **
Province of Residence		
ON	65.1 (63.6 – 66.7)	0.01
AB	14.1 (13.0 - 15.3)	0.01
BC	20.7 (19.5 – 22.0)	0.01
Income ($)		
<15,000	11.2 (10.3 – 12.2)	0.00
15,000 – 29,999	18.4 (17.2 – 19.6)	0.01
30,000 – 49,999	22.8 (21.4 – 24.2)	0.01
50,000 – 79,999	23.3 (22.0 – 25.0)	0.01
≥ 80,000	24.2 (22.7. – 25.7)	0.01
Sex		
Male	41.3 (39.7 – 43.1)	0.01
Female	58.7 (57.0 – 60.3)	0.01
Age (yrs.)		
20 – 24	3.7 (3.0 – 4.6)	0.00
25-29	4.1 (3.5 – 4.7)	0.00
30-34	5.4 (4.7 – 6.2)	0.00
35-39	7.7 (6.8 – 8.7)	0.00
40-44	11.4 (10.4 – 12.6)	0.01
45-49	13.1 (11.8 – 14.5)	0.01
50-54	13.5 (12.4-14.7)	0.01
55-59	6.8 (6.0 – 7.7)	0.00
60-64	13.2 (12.2-14.2.)	0.01
65-69	6.5 (5.9 – 7.3)	0.00
70-74	6.1 (5.4 – 6.8)	0.00
75-79	4.5 (3.9 – 5.1)	0.00
80 +	3.9 (3.5 – 4.4)	0.00
Highest Level of Education Completed		
High School	21.2(19.9 – 22.6)	0.01

Some Post-Secondary	17.0(15.8 – 18.4)	0.01
Other Post-Secondary	9.0(8.1 – 10.0)	0.01
Post-Secondary Graduate	52.8(51 – 54.4)	0.01
Number of Years Since Immigrating to Canada		
Non-Immigrant	74.2(72.5 – 75.9)	0.01
0-9 years	4.0(3.4 – 5.6)	0.01
10+ years	21.4(19.9 – 22.9)	0.01
Employment Status		
Not Working	41.4(39.8 – 43.0)	0.01
Part time	9.6(8.6 – 10.8)	0.01
Full time	49.0(47.3 – 50.1)	0.01
Visible Minority Status		
No	86.9(85.3 – 88.2)	0.01
Yes	13.1(11.8 – 14.6)	0.01
Presence of a Self-Reported Activity Limitation		
Yes	25.7(24.2 – 27.3)	0.01
No	74.3(72.7 – 75.8)	0.01
Presence of Self-Reported Unmet Need for Type of Health Care		
Physical Health Problem	23.8(22.4 – 25.2)	0.01
Mental Health Problem	8.1(7.2 – 9.0)	0.00
Regular Check Up	5.7(5.0 – 6.5)	0.00
Injury	7.2(6.4 – 8.1)	0.00
Other	8.7(7.8 -9.7)	0.00
Self-Report of a Visit to a Physiotherapist in the last 12 months		
No	88.0 (87.2– 88.0)	0.00
Yes	12.0 (11.9 – 12.7)	0.00
Diabetes		
Yes	15.6 (15.2 – 16.1)	0.00
No	84.0 (83.9 – 84.8)	0.00
Heart Disease		
Yes	16.7 (16.3– 17.2)	0.00
No	83.2 (82.8 – 83.7)	0.00
Arthritis / Rheumatism		
Yes	59.6 (59.1 – 60.3)	0.00
No	40.3 (39.7 – 40.9)	0.00
High Blood Pressure		
Yes	49.1 (48.5 – 49.6)	0.00
No	50.8 (50.2 – 51.4)	0.00

*Percentage distributions may not sum to 100 due to rounding of the group percentages.

**The estimates in this table have been rounded to avoid a high number of decimals. However, this masks small values in the standard errors (i.e. they are not zero), further, there are differences in the CI that are also not visible due to rounding.

Table 2: Weighted Descriptive Data for Individuals who Reported a Visit to a Physiotherapist in the last 12 months

	Proportion (%) (95% CI)	**Standard Error (SE)**
Sex		
Male	39.0 (38.0 – 41.0)	0.01
Female	60.0 (59.0 – 62.0)	0.01
Type of Chronic Condition		
Diabetes	15.0 (13.0 – 16.0)	0.01
Heart Disease	16.0 (15.0 – 17.0)	0.01
High Blood Pressure	41.0 (40.0 – 43.0)	0.01
Arthritis / Rheumatism	74.0 (72.0 – 75.0)	0.01
Total Household Income ($)		
<15,000	7.0 (7.0 – 8.0)	0.00
15,000 - 29,999	15.0 (14.0 – 17.0)	0.00
30,000 - 49,999	22.0 (21.0 – 24.0)	0.01
50,000 - 79,999	27.0 (25.0 – 28.0)	0.01
≥80,000	28.0 (27.0 – 30.0)	0.01

Missing Data

Missing data were investigated for respondents from the three provinces. All CCHS respondents (i.e. >12 years) for each independent variable were included in this analysis. The variables age, gender, marital status, self-perceived health and "self-perceived health compared to one year ago" were identified to have full complete responses. There were 35,404 incomplete observations (17%) from the sample used for imputation (n=213,715). Missing responses were imputed for THI (14.0%), highest level of education obtained (1.8%), number of consultations with a physiotherapist (0.1%), total usual hours worked per week

(2.0%), visible minority status (2.2%), presence of an activity limitation (0.7%). In relation to the variable "PT visits", individuals with arthritis/rheumatism were less likely to have missing data for PT visits (OR 0.28, *p*=0.01, 95% CI 0.11 – 0.67) (data not shown). In addition to using variables that had no missing data (i.e. variables of age, gender, marital status, self-perceived health and self-perceived health compared to one year ago), variables that were imputed were also used in the regressions where appropriate; in other words, most full response and imputed variables would contribute to the estimation of imputed values.

Research Question One: *Are specific socioeconomic and health related variables associated with reporting a visit to a physiotherapist in the past 12 months in the 2001, 2003 and 2005* time periods across provinces*?*

The odds ratios (OR) for the regression equations for each CCHS cycle are presented in Table 3 (full output available upon request). The results from the full logistic regression with the complex referent category are also available upon request, and selected output is presented in Supplementary Tables 2 and 3. Of note is that the OR, standard errors, 95% confidence intervals and significance (p-value) were identical for each independent variable for each CCHS cycle in full logistic regression model that forced all variables into the model, and the separate regressions run by CCHS cycle for each province.

Table 3: An Analysis of the CCHS Cycles by Province: odds ratios for each independent variable in relation to reporting a visit to a physiotherapist in the past 12 months

Province	ON			AB			BC		
CCHS Cycle	2001	2003	2005	2001	2003	2005	2001	2003	2005
	Odds Ratio								
AGE (YRS)									
20-29	0.87	1.06	0.87	1.59	1.29	1.33	1.31	1.05	0.73
30-39	1.23	1.61**	1.29	1.44	1.08	1.37	1.20	1.53	0.63
50-59	1.03	1.20	0.87	1.49	1.68*	1.04	1.02	0.81	0.57*
60-69	0.74*	1.10	0.98	1.30	1.02	0.79	0.99	0.59*	0.70
70-79	0.76	1.16	0.89	0.88	1.15	0.94	0.92	0.93	0.67
80+	0.80	0.90	0.79	0.67	0.75	0.70	0.87	0.70	0.48**
SEX									
Female	1.23*	1.41***	1.43***	0.93	1.37*	1.52**	1.55***	1.47**	1.38**
TOTAL HOUSEHOLD INCOME ($)									
0-14,999	0.72*	0.50***	0.49***	0.85	0.53	0.43**	0.82	0.82	0.87
15,000-29,999	0.74*	0.69	0.49***	0.72	0.91	0.55*	0.76	0.62*	0.64
30,000-49,999	0.91	0.83	0.68**	0.81	0.75	0.52**	0.91	0.77	0.88
50,000-79,999	1.06	0.95	0.81	0.69	0.76	0.80	0.92	0.85	0.98
EDUCATION									
Little Secondary	0.70***	1.02	0.78	0.75	0.76	0.88	0.91	0.92	0.90
Other Post Secondary	1.00	1.19	0.67*	0.58	1.10	0.90	1.42	1.04	1.34
Post Secondary Graduate	1.15	0.85	1.39**	0.95	0.93	1.21	1.20	1.48**	1.10
EMPLOYMENT									
Part	0.92	0.85	0.90	0.81	0.83	1.52	1.33	1.45	0.78

Time									
Full Time	0.84	0.92	0.95	0.83	0.83	0.73	1.06	1.31	1.15
TIME SINCE IMMIGRATING (YRS)									
0-9	0.85	1.15	0.95	0.35	1.60	1.41	0.69	0.29*	0.94
10+	1.05	0.96	1.13	1.48*	0.79	1.09	1.03	1.35*	0.82
VISIBLE MINORITY									
Yes	1.35	1.00**	1.32	0.94	1.43	0.78	0.79	0.76	1.11
TYPE OF SELF REPORTED UNMET NEED									
Mental Health	0.92	1.01*	1.10	0.85	1.56	1.27	1.39	0.69	2.12
Regular Check Up	0.46	0.86	1.04	1.90	0.64	1.28	0.30	1.13	0.83
Injury	2.45***	2.15*	3.59***	3.98***	4.08**	1.11	3.79***	2.46*	4.49**
Other	2.31**	2.80***	0.85	3.00**	1.40	0.57	1.21	2.16*	0.95
PRESENCE OF ACTIVITY LIMITATION									
Yes	3.06***	3.00***	2.64***	2.14***	2.72***	2.45***	1.78***	1.93***	1.75***

*$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$
ON = Ontario AB = Alberta BC = British Columbia

Referent Categories:
Sex: Male
Physical Activity Restriction: no
Unmet need: physical health needs
Employment Status: not working
Education: high school graduate
Income: ≥$80,000
Immigrant Status: non – immigrant
Age: 40 – 49 years
Visible Minority: no

The results from this analysis identified the variables of income, age, education and immigrant status had some parameters that were significantly different than zero (Table 3).

Age. The age variable was divided into categories: 20 – 29 years, 30 – 39 years, 40 – 49 years, 50 – 59 years, 60 – 69 years, 70 – 79 years and ≥80 years. There were no consistent patterns of significance in the findings for any of the CCHS cycles related to age (Table 3). A trend was identified towards younger individuals (i.e. <60 years) being more likely to report a PT visit compared to older individuals was noted, but findings were not significant (Table 3). **Sex**. The referent category for sex in the regression analysis was “male”. Women had a higher likelihood of reporting a PT visit in the last 12 months in the 2001, 2003 and 2005 CCHS for each province, with the exception of Alberta in 2001 (Table 3). **Income.** Individuals from ON who reported a THI <$15,000 were less likely than individuals who reported a THI of ≥ $80,000 to report a PT visit in the last 12 months in all three CCHS cycles (Table 3). Individuals from ON with a THI between $15,000 – 29,999 were also less likely to report a PT visit in the last 12 months in the 2001 and 2005 CCHS Cycles compared to those with a THI ≥ $80,000. Individuals from AB, in 2005, who reported a THI of less than $15,000, between $15,000-$29,999, or between $30,000 - $49,999 also had a significantly lower OR compared to individuals who reported the highest THI to report a PT visit in the last 12 months. In BC in 2003, individuals who reported a THI between $15,000 - $29,999 were less likely to report a PT visit. **Education.** Individuals who completed little secondary education in ON in 2001, or completed other secondary education in ON in 2005, were significantly less likely to report a PT visit in the last 12 months compared to individuals who were high school graduates (Table 3). However, post-secondary graduates in ON in 2005 and in BC in 2003 were significantly more likely to report a PT visit in the last 12 months compared to high school graduates in 2001 (Table 3). **Immigrant Status**. Immigrant status was significantly associated with reporting a PT visit in AB and BC. In BC in 2003 individuals who had immigrated to Canada <9 years ago were significantly less likely to report a PT visit in the last 12 months compared to non-immigrants (Table 3). However, immigrants who immigrated to Canada ≥10 years ago were significantly more likely to visit a PT in the last 12 months in AB in 2001 and in BC in 2003 (Table 3). **Unmet Need.** Unmet need for health services is self-reported in the CCHS according to need for mental health services, need for a regular check-up, need for care of an injury, other unmet need, and unmet need for a physical health problem (reference category). Individuals who reported an unmet need for care of an injury or who reported "other" unmet needs had a higher OR for reporting a PT visit in the last 12 months compared to individuals with unmet physical health needs (Table 3). Specifically, individuals who reported an unmet need for care of an injury were significantly more likely in all provinces and in all CCHS cycles, except in AB in 2005, to report a PT visit to in the last 12 months compared to individuals with unmet physical health needs. Individuals who reported 'other' unmet needs were also significantly more likely to report a PT visit in the last 12 months in ON and AB in 2001, and in ON and BC in 2003 compared to individuals with unmet physical health needs. **Physical Activity Restriction.** Individuals who reported a physical activity restriction were significantly more likely to report a PT visit in all three provinces, and in all three

CCHS cycles compared to individuals who did not report a physical activity restriction.

Research Question Two: *Are specific socioeconomic and health related variables associated with reporting a visit to a physiotherapist in the past 12 months in a pooled data set using the 2001, 2003, and 2005 CCHS?*

The output from the abridged model that pooled the data and interacted province and time, is presented in Table 4. In general, the variables that explained the variance associated with the dependent variable (i.e. self-reported PT visit in the last 12 months) did not change in the abridged model, when compared to the variables identified in the separate regressions for each province and year (Table 4). Specifically, individuals 30 – 39 years were more likely to report a PT visit in the last 12 months compared to those 40 – 49 years. There was also a trend for older individuals to be less likely than younger individuals to report a PT visit in the past 12 months (Table 4). Women, those who were post-secondary graduates, individuals with an injury or other unmet need, and those who reported an activity limitation were also significantly more likely to report a PT visit than men, high school graduates, individuals with an unmet physical health need, and those who did not report an activity limitation, respectively. Conversely, those who reported a THI ≤$80,000 and those who completed little secondary education were significantly less likely to report a PT visit in the last 12 months compared to those with a THI of ≥$80,000 and who were high school graduates respectively (Table 4).

Unlike the separate regressions that analyzed the independent variables by province and year, this analysis also investigated differences between provinces and CCHS cycles using an interaction term of province with time. The results from this analysis demonstrated individuals who resided in AB in 2001 or 2003, and individuals who resided in BC in 2001, 2003 or 2005 were all more likely to report a PT visit in the last 12 months compared to individuals who resided in ON in 2001.

Table 4: Full Output for Abridged Model Regression Analysis of Pooled Data from Three CCHS Cycles (2001, 2003, 2005) Related to Self-Reported Visit to a Physiotherapist in the Last 12 Months

Variable	**Odds Ratio**	**T**	**P-value**	**95% Confidence Interval**
AGE (YRS)				
20 - 29	1.02	0.14	0.89	0.81 – 1.27
30 – 39	**1.27**	**2.98**	<0.001*	**1.08 – 1.48**
50 – 59	1.32	0.43	0.67	0.91 – 1.16
60 – 69	0.91	-1.43	0.15	0.80-1.03
70 – 79	0.89	-1.49	0.14	0.78 – 1.03
80+	0.76	-3.27	<0.001***	0.64 - 0.90
SEX				
Female	1.37	8.30	<0.001***	1.27 – 1.47
TOTAL HOUSEHOLD INCOME ($)				
0 – 14,999	0.62	-5.74	<0.001***	0.53 – 0.73
15,000 – 29,999	0.65	-6.76	<0.001***	0.57 – 0.73
30,000 – 49,999	0.78	-4.39	<0.001***	0.70 – 0.87
50,000 – 79,999	0.89	-2.23	0.03*	0.80 – 0.99
HIGHEST LEVEL OF EDUCATION COMPLETED				

Little Secondary	0.78	-4.41	<0.001***	0.70 – 0.87
Other Post-secondary	0.98	-0.19	0.85	0.85 – 1.15
Post-secondary Graduate	1.21	4.00	<0.001***	1.10 – 1.33
EMPLOYMENT STATUS				
Part Time	0.97	-0.50	0.62	0.84 -1.10
Full Time	0.94	-1.20	0.23	0.85 – 1.49
NUMBER OF YEARS SINCE IMMIGRATING TO CANADA				
0-9	0.94	-0.38	0.70	0.67 – 1.30
10+	1.05	1.11	0.27	0.96 – 1.15
VISIBLE MINORITY STATUS				
Yes	1.11	1.51	0.13	0.97 – 1.27
TYPE OF SELF-REPORTED UNMET HEALTHCARE NEEDS				
Mental Health	1.11	0.74	0.46	0.84 – 1.48
Regular Check-Up	0.84	-0.96	0.34	0.58 – 1.21
Injury	2.86	8.52	<0.001***	2.24 – 3.63
Other	1.61	3.52	<0.001***	1.23 – 2.09
SELF-REPORTED ACTIVITY LIMITATION				
Yes	2.51	22.64	<0.001***	2.32 – 2.72
PROVINCE & TIME INTERACTION				
ON 2003	0.97	-0.57	0.57	0.86 – 1.08
ON 2005	1.08	1.33	0.19	0.96 – 1.21
AB 2001	1.20	2.19	0.03*	1.02 – 1.41
AB 2003	1.27	2.75	0.01**	1.07 – 1.41
AB 2005	1.21	2.16	0.03*	1.02 – 1.44
BC 2001	1.52	6.49	<0.001***	1.34 – 1.72
BC 2003	1.22	2.61	0.01**	1.05 – 1.42
BC 2005	1.21	2.49	0.01**	1.04 – 1.40

*$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$

ON = Ontario AB = Alberta BC = British Columbia

Referent Categories:

Sex: Male

Physical Activity Restriction: no

Unmet need: physical health needs

Education: high school graduate

Immigrant Status: non-immigrant

Age: 40 – 49 years

Employment Status: not working	Visible Minority: no
Province & Time Interaction: ON 2001	Income: ≥$80,000

Research Question Three: *Does the likelihood of reporting a PT visit in the past 12 months vary between CCHS cycles for each province?*

Small positive and significant differences between CCHS cycles in relation to the reporting a PT visit in the last 12 months were identified in BC between 2001 and 2003 and 2001 and 2005 (Table 5). In ON respondents were less likely to report a PT visit in the previous 12 months in 2005 compared to in 2003.

Table 5: Difference between the 2001, 2003 and 2005 CCHS Cycles and likelihood of reporting a visit to a physiotherapist in the previous 12 Months in ON, AB and BC.

CCHS Cycle Comparison	Coefficient	Standard Error	T	P-Value	95% Confidence Interval
ONTARIO					
2001 vs. 2003	0.03	0.06	0.57	0.57	-0.08 – 1.15
2001 vs. 2005	-0.08	0.06	-1.33	0.19	-1.93 – 0.04
2003 vs. 2005	-0.11	0.06	-1.98	0.05*	-0.22 – 0.00
ALBERTA					
2001 vs. 2003	-0.61	0.10	-0.59	0.56	-0.27 – 0.14
2001 vs. 2005	-0.01	0.10	-0.09	0.93	-0.21 – 0.20
2003 vs. 2005	0.05	0.11	0.48	0.63	-0.16 – 0.26
BRITISH COLUMBIA					
2001 vs. 2003	0.22	0.08	2.73	0.01**	0.06 – 0.38
2001 vs. 2005	0.23	0.08	2.89	<0.001***	0.07 – 0.38
2003 vs. 2005	0.01	0.09	0.12	0.90	-0.16 – 0.18

$^{*}p \leq 0.05$ $^{**}p \leq 0.01$ $^{***}p \leq 0.001$

Discussion

This analysis has identified that, in general, the socio-demographic variables of age, sex, income, education, and the health-related variables of presence of a self-reported activity limitation and self-reported unmet needs for health care by adults who have specific chronic conditions are associated with reporting a PT visit in the past 12 months in three CCHS cycles (2001, 2003, and 2005) in three Canadian provinces (ON, AB, BC). These findings are similar to the existing literature related to use of and unmet need for a variety of health services in Canada [15, 31-46].

In Canada, 1% of the population accounts for 49% of combined hospital and home care costs, while 5% of the population accounted for 84% of these costs [53]. Several studies have demonstrated that women use more health care services than men [33, 34, 54]. Explanations for this difference include: higher rates of morbidity in women; differences in health perceptions and reporting patterns; and the reproductive role of women [35, 54]. Women are also more predisposed to report their health as poor, and have a greater willingness and ability to take care of themselves when they are sick [35, 54]. Results from this analysis are consistent with previous findings - in every CCHS cycle for every province women were more likely to report a PT visit in the past 12 months compared to men. Despite this increased use of physiotherapy, Canadian women have also been identified to be more likely to report an unmet need for treatment of a physical health problem compared to men [15]. The reported unmet need may be associated with increased reporting of a PT visit in the last 12 months identified by the current analysis. For example, Chen & Hou [55] identified a relationship between higher health system use and the tendency to report unmet health care needs. Specifically, people who had consulted a general practitioner or specialist in the previous year, were identified as having increased odds of reporting an unmet need related to service availability in a secondary data analysis of the 1998/99 National Population Health Survey (NPHS) [55]. Kasman & Badley [45] also found people who had prior visits with a general practitioner, specialist, or physiotherapist were more likely to report unmet needs. However, additional analysis is required to better understand how the reported increased morbidity of women and their stronger tendency to seek services may be associated with the increased likelihood of reporting a PT visit in the last 12 months, and how use is associated to unmet need, by women with the specific chronic conditions identified in this analysis.

This analysis also identified individuals who reported unmet injury needs were more likely to report a PT visit in the last 12 months compared to individuals with unmet physical health needs in ON, AB and BC in all except one cycle – AB in 2003 (Table 3). This finding may highlight treatment differences for acute injuries compared to chronic conditions. With acute disease, treatment aims at returning the individual's life to level of pre-injury function. However, with chronic diseases, neither the disease nor its consequences are static [56]. Instead, the disease and subsequent consequences interact to create patterns of illness that require continuous and complex management [56]. In addition, variations in the patterns of illness for persons with chronic disease, combined with at times, uncertain treatment outcomes, lead to uncertainty about prognosis [56].

Physiotherapists have a specialized knowledge of musculoskeletal function, and have the expertise to make recommendations regarding a person's functional capacity and potential [57]. Due to this knowledge, physiotherapists have established a role within the health system as being well positioned to provide care for individuals with injuries, as well as for individuals with chronic physical health problems. This present analysis indicates that individuals with specific chronic conditions and who reported unmet injury needs, were more likely to report PT visits compared to individuals with specific chronic conditions and who have unmet physical health needs. The rationale for why this difference was identified is unclear. One hypothesis may be that acute injuries may be more likely to occur through a workplace or a motor vehicle accident. In Canada, there are mechanisms in place through provincial agencies, such as the Workplace Safety and Insurance Board (WSIB) (ON), and mandatory automotive insurance that provides access to health care and limited reimbursement to individuals who receive PT services to rehabilitate injuries sustained in either of these instances. However, the progressive decline in functional ability associated with chronic conditions may result in physical health needs that require ongoing attention, and the individual would be responsible for covering the associated costs. As a result, individuals with chronic conditions may not have the resources to access PT in order to address these concerns.

Research has identified that individuals with multiple chronic conditions are especially at risk of insufficient medical care because of the association between a large out of pocket burden and chronic conditions [58]. Individuals with chronic conditions may also be reluctant to seek care based on time constraints and perceived ineffectiveness of PT in relation to the progressive nature of a chronic condition. A recent scoping review on unmet need for community based physiotherapy services in Canada [14] identified that a gap in the literature exists in terms of understanding barriers to receiving PT services from the perspective of the individual (acceptability) [14]. Thus, more research is required to determine if out of pocket costs, or the presence of extended health insurance to protect against out of pocket expense, can explain the variation in reporting a PT visit in a 12-month period for adults with specific chronic conditions. In addition, exploring barriers such as time, or lack of perceived benefit, from the perspective of the individual would provide important insight when interpreting this finding.

Individuals who reported the presence of an activity limitation were more likely to report a PT visit in the past 12 months compared to individuals who did not report an activity limitation in every province and in every cycle. This finding is positive, and aligns with rehabilitation recommendations in the recent literature. For example, a systematic review by Schneirder et al [59] identified increasing the amount of usual rehabilitation aimed at reducing activity limitations improves activity in people post stroke. The authors identified that extra rehabilitation improved activity immediately after the intervention period (SMD = 0.39, 95% CI 0.07 - 0.71, I(2)=66%) [58]. As the percentage of time spent in sedentary behaviours is generally higher for people with a mobility disability than for people without a disability [60], individuals with an activity limitation may also be at risk of increasing sedentary time, with consequent increases in body mass index, higher systolic blood pressure, and other metabolic risk factors [60]. As participation in physical activity is fundamental for the maintenance of metabolic health and the prevention of chronic diseases such as cardiovascular disease [60], ensuring appropriate access to care, including to physiotherapy, for those with activity limitations could maintain or improve function. This improvement may not only provide individual benefits, but may also serve as a cost saving approach for the health care system by delaying or preventing the onset of chronic conditions.

Income had a positive association with the likelihood of reporting a PT visit in this analysis. In general, respondents with a lower THI (≤$15,000) were less likely to report a PT visit in the last 12 months compared to respondents with higher income (i.e. ≥ $80,000) (Table 5). There is a growing body of research that demonstrates persons living in poverty are at a greater risk for deterioration of health status, chronic illness, and premature death compared to affluent persons [40]. Evidence demonstrates that persons living in poverty receive the least amount of health care, are less likely to have a family physician, and less likely to obtain preventative and secondary care compared to affluent individuals [61]. For example, Lasser et al [61] identified through an analysis of the Joint Canada/US Survey of Health that Canadians with an annual income ≥$70,000 (USD) (highest income quartile) were more likely to have a regular medical doctor compared to individuals with income in the lowest quartile (<$17,000 USD income) (OR 1.71, $p \leq .01$, 95% CI 1.13 – 2.60). Canadians with an income ≥$70,000 (USD) (OR 0.36, p <0.0001, 95% CI 0.23-0.57) were less likely than those with an income ≤$17,000 USD to report self-perceived unmet health care needs in the last 12 months [61]. Factors that have been identified to contribute to this difference include the inability to cover associated costs (affordability) of seeking care (i.e. cost of transportation, access to child care, payment for services or prescribed devices, taking unpaid time off of work) and / or perceived value of the intended service [62]. The consequences of this disparity, is that when health care is eventually used there is a higher financial burden to the health care system. For example, individuals with a lower socioeconomic status are more likely to use inpatient services; have increased use of family physician services once contact is made; and have consistently high hospitalization rates [40]. These consequences could be the result of a higher burden of need or, may demonstrate that the services received are not addressing health care needs of those lower on the socioeconomic scale [62]. Thus, in a health system such as Canada's where pubic coverage differs by type of service, and by province, this research has identified that factors, other than needs for service, will determine which services different people use. This difference in service use may create a mismatch of what individuals are accessing and using which health services, which can give rise of inefficient use of health care resources.

Time of survey completion (i.e. 2001, 2003, or 2005) was also identified to be associated with likelihood of reporting a visit to a PT in the last 12 months. Specifically, BC residents were more likely to report a PT visit in the last 12 months in 2003 compared to 2001 and 2005 compared to 2001 (Table 4 and 5). This increase occurs across the same time that PTS were being delisted from public funding in that province [22]. It is not known why this increase was observed, but changes in other sectors (i.e. work place insurance) may have contributed to this change. Trends were not identified for ON, and this may be due to the timing of the survey administration and delisting (i.e. delisting was implemented April 2005, and the CCHS was administered across that year). However, there is a paucity of research investigating use and access pre- and post delisting PTS in AB and BC, and only a few articles describe the impact of this policy decision in ON [20,23,59]. In general, delisting CBPTS in ON was perceived to: decrease demand for PT in publicly funded, community settings [23]; increase costs to the client [23]; and require some clients to not received PTS despite a self-reported perceived need [20] immediately following the implementation of the policy decision. Landry et al [20] also identified that the majority of clients (81/113, 71.7%) in a small cohort followed pre- and post the partial delisting of physiotherapy in ON continued to receive PTS. Reasons why individuals maintained access to PTS included some individuals: satisfied newly implemented eligibility criteria for access to publicly funded PTS in ON; had private insurance that covered associated costs of receiving PTS; and /or could afford to pay out of pocket. However, of the individuals who reported they required PTS but did not receive them after partial delisting (20/113, 17.7%), lack of use was reported to be due to not being able to afford associated costs [20]. Research with more recent data is required to determine if the socio-demographic and health-related variables identified to be associated with self-reporting a PT visit in the last 12 months continue to be associated with PT use in light of recent health system changes in each province.

Strengths and Limitations

The regression equations generated for this analysis were theoretically driven and empirically supported and based on variables identified in the literature as influencing unmet need for health care [15, 31-46].

The results show the substantial associations between socio-demographic, health related variables, and reporting a PT visit (in the past 12 months) within the context of relevant and somewhat recent policy changes; thereby highlighting key variables that should be considered in the generation of new policies targeting improved equity to future access to PTS. However, Greenland & Pearce [63] have noted that models fall short of the complex reality under study, and current approaches to modeling fall short in addressing the complexity of health issues. Thus, the results of this study need to be interpreted within the context of the analysis completed. The CCHS data used to explore associations between reporting a PT visit in the last 12 months and independent variables was cross-sectional and did not allow for causality to be assessed [64]. Only adults with specific chronic conditions for which there is evidence to support a role for PT interventions were included in this analysis. As a result, it is possible that these results may not be generalizable to PT use by the general population or by adults with other chronic conditions.

Inequities in health use may not solely reflect inappropriate or unfair differences in access- but also differences that arise from personal characteristics, expectations and beliefs [38]. Additionally, patterns of health care use and barriers to access are affected by system level factors such as the administration and funding of health systems [38]. However, use represents realized access [46]. Additionally, determining whether factors other than need measure access inequities to needed health care has previously been reported in the study of equity in health care [46]. This study investigates which socio-demographic and health-related variables are specifically associated with use of physiotherapy by adults with specific chronic conditions in three provinces in Canada. However, the variables identified to be less likely associated with reporting a PT visit, do not directly translate to the variables associated with unmet need for physiotherapy for adults with chronic conditions. Future analysis should include targeted comparisons between individuals with and without chronic conditions to identify if the socio-demographic and health-related variables associated with a PT visit in this study are consistent between the two populations, and if significant differences may exist. Additionally, research that investigates how the variables less likely to be associated with a PT visit are associated with unmet need for physiotherapy is required.

The nature of the CCHS data only allowed for an exploratory analysis of how the policy decision to partially delist physiotherapy was associated with use of PTS across time (research question three). A more complex analysis using the CCHS Master file is required to fully examine any associations between PT use and time in the context of delisting, for both individuals with and without a chronic disease. The CCHS also did not identify where the PT services were received (i.e. in a hospital or a community setting), nor were specific reasons for consulting a physiotherapist provided. Therefore, it is not possible to make conclusions about differences in use by settings or the reasons why individuals with specific chronic conditions sought PT. However, to the knowledge of the authors, this is the first analysis of a national data set to specifically explore what characteristics are associated with reporting a PT visit in three different Canadian provinces at three different points in time. This analysis identifies specific socio-demographic and health related characteristics that can now be researched further to better understand the association of use of PTS within structure and delivery of Canadian health systems.

Conclusions

This analysis demonstrated differences in the reporting a physiotherapy visit by adults with specific chronic conditions in three Canadian provinces.

Specifically, access to physiotherapy in the studied provinces was identified to be subject to barriers related to affordability and availability. Policy makers and physiotherapists alike are encouraged to consider how to address service differences, including cost and lack of availability, that have been identified by adults with chronic conditions [14], to ensure equitable use of, and access to, physiotherapy for all Canadians.

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Conflicts of Interest: None

Author Contributions

SW generated the research questions, completed the data analysis and led the writing of the manuscript

JR participated in the discussion for the conceptual ideas for the paper, contributed to generation of the research questions, reviewed data analysis, consulted on statistical techniques, and reviewed manuscript drafts

JC reviewed data analysis, consulted on statistical techniques, reviewed manuscript drafts

MB & SB both participated in the discussion for the conceptual ideas for the paper and research questions and reviewed manuscript drafts

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Supplementary Table 1: Definitions of Independent Variables from Statistics Canada [50]

Variable	Definition	Public Use Microdata Files (PUMF) Categories	
Age	Calculated and confirmed with respondent using: Day of birth (2 digits) Month of birth (2 digits) Year of birth (4 digits)	Years: 12 – 14 15 – 19 20 – 24 25 - 29 30 – 34 35 – 39 40 – 44	45 - 49 50 – 54 55 – 59 60 – 64 65 – 69 70 – 74 75 – 79 80 years or more
Sex	Male or female	Male Female Not applicable Not stated	
Total Household Income	The total household income from all sources	Less than $50,000 $50,000 to less than $60,000 $60,000 to less than $80,000 $80,000 or more	
Education	Highest level of education completed	Less than secondary Secondary graduate Other post-secondary Not applicable Not stated	
Work status	The respondents' total usual hours worked per week	Full time Part time Not applicable Not stated	
Immigrant Status – Country of Birth	The respondent's country of birth	Canada China France Germany Greece Guyana Hong Kong Hungary India	Netherlands Philippines Poland Portugal United Kingdom United States Viet Nam Other – Specify Do not know

		Italy Jamaica	Refused to answer
Immigrant Status - Immigration to Canada	A respondent who is an immigrant to Canada	Yes No	
Length / Time in Canada since Immigration	The length of time the respondent has been in Canada since his / her immigration	0 – 9 years 10 years or more not applicable not stated	
Visible Minority Status	The cultural / racial origin of the respondent	White Visible minority Not applicable Not stated	
Presence of Activity Limitation	The presence of a long-term health condition or problem that has created self-reported difficulty with seeing, hearing, communicating, walking, climbing stairs, bending, learning or doing any similar activities	Sometimes Often Never Do not know Refused to Answer	
Cause of Condition limiting activity	The best description for the condition that is causing self-reported activity limitations	Accident at home Motor vehicle accident Accident at work Other type of accident Existing from birth or genetic Work conditions Disease / illness Ageing Emotional / mental health problem or condition Use of alcohol / drugs Other – Specify Do not know Refused to answer	
Unmet Health Care Needs	Thinking of the most recent time, what was the type of care that was needed	Treatment of a physical health problem Treatment of an emotional health problem	

		A regular check-up (including regular pre-natal care) Care of an injury Other – specify Do not know Refused to Answer
Self-Reported Visit to a physiotherapist	Not counting when the respondent was an overnight patient, In the past 12 months how many times have you seen or talked on the telephone about your physical, emotional or mental health with a physiotherapist	Range from 1 – 99 visits Not applicable Not stated
Presence of the following chronic conditions: Diabetes High Blood Pressure Heart Disease Arthritis/ Rheumatism	Long term conditions which are expected to last or have already lasted 6 months or more that have been diagnosed by a health care professional	Yes No Do not know Refused to answer

Supplementary Table 2: Logistic Regression Results (Selected Output) for Complete Regression Analysis that Compared CCHS Cycles

Variable	OR	SE	t	*p*- value	95% CI	
AGE 30- 39						
ON						
2001	1.23	0.20	1.31	0.19	0.90	1.69
2003	1.61	0.29	2.64	0.01**	1.13	2.28
2005	1.29	0.25	1.31	0.19	0.88	1.88
AB						
2001	1.44	0.38	1.38	0.167	0.86	2.41
2003	1.08	0.36	0.23	0.82	0.56	2.07
2005	1.37	0.54	0.79	0.43	0.63	2.99
BC						
2001	1.20	0.25	0.90	0.37	0.80	1.80
2003	1.53	0.44	1.47	0.14	0.87	2.70
2005	0.63	0.18	-1.59	0.11	0.35	1.11
AGE 50 – 59						
ON						
2001	1.04	0.14	0.27	0.79	0.79	1.36
2003	1.20	0.16	1.34	0.18	0.92	1.57
2005	0.87	0.15	-0.81	0.42	0.62	1.22
AB						
2001	1.49	0.35	1.68	0.09	0.94	2.36
2003	1.68	0.42	2.08	0.04*	1.03	2.75
2005	1.04	0.30	0.15	0.88	0.59	1.84
BC						
2001	1.02	0.16	0.14	0.89	0.76	1.38
2003	0.81	0.19	-0.91	0.37	0.52	1.27
2005	0.57	0.15	-2.11	0.04*	0.34	0.96
AGE 60 – 69						
ON						
2001	0.74	0.11	-2.00	0.05*	0.55	0.99
2003	1.10	0.16	0.65	0.51	0.83	1.46
2005	0.98	0.14	-0.15	0.88	0.74	1.29
AB						
2001	1.30	0.31	1.11	0.27	0.82	2.07
2003	1.02	0.30	0.08	0.94	0.60	1.75

2005	0.79	0.21	-0.89	0.37	0.46	1.33
BC						
2001	0.99	0.17	-0.04	0.97	0.72	1.38
2003	0.59	0.15	-2.12	0.03*	0.36	0.96
2005	0.70	0.14	-1.78	0.08	0.48	1.03
AGE 80 +						
ON						
2001	0.80	0.16	-1.11	0.27	0.54	1.19
2003	0.90	0.17	-0.57	0.57	0.62	1.30
2005	0.79	0.15	-1.21	0.23	0.55	1.15
AB						
2001	0.67	0.22	-1.22	0.22	0.36	1.27
2003	0.75	0.28	-0.77	0.44	0.35	1.57
2005	0.70	0.21	-1.18	0.24	0.39	1.26
BC						
2001	0.89	0.19	-0.57	0.57	0.59	1.34
2003	0.70	0.21	-1.18	0.24	0.39	1.26
2005	0.48	0.12	-2.90	0.01**	0.29	0.79
FEMALE						
ON						
2001	1.23	0.11	2.36	.02*	1.04	1.46
2003	1.42	0.12	4.17	<.001***	1.20	1.67
2005	1.43	0.13	4.07	<.001***	1.20	1.70
AB						
2001	0.93	0.14	-0.50	.62	0.69	1.25
2003	1.37	0.22	1.99	.05*	1.01	1.88
2005	1.52	0.24	2.66	.01**	1.12	2.06
BC						
2001	1.55	0.16	4.27	<.001***	1.27	1.90
2003	1.47	0.20	2.80	.01**	1.12	1.94
2005	1.38	0.18	2.54	.01**	1.08	1.77
INCOME 0-$14,999						
ON						
2001	0.72	0.12	-2.02	.04*	0.52	0.99
2003	0.50	0.11	-3.25	<.001***	0.32	0.76
2005	0.49	0.09	-4.02	<.001***	0.35	0.69
AB						

2001	0.85	0.24	-0.58	.57	0.48	1.49
2003	0.53	0.19	-1.80	.07	0.26	1.06
2005	0.43	0.14	-2.57	.01**	0.22	0.82
BC						
2001	0.82	0.17	-0.95	.34	0.55	1.23
2003	0.82	0.29	-0.57	.57	0.41	1.63
2005	0.87	0.23	-0.51	.61	0.52	1.47
INCOME $15,000 – 29,999						
ON						
2001	0.74	0.11	-1.94	.05	0.55	1.00
2003	0.69	0.10	-2.50	.01**	0.52	0.92
2005	0.49	0.07	-5.25	<.001***	0.37	0.64
AB						
2001	0.72	0.19	-1.27	.20	0.43	1.20
2003	0.91	0.22	-0.40	.69	0.56	1.47
2005	0.55	0.15	-2.24	.03*	0.33	0.93
BC						
2001	0.76	0.14	-1.46	.15	0.52	1.10
2003	0.62	0.14	-2.05	.04*	0.40	0.98
2005	0.64	0.15	-1.91	.06	0.41	1.01
INCOME $30,000 - $49,999						
ON						
2001	0.91	0.12	-0.72	.47	0.69	1.19
2003	0.83	0.10	-1.51	.13	0.65	1.06
2005	0.68	0.09	-2.99	<.001***	0.53	0.88
AB						
2001	0.81	0.20	-0.88	.38	0.50	1.30
2003	0.75	0.20	-1.07	.29	0.44	1.27
2005	0.52	0.12	-2.72	.01**	0.33	0.84
BC						
2001	0.91	0.15	-0.54	.59	0.66	1.26
2003	0.77	0.16	-1.30	.20	0.51	1.15
2005	0.88	0.19	-0.63	.53	0.58	1.33
EDUCATION - LITTLE SECONDARY						
ON						
2001	0.70	0.09	-2.92	<.001***	0.55	0.89
2003	0.73	0.09	-2.56	.01**	0.57	0.93

2005	0.78	0.11	-1.83	.07	0.60	1.02
AB						
2001	0.75	0.17	-1.26	.21	0.49	1.17
2003	0.76	0.18	-1.17	.24	0.47	1.21
2005	0.88	0.21	-0.52	.60	0.55	1.41
BC						
2001	0.91	0.14	-0.60	.55	0.68	1.23
2003	0.92	0.18	-0.40	.69	0.63	1.36
2005	0.90	0.18	-0.50	.62	0.61	1.35
EDUCATION - OTHER POST SECONDARY						
ON						
2001	1.01	0.20	0.03	.98	0.69	1.48
2003	1.03	0.19	0.14	.89	0.72	1.47
2005	0.68	0.13	-2.00	.05*	0.46	0.99
AB						
2001	0.58	0.18	-1.74	.08	0.32	1.07
2003	1.11	0.34	0.34	.73	0.61	2.01
2005	0.90	0.29	-0.33	.75	0.48	1.69
BC						
2001	1.42	0.26	1.92	.05	0.99	2.04
2003	1.04	0.27	0.17	.87	0.63	1.73
2005	1.34	0.35	1.12	.26	0.80	2.25
EDUCATION – POST SECONDARY GRADUATE						
ON						
2001	1.16	0.13	1.35	.18	0.93	1.44
2003	1.19	0.13	1.68	.09	0.97	1.47
2005	1.39	0.16	2.86	<.001***	1.11	1.74
AB						
2001	0.95	0.21	-0.22	.83	0.62	1.46
2003	0.93	0.19	-0.39	.70	0.63	1.37
2005	1.21	0.26	0.91	.36	0.80	1.84
BC						
2001	1.20	0.16	1.37	.17	0.93	1.54
2003	1.48	0.24	2.42	.02**	1.08	2.02
2005	1.10	0.18	0.58	.56	0.80	1.52
IMMIGRANT 0-9 YRS.						
ON						

2001	0.85	0.24	-0.57	.57	0.48	1.49
2003	1.16	0.37	0.46	.65	0.62	2.15
2005	0.95	0.38	-0.14	.89	0.43	2.08
AB						
2001	0.35	0.22	-1.65	.10	0.10	1.22
2003	1.60	1.12	0.67	.50	0.41	6.28
2005	1.41	0.96	0.50	.62	0.37	5.38
BC						
2001	0.69	0.26	-1.00	.32	0.33	1.44
2003	0.29	0.15	-2.44	.02**	0.10	0.78
2005	0.94	0.48	-0.13	.90	0.34	2.55
IMMIGRANT TO CANADA: 10 OR MORE YEARS						
ON						
2001	1.05	0.11	0.46	.64	0.85	1.30
2003	0.96	0.10	-0.38	.70	0.79	1.17
2005	1.14	0.11	1.30	.19	0.94	1.38
AB						
2001	1.48	0.27	2.15	.03**	1.04	2.12
2003	0.79	0.19	-0.98	.33	0.49	1.27
2005	1.09	0.24	0.38	.71	0.71	1.67
BC						
2001	1.03	0.12	0.28	.78	0.83	1.29
2003	1.35	0.19	2.12	.03*	1.02	1.78
2005	0.82	0.12	-1.30	.19	0.62	1.10
SELF REPORTED UNMET NEED FOR TREATMENT OF AN INJURY						
ON						
2001	2.46	0.63	3.49	<.001***	1.48	4.07
2003	2.15	0.78	2.12	.03**	1.06	4.37
2005	3.59	1.03	4.46	<.001***	2.05	6.29
AB						
2001	3.98	1.61	3.41	<.001***	1.80	8.81
2003	4.08	1.87	3.07	<.001***	1.66	10.02
2005	1.11	0.65	0.18	.86	0.35	3.52
BC						
2001	3.79	1.23	4.11	<.001***	2.01	7.15
2003	2.46	1.00	2.21	.03*	1.11	5.46
2005	4.50	2.11	3.20	<.001***	1.79	11.29

SELF REPORTED UNMENT NEED – OTHER						
ON						
2001	2.32	0.70	2.80	.01**	1.29	4.17
2003	2.80	0.78	3.70	<.001***	1.62	4.83
2005	0.85	0.29	-0.47	.64	0.44	1.66
AB						
2001	3.00	1.29	2.56	.01**	1.29	6.95
2003	1.40	0.82	0.58	.56	0.45	4.40
2005	0.57	0.44	-0.72	.47	0.12	2.62
BC						
2001	1.21	0.50	0.47	.64	0.54	2.70
2003	2.16	0.84	1.98	.05*	1.01	4.62
2005	0.95	0.45	-0.10	.92	0.37	2.42
PHYSICAL ACTIVITY RESTRICTION						
ON						
2001	3.06	0.32	10.76	<.001***	2.50	3.75
2003	3.00	0.27	12.11	<.001***	2.51	3.59
2005	2.64	0.24	10.70	<.001***	2.21	3.15
AB						
2001	2.14	0.36	4.58	<.001***	1.55	2.96
2003	2.72	0.47	5.83	<.001***	1.94	3.81
2005	2.45	0.41	5.39	<.001***	1.77	3.39
BC						
2001	1.78	0.19	5.42	<.001***	1.45	2.20
2003	1.93	0.28	4.51	<.001***	1.45	2.57
2005	1.76	0.23	4.26	<.001***	1.36	2.28
_cons .0677341	.014086		-12.95	<.001***	0.05	0.10

*$p \leq 0.05$ **$p \leq 0.01$ ***$p \leq 0.001$

ON = Ontario AB = Alberta BC = British Columbia

Referent Category:
Sex: Male
Unmet need: physical health needs
Education: high school graduate
Physical Activity Restriction: no
Immigrant Status: non – immigrant
Income: ≥$80,000
Age: 40 – 49 years

Supplementary Table 3: Logistic Regression Results (Selected Output) for Variables Identified to be Significant Between CCHS Cycles, and tested for Significance within CCHS Cycles

Variable	**OR**	**SE**	**t**	***p*- value**	**95% CI**
AGE 80+					
BC					
2005	0.24	0.08	-2.78	0.01**	0.09-0.66
INCOME <$14,999					
ON					
2001	0.72	0.10	-2.02	0.04*	0.52 0.99
2005	0.47	0.12	-2.13	0.03*	0.23 0.94
AB					
2005	0.27	0.62	-2.11	0.04	0.08 0.91
INCOME $15000 – 29,999					
ON					
2005	0.46	0.11	-2.27	0.02*	0.24 0.90
INCOME $30,000-49,999					
AB					
2005	0.33	0.11	-2.00	0.05*	0.11 0.81
EDUCATION – LITTLE SECONDARY					
ON					
2001	0.70	0.08	-2.92	<0.001***	0.55 0.89
IMMIGRANT YEARS 0-9					
BC					
2003	0.24	0.09	-2.17	0.03*	0.07 0.87

$*p \leq 0.05$ $**p \leq 0.01$ $***p \leq 0.001$
ON = Ontario AB = Alberta BC = British Columbia

Referent Category:
Age: 40 – 49 years
Income: > $80,000
Education: High School Graduate
Immigrant Status: non-immigrant

CHAPTER FIVE

MORE THAN TEN YEARS LATER: AN EVALUATION OF THE POLICY DECISION TO DELIST PHYSIOTHERAPY SERVICES IN ONTARIO RELATED TO UNMENT NEED.

Authors:
SARAH WOJKOWSKI, PT, PhD (Candidate)
School of Rehabilitation Science, McMaster University

JULIE RICHARDSON, PT, PhD
School of Rehabilitation Science, McMaster University

STEPHEN BIRCH, D. Phil.
Department of Clinical Epidemiology and Biostatistics, McMaster University

MICHAEL BOYLE, PhD
Department of Psychiatry and Behavioural Neuroscience, McMaster University

Corresponding Author:
Sarah Wojkowski, PT, PhD(Candidate), McMaster University
wojkows@mcmaster.ca
School of Rehabilitation Science, IAHS Rm. 432
McMaster University, 1400 Main St. West,
Hamilton, Ontario, Canada
L8S 1C7
Ph. 905-525-9140 ext. 27814
Fax: 905-524-0069

MANUSCRIPT PREPARED FOR SUBMISSION TO: PHYSIOTHERAPY CANADA

Abstract

Objective: To investigate if the policy decision to partially remove physiotherapy services (PTS) from OHIP ('delisting') resulted in an increase in unmet need for physiotherapy by Ontario residents immediately following and more than ten years after implementation. **Methods:** Semi-structured interviews with six key informants with expert knowledge about partial delisting of PTS in Ontario were completed. Transcripts were coded using directed content analysis and a priori codes of availability, affordability and acceptability. Themes were identified for each research question. **Results:** The majority of informants identified unmet need occurred immediately following partial delisting of PTS in Ontario. The most common reasons identified for unmet need were reductions in availability and affordability of PTS. Additionally, unmet need for PTS was identified to exist in the present day, more than ten years following partial delisting. Affordability and availability continued to be perceived as main reasons why unmet need for PTS persists. **Conclusion:** The policy decision to partially delist PTS resulted in an unintentional consequence of unmet need for specific groups in the Ontario population. This unmet need continues to exist today, despite additional policy changes that have occurred since partial delisting.

INTRODUCTION

The Canadian health care system is comprised of ten provincial, and three territorial health insurance plans that fund medically necessary health care services on the basis of need.[1] In Canada, the responsibility for most health services falls under provincial / territorial jurisdiction, supported by the federal government and directed by the principles of the Canada Health Act (CHA).[2] However, the Federal government retains responsibility for the health care provided to some specific populations which include: first nations, inmates of Federal penitentiaries and members of the armed forces - regardless of province/territory of residence. [2] While each province/territory has the flexibility to create individualized health care services, the CHA establishes minimum criteria and conditions to which all provinces and territories must adhere in order to qualify for federal transfer payments, and facilitate access to health services without financial or other barriers.[3]

The CHA applies to the delivery of physiotherapy services (PTS) in Canada only in relation to necessary in-hospital physiotherapy for patients. [4] Over the last four decades, the delivery and coverage of PTS has changed in response to changes in medical practice and society[3] and fiscal constraints.[5-7,9] These changes have included: transition of services from hospital to community sector where physiotherapy is no longer covered by the CHA;[9] and the decision to remove, in part or whole, physiotherapy from the list of publicly funded health services by some provinces (delisting).[7-9]

Delisting can create inequalities in access to and use of health services.[10] For example, Ontario delisted routine eye examinations for persons 20 - 64 years from the Ontario Health Insurance Plan (OHIP) in 2004. Jin et al[11] compared self-reported utilization rates of eye care providers in two Canadian Community Health Survey (CCHS) cycles: 2000/01 (pre-delisting) and 2007/08 (post delisting). Utilization was significantly reduced (7.2% decrease, $p < 0.05$), among Ontarians 40 – 64 years who did not graduate from high school.[11] Kiran et al (2013) identified an 8.7% decrease (95% CI 6.3-11.1%) in eye examinations between 2004 -2006 for Ontarians 40 – 65 years, with diabetes through a longitudinal analysis of OHIP administrative claims data.[12] This decrease occurred despite a provision to maintain public coverage for this population's eye examination during and post eye exam delisting.[12]

Delisting services from provincial health plans create naturally occurring health policy experiments that present opportunities to explore policy decision consequences by comparing pre- and post delisting periods.[7,13] Understanding the effect of delisting services on the quantity and distribution of care is important. Governments face continued fiscal pressures and must contemplate further reductions in publicly funded health services to meet fiscal demands.[12] Health policy research builds a comprehensive understanding of a policy and its implication(s).[7] Health policy research triangulates available data sources to examine the health care system and health policy processes.[7] The health policy process, otherwise known as a 'policy cycle', generally includes problem identification and issues recognition, policy formulation, policy implementation and policy evaluation.[14]

A reasonable evaluation of the impact of a policy cycle can be completed a decade or more after implementation.[15] A decade allows sufficient time between the emergence of a problem and policy implementation. [15] Longitudinal study of policy decisions may also identify unintended and unexpected consequences.[16] For example, a temporary reduction in service demand may be an immediate impact post delisting, as people adjust to new conditions of access. Specifically, individuals not previously required to pay for the service, may need to adjust expenditure patterns to afford the out of pocket costs associated with seeking care. Cleary et al[17] noted a household's first response to cover costs associated with health service use is to mobilize the available household budget and savings. However, at times this mobilization requires a special effort to generate additional income or reduce household spending on other items.[17] Similarly private, and in particular employer based insurance plans, may respond to policy changes by extending service coverage in response to demands. However, this coverage change may be delayed, as changes often involve contract negotiations with unions/professional bodies that follow a rigid timetable. Finally, individuals themselves might try to reduce use, and only restore it with out of pocket payments if symptoms persist. Thus, longitudinal studies can identify immediate changes post implementation of a policy and determine if they are sustained long term.

The objective of this study is to investigate whether the partial removal of PTS from OHIP ('partial delisting') in Ontario, Canada in 2005, resulted in an increase in unmet need for physiotherapy immediately following, and more than ten years after, implementation. This qualitative study uses stakeholder interviews to focus on the policy evaluation stage.[16] The research questions (RQ) that guided the study examined:

1) What factors contributed to the policy decision to delist physiotherapy services in Ontario in 2005?

2) Did the policy decision to delist PTS create an increase in unmet need for physiotherapy immediately following implementation?

3) Did the policy decision to partially delist physiotherapy create an increase in unmet need more than ten years after implementation?

The consolidated criteria for reporting qualitative research (COREQ)[18] guided the reporting of this project.

METHODS

Research Team: This study is part of a larger research project investigating unmet need for Canadian PTS.[19,20] The principal investigator (SW) and one researcher (JR) are physiotherapists with experience in various clinical settings.

The principal investigator completed all interviews. Previous research completed by the investigators has identified unmet need for physiotherapy in Canada exists. [19,20] As such, the hypothesis was that key informants would identify an increase in unmet need for PTS immediately following and more than 10 years post the implementation of partial delisting.

Study Design: Study approval was obtained from the Hamilton Integrated Research Ethics Board (Project Number 2519). This paper employs directed content analysis[21] to code interview transcripts and focuses on the policy stage of evaluation.[16]

Key Informant Interviews

Selection of Key informants: Key informants with expert knowledge about the policy decision to partially delist PTS from OHIP were purposively sampled after a review of the grey and academic literature, and invited to complete an interview. The sampling frame included physiotherapists, administrators, lobbyists, and academics with provincial, national and international perspectives on PTS delisting. The principal investigator (SW) conducted all interviews. Prior to the interviews, the interviewer had previous professional interactions through the national and provincial physiotherapy associations with four participants; one participant was a previous colleague; and no former interactions with one participant. Specific names and designations of informants are not disclosed to maintain confidentiality. Informed consent was obtained prior to each interview (Hamilton Integrated Research Ethics Board, Project Number 2519)

Data Collection: Telephone interviews were conducted using a semi-structured interview guide developed by two of the investigators (SW and JR) based on their knowledge of the policy decision to delist PTS (Table 1: Interview Guide). Informants were provided with the guide in advance of being interviewed. A semi-structured interview approach has been previously used to explore the impact of partial delisting in Ontario.[7] This approach also contributes significantly to health care knowledge, and developing exploratory hypothesis for future studies.[22] The interviews occurred between April and October 2017 and lasted approximately one hour each. Interviews were audiotaped, and transcribed verbatim. Transcripts were sent to each informant one week after the interview for review to ensure the correct meaning had been captured in the transcript and that there were no omissions.

Data Analysis: Transcripts were anonymized and uploaded into a qualitative software package (NVivo). Directed content analysis was completed using each transcript.[21] The goal of this approach is to validate or extend conceptually a theoretical framework or theory.[21] Initial coding categories, and corresponding definitions, to explain unmet need for PTS related to delisting were established prior to completing the interviews. [21] The codes were based on McIntyre et al's[23] access evaluation framework and consisted of: availability (physical access), affordability (financial access) and acceptability (cultural access). Data that could not be coded with the predetermined codes were identified and analyzed to determine if they represent a new category or sub code. [21] The primary investigator (SW) coded each transcript. Codes were discussed with another member (JR) of the research team familiar with all transcripts. Two other researchers (SB, MB) reviewed the application of the themes to the research questions.

RESULTS

Stakeholder Characteristics: Nine individuals were contacted for an interview between April and September of 2017. Six individuals consented to participate. One individual declined citing lack of time as the reason for not participating; and two individuals did not respond to multiple (n=3) email invitations. Table 2 describes the informants in greater detail. Saturation, or the point in data collection and analysis when new information produces little or no change to the codebook[24] was achieved after five interviews. The sixth interview reinforced themes previously identified. Each research question and associated findings are presented below.

***RQ 1:* What factors contributed to the policy decision to delist physiotherapy services in Ontario in 2005?** Informants consistently identified the following factors contributed to the policy decision to partially delist PTS in Ontario: a) low reimbursement rates, which drove up service volume and increased costs to the Ministry of Health (now Ministry of Health and Long-Term Care; both terms subsequently referred to as “the Ministry”); b) competing demands for funds during the 2004 provincial budget; c) unequal geographic distribution of publicly funded physiotherapy clinics. Informants also noted the public's reaction to the initial announcement of full PTS delisting preserved some public funding through the Ministry's reversal to partial delisting.

Low reimbursement rates increased Ministry costs

Four informants identified a significant factor in the decision to partially delist PTS in ON was the low reimbursement rates. Specifically, physiotherapy providers with OHIP invoice agreements (known as Schedule 5 providers) were reimbursed $12.20 per visit[7] prior to delisting. This level of reimbursement drove up service volume and ultimately Ministry expenditures. One informant stated

> "….unfortunately reimbursement rates did not change very much (over time), and they were extremely low, and for private practitioners who had it (a Schedule 5 license) they had to ….work on volume".

Key informants also identified that some Schedule 5 providers used group classes to maximize patient volumes to compensate for low reimbursement rates. This approach ultimately increased Ministry costs as individual invoices were submitted for each group participant. Informants noted that this approach to care tended to occur in areas where seniors resided (e.g. long term care homes). This increased billing was believed to have heightened the Ministry's 'awareness' of PTS expenditures in Ontario, and the need to control spending in this area.

The increased invoicing by some Schedule 5 providers also coincided with the Ministry's desire to move away from the "fee for service" (FFS) payment model (i.e. a set fee for each visit). The FFS model was perceived to pose budgeting difficulties for the Ministry, and promote perverse incentives for Schedule 5 providers. Fee for service established an environment where providers essentially controlled the amount of service delivered, and there was an inherent financial incentive to deliver more care – regardless of patient outcomes. Under the FFS model the Ministry was unable to predict the number of physiotherapy visits a client required to achieve optimal health outcomes. Informants noted, however, that in the period prior to delisting the Ministry was moving towards bundled payment models. In these models, a set fee would be provided for all services rendered. The bundled payment model was perceived to provide the Ministry with improved capacity to budget and forecast health care spending, as well as minimize perverse incentives.

Informants also noted other health care providers (i.e. chiropractors) received low reimbursement rates from the Ministry prior to partial delisting. Thus, there was concern at the Ministry about increasing the reimbursement fees for all providers to market value due to competing financial demands. As a result, high PTS expenditures due to high billing volumes, and potential costs to address low reimbursement rates, influenced the Ministry's decision to partially delist physiotherapy, and other health services, in the same budget.

Competing demands for fiscal resources

The competition for funds within the 2004 Ontario Provincial Budget was also identified to contribute to PTS partial delisting. Under the direction of the

Minister of Health, the Honourable George Smitherman, the Ministry had to balance competing demands for limited funds. These demands not only included a need for increased compensation for multiple health services, but also funding new initiatives. This notion of competing priorities is reinforced in the 2004 Ontario Budget Speech.[25] In this speech, the Honourable Greg Sorbara, Minister of Finance, announced additional cataract surgeries, new MRI / CT sites; increased cardiac procedures, joint replacements, organ transplants and dialysis treatments; established the Ontario Health Quality Council; and added three new vaccines to the children's immunization program.[25] However, the Minister also noted[25]

> "We will no longer cover chiropractic and physiotherapy services – although seniors will continue to receive physiotherapy through home care and long-term care facilities. These were not easy choices but we believe they were responsible choices…." (p. 11)

The provincial decision to enhance funding for specific initiatives (i.e. cataract surgery, new MRI / CT sites, increased joint replacements and organ transplants) aligned with a national commitment to reduce wait times in priority areas (i.e. cancer, heart, diagnostic imaging, joint replacements sight restoration).[26] The First Ministers' commitment to wait time reductions is outlined in the document "A Ten Year Plan to Strengthen Canada." [26] This initiative included establishing a federal Wait Times Reduction Fund to augment existing provincial investments to reduce wait times nationally in the priority areas by March 2007. [26] Thus, the decision to refocus health care from CBPTS to other services in ON may have been in part been influenced by the priorities of the First Ministers.

Unequal distribution of existing resources and response to public reaction

Two other themes identified related to unmet need and partial delisting were: the unequal geographic distribution of Schedule 5 clinics; and the public's response to the initial announcement of full delisting for community based PTS (CBPTS). Every informant identified that Ontarians experienced access inequities to Schedule 5 clinics in the years preceding partial delisting. This was primarily due to an awareness that Schedule 5 licenses were issued to providers that resided in densely populated communities in the early 1960s - which were predominately in Southern Ontario.[7] However, informants noted changes to where people resided in Ontario (i.e. increased populations in Northern Ontario), and no new Schedule 5 agreements post 1964 resulted in access disparities for publicly funded CBPTS in Ontario in the 2000s. Informants also noted the Ministry was aware of these disparities and the need for a provincial solution that would improve access for all Ontarians.

Five informants also noted that despite originally announcing PTS would be fully delisted, the public's reaction led the Ministry to partially reverse this decision. The decision to partially delist PTS is highlighted in the Legislative Assembly proceedings from 31 March 2005.[27] It was during this Assembly, that the Honourable George Smitherman reinforced the 'physiotherapy plan' to preserve public funding for CBPTS. [27] As part of this plan, criteria for access to publicly funded CBPTS were established. [27] These criteria, preserved publicly funded PTS for the following individuals:[27]

- ≥65 years or ≤19 years; or
- who resided in long term care homes; or
- who required short term access to physiotherapy in their home or through community care access center; or
- of all ages who require physiotherapy after hospitalization; or
- who are recipients of Ontario disability support, Ontario Works and family benefits.

Informants stressed that partial delisting resulted in continued increased Ministry costs due to a perpetuated focus on high service volumes by some Schedule 5 providers. These costs continued to increase until further legislative changes were made (Research Question 3).

***RQ 2*: Did the policy decision to delist PTS create an increase in unmet need for physiotherapy immediately following implementation?**

All informants noted some populations experienced increased unmet need for PTS post partial delisting. However, two informants also noted an inability to accurately measure the immediate impact of the policy decision to partially delist physiotherapy in Ontario. The main themes identified related to an immediate change in unmet need for PTS post partial delisting were: a) minimal changes in unmet need for those who maintained access and; b) greatest increase in unmet need experienced by marginalized populations. Affordability and availability were the most frequent reasons cited for increased unmet needs post partial delisting.

Minimal changes in unmet need

All informants indicated that partial delisting of PTS preserved access for specific groups of individuals in Ontario. Additionally, informants believed individuals who met the new access criteria likely experienced minimal increases in unmet need for PTS post partial delisting. If any increase in unmet need was experienced by those who met the access criteria informants hypothesized it was likely due to a limit on the total number of treatments per year per person enforced by the Ministry post partial delisting. As such, individuals who met access criteria may have experienced increased unmet need if they required service beyond the cap. However, the implementation of access criteria post partial delisting was believed to, in general, preserve access for individuals with the highest need for publicly funded PTS.

Individuals with extended health benefits under private insurance were also believed to experience minimal increases in unmet need post partial delisting. Informants stated some Schedule 5 providers had introduced co-payments and user fees over the decade prior to partial delisting. The implementation of these fees motivated individuals to identify whether they had extended health benefits to reimburse costs associated with seeking care. Thus, at the time of partial delisting, individuals with extended health benefits were believed to have previously removed themselves from the publicly funded system to privately financed care.

Four informants discussed the impact of partial delisting in relation to service quality. They suggested that PTS quality declined at some Schedule 5 clinics prior to partial delisting, because of an emphasis on patient volume. Additionally, informants noted that prior to partial delisting, OHIP funded CBPTS were not structured in a manner to ensure clients received the volume and type of care best suited to their needs. There was also a perceived lack of funding accountability - as providers did not have to report patient outcomes. Some informants also suggested a small portion of clients receiving PTS by Schedule 5 providers prior to partial delisting likely did not require CBPTS. Informants hypothesized that some clients were provided with non-specific physiotherapy interventions to maintain billing volumes, and not because they had physiotherapy specific needs. Thus, some informants noted a portion of individuals who perceived an unmet need immediately following delisting likely did not require physiotherapy at all, and that delisting had the potential to positively influence the service quality of physiotherapy.

Increased unmet need

Individuals 19-64 years, who lacked extended health benefits, were recognized to be the most likely to experience increased unmet need post partial delisting. Informants recognized that these individuals were mostly likely to be in situations of precarious employment (i.e. contract work, multiple part times jobs).

As such, these individuals were believed to lack financial means to cover service costs. Informants also identified other groups of individuals believed to experience immediate increases in unmet need post partial delisting. These included adults, 19-64 years with chronic diseases or functional mobility limitations; and individuals unable to travel to access other publicly funded services (i.e. living in rural areas without other service options).

The inability to measure changes in unmet need

Despite recognition that there were mixed effects due to partial delisting, two informants stressed an inability to accurately measure the impact of this decision. The informants noted that there was no organization during the time of partial delisting representing persons most affected, nor was there focused data collection to demonstrate the impact of this policy decision. Specifically, one informant noted

> "…. there was no organized group of those between 19 to 65 years of age who don't have extended health benefits, no association, so there is no way of gathering that information to really measure what the unmet need would be…."

Thus, the reported increases in unmet need were from subjective reports and small cohort studies – which made making conclusive statements about increased unmet need difficult. If there had been proactive data collection, or an organized voice to represent those most affected, they stated that accurate data could have been collected to evaluate the impact of this decision.

Availability and Affordability in Relation to Unmet Need

Affordability[23] (n=5) and availability[23] (n=4) were the most common reasons identified to explain immediate increases in unmet need for PTS post partial delisting. Despite agreement on the rationale for increased unmet need, the underlying reasons of why these were identified varied. Of those who indicated availability, three respondents noted it was so closely tied with affordability it was hard to differentiate the concepts. They noted that if publicly funded services were not available, the increase in unmet need was due to the cost of seeking PTS elsewhere (i.e. affordability). Two informants noted availability drives access, especially in relation to publicly funded services; while another commented that any change in unmet need was likely due to pure economics. The latter stated that individuals who were used to getting something for free (i.e. PTS), and who then had to pay for it, could have stopped using the service.

RQ 3: Did the policy decision to partially delist physiotherapy create an increase in unmet need more than ten years after implementation?

The following themes were identified in relation to the third research question: a) current unmet need for PTS must be considered in the context of partial delisting and other more recent policy decisions; and b) the current climate of health and health care funding in the province. Affordability[23] and availability[23] were the most frequently identified reasons for why unmet need for PTS has persisted. Informants also noted significant health system changes were required to eliminate future unmet need for PTS.

Additional Policy Changes

Five informants noted additional policy changes in Ontario related to publicly funded, CBPTS had to be considered to understand current unmet need for PTS. Informants commented that until 2013, partial delisting continued to drive up Ministry costs by perpetuating some Schedule 5 providers' focus on high patient volumes due to maintaining the FFS payment model. Informants also noted partial delisting prevented physiotherapy from being funded across all sectors of health care. Specifically, informants believed that the Ministry did not perceive a need to fund physiotherapy in other sectors as Ontarians could access publicly funded PTS at Schedule 5 Clinics.

However, five informants stressed that 2013 was a period of significant policy change in Ontario related to publicly funded CBPTS. Specifically, the 2013 decision to remove all non–hospital, OHIP insured PTS from the Health Insurance Act (HIA),[28] the act that outlines the provisions of the OHIP, was believed to be instrumental to understanding current unmet need. After the 2013 decision, the Ministry implemented a new public funding model for CBPTS through establishing volume-based contracts known as bundled payments (i.e. Episode of Care, EOC). The clinics who were awarded these contracts were subsequently known as Community Rehabilitation Clinics (CRC). Under the bundled payment model, the Ministry agreed to a set fee of $312.00 per EOC, for an undefined number of visits. Specifically, physiotherapists determined the number of visits each client received in accordance with individual needs.[29] However, the access criteria established during partial delisting were maintained for CRCs during this change.

The 2013 decision eliminated the FFS payment model for publicly funded PTS and subsequently the notion of perverse incentives for Schedule 5 providers. The decision was also perceived to provide better budget control for the Ministry and redistribute where publicly funded CBPTS was delivered across the province. This decision also resulted in enhanced funding for physiotherapists in homecare and primary care (i.e. family health teams, community health centers, and nurse practitioner led clinics). However, informants questioned the decision to maintain the access criteria established during partial delisting for the CRCs. Specifically, informants identified this decision as the primary reason why some Ontarians continue to experience increased unmet need for PTS more than ten years post partial delisting. Informants believed persons most likely to experience increased unmet need for PTS post partial delisting continued to be adults 20 – 64 years who lack extended health benefits and who require physiotherapy for acute or chronic pain management. Additionally, persons with other chronic conditions who require physiotherapy to maintain current levels of function were also identified to be at risk for increased unmet need.

Informants also discussed how the preservation of the access criteria has restricted physiotherapists' scope of services related to health promotion, and primary and secondary prevention interventions. Informants noted these interventions, delivered upstream, could ultimately decrease health system costs (i.e. through reduction of inappropriate use of other health services) if delivered at the right time to the right individual or population. One informant noted

> "…no one comes to chronic illness with a clean slate. No one comes to (age) 65 with sudden eligibility for care, without having things in the past. My biggest concern is that we are creating the chronic problems of the future, but not addressing the problems of today."

Unmet need in relation to the current climate of health care

All informants stressed that the ongoing unmet need for PTS by specific groups of individuals has contributed to the current climate of health and health care use in ON. Four informants noted that the failure to offer PTS as a means to address acute or chronic pain has potentially contributed to the escalating opioid crisis in Ontario. Specifically, informants noted

> "….delisting physiotherapy has really added to system costs…but also impaired client outcomes, because we know the long term solutions for people with pain is access to therapy, proper care, and restoration of proper movement, but a lot of the interventions that people are being offered right now for pain and functional limitation are really more about masking symptoms and not really getting to the root of the issue"
>
> "The stories I heard from people is that they had developed pain conditions earlier, and had not been able to access the physiotherapy that they needed – and those conversations continue. So that is nine years later that I am hearing people say that they developed pain five years ago – but the general physician that I was seeing at the time did not refer me to

> physiotherapy because I was not eligible, I was not eligible to get it anywhere….”
>
> “After delisting, physicians were probably more likely to prescribe opioids to manage pain, because they knew that the patient would just not be able to access care through rehab….”
>
> “The government is so focused on treatment….but people can’t overdose if they are not using (opioids)….”

Other informants perceived increased use of other health services because health care providers could not refer specific groups of clients to publicly funded physiotherapy. One informant noted,

> “…we have seen increases in diagnostic medical imaging, in terms of x-rays, and ultrasound, which may potentially not be necessary….but because primary care providers do not have access to refer clients to therapy they need, these are some of the tools that they have at their disposal to be able to care for their patients the best that they can”.

Informants also discussed the demographic shift in Ontario since partial delisting. More Ontarians were recognized as aging with a chronic condition, and persons who were aging have an expectation to remain active. Specifically, informants identified individuals who experienced a stroke, and those with complex chronic conditions and require PTS to maintain function, as being likely to have unmet need for PTS. Individuals discharged to the community after inpatient surgery (i.e. post hip / knee replacement) were also identified as being at risk of unmet need for PTS due to decreased inpatient stays and a faster transition to community services with a lack of publicly funded options.

Affordability and Availability

All informants identified affordability[23] and five identified availability[23] as reasons for persistent unmet need. Again, the concept that availability and affordability were closely connected was raised. Informants specifically questioned whether the two could be separated in the current health care climate. In relation to how affordability and availability contribute to the current unmet need for PTS, the informants noted,

> "If you do not have the resources (to access physiotherapy), then it's going to be a problem of affordability and availability. It's kind of dual – you can't afford private services, but there is no publicly funded services …affordability and availability go hand in hand"
>
> "…both being able to afford at the level of the patient, but the availability of the services that are funded by the system…so you do not build it if it is not funded. So affordability, I think really determines availability…."

One informant also recognized acceptability as an emerging theme, and stressed that in the future the public will drive demand for specific health services.

The reduction or elimination of unmet need for PTS in the future

Informants provided recommendations about how to reduce, or eliminate, unmet need for PTS. These suggestions ranged from changing how funding is provided to enhancing primary care teams (Table 3). One informant was concerned the current system drives Ontarians with musculoskeletal conditions and who require publicly funded care to choose high-risk health care options (i.e. surgeries or opioid prescriptions) instead of providing access to conservative options (i.e. PTS). Many informants also noted Ontarians should be aware of the choices for care that exist. A role for increased consultation of the public, such as through stakeholder consultations, was identified so Ontarians could drive where health care spending occurs. Informants believed that Ontarians, with increased consultation, would choose to enhance funding for conservative (i.e. PTS) compared to surgical options. The majority of informants noted that individuals, funders and service provides must become more informed of the trade-offs made in order to fund some services over others. Additionally, they stressed funding models (e.g. bundled funding) where the money follows the patient across sectors would improve access to PTS for all Ontarians.

DISCUSSION

Key informant interviews explored themes related to factors contributing to the policy decision to partially delist physiotherapy in Ontario in 2005. Additionally, these interviews explored whether partial delisting established an increase in unmet need for PTS immediately following, and more than a decade later. The results of the directed content analysis validate the access dimensions of availability and affordability proposed by McIntyre et al[23] relative to access to PTS in ON. Barriers for use and access to PTS specific to availability and affordability were identified immediately following and ten years after the PTS delisting in ON. This paper also identifies that the dimension of acceptability has not influenced access to and use of PTS in ON to the same extent as availability and affordability. This dimension should be considered an emerging dimension with the potential to influence future access. The themes identified through the transcript analysis as contributing to partial delisting included: low reimbursement rates that drove up service volume and Ministry costs; unequal distribution of Schedule 5 clinics prior to partial delisting; and limited provincial funds. These themes are consistent with the literature.[6-8]

The low reimbursement rate for OHIP funded PTS at the time of partial delisting has been previously identified.[7] Gordon et al[7] provided the context of the history of the OHIP funding for PTS, including the trajectory from the first agreements with the Ministry in the 1960s to the rationale provided in the 2004 Ontario Budget for PTS delisting. The authors reported that despite small increments over time, the billing rate for Schedule 5 clinics prior to partial delisting was $12.20 per visit.[7] This paper establishes low reimbursement rates for Schedule 5 providers as a factor contributing to the decision to delist PTS in Ontario. This link was perceived to be due in part due to focus on patient volumes by some publicly funded clinics (i.e. Schedule 5). Limited provincial funds were recognized as being unable to support, or sustain, fee increases for all service providers who were being reimbursed below market cost by OHIP, while also investing in other health care ‘priorities’. The trade-offs for provincial funding in the 2004 Ontario Budget were highlighted by Stabile & Ward.[8] Specifically, Stabile & Ward[8] noted that PTS delisting was considered to be a trade-off for funding for new children’s immunizations.

Linking limited financial resources and public funding is an important consideration for physiotherapists. As demands on health care resources continue to grow, physiotherapists must provide evidence related to effectiveness of patient outcomes and return on financial investment to support ongoing value for investment at proper market worth. This evidence is required if physiotherapy is to be regarded as a prioritized health service, that makes valuable contributions to the overall health of Ontarians, at lower cost and risk than other services. Additionally, physiotherapists must demonstrate an ability to leverage bundled payment models to maximize delivery of high quality services. Effective, long-term evaluation processes are required for physiotherapy to demonstrate continued improvement of health outcomes for populations.

Interviewees also identified some populations, specifically individuals lacking extended health benefits or with chronic conditions, were most likely to have experienced ongoing unmet need for PTS. Reasons for unmet need were identified to be specifically due to affordability and availability.[23] These themes can also be triangulated with previous literature. Landry et al[6] interviewed individuals who had received physiotherapy prior to delisting (n=113). All participants who required services, but did not receive them post delisting (n=20, 17.7%), noted they lacked private insurance, or were unwilling or unable to pay costs out of pocket (affordability). Interviews were also completed with physiotherapists post delisting. [9] Physiotherapists who worked in homecare and in publicly funded, community based physiotherapy clinics perceived uninsured, or underinsured, clients were less likely to continue with CBPTS once discharged from home care post partial delisting.[9] This perception was due to an inability, or unwillingness, of the individuals to pay for services out of pocket. [9] These providers also perceived clients with chronic conditions, such as arthritis, had longer waiting times for access to publicly funded PTS 12 months post delisting. [9]

The consistency of association of affordability and availability with unmet PTS need is concerning. A growing body of research demonstrates persons living in poverty are at greater risk of deteriorating health status, chronic illness and premature death compared to affluent individuals.[30] Additionally, individuals with low socioeconomic status are more likely to use inpatient services; have increased use of family physician services once contact is made; and have consistently high hospitalization rates[30] – resulting in higher overall costs to the system. Unfortunately, lack of access to CBPTS in Canada is not restricted to Ontario. Availability and affordability were the most common barriers identified for accessing CBPTS in a scoping review on need and unmet need for CBPTS in Canada.[20] This review identified individuals either with chronic conditions or from rural communities across Canada frequently reported unmet. [20] An analysis of the CCHS also identified individuals with a total household income of ≤$49,999 in three Canadian provinces (Ontario, Alberta, British Columbia) were less likely to report a visit to a physiotherapist in the last 12 months compared to individuals with a total household income of >$80,000 (Wojkowski et al, unpublished). Thus, availability and affordability have been established as sources of inequities related to access to and use of CBPTS, and must be addressed. Patients, physiotherapists, and policy makers are challenged to consider if existing access criteria for publicly funded PTS facilitate improved health for all, or if they reinforce access and use inequities for CBPTS that impact the health of marginalized populations.

Recognizing and identifying key factors that inform policy processes are critical to furthering the development/creation of evidence-based policy.[13] However, national, or provincial, data specific to how physiotherapy access or use has been impacted by policy changes in Canada is limited. This paper is the first to explore long-term implications of the policy decision to partially delist physiotherapy services in ON. More research is required to determine how policy changes impact overall access and use of PTS in each province. This research should include a demonstration of how lack of public funding for PTS has created a public health burden, and convey how peoples' lives are affected as a result of this lack of funding.[13] Physiotherapists must also demonstrate why physiotherapy funding should be prioritized over other issues, and estimate the costs to the system failing to fund these services.[13] Recent provincial legislation, such as the Patients First Act in Ontario, focuses on creating more patient centered health systems. [31] This legislation also adds promotion of health equity and development and implementation of health promotion strategies to the Local Health Integrated Networks' mandate.[31] Thus, the time is right for advocacy.

The current context of unmet need for PTS must be considered using a lens of layered policy decisions. Specifically, the 2013 HIA[28] changes were identified to substantially influence current unmet need. These changes included provisions to both minimize unmet need for PTS. Informants noted that persistent lack of access to publicly funded PTS has likely contributed to the current opioid crisis in Ontario. However, this concern was identified in the literature as early as 12 months post partial delisting.[9] Physiotherapists purported that partial delisting would limit access to PTS and increase the use of pharmacological interventions as pain management strategies. [9] Presently, the opioid problem in Ontario is growing and affects people of all ages.[32] There is also a lack of Canadian data that compares use of physiotherapy over opioids for management of chronic pain. However, recent guidelines, (e.g. 2017 Canadian Guidelines for Opioids for Non Cancer Pain), include physiotherapy in pain management strategies. [33, 34] Thus, policy makers and physiotherapists are challenged to consider how access to PTS may address the needs of individuals with acute and chronic pain, and positively affect public health burdens.

Increased unmet need for PTS was experienced immediately following, and continues to exist more than ten years after partial delisting. Unfortunately, this study identifies increased unmet need in populations who may be the most likely to require PTS to improve their health and well-being. Future research, including prospective comparisons of overall health system use of those who have access to PTS and those who do not, is required to gain more insight into the current status of unmet need for PTS.

POLICY IMPLICATIONS

From a policy perspective, a successful transition following partial delisting of PTS would have seen clients accessing PTS through other funding sources or provider types.[7] However, this research identifies that partial delisting, resulted in increased unmet need for physiotherapy immediately following, and more than ten years after the implementation for specific groups of Ontarians. In addition, questions exist related to partial delisting and associations with increased aggregate costs to the health care system. While subsequent policy initiatives such as transformations in primary care have been introduced to address unmet need for PTS, work is still required to address the availability and affordability of publicly funded physiotherapy in Ontario. Future policies related to PTS public funding need to consider current demands and resources for health care, as well as how past decisions may have created unintended unmet need and self-reported ill health.

LIMITATIONS

This study has limitations. Six key informants with expert knowledge about partial delisting of PTS in Ontario were interviewed. While the themes for each research question were consistent between interviewees, the themes represent the perspective of a small number of experts. Romney et al[35] noted experts tend to agree more with each other in their particular domain of expertise. Additionally, small sample sizes provide complete and accurate information, as long as the participants have a certain domain of expertise about the domain of inquiry.[35] Sample sizes as small as four individuals have been identified to render extremely accurate information with a high confidence when the individuals have a high degree of competence for the domain of inquiry.[35] Guest et al[36] also noted that for studies with a highly homogenous population, six interviews may be sufficient to enable the development of meaningful themes and useful interpretations. The six informants who completed interviews for this study had in depth knowledge related partial PTS delisting. Thus, the high level of agreement within this small sample size is consistent with the literature. However, the themes presented should be interpreted as the perspective of a small group of experts but cannot establish causal associations for unmet need for PTS in Ontario.

Limitations related to neutrality have also been raised for directed content analysis.[21] Specifically, an overemphasis on existing theory has been perceived to limit researchers from understanding the contextual aspects of phenomenon identified through interviews. [21] However, establishing clear code definitions and having an individual review and examine the definitions prior to coding can increase the accuracy of the predetermined categories. [21] To address these concerns, the a priori codes were defined, and discussions with other team members were used to minimize the individual influence. Additionally, the length of time elapsed between the implementation of partial delisting and the interviews may have resulted in recall bias for two research questions. This concern was minimized with triangulation of previous research related to the consequences of delisting PTS in Ontario.[6,7,9]

CONCLUSIONS

Across Canada, the physiotherapy profession has responded to health system and population need changes, through evolved scope of practice, increased entry to practice requirements, and diversification of where services are delivered.[37] Despite this evolution, some Ontarians still experience unmet need for PTS. This paper examined themes related to factors contributing to the policy decision to partially delist PTS in Ontario in 2005; and whether PTS partial delisting created increased unmet need immediately following and more than ten years after implementation. Individuals without the ability to pay for services, and those with chronic conditions, were identified as being at risk of unmet need for PTS for over a decade. Availability[23] and affordability[23] were identified as the main reasons for this lack of access. Physiotherapists can no longer ignore access disparities that create unmet service need and subsequent public health burdens. Timely and relevant data collection and advocacy efforts are urgently required to address longstanding unmet need for PTS through policy and system changes.

Key Messages

What is Already Known?

- Community based physiotherapy was partially delisted in Ontario in 2005
- A cohort study done identified participants who required physiotherapy, and who received it post partial delisting were ten times more likely to

report good health compared to persons who required but did not receive services (OR 10.72, 95% CI 2.20 – 52.25)[6]

- Immediately following partial delisting, physiotherapists from a range of settings generally agreed delisting restricted access and ultimately impacted the health status among persons no longer eligible for PTS.[7]

What does this Study Add?

- This study expands the current literature on the evaluation of the policy decision to partially delist PTS through an exploration of perceived long-term implications
- The change from full to partial delisting in 2005 minimized changes in unmet need post delisting for some populations.
- Marginalized populations who do not meet access criteria for publicly funded, CBPTS remain most at risk for unmet need
- Further research is warranted to fully understand the present status of unmet need for physiotherapy in Ontario, and how this unmet need may be contributing to other public health crises

Table 1: Semi – Structured Interview Guide

Please describe what position you held leading up to, during and immediately after the policy implementation to partially delist physiotherapy services in Ontario? What position do you hold now, more than ten years after the policy to partially delist physiotherapy services in Ontario was implemented?

What is your understanding of how the process of delisting of physiotherapy services transpired?

Do you believe your opinion of how de-listing transpired is the generally held view in Ontario?

Immediately following the implementation of the policy, in your opinion, did Ontario residents experience a change in unmet need for physiotherapy services? Why or why not was a change in unmet need experienced?

In your opinion did the implementation of partial delisting for physiotherapy services in Ontario impact some individuals more than others? If yes, please explain your answer.

McIntyre et al[23] propose a framework that describes access to care as an influence on an individual's health care seeking behaviours in various settings. The three determinants of access in this framework are:

- Availability (are services available when the individual can use them),
- Affordability (full financial costs of using services including transportation, child care etc.)
- Acceptability of care (the individual's perception of how the service is delivered).

In your expert opinion, which determinant(s) proposed by McIntyre et al[23] were affected most immediately following the implementation of delisting in Ontario? Why did you select this determinant?

The decision to partially delist physiotherapy services was implemented more than 10 years ago in Ontario. How has the need for physiotherapy changed or evolved since the implementation of delisting? What has been the trend for unmet need?

Table 2: Key Informant Characteristics

Characteristic	Number of Key Informants
Sex	
Female	4
Male	2
Residence at Time of Interview	
Ontario	3
Canada	1
International	1
Designation at Time of Interview*	
Physiotherapist	5
Administrator	4
Academic	3
Clinician	1
Lobbyist	1

*Note sum >6 as many key informants held multiple designations

Table 3: Recommended Changes by Key Informants to Eliminate Unmet Need for Physiotherapy in Ontario

Key informants recommended the following ideas as possible ways to address unmet need for physiotherapy:

- Changing the funding structures for all health care services, such as to an environment where bundled funding follows the patient from acute care to long term follow up, regardless of where the services are provided;

- Transition to a model where institutions and organizations who receive funding (i.e. hospitals / LHINs) become responsible for patient outcomes. This would include the institution / organization being fully responsible for the costs associated with failing to deliver a service such as physiotherapy.

- Increased flexibility in primary care models in order to encourage teams to evolve to incorporate other professionals and provide diverse care delivery models (i.e. group appointments) to maintain and sustain the health and good outcomes of enrolled patient populations;

- Increase public awareness and role in decision making related to how health care dollars are being spent in Ontario.

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CHAPTER SIX

DISCUSSION

6.1 THESIS OVERVIEW

The objective of this thesis is to determine whether inequities exist and what are the potential source(s) of the inequities, in relation to community based physiotherapy services (CBPTS) in Canada. The four manuscripts completed to address this objective investigate: (1) how access to and use of CBPTS are associated with unmet need; (2) variables associated with unmet physical health needs and (3) likelihood of reporting a visit to a physiotherapist (PT visit); and (4) how changes in public funding for CBPTS in Ontario contributed to increases in unmet need in that province. Access to physiotherapy is explored throughout this thesis through “perceived unmet health care needs”, or the difference between the care felt to be necessary and the services actually received (Socias et al, 2016). The dimensions of health care access proposed by McIntyre et al (2009): availability (physical access), affordability (financial access) and acceptability (cultural access) are integrated across manuscripts to provide a structure for data organization and synthesis of findings. McIntyre et al (2009) noted that although each dimension is distinct, the interaction between the dimensions determines access to care. The consistent use of the McIntyre et al (2009) framework also permits the identification of common themes between the results of each manuscript. A summary of findings from each chapter, the contributions this body of work has made to the literature, limitations and future directions are discussed throughout this chapter.

6.2 SUMMARY OF FINDINGS

A summary of the findings from each manuscript is described below.

6.2.1 Summary of Chapter Two: A Scoping Review of Need and Unmet Need for Community Based Physiotherapy Services in Canada

Chapter two presents the scoping review results that investigated need and unmet need for CBPTS in Canada. Both Bradshaw's (1972) taxonomy and McIntyre et al's (2009) "access" framework guided data extraction from the twenty-four selected studies. Half of the articles described unmet need for CBPTS in Ontario. Comparative need, or comparison of populations or geographies related to accessing CBPTS, was the most frequently described theme from Bradshaw's (1972) taxonomy identified in the included studies. Individuals with chronic conditions compared to persons without chronic conditions were disadvantaged in their access to CBPTS. Availability, or physical access to CBPTS, was the most common domain from the McIntyre et al (2009) framework identified in the literature. Individuals from rural communities compared to individuals in urban communities were most disadvantaged due to concerns of availability.

6.2.2 Summary of Chapter Three: Unmet Needs Reported by Adults with Chronic Conditions – An Analysis of Data from The Canadian Community Health Survey

Chapter three investigates self-reported unmet need by adults with specific chronic conditions in three Canadian Community Health Survey (CCHS) cycles

(2001, 2003, 2005) for treatment of a physical health problem (physical unmet need). McIntyre et al.'s (2009) framework provided a structure for the data analysis and reporting of results. The results indicated a larger proportion of respondents with specific chronic conditions reported physical unmet need, compared to any other unmet needs (i.e. injury, emotional health, regular check up). A higher proportion of AB and BC residents reported a physical unmet need compared to ON residents in 2005. Significant differences related to affordability (McIntyre et al, 2009) were identified in AB and BC in 2005 and 2003 respectively compared to 2001. This manuscript also identified variables associated with physical unmet need that could be attributed to each of affordability, availability or acceptability. In general, adults > 50 years were significantly less likely than adults 40 – 45 years (reference group), and women are less likely than men (reference group) to report a physical unmet need due to each domain.

6.2.3 Summary of Chapter Four: Use of Physiotherapy Services by Adults with Specific Chronic Conditions- An Analysis of the Canadian Community Health Survey

The third manuscript presents an analysis of three different CCHS cycles (2001, 2003, 2005) to determine how self-reported PTS use, based on socio-demographic characteristics and two health-related variables, in three Canadian provinces (ON, AB, BC), varied across the three cycles. Women, and individuals who were post-secondary graduates; or reported a physical activity restriction; or reported an unmet need for care of an injury or other concerns were all significantly more likely to report a PT visit than men, and individuals who were high school graduates, did not report an activity limitation, and reported an unmet physical health need respectively. Additionally, individuals who reported a total household income (THI) ≤ $80,000 and who completed little secondary education were less likely to report a visit to a PT in the last 12 months compared to those with a THI ≥ $80,000 and who were high school graduates respectively.

6.2.4 Summary of Chapter Five: More than Ten Years Later: An Evaluation of the Decision to Partially Delist Physiotherapy Services in Canada Related to Unmet Need

The final manuscript investigates whether the decision to partially delist physiotherapy services in ON in 2005, increased unmet need for CBPTS in this province. McIntyre et al.'s (2009) framework was used to explore reasons for perceived differences in unmet need prior to and post partial delisting of CBPTS. Qualitative analysis of interview transcripts with key informants, identified the themes of affordability and availability in relation to why individuals in ON experienced an increase in unmet need for CBPTS post partial delisting. Unmet need for CBPTS in ON was identified as long standing, and informants hypothesized that the duration of the unmet need has contributed to the current health status of Ontario residents.

6.3 CONTRIBUTION TO THE LITERATURE

The four manuscripts included in this thesis, together make important contributions to existing knowledge related to understanding access to and use of physiotherapy in Canada. To the knowledge of the author, this is the first time multiple Canadian Community Health Survey (CCHS) cycles have been specifically used to explore access to and use of physiotherapy services in three Canadian provinces through proxy derived variables (i.e. self-reported unmet need for access; likelihood of reporting a PT visit for use). Additionally, this work represents the first time that long-term implications of the policy decision to partially delist physiotherapy in ON have been explored. This thesis also identifies future areas of research required to investigate causes of underutilization of rehabilitation in high-income countries (WHO, 2017b).

Perhaps one of the most substantial contributions of this thesis is the identification that sex differences exist for Canadians with specific chronic conditions in relation to access and use of physiotherapy services. Another substantial contribution to the literature is the identification of affordability and availability as barriers for individuals with chronic conditions in terms of access to and use of physiotherapy in Canada. An additional contribution to the literature from this thesis is the generation of provincial timelines for ON, AB, and BC (Figures 1-3) that reflect provincial policy decisions relevant to community based physiotherapy services (CBPTS). These timelines address a gap in the literature by consolidating historical policy decisions for each province into one document. They also elucidate how current delivery models, funding, and unmet need for CBPTS have emerged over time. Below, each contribution is discussed in detail.

6.3.1 Sex Differences in Access to and Use of Physiotherapy Services

The quantitative analyses (Chapters 3 and 4) completed as part of this thesis consistently identified a sex-based difference in relation to reporting an unmet physical health need (unmet physical need) and the likelihood of reporting a physiotherapy visit (PT visit). Specifically, women were identified to be both more likely to report an unmet physical need, as well as to report a PT visit in the past 12 months compared to men. Thus, this thesis identifies that women are both more likely to report access barriers (i.e. using self-reported unmet need as a proxy for access) to and use of physiotherapy services compared to men (i.e. using likelihood to report a PT visit as a proxy for use).

Sex based differences in unmet need have been previously identified in the literature related to perceived health care needs and access to health services. Socias et al (2016) analyzed perceived unmet health care needs and access to health care services using the 2011/ 2012 CCHS. The purpose of the authors' research was to provide a population-based-estimate of the prevalence of perceived unmet health care needs for BC residents (Socias et al, 2016). The overall weighted prevalence of perceived unmet health care needs for adults > 18 years in BC was 12% (95% CI 10.9 – 13.0), with higher rates among women compared to men (13.7% vs. 10.1%, $p <0.001$) (Socias et al, 2016). Logistic regression analysis identified that sex remained associated with an increased odds of perceived unmet needs after adjusting for other predictors (i.e. income, self perceived health) (AOR 1.37, 95% CI 1.11 – 1.68) (Socias et al, 2016).

Differences in rates of men and women identifying perceived unmet health needs and reporting health care utilization may be due to gender differences. For example, Spitzer et al (2005) noted that "help seeking behaviours" are considered by many men as incompatible with masculinity. Nabalama & Millar (2007) have also noted women may have greater awareness about their health condition and need for care. However, sex based differences in use and unmet need may also stem from system issues. Previous studies have highlighted sex disparities in the delivery specialized health care services (Socias et al, 2016). For example, women are less frequently offered invasive procedures for joint replacements (Borkhoff, Hawker & Wright 2011) and cardiovascular disease (Chang et al, 2007). However, sex based, unmet needs for physiotherapy services by adults with chronic conditions have not been well studied. Lonergan et al (2015) explored unmet needs of Irish patients with multiple sclerosis (MS) in the community. The authors identified unmet need for physiotherapy differed by the type of MS reported by participants (Lonergan et al, 2015). Although this thesis identifies sex based differences and unmet needs for physiotherapy, additional research is required. Specifically, future research should investigate how other variables (i.e. income, health status, personal preferences) mediate (i.e. explain the relationship between sex and unmet need) sex-based differences in unmet need.

The simultaneous reporting of unmet need as well as increased likelihood of use of health care is also consistent with existing literature. Allin et al (2010) found a significant association between types of self-reported unmet needs and health service use adjusting for measurable health and socioeconomic characteristics. Specifically, an analysis of the 2003 CCHS identified differences between “actual use” and “need predicted use” (based on health and socioeconomic characteristics) was larger for an individual with unmet need due to waiting times than for an individual without an unmet need (Allin et al, 2010). However, no clear pattern was identified for other types of self-reported unmet need and health care utilization (Allin et al, 2010).

It is unclear why sex differences in the use of physiotherapy services (i.e. women were more likely to report a PT visit), were identified in two manuscripts completed for this thesis. From the analyses completed in Chapter three and Chapter four it was not possible to determine if the differences identified in relation to women being more likely to report a PT visit should be considered “unfair” or inequitable. Additionally, previous research has indicated that women may be *less likely* to use health services. Women may be more likely to hold precarious employment, which restricts the ability to pay for associated costs and /or take time away (Bryant et al, 2009). In addition, women are primary care givers to family members and consequently have less time to seek care for themselves (Bryant et al, 2009). More research is required to determine whether sex differences in reporting a PT visit reflect personal characteristics, such as individual preferences and beliefs, or unfair systemic differences that disadvantage men in terms of receiving physiotherapy services (Allin et al, 2008).

6.3.2 Availability and Affordability as Potential Sources of Inequities Related to Physiotherapy Access and Use

The findings from Chapters one (scoping review), two (descriptive analysis) and five (policy analysis) highlight two potential sources of inequities related to access and use of CBPTS in Canada: availability and affordability. The findings that availability and affordability are potential sources of inequities related to access to and use of physiotherapy have been reported by other studies (i.e. Paul et al, 2008; Cott et al, 2011). However, the results of this thesis provide an update to the literature by identifying availability and affordability as longitudinal barriers to accessing and using CBPTS. This thesis indicates that these barriers have persisted despite changes, such as in provincial funding, in the delivery of publicly funded CBPTS in multiple provinces.

i) Availability

Lack of available CBPTS is specifically identified in Chapter two for individuals who live in rural/ remote communities. Additionally, Chapter five identified that individuals without financial means to pay for private physiotherapy services were more likely to experience barriers to receive CBPTS due to lack of an affordable service option. However, availability as a source of inequity may vary over time. For example, Chapter three identified that the likelihood of reporting an unmet physical need due to availability was significantly *less* in 2003 and 2005 compared to 2001 (2003: OR 0.82, 95% CI 0.73-0.92%, $p<0.001$; 2005: OR 0.86, 95% CI 0.76-0.97, $p=0.01$).

Availability as a potential source of inequity related to physiotherapy services has been reported elsewhere (Paul et al, 2008, Cott et al, 2011). Twelve months after the implementation of partial physiotherapy delisting in ON, Paul et al (2008) analyzed the consequences of this policy decision. Physiotherapists working in homecare identified they were more likely to retain vulnerable individuals on their active caseload post partial delisting compared to prior to partial delisting (Paul et al, 2008). The therapists' reason for this extension was that they were less confident these clients would access CBPTS post discharge from homecare due to associated costs (Paul, 2008). These physiotherapists also noted that by maintaining specific clients for longer periods of time, wait list times for homecare physiotherapy increased - especially for clients with chronic conditions, and overall availability decreased (Paul et al, 2008). The lack of availability of physiotherapy services in ON was also highlighted through a mapping exercise completed by Cott et al (2011). Prior to physiotherapists being integrated into family health teams (FHTs) in 2013, Cott et al (2011) mapped the locations of 129 FHTs and existing physiotherapy clinics by Local Health Integrated Networks (LHIN). This exercise identified only 28% of FHTs were close to publicly funded physiotherapy clinics; and approximately 20% of FHTs, mostly in rural communities, were not close to any physiotherapy clinics (publicly or privately funded) (Cott et al, 2011). Access to physiotherapy has been a long-standing issue in ON, and the erosion of publicly funded options (i.e. partial delisting) has been found to further restrict access (Cott et al, 2011).

Identifying the specific reasons (i.e. transportation needs, hours of service delivery) associated with availability as a reason for inequalities in access for CBPTS was beyond the scope of this thesis. Additional research is required at the individual level, to understand where system opportunities may exist and to develop targeted interventions through studying personal preferences and reasons for availability barriers. In addition, research that investigates the benefit of distributing physiotherapy resources according to need across the province should be conducted to better understand how this may improve availability for those with greater need.

ii) Affordability

Affordability was identified in Chapter three, Chapter four and Chapter five as a potential source of inequity related to access and use of physiotherapy. Affordability has also been previously identified in the literature as a reason for under-utilization of rehabilitation services, including physiotherapy. For example, a follow-up study with a small cohort of individuals (n=64) 12 months post partial delisting of physiotherapy services in ON identified that 12.5% of the individuals expressed they required, but could not access physiotherapy due to associated costs (Paul et al, 2008). While the identification of affordability as a barrier to access and use of physiotherapy is not new, unique contributions of the work from this thesis is the illustrations that affordability can be considered a barrier in multiple provinces. To illustrate this link, a visual representation of the cumulative findings from this thesis was generated (Figure 4). This figure includes the timing of delisting of PTS in each province (ON, AB, BC), and integrates the manuscript results from this thesis. By reviewing this figure, the impact of policy decisions on perceived affordability is illustrated. For example, the results from Chapter three identified an increased number of CCHS respondents from BC, which delisted CBPTS in 2002, and reported affordability as a reason for unmet physical health needs in 2005 compared to in 2001. Additionally, in ON in 2005, when ON enacted the partial delisting of CBPTS, total household income (THI) was associated with being less likely to report a PT visit increased compared to previous years (2003, 2001). For example, in 2005, individuals from ON with a THI <$49,999 were less likely to report a PT visit compared to individuals with a THI > $80,000. However, in 2003 individuals with a THI <$14,999 were less likely to report a PT visit compared to individuals with a THI > $80,000. Additionally, individuals from BC with a THI between $15,000-$29,999 were less likely to report a PT visit compared to individuals with a THI > $80,000. Thus, in both ON and BC the concern about affordability of physiotherapy was significant in the cycle(s) post delisting. However, it was beyond the scope of this thesis to determine if the associations between policy decisions and the quantitative analysis were causal in nature. In addition, it is unclear if affordability concerns plateau over time (i.e. as individuals adjust to paying for a service). Future research should include the use longitudinal data to explore if causal relationships exist in the associations identified, as well as determine if unmet need persists over extended periods of time.

6.3.3 Provincial Timelines of Policy Decisions Related to CBPTS

The generation of the provincial timelines (Figures 1 – 3) related to policy decisions that impacted CBPTS were an additional contribution from this thesis. The need for the timelines was identified over the course of this thesis and through the realization a consolidated document that captures historical decisions related to CBPTS did not exist. These timelines, while not specific to any one manuscript, help to elucidate how current funding and delivery models have been established within each province. They also provide the context for interpreting secondary data analysis findings (i.e. so changes may be considered in light of decisions that occurred close to the same time). These timelines can be used to inform future research in relation to when specific policy decisions were made and how these decisions may have to be considered in the context of the research question being studied. As the main focus of this thesis was analysis of data for three Canadian provinces, the timelines were generated for the provinces of interest only. Future opportunities exist to establish similar timelines for each of the provinces, as well as expand the timelines to include decisions relative to other sectors (i.e. hospitals) where physiotherapy is delivered.

6.4 LIMITATIONS

Each manuscript acknowledges specific limitations relative to each of the studies. However, there are some general limitations to this thesis that should be acknowledged. The CCHS data used for the secondary data analyses are cross sectional and not specifically collected for the purpose of studying access to and use of physiotherapy services. As such, proxy derived variables (i.e. self-reported unmet need for access; likelihood of reporting a PT visit for use) were used to analyze existing data to form observations about the concepts of access to and use of physiotherapy. In addition, causal relationships could not be established due to the cross- sectional nature of the data. Finally, changes to the survey structure and variables collected within the CCHS did not permit the analyses of more than three cycles. As such, the quantitative analyses (Chapter three and four) provide an analysis of access and use of physiotherapy at three specific points in time for three Canadian provinces by adults with specific chronic conditions, and may not reflect current access and use of physiotherapy by Canadians.

However, the concepts of affordability or availability as sources of inequities related to access and use of physiotherapy was identified across all of manuscripts completed for this thesis. As the scoping review and policy analysis integrate more recent evidence, they strengthen the notion that findings from the secondary data analysis related to affordability and availability remain reflective of current barriers to access and use of physiotherapy by Canadians. In addition, a national or provincial survey that specifically collects information on the use of and access to physiotherapy services in Canada currently does not exist. As such, national surveys like the CCHS provide the only opportunities for population level analyses related to physiotherapy services.

Another limitation is that the policy analysis (Chapter 5) was only completed for ON. As a result, it is not possible to compare whether the same trends related to the long-term consequences of the policy decision to delist physiotherapy services exist in each of the three provinces of interest. Exploring the long-term implications related to delisting for AB and BC may enhance the concern identified in Chapter 5 that past policy decisions related to physiotherapy services in have contributed to the current health status Canadians.

6.5 FUTURE RESEARCH

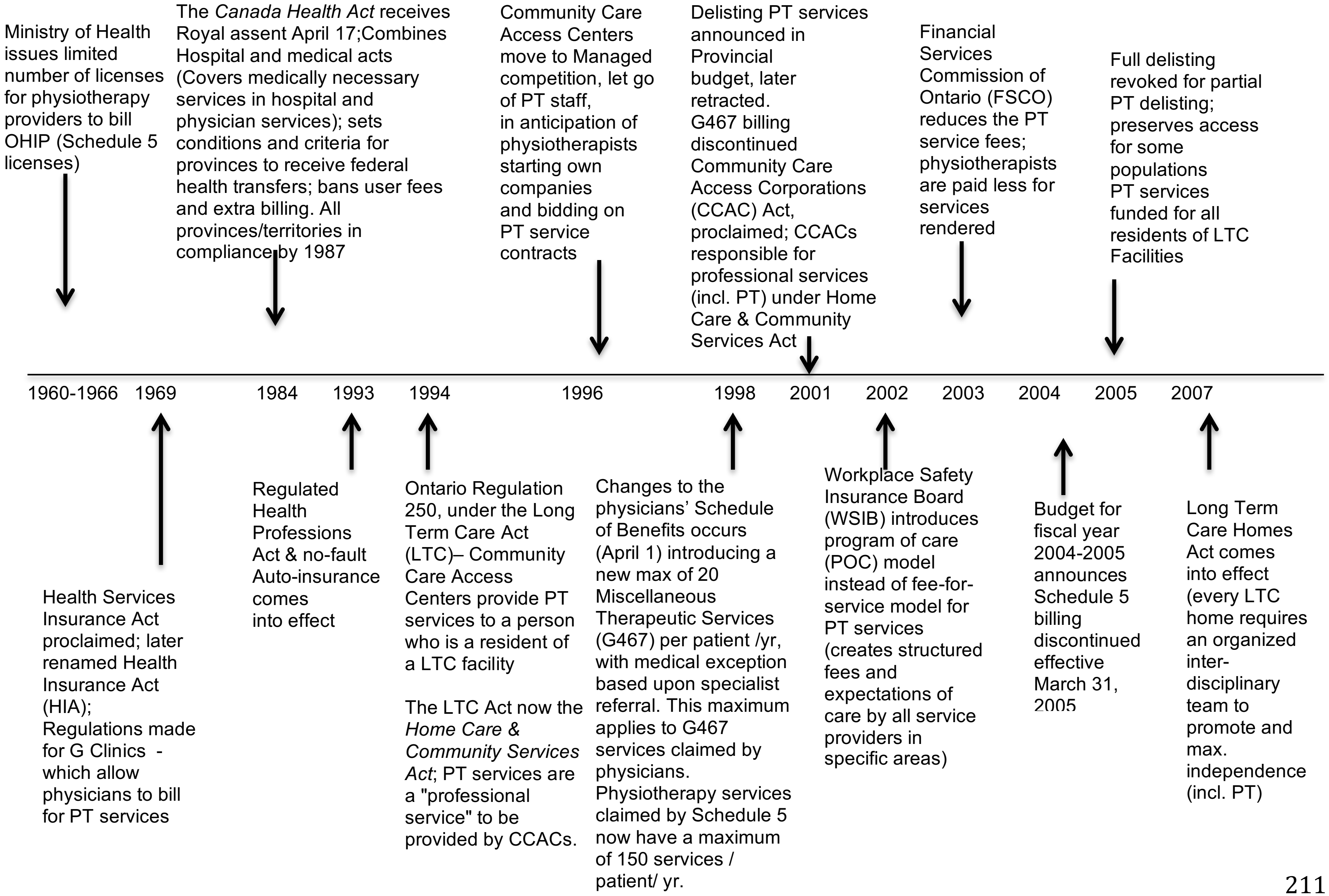
The ageing population, with an accompanying rise in multi-morbidity, is expected to result in a higher absolute number of older adults who experience disability over the coming decade (WHO, 2017). These changes will increase the global need for rehabilitation, including physiotherapy, to optimize function (WHO, 2017). To address this need, the Sixty–sixth World Health Assembly endorsed a coordinated action plan to strengthen and extend rehabilitation (WHO, 2017). This action plan identified a need for research to investigate causes for underutilization of rehabilitation services in high-income countries (WHO, 2017). This thesis has provided a foundation on which future research can be established to enhance the understanding of systemic and personal factors (i.e. referral patterns, personal preferences) associated with access to and use of physiotherapy services. Specifically, this thesis has identified the need for future research to address: sex based differences in unmet need for and the use of physiotherapy services; how specific personal and systemic factors (i.e.

precarious employment, primary care giver status) are associated with concerns of affordability and availability of physiotherapy services; and if historical policy decisions related to physiotherapy services have contributed to the current health crises (i.e. opioid crisis).

6.6 CONCLUSION

This thesis identified that differences exist in relation to access and use of physiotherapy services by Canadians with specific chronic conditions. Specifically, women are more likely than men to report an unmet need for the treatment of a physical health condition and to report a visit to a physiotherapist in the last 12 months. In addition, affordability and availability are potential sources of inequities related to physiotherapy services specifically for individuals who reside in rural communities, those with chronic conditions, and who lack the resource to pay for services. These inequities have the potential to increase health care costs and contribute to decreased quality of life for Canadians. Physiotherapists, provincial and national physiotherapy organizations, patients, and policy makers must consciously take efforts to address these inequities to ensure all Canadians, and particularly persons with chronic conditions and older persons, have the same opportunity for an optimal quality of life that is minimally impacted by changing levels of function.

Figure 1: Policy Timeline in Relation to Community Based Physiotherapy (PT) in Ontario



Ministry of Health issues limited number of licenses for physiotherapy providers to bill OHIP (Schedule 5 licenses)

The *Canada Health Act* receives Royal assent April 17;Combines Hospital and medical acts (Covers medically necessary services in hospital and physician services); sets conditions and criteria for provinces to receive federal health transfers; bans user fees and extra billing. All provinces/territories in compliance by 1987

Community Care Access Centers move to Managed competition, let go of PT staff, in anticipation of physiotherapists starting own companies and bidding on PT service contracts

Delisting PT services announced in Provincial budget, later retracted. G467 billing discontinued Community Care Access Corporations (CCAC) Act, proclaimed; CCACs responsible for professional services (incl. PT) under Home Care & Community Services Act

Financial Services Commission of Ontario (FSCO) reduces the PT service fees; physiotherapists are paid less for services rendered

Full delisting revoked for partial PT delisting; preserves access for some populations PT services funded for all residents of LTC Facilities

1960-1966 1969 1984 1993 1994 1996 1998 2001 2002 2003 2004 2005 2007

Health Services Insurance Act proclaimed; later renamed Health Insurance Act (HIA); Regulations made for G Clinics - which allow physicians to bill for PT services

Regulated Health Professions Act & no-fault Auto-insurance comes into effect

Ontario Regulation 250, under the Long Term Care Act (LTC)– Community Care Access Centers provide PT services to a person who is a resident of a LTC facility

The LTC Act now the *Home Care & Community Services Act*; PT services are a "professional service" to be provided by CCACs.

Changes to the physicians' Schedule of Benefits occurs (April 1) introducing a new max of 20 Miscellaneous Therapeutic Services (G467) per patient /yr, with medical exception based upon specialist referral. This maximum applies to G467 services claimed by physicians. Physiotherapy services claimed by Schedule 5 now have a maximum of 150 services / patient/ yr.

Workplace Safety Insurance Board (WSIB) introduces program of care (POC) model instead of fee-for-service model for PT services (creates structured fees and expectations of care by all service providers in specific areas)

Budget for fiscal year 2004-2005 announces Schedule 5 billing discontinued effective March 31, 2005

Long Term Care Homes Act comes into effect (every LTC home requires an organized inter-disciplinary team to promote and max. independence (incl. PT)

Bill 179 receives royal ascent; Changes scope of practice for physiotherapists to include: diagnosis and new authorized acts for communicating a diagnosis, administrating a substance by inhalation, assessment and treatment of incontinence and pelvic pain, procedures below the dermis for wound care, ordering forms of energy (MRI and diagnostic US) within the Physiotherapy Act and changes to the Healing Arts Radiation Protection Act and the Laboratory Specimens Collections Act for ordering x-rays and certain lab tests

Redistribution and expansion of publicly funded PT clinics begins based on the 2013 policy decision; FHTs and NP Clinics waiting for approval for PT applications submitted based on 2013 policy decision; Some additional PT positions in CHCs for community lung health positions
LTC PT Funding – Local Health Integrated Networks (LHIN) provide each LTC home with $750 per bed per year for PT services; must be delivered by a registered physiotherapist

2009 2010 2011 2013 2014

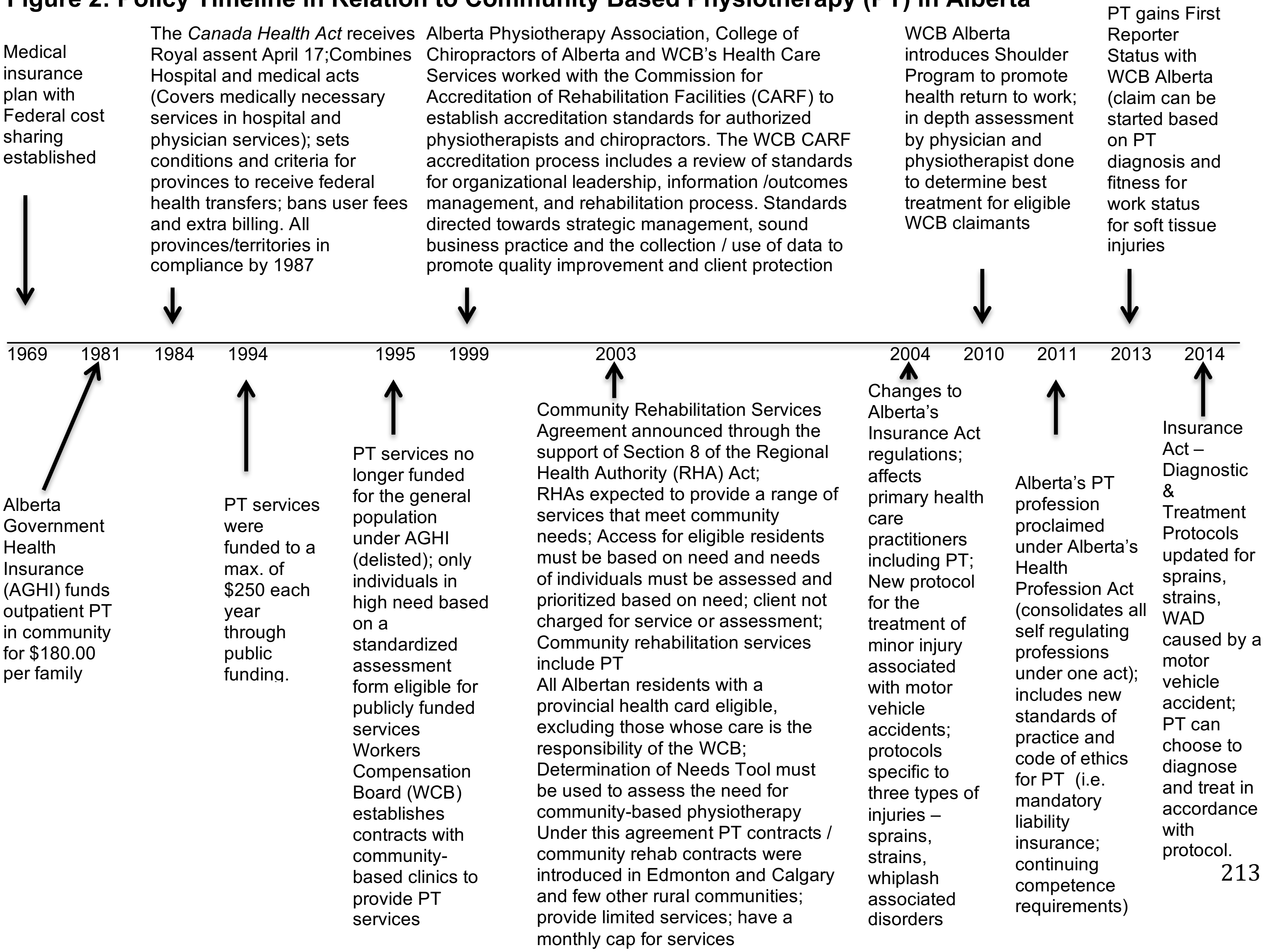
Ontario Regulation 79 of the *LTC Homes Act* takes effect. Every licensee of a LTC home shall ensure therapy services for residents are arranged or provided; include, on-site PT provided to residents on an individual basis or in a group setting based on residents' assessed care needs.

Changes to PT Act from Bill 179; it amends 26 health-related statutes, including the Regulated Health Professions Act; increases scope of practice for PT

Ministry of Health and Long Term Care (MOHLTC) announces plans to reconfigure funding and public delivery of PT including physiotherapists as part of family health teams and nurse practitioner led clinics, and increasing the number of physiotherapists in Community Health Centers (CHC); all existing DPC clinics, in addition to new sites interested in providing publicly funded services must complete an application and submit to MOHLTC; the clinics provided with volume based contracts to be distributed equitably across the province

Federal Court ruling: Métis population, non- status First Nations and Inuit peoples no longer living in traditional territories should have access to the Federal funding for Aboriginal health services through the First Nations and Inuit Health Branch (FNIHB) and primarily addresses public health and prevention programs on reserves and traditional territories. No funding for physiotherapy through the FNIB outside of hospitals and physiotherapists are not recognized as authorized prescribers for mobility devices

Figure 2: Policy Timeline in Relation to Community Based Physiotherapy (PT) in Alberta



Medical insurance plan with Federal cost sharing established

Alberta Government Health Insurance (AGHI) funds outpatient PT in community for $180.00 per family

The *Canada Health Act* receives Royal assent April 17;Combines Hospital and medical acts (Covers medically necessary services in hospital and physician services); sets conditions and criteria for provinces to receive federal health transfers; bans user fees and extra billing. All provinces/territories in compliance by 1987

PT services were funded to a max. of $250 each year through public funding.

PT services no longer funded for the general population under AGHI (delisted); only individuals in high need based on a standardized assessment form eligible for publicly funded services
Workers Compensation Board (WCB) establishes contracts with community-based clinics to provide PT services

Alberta Physiotherapy Association, College of Chiropractors of Alberta and WCB's Health Care Services worked with the Commission for Accreditation of Rehabilitation Facilities (CARF) to establish accreditation standards for authorized physiotherapists and chiropractors. The WCB CARF accreditation process includes a review of standards for organizational leadership, information /outcomes management, and rehabilitation process. Standards directed towards strategic management, sound business practice and the collection / use of data to promote quality improvement and client protection

Community Rehabilitation Services Agreement announced through the support of Section 8 of the Regional Health Authority (RHA) Act;
RHAs expected to provide a range of services that meet community needs; Access for eligible residents must be based on need and needs of individuals must be assessed and prioritized based on need; client not charged for service or assessment;
Community rehabilitation services include PT
All Albertan residents with a provincial health card eligible, excluding those whose care is the responsibility of the WCB;
Determination of Needs Tool must be used to assess the need for community-based physiotherapy
Under this agreement PT contracts / community rehab contracts were introduced in Edmonton and Calgary and few other rural communities; provide limited services; have a monthly cap for services

Changes to Alberta's Insurance Act regulations; affects primary health care practitioners including PT; New protocol for the treatment of minor injury associated with motor vehicle accidents; protocols specific to three types of injuries – sprains, strains, whiplash associated disorders

WCB Alberta introduces Shoulder Program to promote health return to work; in depth assessment by physician and physiotherapist done to determine best treatment for eligible WCB claimants

Alberta's PT profession proclaimed under Alberta's Health Profession Act (consolidates all self regulating professions under one act); includes new standards of practice and code of ethics for PT (i.e. mandatory liability insurance; continuing competence requirements)

PT gains First Reporter Status with WCB Alberta (claim can be started based on PT diagnosis and fitness for work status for soft tissue injuries

Insurance Act – Diagnostic & Treatment Protocols updated for sprains, strains, WAD caused by a motor vehicle accident;
PT can choose to diagnose and treat in accordance with protocol.

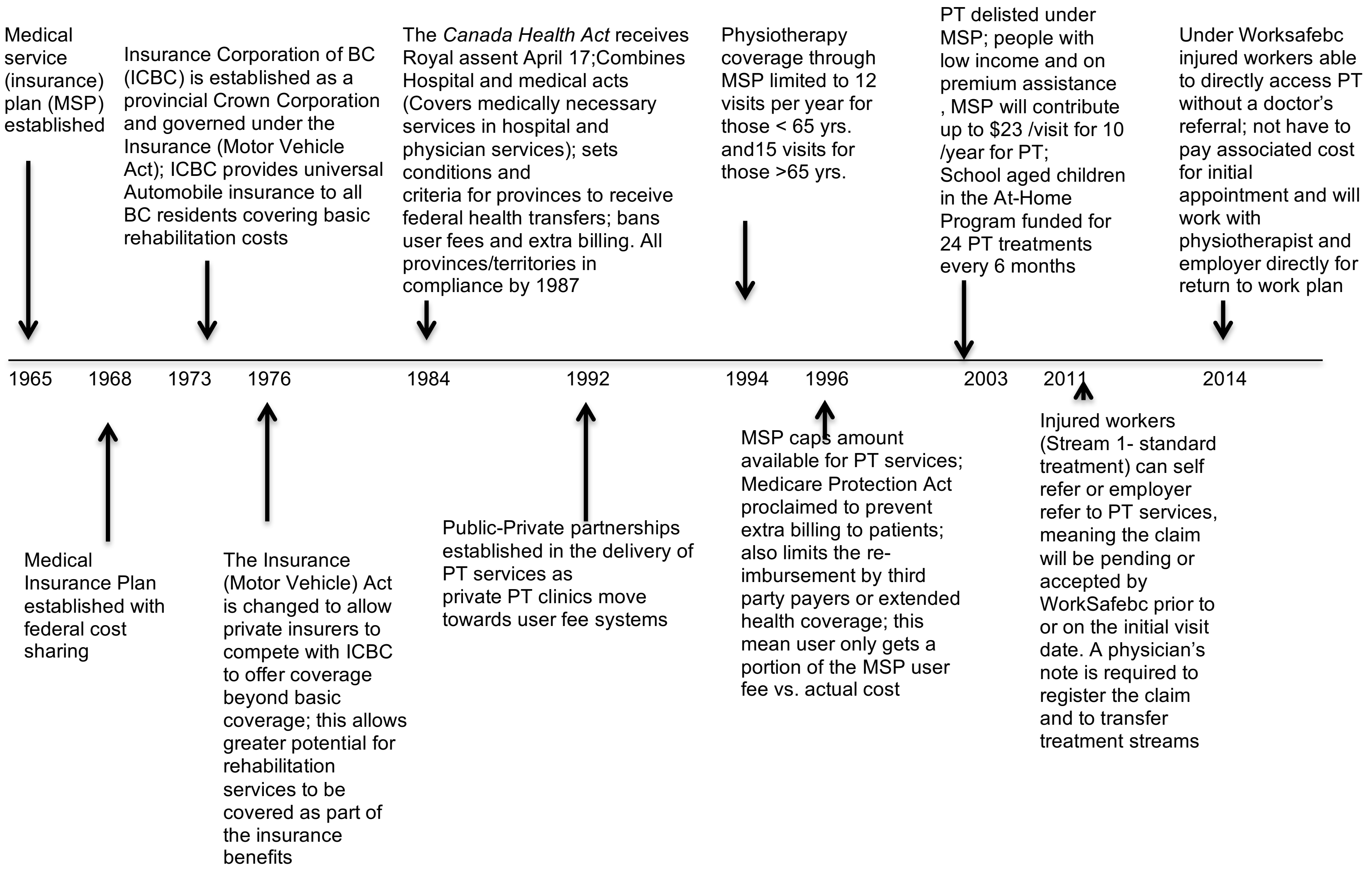


Figure 3: Policy Timeline in Relation to Community Based Physiotherapy (PT) in British Columbia

1965 Medical service (insurance) plan (MSP) established

1968 Medical Insurance Plan established with federal cost sharing

1973 Insurance Corporation of BC (ICBC) is established as a provincial Crown Corporation and governed under the Insurance (Motor Vehicle Act); ICBC provides universal Automobile insurance to all BC residents covering basic rehabilitation costs

1976 The Insurance (Motor Vehicle) Act is changed to allow private insurers to compete with ICBC to offer coverage beyond basic coverage; this allows greater potential for rehabilitation services to be covered as part of the insurance benefits

1984 The *Canada Health Act* receives Royal assent April 17;Combines Hospital and medical acts (Covers medically necessary services in hospital and physician services); sets conditions and criteria for provinces to receive federal health transfers; bans user fees and extra billing. All provinces/territories in compliance by 1987

1992 Public-Private partnerships established in the delivery of PT services as private PT clinics move towards user fee systems

1994 Physiotherapy coverage through MSP limited to 12 visits per year for those < 65 yrs. and15 visits for those >65 yrs.

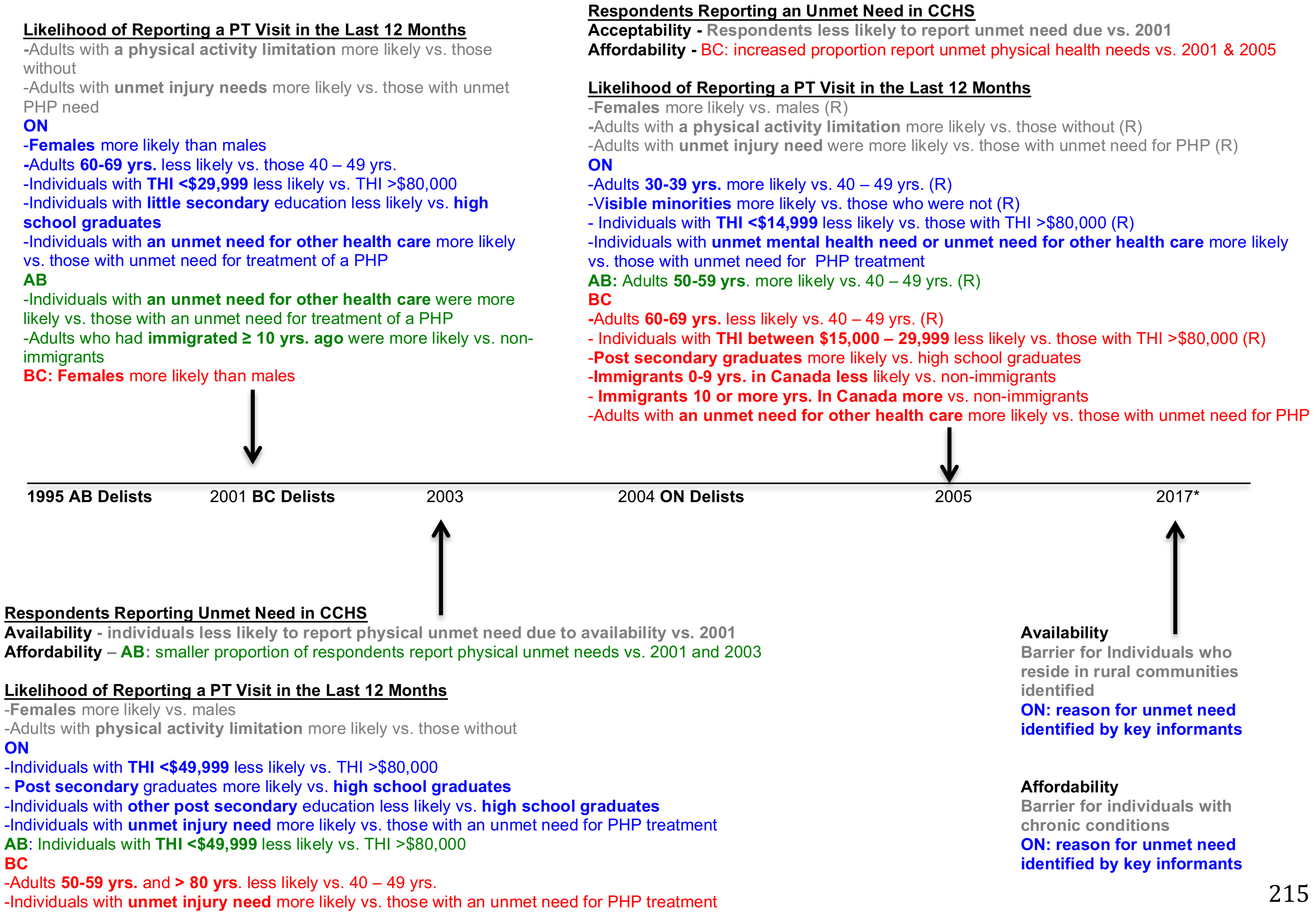
1996 MSP caps amount available for PT services; Medicare Protection Act proclaimed to prevent extra billing to patients; also limits the re-imbursement by third party payers or extended health coverage; this mean user only gets a portion of the MSP user fee vs. actual cost

2003 PT delisted under MSP; people with low income and on premium assistance , MSP will contribute up to $23 /visit for 10 /year for PT; School aged children in the At-Home Program funded for 24 PT treatments every 6 months

2011 Injured workers (Stream 1- standard treatment) can self refer or employer refer to PT services, meaning the claim will be pending or accepted by WorkSafebc prior to or on the initial visit date. A physician's note is required to register the claim and to transfer treatment streams

2014 Under Worksafebc injured workers able to directly access PT without a doctor's referral; not have to pay associated cost for initial appointment and will work with physiotherapist and employer directly for return to work plan

Figure 4: Mapping of Results onto the Timeline to Delist Physiotherapy in Ontario, Alberta and British Columbia



Likelihood of Reporting a PT Visit in the Last 12 Months
-Adults with **a physical activity limitation** more likely vs. those without
-Adults with **unmet injury needs** more likely vs. those with unmet PHP need
ON
-**Females** more likely than males
-Adults **60-69 yrs.** less likely vs. those 40 – 49 yrs.
-Individuals with **THI <$29,999** less likely vs. THI >$80,000
-Individuals with **little secondary** education less likely vs. **high school graduates**
-Individuals with **an unmet need for other health care** more likely vs. those with unmet need for treatment of a PHP
AB
-Individuals with **an unmet need for other health care** were more likely vs. those with an unmet need for treatment of a PHP
-Adults who had **immigrated ≥ 10 yrs. ago** were more likely vs. non-immigrants
BC: Females more likely than males

Respondents Reporting an Unmet Need in CCHS
Acceptability - Respondents less likely to report unmet need due vs. 2001
Affordability - BC: increased proportion report unmet physical health needs vs. 2001 & 2005

Likelihood of Reporting a PT Visit in the Last 12 Months
-**Females** more likely vs. males (R)
-Adults with **a physical activity limitation** more likely vs. those without (R)
-Adults with **unmet injury need** were more likely vs. those with unmet need for PHP (R)
ON
-Adults **30-39 yrs.** more likely vs. 40 – 49 yrs. (R)
-**Visible minorities** more likely vs. those who were not (R)
- Individuals with **THI <$14,999** less likely vs. those with THI >$80,000 (R)
-Individuals with **unmet mental health need or unmet need for other health care** more likely vs. those with unmet need for PHP treatment
AB: Adults **50-59 yrs**. more likely vs. 40 – 49 yrs. (R)
BC
-Adults **60-69 yrs.** less likely vs. 40 – 49 yrs. (R)
- Individuals with **THI between $15,000 – 29,999** less likely vs. those with THI >$80,000 (R)
-**Post secondary graduates** more likely vs. high school graduates
-**Immigrants 0-9 yrs. in Canada less** likely vs. non-immigrants
- **Immigrants 10 or more yrs. In Canada more** vs. non-immigrants
-Adults with **an unmet need for other health care** more likely vs. those with unmet need for PHP

1995 AB Delists 2001 **BC Delists** 2003 2004 **ON Delists** 2005 2017*

Respondents Reporting Unmet Need in CCHS
Availability - individuals less likely to report physical unmet need due to availability vs. 2001
Affordability – **AB**: smaller proportion of respondents report physical unmet needs vs. 2001 and 2003

Likelihood of Reporting a PT Visit in the Last 12 Months
-**Females** more likely vs. males
-Adults with **physical activity limitation** more likely vs. those without
ON
-Individuals with **THI <$49,999** less likely vs. THI >$80,000
- **Post secondary** graduates more likely vs. **high school graduates**
-Individuals with **other post secondary** education less likely vs. **high school graduates**
-Individuals with **unmet injury need** more likely vs. those with an unmet need for PHP treatment
AB: Individuals with **THI <$49,999** less likely vs. THI >$80,000
BC
-Adults **50-59 yrs.** and **> 80 yrs**. less likely vs. 40 – 49 yrs.
-Individuals with **unmet injury need** more likely vs. those with an unmet need for PHP treatment

Availability
Barrier for Individuals who reside in rural communities identified
ON: reason for unmet need identified by key informants

Affordability
Barrier for individuals with chronic conditions
ON: reason for unmet need identified by key informants

Legend for Figure 4

Ontario (ON) – Blue **Alberta (AB) – Green** **British Columbia (BC) – Red** **All 3 provinces – Grey**

THI: Total household income
<: less than or equal to

yrs.: years
>: greater than or equal to

PT: physiotherapy
PHP: Physical Health Problem

Delist: Delisting (full or in part) of Physiotherapy Services

Note: Results based on Scoping Review (Canadian) and Qualitative Interviews (Ontario specific)

Significant Differences in Likelihood of Reporting Unmet Physical Health Need due to 3As also Identified in Combined CCHS Data:

All 3As: individuals **≥50yrs** *less likely* vs. 40-45 yrs.; **women** *more likely* vs. men

Availability: **part time / full time employment**; or **responded in 2003 or 2005** *less likely* vs. not employed or responded in 2001; **recent immigrants and unmet needs other that PHP** *more likely* vs. non-employed; non-immigrants and physical unmet need

Affordability: **full time employment** *less likely* vs. non-employed; u**nmet: mental health need, injury or check-up; and income≤$80,000** *more likely* vs. unmet physical need and income ≥ $80,000.

Acceptability: **individuals < 39, income <$49,999, some other post-secondary, mental health or injury unmet need** *more likely* vs. 40-49 yrs., high school grads, and unmet physical health need; **2003 respondents** *less likely* than 2001 respondents

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