

PRIMARY CARE TYPES AND ACCESS PROBLEMS: ARE ACCESS PROBLEMS  
LESS PREVALENT IN TEAM-BASED PRIMARY CARE THAN NON-TEAM-  
BASED PRIMARY CARE?

by

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The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled “PRIMARY CARE TYPES AND ACCESS PROBLEMS: ARE ACCESS PROBLEMS LESS PREVALENT IN TEAM-BASED PRIMARY CARE THAN NON-TEAM-BASED PRIMARY CARE?”

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## ABSTRACT

The objectives of this thesis were to examine (1) associations between primary care type (team-based versus non-team based) and access problems (difficulty in access and self-reported unmet need), and (2) if socioeconomic variations in access problems were less graded for team-based than non-team-based primary care. Data came from a nationally representative cross-sectional survey, the 2008 Canadian Survey of Experiences with Primary Health Care. Using logistic regression, we examined the associations between primary care type and access problems, adjusting for demographic, health status, socioeconomic, and health care supply factors. We then stratified by primary care type to compare steepness of socioeconomic associations with access problems. Primary care type had no statistically significant, independent associations with access problems. No statistically significant socioeconomic gradients in access problems were observed regardless of primary care type, except that difficulty in access was statistically significantly and positively graded by education for non-team-based primary care.

## **LIST OF ABBREVIATIONS USED**

CIHI	Canadian Institute for Health Information
CCHS	Canadian Community Health Survey
COPD	Chronic Obstructive Pulmonary Disorder
CSE- PHC	Canadian Survey of Experiences with Primary Health Care
GP	General Practitioner
MD	Medical Doctor

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## CHAPTER 1- INTRODUCTION

### 1.1 INTRODUCTION

Primary health care plays an integral role in Canada's universal health care system by providing services that allow patients to maintain and strengthen their health such as health education, promotion, prevention, and rehabilitation.<sup>1</sup> Primary care is one aspect of primary health care and involves first-contact, non-referral services to address patients' new and ongoing health problems. Traditionally, primary care has been provided by general practitioners (GPs) or family physicians working independently of each other in individual or group practice (non-team-based primary care).<sup>1</sup> In the past decade, team-based primary care has emerged across Canada although its uptake has not been uniform across the provinces.<sup>2</sup> Delivery of team-based primary care includes non-GP health care providers who work collaboratively with GPs to provide diagnoses, assessments, and interventions to patients. At its most basic level, team-based primary care involves a GP and some type of registered nurse but can include other non-GP health care providers such as physician assistants, dietitians, and social workers.<sup>3</sup> By providing comprehensive care to patients who need health care services the most, access problems are expected to be less prevalent for team-based than non-team-based primary care. Whether this expectation is realized, however, is uncertain as more advantaged individuals are often better able to demand and adapt to innovative care.<sup>4</sup>

Past literature has shown that primary care access problems remain despite the universal health insurance system with no payment at the point of service in Canada. This is concerning as patients with access problems typically delay seeking medical treatment, do not use preventive health care services, and are at greater risk of complications from their illnesses. Two methodological approaches that studies have used to examine access problems are the population standard approach and the direct approach.<sup>5</sup>

The population standard approach examines utilization of GP services, more specifically, whether one used GP services or not (probability of use) and among those who did, how

often they used GP services (frequency of use). Those of with access to a regular medical doctor (MD), being a visible minority, and having prescription drug insurance are associated with a higher probability of GP use and among those who use a GP, a greater frequency of use. Probability of GP use and frequency of GP use among users have no clear associations with income, education, urban/rural residence, or immigrant status.

Alternatively, researchers have asked people directly about their primary care access problems, either difficulty in access or self-perceived unmet need. In addition to their overall measures, it is becoming increasingly common to distinguish their components. For difficulty in access, common components asked are difficulty in access to: health information or advice, routine or ongoing care, and immediate care.<sup>6,7</sup> For unmet need, typical components distinguished are: unmet need due to availability of services, accessibility to services, and acceptability of available services.<sup>8,9</sup> While anyone reporting difficulty in access or unmet need may be of concern, systematic reporting of access problems, for example, the sick or the socially disadvantaged report more access problems than their counterparts, may be of greater concern. At the same time, not all reported access difficulty or unmet need is of health policy concern. For example, those who have a greater number of encounters with the health care system may have a greater likelihood to report access problems than those who rarely use health care, or some people may have unreasonable expectations or attitudes.

To attempt to identify difficulty in access or unmet need that is of health policy concern, researchers typically use two strategies. First, they refine the variables of access problems. Researchers interested in unmet need, for example, often exclude self-reported unmet need due to reasons that can be considered as personal choice (for example, the respondent does not like a doctor). Second, they control for a variety of potential confounders including demographic, health status, socioeconomic, and health care supply factors. The degree of exposure to the health care system may be, at least partially, controlled for by health status and/or health care supply variables. Past studies have found that those who are younger, women, lower income, higher educated, and employed are independently associated with certain components and have different magnitudes of

effect sizes. Whether we should consider systematic variations in access problems associated with each of these characteristics as health policy concern depends on the appropriateness of the adjustment for confounders. As each variable captures multiple measurement constructs, for example, education may be a proxy for health status as well as navigation within the health care system, in reality, identification of health policy concern is often challenging.

The review of the literature on primary care access problems in Canada highlights the following limitations common across studies, they have: (1) tended not to provide detailed information about patients' primary care access problems; (2) typically under-adjusted for potential confounders; and (3) not had opportunities to differentiate primary care type. A promising venue for examining primary care access problems is the 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC) conducted by Statistics Canada. This survey offers uniquely detailed information on patient's experiences with primary care, in particular, their reasons for difficulty in access to care and self-reported unmet need and thus we are able to address the first limitation. The CSE-PHC offers a wide range of demographic, health status, socioeconomic, and health care supply factors allowing us to address the aforementioned second limitation. Finally this survey asks questions of respondent's primary care delivery including the involvement of nurses and other non-GP health care providers allowing us to differentiate team-based primary care from non-team-based primary care.

Using the 2008 CSE-PHC, this thesis augments past efforts to describe and understand primary care access problems in Canada. This thesis is organized into three additional chapters. Chapter 2 provides a literature review of the current knowledge on primary care including reform efforts and access problems. Chapter 3 is a stand-alone manuscript to be submitted to a peer-reviewed academic journal. This manuscript examines if access problems are less prevalent for team-based versus non-team-based primary care. Chapter 4 concludes by highlighting the strengths and limitations of our research, the policy implications of the results, and direction for future studies.

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## CHAPTER 2- LITERATURE REVIEW

### 2.1 PRIMARY CARE

Primary health care plays an integral role in Canada's universal health care system as it is the first level of care that most patients experience.<sup>1,2</sup> Primary health care involves a set of services that allow individuals to maintain and strengthen their health through health education and promotion, illness prevention, rehabilitation, and support for illness and injury.<sup>1</sup> These primary health care services are organized to be adaptable to the need of the individual, family, and community as a whole.<sup>1</sup> Countries that have high-quality primary health care have improved population health outcomes, lower total health care system costs, and reduced socioeconomic inequalities in health.<sup>3-5</sup>

Primary care is one aspect of primary health care. Involving first-contact, non-referral services, primary care is delivered to patients ideally through a continuous and sustained relationship with a regular primary care provider.<sup>1</sup> Primary care is important because it addresses a large majority of a patient's new and ongoing health care need and problems.<sup>6,7</sup> Traditionally, primary care has been delivered through non-team-based primary care, that is, by general practitioners (GPs) or family physicians (whom for this thesis, we will refer to as GPs) working independently in an individual or group practice.<sup>1</sup> GPs as part of a group practice still work independently of each other and come together as a group to share major overhead expenses of running a practice such as building rent and administrative staff.<sup>8</sup> Having access to a regular primary care provider is not only important to address a patient's need for care but also to reduce need for other parts of the health care system.<sup>9</sup>

Ensuring equitable access to primary care, commonly understood as equal access to primary care for equal need for primary care, is a common goal of many publically funded health care systems.<sup>10-15</sup> In Canada, this objective is assumed under the *Canada Health Act*, federal legislation adopted in 1984 that lays out principles for publicly funded health services.<sup>16</sup> The interpretation is that equal access for equal need be provided by



eliminating the potential for differences in access attributable to income or other factors.<sup>16</sup> Primary care reform efforts have strived to achieve equitable access to primary care in Canada.<sup>17</sup>

## 2.2 PRIMARY CARE REFORM

Primary care reform in Canada began with a turbulent start. Between the 1970s and 1990s, only small-scale programs were adopted while reform efforts targeted at large-scale, system level change were stalled.<sup>6,18</sup> This period of time involved conflicts over new funding and remuneration methods amongst physicians; the unwillingness of both the federal and provincial governments to invest significant resources into primary care; unfavourable economic conditions; a lack of evidence to support one model of primary care organization and delivery over another; and a potential lack of support amongst the Canadian public who may have seen reform as encroaching on public social values of health care.<sup>6,18</sup> These conflicts occurred despite a number of federal reports supporting the need for primary care reform including *The Royal Commission on Health Services: The Hall Commission* (1964),<sup>19</sup> *A New Perspective on the Health of Canadians: The Lalonde Report* (1974),<sup>20</sup> *Health Services Review* (1979),<sup>21</sup> and *The National Forum on Health* (1997).<sup>22</sup> In addition, the *Canada Health Act* may have had the unexpected effect of limiting reform efforts. Provinces may have interpreted “comprehensives,” one of the five principles of the *Canada Health Act*, to refer only to traditional forms of hospital and physician services. This interpretation may have initially led the provinces to limit the potential for primary care to be delivered by non-GP health care providers or in alternative settings.<sup>6</sup>

The new millennium brought about a new emphasis to reform primary care. The rejuvenation of primary care reform efforts was due in part to political and public concern about the perceived decline in access to primary care that occurred in response to cutbacks in health care funding during the 1990s and a decrease in medical school graduates choosing to work in primary care.<sup>23,24</sup> Leading these efforts were a variety of new federal reports that made recommendations for improvements in access to and

quality of primary care: *The Commission on the Future of Health Care in Canada: The Romanow Commission* (2002),<sup>25</sup> *The Standing Senate Committee on Social Affairs, Science and Technology Study on the State of the Health Care System in Canada: The Kirby Committee* (2002),<sup>26</sup> and the *First Minister's Accord on Health Care Renewal* (2003)<sup>27</sup>. These reports increased pressure on federal, provincial, and territorial governments to deliver structural changes to primary care delivery and provide the financing required to increase the effectiveness and efficiency of the health care system.<sup>15,18</sup> To support the costs associated with introducing these changes, the federal government launched the Primary Health Care Transition Fund providing \$800 million to the provinces from 2000 to 2006.<sup>28</sup>

The Primary Health Care Transition Fund was instrumental in accelerating primary care reform efforts in Canada through structural changes to health care delivery.<sup>15,29</sup> This fund had five main goals: (i) to increase access to primary care; (ii) emphasize health promotion, disease and injury prevention, and chronic disease management; (iii) provide round-the-clock access to all essential services; (iv) establish team-based models of care; and (v) coordinate with non-GP health care providers.<sup>15</sup> As health care delivery is the responsibility of the provinces and not the federal government, each province had to ensure that their reform efforts matched the objectives of the Primary Health Care Transition Fund in order to receive funding.<sup>15</sup> As a result, the specific types of reform efforts vary by province but overall most reform efforts have involved similar initiatives.<sup>30</sup> Typical reform initiatives have included rostering patients to define practice populations; reorganizing payment mechanisms away from fee-for-service; introducing financial incentives to reward comprehensive care, continuity of care, and delivery of preventive services; regionalization of health care planning from the provincial level to local regional health boards; increasing access to after-hours primary care; and implementation of electronic health records.<sup>30,31</sup>

The health policy response aimed at improving equitable access to primary care has been the introduction of team-based primary care.<sup>17,31-33</sup> Team-based primary care has redefined the delivery of care to include various non-GP health care providers working

collaboratively in providing diagnoses, assessments, and interventions.<sup>17,34</sup> Their composition varies by province and practice, and their uptake has not been uniform. At its most basic level, team-based primary care involves a GP and some form of a registered nurse, such as an advanced practice nurse or nurse practitioner.<sup>30,35,36</sup> In some provinces, in addition to the nurse, team-based primary care includes other types of non-GP health care providers required to meet the need of the patients, such as physician assistants, dietitians, social workers, pharmacists, health educators, as well as others.<sup>36-38</sup>

Team-based primary care is expected to provide more comprehensive and coordinated care to patients than non-team-based primary care. This type of care typically involves separate patient appointments with each team member who is able to offer their own perspective, individual skills, and experience in managing the health of the patient.<sup>39,40</sup> The team then meets regularly without the patient to discuss ongoing and future care directions.<sup>34</sup> Previous studies have found that team-based primary care improves processes and outcomes of care for those who appear to be in greater need for health care (i.e., poorer health status, more chronic conditions) than those with non-team-based primary care.<sup>39</sup> Extended, those who are in poorer health are also typically socioeconomically disadvantaged. By providing comprehensive care to these patients who need health care services, it is thought that team-based primary care has the potential to be associated with less socioeconomic variations in primary care access problems.<sup>41</sup> Whether this expectation is realized, however, is uncertain as more socioeconomically advantaged individuals are often better able to demand and adapt to innovative care.<sup>31</sup>

### 2.3 PRIMARY CARE ACCESS PROBLEMS

Past literature has shown that primary care access problems remain despite the universal health insurance system with no payment at the point of service in Canada.<sup>42</sup> This is concerning as patients with primary care access problems typically delay seeking medical treatment, do not use preventive health care services, and are at greater risk of complications from their illnesses.<sup>43</sup> They also tend to enter the health care system sicker,

later, and stay for a more prolonged period of time, putting an increased financial burden on other parts of the health care system such as an excess number of emergency department visits.<sup>9,43,44</sup>

Conceptually access to primary care and use of primary care are different. Access is the *opportunity to use* primary care and should be distinguished from the *actual use* of primary care.<sup>13,45</sup> Access understood this way, however, can rarely be both observed and measured, and it is *actual use* of primary care that is instead quantifiable.<sup>46</sup> Therefore, past studies have investigated access to primary care by using *actual use* as a proxy for access, conceptualized as “realized access.”<sup>46</sup>

Two methodological approaches that studies have employed to examine access problems are the population standard approach and the direct approach.<sup>47</sup> The population standard approach examines utilization of GP services, more specifically, whether one used GP services or not (probability of use) and among those who did, how often they used GP services (frequency of use). The population standard approach can also be extended to quantify the degree of inequity in utilization of GP services, after standardizing for need for GP services. Alternatively, researchers have asked people directly about their difficulty in access and self-perceived unmet need.

### 2.3.1 *Population standard approach*

Studies using the population standard approach typically employ regression analyses with utilization of GP services as the dependent variable. Utilization of GP services is measured by questions such as “How many times did you visit your general practitioner in the past twelve months?”<sup>48,49</sup> This construct can be measured overall or divided into two components: probability of GP use and frequency of GP use among users.<sup>50</sup>

Probability of GP use captures whether an individual uses a GP or not while frequency of use among users, captures the volume of GP use among those who have used their GP at least once. While probability of GP use captures an individual patient’s initial decision to

use a GP, the frequency of GP use among users captures the volume of future visits for that patient, a number that is in part attributable to decisions made by the GP.<sup>50</sup>

Since it is reasonable to expect the sick to use more care than the healthy, it is important to adjust for need for health care when examining utilization of GP services. Consider the situation in which those with more need for health care, e.g., persons with a greater number of chronic conditions that require on-going care, i.e., older, sicker patients, typically use more care than those with less need for health care, e.g., persons with seasonal influenza. This is considered equitable as those who need more health care use more health care.<sup>13</sup> Now consider if individuals of equal need differed in their access based on a factor such as income. If those with higher income used more care than those with lower income this would be considered inequitable as income is a factor that should not determine how much care one uses. Extended, access to primary care is inequitable when, after adjustment for need for health care, access is systematically associated with what are called *non-need factors* (e.g., income and education) that favour advantaged individuals or populations.<sup>51</sup> It is important to study and measure access to primary care to ensure that access is based on need for health care and not individual or social characteristics that are thought to have problematic influence.<sup>33</sup>

Need adjustment allows researchers to examine the extent of the influence of non-need factors on access problems after adjusting for *need factors* (e.g., age, sex, health status). No systematic variation in access problems by non-need factors may imply equity, while systematic variation may imply inequity. In other words, associations between non-need factors and probability of GP use or frequency of GP use among users can be positive (e.g., higher income is associated with higher probability of GP use), negative (e.g., lower income is associated with higher frequency of GP use among users), or neither positive or negative (no association). Studies using need-adjustment to examine overall GP use have found no association with non-need factors (Appendix 1). These non-need factors include: income,<sup>52-54</sup> education,<sup>52,54</sup> immigrant status,<sup>54</sup> ethnicity,<sup>54,55</sup> and urban or rural residence<sup>53</sup>. A clear picture of inequity, however, is not visible unless utilization of GP services is measured in components.

Studies using need-adjustment to examine probability of GP use (Appendix 2) and frequency of GP use among users (Appendix 3) have found varying associations with non-need factors. Those with access to a regular MD<sup>56</sup>, being a visible minority<sup>50,57</sup>, and having prescription drug insurance<sup>46,58,59</sup> are associated with a higher probability of GP use and among those who use a GP, a greater frequency of use. Probability of GP use has no clear associations with income (positive<sup>50,60</sup>, no association<sup>56,61-63</sup>, or negative<sup>59,64</sup>), education (negative<sup>46,56,58,64</sup> or no association<sup>50,59,61-63</sup>), urban residence (positive<sup>56,58,59</sup> or no association<sup>60,62,63</sup>), or immigrant status (negative<sup>64,65</sup> or no association<sup>59,64,65</sup>). Frequency of GP use has no clear association with income (negative<sup>50,61,63,64</sup> or no association<sup>56,59,61</sup>), education (negative<sup>50,61,63</sup> or no association<sup>56,58,59,64</sup>), urban residence (positive<sup>56,59,63</sup> or no association<sup>56,58</sup>), or immigrant status (positive<sup>64</sup>, no association<sup>56,58</sup>, or negative<sup>59</sup>).

Some studies examining the influence of non-need factors on utilization of GP services go beyond need-adjustment and use need-standardization. Need-standardization provides a summary score of the degree of inequity in GP use. It follows three steps. The first step, using individual-level data, explains GP use by a variety of need and non-need factors. The second step estimates need-expected use, by holding non-need factors constant. The third step calculates need-standardized use by subtracting the need-expected use from the observed use and adding the population's average use. A summary index, such as the Horizontal Inequity Index, can summarize the distribution of the need-standardized use in the population, thus, indicating the degree of inequity.<sup>47,66</sup> Studies using need-standardization methods to examine GP use have focused on and found income-related inequity. Studies have found a negative association with overall GP use, those with lower income use more GP services.<sup>29,67-69</sup> Studies considering GP use in components have found a positive association with probability of GP use<sup>29,46,58,67</sup> (higher income has higher probability of GP use) and a negative association with frequency of GP use among users<sup>29,58,67</sup> (lower income has a higher frequency of GP use among users).

### 2.3.2 *Direct approach*

Studies using the direct approach typically employ regression analyses with either difficulty in access or self-reported unmet need as the dependent variable. Difficulty in access is measured by questions that ask respondents if they experienced any difficulties in access to primary care in the past 12 months. Self-reported unmet need is measured by questions such as “During the past 12 months, was there ever a time when you felt that you needed health care but you didn’t receive it?” This question is meant to capture respondents who genuinely thought that they did not receive the health care that they think they should have to improve their health.<sup>42,48,49,70</sup>

Some studies only estimate percentages for those with difficulty in access or self-reported unmet need.<sup>71-73</sup> For example, one study<sup>73</sup> found that 18.4 % of Canadians reported having difficulty in access and another<sup>42</sup> found that 11.7% reported having unmet need in the previous 12 months. While anyone reporting difficulty in access or unmet need may be concerning, systematic reporting of access problems, for example, the sick or the socially disadvantaged reporting more access problems than their counterparts, may be of greater concern. At the same time, not all reported difficulty in access or unmet need is of health policy concern. For example, those who have a greater number of encounters with the health care system may have a greater likelihood to report access problems than those who rarely use health care, or some people may have unreasonable expectations or attitudes.

To identify access problems that are of health policy concern, researchers typically use two strategies. First, they differentiate access problems due to personal factors (e.g., dislike of doctors, felt care would be inadequate) from access problems due to health care system level factors (e.g., service not available in the area or time required).<sup>42,70</sup> Access problems attributable to health care system level factors are of greater interest as they can be addressed by decision makers unlike personal factors that are assumed to be the responsibility of the individual.<sup>70,74</sup> Second, they control for a variety of potential confounders including demographic, health status, socioeconomic, and health care supply

factors.<sup>42,43,70,73</sup> Whether we should consider systematic variations in access problems associated with each of these characteristics as a health policy concern depends on the appropriateness of the adjustment for confounders. Certain variables capture multiple measurement constructs such as education which may be a proxy for health status as well as navigation within the health care system.<sup>50</sup> Despite these two strategies, identification of health policy concerns is often challenging.

In addition to examining difficulty in access or self-reported unmet need overall, it is becoming increasingly common to distinguish their components. For difficulty in access, common components are difficulty in access to: health information or advice, routine or ongoing care, and immediate care.<sup>43,73</sup> Health information or advice is the knowledge required for a patient to improve their health.<sup>75</sup> Routine care typically encompasses services such as an annual examination or ongoing care for an illness.<sup>43</sup> Immediate care involves care for a minor but non-life-threatening health issue such as a fever or minor cut or burn.<sup>43</sup> For unmet need, typical components distinguished are unmet need due to: availability of services, accessibility to services, and acceptability of available services.<sup>42,76</sup> Availability captures insufficient supply of health care services when or where they are required such as: waiting too long to get an appointment or to see the physician and services not available in the area or at the time required. Accessibility captures barriers to access care such as: cost, language problems, transportation, difficulty getting an appointment or contacting a physician, and being unable to leave house due to a health problem. Acceptability captures personal preferences, attitudes, or circumstances of individuals unrelated to characteristics of health care services including: not knowing where to go, feeling that care would be inadequate, not getting around to it, deciding not to seek care, being too busy, and disliking doctors.

To our knowledge, only one study has examined components of difficulty in access.<sup>43</sup> It found that those who report difficulty in access to routine care are younger, women, have poorer health status, live east of Quebec, employed, and have no regular family doctor. Immigrants in Canada for more than five years and those with less than post-secondary education were less likely to report difficulty in access to routine care compared to non-



immigrants and those with a post-secondary degree/diploma education. No statistically significant differences between difficulty in access to routine care and urban/rural residence or income were reported. Those who report difficulty in access to immediate care are younger, women, live in rural areas, live east of Quebec, and immigrants in Canada for less than five years. They also found that those who report difficulty in access to immediate care are younger, women, have more than high school education, live in rural areas, live east of Quebec, and an immigrant in Canada for less than five years. There were no statistically significant differences between income, job status, health status, and regular family doctor status. This study did not consider difficulty in access to health information or advice.<sup>43</sup>

Studies have found associations between overall self-reported unmet need and various demographic, health status, socioeconomic, and health care supply factors (Appendix 6). Those who report unmet need are typically younger,<sup>42,43,62,76-78</sup> women,<sup>42,43,74,77,78</sup> have poorer health status,<sup>42,43,62,74,76-78</sup> have higher education,<sup>42,43,74,77,78</sup> live in urban areas,<sup>42,62,74,79</sup> are non-immigrants,<sup>43,46,74</sup> have no regular doctor,<sup>42,43,80</sup> and have no prescription drug insurance.<sup>42,78</sup> Studies have found negative<sup>42,76,78,81</sup> and no<sup>43,62,74,76,77</sup> associations between income and overall unmet need.

Few studies have examined the components of self-reported unmet need. Those who report unmet need due to availability are typically younger<sup>42</sup>, women<sup>42</sup>, in poorer health status<sup>42,76</sup>, have chronic conditions<sup>42,76</sup>, have post-secondary education<sup>42</sup>, and do not live in rural areas<sup>42</sup>. There were no statistically significant associations between unmet need due to availability and income, ethnicity, or immigrant status.<sup>42,76</sup> Those who report unmet need due to accessibility to services are generally younger<sup>42,76</sup>, women<sup>42</sup>, in poorer health status<sup>42</sup>, have chronic conditions<sup>42,76</sup>, have post-secondary education<sup>42</sup>, have low income<sup>42,76</sup>, a visible minority<sup>42</sup>, do not have a regular MD<sup>42</sup>, do not have prescription drug insurance<sup>42</sup>, and do not live in rural areas<sup>42</sup>. There were no statistically significant associations between unmet need due to accessibility to services and immigrant status.<sup>76</sup> Those who report unmet need due to acceptability of available services are younger<sup>42,76</sup>, women<sup>42</sup>, in poorer health status<sup>42,76</sup>, have chronic

conditions<sup>42,76</sup>, have post-secondary education<sup>42</sup>, have low income<sup>42</sup>, a visible minority<sup>42</sup>, do not have a regular MD<sup>42</sup>, and currently working<sup>76</sup>. There were no statistically significant associations between unmet need due to acceptability of available services and immigrant status.<sup>76</sup>

### *2.3.3 Summary of literature on primary care access problems*

Using either the population standard approach or the direct approach, studies have found certain characteristics to be associated with primary care access problems. Studies using the population standard approach to examine utilization of GP services have shown that, after adjustment for need, those having a regular MD, being a visible minority, and having prescription drug insurance are associated with a higher probability of GP use and, among those who use a GP, a greater frequency of use. Probability of GP use and frequency of GP use among users have no clear associations with income, education, urban/rural residence, or immigrant status. Studies using need-standardization have shown that despite having greater need for primary care, disadvantaged populations do not make greater use of primary care, however, among those who use a GP, disadvantaged populations have a higher frequency of use. Although any difficulty in access or self-reported unmet need identified using the direct approach is of concern, systematic variation of such problems poses even greater concern. In general, studies examining components of difficulty in access (difficulty in access to health information or advice, routine or ongoing care, and immediate care) and self-reported unmet need (unmet need due to availability, accessibility, and acceptability) have found that those who are younger, women, lower income, higher educated, and employed are independently associated with certain components and have different magnitudes of effect sizes. Future research using either the population standard approach or the direct approach should continue to analyze primary care access problems in their components to better understand differences in health policy concerns.

## 2.4 LIMITATIONS OF PAST LITERATURE

The review of the literature on primary care access problems in Canada highlights three limitations common across many studies: they (1) typically do not provided detailed information about patients' access problems; (2) frequently under-adjusted for potential confounders; and (3) have not had opportunities to differentiate primary care type.

### *2.4.1 Lack of details about patients' access problems*

Access problems are frequently examined overall and not in components.<sup>62,77,79,81</sup> This is due to the use of basic questions such as “How many times did you visit your general practitioner in the past twelve months” or “In the past twelve months, was there ever a time you felt you needed health care but did not receive it” Questions of this nature are unable to provide in depth reasons for why access problems occur so these measures are unable to separate access problems into components. This is concerning as the few studies that have examined components of access problems have found that characteristics of persons reporting access problems vary by component.<sup>42,43,70,76</sup>

### *2.4.2 Under-adjustment of potential confounders*

Some studies under adjust for potential confounders by only capturing basic variables such as age, sex, self-rated health status, income, and education. Health status, for example, is a multifaceted concept and cannot be appropriately captured using just one measure of health status.<sup>50</sup> Some studies have used additional indicators of health status such as the presence of certain chronic conditions and total number of chronic conditions as need for health care likely varies by type of chronic condition.<sup>39,42,56,76</sup> Few studies go even further by allowing for the effects of need indicators to vary by age, such as age and sex and age and chronic conditions.<sup>50</sup> When studies only use self-rated health status as the measure of health then variables such as income and education can actually capture health as those with low income and education tend to have poorer health.<sup>82,83</sup> When studies appropriately measure health then socioeconomic variables serve as a proxy for

accessibility to the health care system as those with higher income and education are typically better able to navigate the health care system.<sup>29,50,67</sup> There is no agreed upon list or number of variables that must be controlled for and studies are only capable of adjusting for the variables provided in a particular data set. Nevertheless, it is important that studies control for a variety of demographic, health status, socioeconomic, and health care supply factors so that they are better positioned to make inferences about primary care access problems.<sup>50</sup>

#### *2.4.3 Lack of opportunities to differentiate primary care type*

Previous studies have typically only used the GP to identify those with a source of primary care. By not examining the role of non-GP health care providers in delivering primary care, the distinction between team-based primary care and non-team-based primary care cannot be made. That past studies did not differentiate primary care type is largely due to limited data availability in population health surveys. This is true for the two primary population health surveys in Canada, the Canadian Community Health Survey (CCHS) and the National Population Health Survey, both conducted by Statistics Canada.

#### *2.4.4 Future examinations of access problems*

A promising venue for examining primary care access problems is a new survey, the 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC), which offers uniquely detailed information on Canadian's experiences with primary care, including reasons for difficulty in access and self-reported unmet need. Thus this information can be used to address the first limitation, general lack of details about patients' access problems. The questions for the CSE-PHC were developed with input from the two co-sponsors of the survey, the Health Council of Canada and the Canadian Institute for Health Information (CIHI), including mapping of 27 health indicators developed by CIHI. The Health Council of Canada reports on health care renewal in Canada and the CIHI aims to improve both the health of Canadians and the Canadian

health care system by producing high quality and reliable health information. In addition to detailed information on primary care access problems, the CSE-PHC also offers a wide range of demographic (age and sex), health status (self-rated health status, presence of individual chronic conditions), socioeconomic (income, education, and employment status), and health care supply factors (regular MD status and province of residence). Thus this information can be used to address the aforementioned second limitation of past studies, general under-adjustment of potential confounders. The CSE-PHC also asks questions on respondent's primary care delivery including the involvement of nurses and other non-GP health care providers such as dietitians and social workers. These questions can be used to differentiate team-based primary care from non-team-based primary care, addressing the third limitation.

To our knowledge only two studies have used the 2007 or 2008 CSE-PHC to examine processes and outcomes associated with team-based primary care.<sup>39,40</sup> These studies found that compared to non-team-based primary care, team-based primary care is associated with improved health promotion and disease prevention, access to after-hours care, and quality of care, however, no reduction in overall unmet need.<sup>39,40</sup>

## 2.5 OBJECTIVES

Using the CSE-PHC, this study augments past efforts to describe and understand primary care access problems in Canada. Specifically, it aims to: (1) describe the characteristics of persons reporting primary care access problems in Canada, (2) examine whether team-based primary care is associated with less access problems than non-team-based primary care, either overall or in components, and (3) investigate whether socioeconomic variations in overall access problems are less graded for team-based primary care than for non-team-based primary care.

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## CHAPTER 3- MANUSCRIPT

### 3.1 ABSTRACT

**Objectives:** To (1) describe the characteristics of persons reporting primary care access problems (2) examine whether associations exist between primary care type (team-based vs. non-team based) and access problems, and (3) examine whether socioeconomic variations in access problems are less graded for team-based versus non-team-based primary care.

**Data:** This study used a nationally representative cross-sectional survey, the 2008 Canadian Survey of Experiences with Primary Health Care conducted by Statistics Canada.

**Methods:** Using logistic regression, we examined the associations between primary care type and access problems (difficulty in access and self-reported unmet need), adjusting for demographic, health status, socioeconomic, and health care supply factors. We stratified the sample by primary care type to compare the steepness of socioeconomic associations with access problems.

**Results:** Primary care type had no statistically significant, independent associations with access problems. We observed no statistically significant socioeconomic gradients in access problems regardless of primary care type, except that difficulty in access was statistically significantly and positively graded by education for non-team-based primary care.

**Conclusion:** This study adds to the growing body of research evidence examining the impact of team-based primary care on access problems. We did not find clear positive nor negative impact of team-based primary care.



## 3.2 INTRODUCTION

Primary health care plays an integral role in Canada's universal health care system as the first level of care that most patients experience.<sup>1</sup> Primary health care allows patients to maintain and strengthen their health through services such as health education, promotion, prevention, and rehabilitation.<sup>1</sup> Primary care is one aspect of primary health care involving non-referral services targeted at personal health care need.<sup>2,3</sup> Traditionally, primary care has been delivered by general practitioners (GPs) or family physicians (whom, for this paper, we will refer to as GPs) working independently of each other in individual or group practice.<sup>4</sup> This method of primary care delivery is referred to as non-team-based primary care. In the past decade, team-based primary care has been introduced across Canada, particularly in Alberta, Ontario, and Quebec.<sup>5</sup>

Team-based primary care has redefined care delivery to include non-GP health care providers who work collaboratively with GPs to provide diagnoses, assessments, and interventions to patients.<sup>6</sup> At its most basic level, team-based primary care is comprised of a GP and some type of registered nurse but can include other non-GP health care providers such as dietitians, nutritionists, and social workers.<sup>7,8</sup> Each health care provider is able to offer their own perspective, individual skills, and experience ideally to those who need health care services the most (e.g., poor health status, several chronic conditions).<sup>5,9</sup> By providing this comprehensive care there is an expectation for access problems to be less prevalent in team-based primary care than non-team-based primary care.<sup>9-11</sup> Typically, diffusion of innovation involves advantaged individuals, such as those with higher income and education, demanding and adapting to care.<sup>12</sup> Thus, investigation is necessary as to how team-based primary care may alter access problems.

Past literature has shown that primary care access problems remain despite universal health insurance with no payment at the point of service in Canada. This is concerning as patients with primary care access problems tend to delay seeking medical treatment, do not use preventive health care services, and are at greater risk of complications from their illnesses.<sup>13</sup> Two methodological approaches to examine primary care access problems are

the population standard approach and the direct approach.<sup>14</sup> The population standard approach examines utilization of GP services, more specifically, whether one uses GP services or not (probability of use) and among those who did, how often they use GP services (frequency of use). Since it is reasonable to expect the sick to use more care than the healthy, it is important to adjust for need when examining utilization of GP services. Associations between independent variables and probability of GP use or frequency of GP use among users can be positive (e.g., higher income is associated with higher probability of GP use), negative (e.g., lower income is associated with higher frequency of GP use among users), or no association. After adjustment for need, studies found that those with access to a regular medical doctor<sup>15</sup>, being a visible minority<sup>16,17</sup>, and having prescription drug insurance<sup>18-20</sup> are associated with a higher probability of GP use and, among those who use a GP, a greater frequency of use. Probability of GP use and frequency of GP use among users have no clear associations with income, education, urban/rural residence, or immigrant status.<sup>15,16,18,20-25</sup>

Alternatively, researchers have asked people directly about their primary care access problems, either difficulty in access or self-perceived unmet need. In addition to examining these access problems overall, it is becoming increasingly common to distinguish their components. For difficulty in access, common components are difficulty in access to: health information or advice, routine or ongoing care, and immediate care.<sup>13,26</sup> For unmet need, typical components distinguished are unmet need due to: availability of services, accessibility to services, and acceptability of available services.<sup>27,28</sup> While anyone reporting difficulty in access or unmet need may be concerning, systematic reporting of access problems, for example, the sick or the socially disadvantaged reporting more access problems than their counterparts, may be of greater concern. At the same time, not all reported difficulty in access or unmet need is of health policy concern. For example, those who have a greater number of encounters with the health care system may have a greater likelihood to report access problems than those who rarely use health care, or some may have unreasonable expectations or attitudes,

To identify access problems that are of health policy concern, researchers typically use two strategies. First, they differentiate access problems due to personal factors (e.g., dislike of doctors, felt care would be inadequate) from access problems due to health care system level factors (e.g., service not available in the area or time required).<sup>27,29</sup> Access problems attributable to health care system level factors are of greater health policy interest than those related to personal factors due to their policy amenability.<sup>29,30</sup> Second, they control for a variety of potential confounders including demographic, health status, socioeconomic, and health care supply factors.<sup>13,26,27,29</sup> The degree of exposure to the health care system may be, at least partially, controlled for by health status and/or health care supply variables. Past studies have found that those who are younger, women, lower income, higher educated, and employed are independently associated with certain components and have different magnitudes of effect sizes.<sup>13,26-28</sup> Whether systematic variations in access problems associated with each of these characteristics should be considered as health policy concern depends on the appropriateness of the adjustment for confounders. As each variable captures multiple measurement constructs, for example, education may be a proxy for health status as well as navigation within the health care system, in reality, identification of health policy concern is often challenging.<sup>16</sup>

Regardless of the methodological approach, and largely due to the availability of data, past studies have been unable to differentiate team-based from non-team-based primary care when examining access problems. A promising venue for examining primary care access problems is the 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC). This national cross-sectional survey offers detailed information on respondent's primary care type as well as uniquely detailed information on access problems, including reasons for difficulty in access and self-reported unmet need. To our knowledge, only two studies have used the 2007 or 2008 CSE-PHC to examine processes and outcomes of care associated with team-based primary care.<sup>9,10</sup> These studies found that, compared to non-team-based primary care, team-based primary care is associated with improved health promotion and disease prevention, access to after-hours care, and quality of care.<sup>9,10</sup> Our study augments these past efforts to describe and understand primary care access problems in Canada. Specifically, it aims to: (1) describe the

characteristics of persons reporting primary care access problems in Canada, (2) examine whether team-based primary care is associated with less access problems than non-team-based primary care, either overall or in components, and (3) investigate whether socioeconomic variations in overall access problems are less graded for team-based than for non-team-based primary care.

### 3.3 METHODS

#### 3.3.1 *Data*

Data come from the 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC) conducted by Statistics Canada. The target population was non-institutionalized Canadians aged eighteen years and older. The survey sample was taken from respondents of the Canadian Community Health Survey (CCHS) Cycle 4.1.<sup>31</sup> The CSE-PHC survey used a complex sampling design, with stratification, multiple stages of selection, and unequal probabilities of selection of respondents due to over-sampling in some regions. Data were collected using a computer assisted telephone interview administered between April and June of 2008. The response rate was 70.8%, resulting in a sample size of 11,582.

This study used the Public Use Microdata File of the CSE-PHC, accessed through the Statistics Canada Data Liberation Initiative.<sup>32</sup> This file excluded respondents who lived in the three territories (n = 61) resulting in a sample size for this study of 11,521. We used different sub-samples for analysis for each objective. For analyses for objective 1 (describing characteristics of persons reporting access problems), we used the entire sample (n=11,521). For analyses for objective 2 (examining access problems by primary care type), we focused only on persons who had a regular source of primary care (n=10,858). We excluded respondents with no primary care if they did not have (a) a regular medical doctor (MD) or their regular MD was considered a non-primary care source (specialist care) or (b) a regular source of care or their regular source of care was

considered a non-primary care source (emergency department or urgent care centre) (n=663). Finally, for analyses for objective 3 (investigating the steepness of socioeconomic gradients by primary care type), we stratified the sample for objective 2 into team-based primary care (n = 4,204) and non-team-based primary care (n = 6,654).

### 3.3.2 Variables

#### Access problems (dependent variables)

We created two main categories of access problems: difficulty in access and self-reported unmet need. For each category we generated an overall variable as well as three component variables. All of these variables were dichotomous. Components of difficulty in access were based on questions asking respondents if they had difficulty in: (1) health information or advice, (2) routine or ongoing care, and (3) immediate care. Health information or advice is the knowledge required for a patient to improve their health, routine or ongoing care encompasses services such as an annual examination or care for an illness, and immediate care is for a minor but non-life-threatening health issue such as a fever or minor cut.<sup>13</sup> We created an overall difficulty in access variable that indicates the presence of at least one component of difficulty.

Regarding self-reported unmet need, respondents were asked “In the past 12 months, was there ever a time when you felt that you needed health care but you didn’t receive it?” Those responding positively were then asked to provide a reason(s) for their unmet need. Based on past literature, we classified these reasons under three components: availability of services, accessibility to services, and acceptability of available services.<sup>27,28</sup> Availability captures insufficient supply of health care services when or where they are required: waited too long to get an appointment, waited too long to see the physician, service not available in the area, service not available at the time required, and do not have a family physician. Accessibility captures barriers to access care: cost, language problems, transportation, difficulty contacting a physician, difficulty getting an

appointment, and unable to leave house due to health. Acceptability captures personal preferences, attitudes, or circumstances of individuals unrelated to characteristics of health care services: did not know where to go and other reasons. We created an overall unmet need variable that indicates the presence of at least one component of unmet need.

### Primary care type

We assigned each respondent to one of the following three primary care types: (1) team-based primary care, (2) non-team-based primary care, and (3) no primary care<sup>9,10</sup>. Respondents were first classified as having any primary care if they had (a) a regular primary care MD (GP or family physician) or (b) a regular source of primary care (doctor's office, walk-in clinic, *centre local de services communautaires*/local community service centre, or a community health centre). Based on past literature we further distinguished those with any primary care into team-based primary care and non-team-based primary care.<sup>9,10</sup> We assigned respondents as having team-based primary care if they responded positively to either of the following two questions: (a) "Is there a nurse working with your [primary care provider] who is regularly involved in your health care?" or (b) "Other than your [primary care provider], other doctors and a nurse, are there other health providers like dietitians and nutritionists working in the same office where you get your regular health care?" Respondents answering no to both questions were assigned to non-team-based primary care. We assigned respondents to no primary care if they did not have (a) a regular MD or their regular MD was considered a non-primary care source (specialist care) or (b) a regular source of care or their regular source of care was not considered primary care (emergency department or urgent care centre). Primary care type was one of the characteristics with which we described access problems for objective 1, the independent variable of primary interest for objective 2, and the characteristic used to stratify the sample for objective 3.

## Independent variables

We included a variety of demographic, health status, socioeconomic, and health care supply factors known to be associated with access problems, as listed in Table 1. We also tested interaction terms between age and sex; between age and each health variable (self-rated health status, individual chronic conditions, and total number of chronic conditions); and between sex and each health variable. All variables had missing values except age, sex, and province. We created a missing category for income and employment status as they had high non-response (15.9% and 11.0%, respectively). All other variables had low non-response (< 2%), and we assigned missing response to the largest response category in each to prevent a reduction in sample sizes and a minimizing of potential biases.

### *3.3.3 Analysis*

We first described the characteristics of persons reporting access problems (objective 1). Access problems considered were: (1) overall difficulty in access, (2) difficulty in access to: health information or advice, routine or ongoing care, and immediate care, (3) overall self-reported unmet need, and (4) unmet need due to: availability, accessibility, and acceptability. We reported unadjusted frequencies of each of these access problems weighted by sample weight. Second, we examined access problems by primary care type, adjusting for other independent variables (objective 2). We conducted separate analyses for each access problem listed above. Third, we stratified the sample by primary care type to investigate socioeconomic variations with access problems, after adjustment for other independent variables (objective 3). We conducted separate analyses for overall difficulty in access and overall self-reported unmet need.

For analyses for objectives 2 and 3, we used multiple logistic regression models. Building of all models started with the same independent variables, except analyses for objective 3, which excluded individual chronic conditions as they did not improve model fit. The

decision to keep or drop variables in models depended on: (a) conceptual reasoning based on past studies suggesting their importance in examining access problems, and (b) statistical significance based on the Wald chi-square test statistic. We included interaction terms in the final models only if they remained statistically significant. We assessed goodness of fit using the Hosmer–Lemeshow goodness-of-fit chi-square. For all analyses we used survey weights provided by Statistics Canada. To determine the statistical significance of the odds ratios (ORs), we estimated robust standard errors to account for unequal variance and considered  $p < 0.01$  as statistically significant.

### 3.4 RESULTS

#### *3.4.1 Characteristics of the population with access problems*

The most notable result from the description of unadjusted characteristics of those reporting access problems was that there were no statistically significant differences by primary care type for all access problems, either difficulty in access or unmet need, and either overall or in components (Table 1). Reporting of all access problems statistically significantly differed by self-rated health status (except difficulty in access to immediate care) and by total number of chronic conditions. In general, those in poorer health had more access problems than those in better health.

Socioeconomic variables had statistically significant differences for all difficulty in access variables, either overall or in components, (except for difficulty in access to routine or ongoing care). Those with higher education had more difficulty in access than those with less education. Income was statistically significantly associated with difficulty in access to health information or advice, albeit with no clear gradients. Regular MD status had statistically significant differences for all unmet need variables (except unmet need due to acceptability). Those with no regular MD reported more unmet need than those with a regular MD.



### 3.4.2 *Associations between primary care type and access problems*

In our data, among the any primary care group, 38.7% were classified as having team-based primary care and 61.3% with non-team-based primary care (Table 2). Compared to non-team-based primary care, team-based primary care had a statistically significantly greater proportion for 65 years or over; diagnosis of arthritis, asthma, emphysema or chronic obstructive pulmonary disorder (COPD), cancer, and high blood pressure or hypertension; at least one chronic condition; less than secondary education; and non-full-time employment.

Our multiple regression analysis showed that primary care type had no statistically significant independent associations with all access problems, either difficulty in access or unmet need, and either overall or in components (Table 3). The power was sufficient, and p-values for the primary care type variable were large ( $p > 0.20$ ). Self-rated health status was the only variable that was statistically significantly associated with all access problems. We observed clear gradients that those reporting worse self-rated health status were more likely to report all access problems than their counterparts, and the ORs were generally higher for unmet need than difficulty in access. We also found that, compared to older persons, younger persons were more likely to report most access problems.

Socioeconomic variables were statistically significantly associated with certain access problems. Those with higher education were more likely to have overall difficulty in access and difficulty in access to routine or ongoing care than those with less education. Education was statistically significantly associated with unmet need due to availability, and income was statistically significantly associated with difficulty in access to routine or ongoing care and unmet need due to acceptability. We did not observe clear directions of gradients for these relationships.

Two health care supply factors were associated with opposite types of access problems. No regular MD were statistically significantly associated with more self-reported unmet need for all variables (except unmet need due to acceptability), and province of residence

was statistically significantly associated with all difficulty in access variables (except difficulty in access to health information or advice).

### *3.4.3 Steepness of socioeconomic gradients in access problems by primary care type*

In the multiple regression analyses stratified by primary care type, on the whole, we did not observe statistically significant socioeconomic gradients in overall access problems for team-based primary care or non-team-based primary care (Table 4). The only exception was that overall difficulty in access was statistically significantly and positively graded by education for non-team-based primary care. As education level increased, the odds of reporting overall difficulty in access increased (Figure 1).

Regardless of the primary care type, and even more pronounced for team-based primary care than non-team-based primary care, we found certain factors were statistically significantly and independently associated with overall difficulty in access or overall unmet need. Those with younger age, three or more total number of chronic conditions, and having no regular MD were more likely to report overall access problems than their counterparts, and their odds of doing so were greater if they were with team-based primary care than with non-team-based primary care. Those with poorer self-rated health were also more likely to report overall access problems than those in better health, however, their odds of doing so were greater if they were with non-team-based rather than team-based primary care.

In contrast to analyses for objective 2, the total number of chronic conditions was statistically significantly associated with overall access problems regardless of primary care type in analyses for objective 3. This was likely due to the exclusion of individual chronic conditions from analyses for objective 3 for the fit of the model. As a sensitivity analysis we dropped individual chronic conditions from analyses for objective 2 and the total number of chronic conditions became statistically significant in all models except for unmet need due to acceptability (results not shown).

### 3.5 DISCUSSION

Using a national survey, the 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC), this study examined a common expectation that access problems are less prevalent in team-based primary care than non-team-based primary care. Our primary finding was that primary care type had no statistically significant independent associations with access problems, measured either as difficulty in access or self-reported unmet need, and either overall or in components. Moreover, we found no statistically significant socioeconomic variations in overall access problems among team-based primary care. Overall difficulty in access was statistically significantly graded by education among non-team-based primary care, while income had no statistically significant associations with access problems regardless of primary care type. These results may suggest that highly educated persons are not adapting to innovative primary care as quickly as may have been expected and cost-related barriers to access care are minimum in Canada's universal health care insurance systems.

Identification of access problems amenable to health policy interventions and their prioritization are critical in a universal health care system with finite resources, yet these tasks are often challenging. Among components of unmet need, Sibley and Glazier ranked unmet need due to availability as the greatest health policy concern followed by accessibility and acceptability.<sup>27</sup> Availability reasons (such as health care services not available in the area) are directly related to characteristics of the health care system, and, as such, are directly applicable for health decision makers. Accessibility reasons (such as transportation issues) are of health policy concern but may be more or equally tangible for non-health care areas of the government to address. Acceptability reasons (such as dislike of doctors) are typically considered as personal factors and may therefore be difficult for health policy decision makers to address directly. Our results found that those without a regular MD were more likely to report unmet need due to availability of services and accessibility to services than those with a regular MD. This may suggest that decision makers focus on providing regular access to medical doctors for patients.

Prioritizing components of difficulty in access according to health policy importance is equally, if not more, difficult than unmet need. Given implied urgency, patients having difficulty in access to immediate care may be of greater health policy concern than difficulties in access to health information or advice and routine or ongoing care. It is also possible that these components may relate to each other in a complex way, as it is probable that patients having difficulty in access to routine or ongoing care end up seeking costly immediate care. In our analyses, difficulty in access to routine or ongoing care was the only component of difficulty in access statistically significantly associated with education and income. This may suggest that health policy initiatives focus on increasing access to routine or ongoing care for those of lower socioeconomic status.

As with other studies, we found that those who were younger, women, in poorer self-rated health status, of higher education, and having no regular MD were more likely to report components of access problems than their counterparts (objective 2).<sup>13,26-28</sup> To determine whether these systematic variations in access problems are of health policy concern requires careful considerations through contextualizing our study results within the relevant literature. Systematic variations may be due to unmeasured characteristics that made some patients more apt to report access problems than others. Studies have shown that some patients have higher or unrealistic expectations of when and how health care services should be provided and when their expectations are not met they report having access problems.<sup>33,34</sup> Educated patients are likely to be well-informed of the health care services available to them and report having access problems when they do not receive these services. Younger patients are likely to expect prompt delivery of health care services and report access problems when they have to wait. In addition, past studies have shown that, compared to low users, high users of primary care may be provided increased opportunities to experience access problems and may be more likely to be dissatisfied with their care.<sup>29</sup> Women do not only require more health care through pregnancy and childbirth but they also typically seek care for their children and parents.<sup>13,35</sup> Those in poorer health status and those with certain chronic conditions also have a higher frequency of primary care utilization than healthier individuals.<sup>36</sup> Those without a regular MD had higher odds of reporting access problems. Moreover, those

with team-based primary care had higher odds of reporting access problems if they did not have a regular MD than those with non-team-based primary care. Since these team-based primary care patients receive their care through sources such as walk-in-clinics or community health centres they may be more apt to receive care from non-GP health care providers instead of a GP. As such these patients may have problematic access to a regular MD.

Some results of our study diverge from previous literature. For example, while previous studies have found positive associations between components of difficulty in access and those who are employed and without a regular MD, we did not observe these associations.<sup>13,26</sup> In terms of self-reported unmet need, previous studies have found positive associations between components and those who are women, highly educated, and of low income, which were not found in this study.<sup>27,28</sup> A reason for these differences may be in the variables controlled for. These studies have controlled for other factors that have been shown to be associated with access problems such as immigration status, urban/rural residence, prescription drug insurance, and ethnicity.<sup>13,26-28</sup> Due to the unavailability of these variables in the CSE-PHC survey we were unable to adjust for these factors and therefore may be underestimating some variations in access problems.

One finding that merits future investigation is that the “no primary care” sample was notably different from the “any primary care” sample. Specifically, compared to any primary care (team or non-team based), we found that the no primary care sample was statistically significantly younger, male, in better health status, had a lower presence of all individual chronic conditions (except diabetes and stroke), had a lower total number of chronic conditions, worked full-time, and had no regular MD. In addition, unadjusted descriptive analysis indicated that, compared to the any primary care sample, the no primary care sample had a statistically significantly lower percentage of reporting difficulty in access to routine or ongoing care and a statistically significantly higher percentage of reporting overall self-reported unmet need and unmet need due to availability (results not shown). Given these significant differences, we did not include the no primary care sample in the analyses examining factors associated with access

problems (objective 2). In addition to the analyses reported for objective 3, we ran models for the no primary care sample using the same variables as our other models, however, the goodness-of-fit test were dismal (results not shown). Taken together, those with no primary care are likely to have different factors associated with access problems compared to those with any primary care type. It will be worthwhile for future studies to examine this population with no primary care in greater detail to determine what these unique factors of their access problems are.

To estimate variance, this study used the linearization (robust variance) method rather than replication methods as recommended by Statistics Canada. Specifically, Statistics Canada recommends the use of the balanced repeated replication [BRR] methods with BRR replicate weights (“bootstrapping with bootstrap weights” in Statistics Canada’s language). These replication weights are only available for the master file of the CSE-PHC and not available for the public file, which this study used. While the linearized/robust variance estimation is considered to be appropriate for studies using a complex survey design<sup>37-39</sup> it typically gives a smaller variance than replication methods. We therefore used a conservative level of statistical significance of  $p < 0.01$ . It is possible that our use of the linearized/robust variance with the conservative statistical significance still underestimated variance (i.e., we interpreted non-statistically significant results as statistically significant) or overestimated variance (i.e., we interpreted statistically significant results as statistically not significant) compared to the recommended variance estimation using replication methods.

Several limitations should be noted. This study was cross-sectional in design so we can only comment on the associations between variables and not causation. All answers to the CSE-PHC survey were self-reported and therefore are subject to recall bias. It is possible that some respondents were not able to properly distinguish the professional background of their health care providers leading to a misclassification of primary care type. Some respondents may have reported that their primary care did not involve non-GP health care providers when it did, or vice versa. Where team-based primary care is mistakenly classified as non-team-based primary care, the impact would be a potential minimizing of the true effect of non-team-based primary care. Where non-team-based primary care is

mistakenly classified as team-based primary care, the impact would be a potential minimizing of the true effect of team-based primary care. Either misclassification would lead to under-estimation of the differences between team-based and non-team-based primary care.

### 3.6 CONCLUSION

This study adds to the growing body of research evidence examining the impact of team-based primary care on access problems. There was no statistically significant indication that team-based primary care is associated with less access problems compared to non-team-based primary care. Among those with team-based primary care, there were no statistically significant associations between access problems and socioeconomic status. We did observe non-statistically significant trends where socioeconomically advantaged individuals had less access problems than their counterparts.

### 3.7 TABLES AND FIGURES

Table 1 – Unadjusted proportion of access problems, overall and in components, by respondents’ characteristic

	Percentage of the population							
	Difficulty in access				Self-reported unmet need			
	Overall	Health info or advice	Routine / ongoing care	Immediate care	Overall	Availability	Acceptability	Accessibility
Total	17.98	11.15	7.52	5.57	10.16	4.92	4.13	4.02
<i>Primary care type</i>								
Team-based primary care	17.68	11.38	8.21	5.34	9.65	4.86	3.54	4.14
Non-team-based primary care	18.31	10.92	7.49	5.82	9.85	4.59	4.24	3.67
No primary care	16.41	12.10	3.48	4.35	16.62	8.71	6.69	6.75
<i>Demographic variables</i>								
Age	x	x		x	x	x	x	
18-24	14.69	8.13	4.38	7.02	10.69	5.71	4.18	3.36
25-44	23.03	15.49	8.99	8.54	15.39	7.26	7.53	6.03
45-64	18.60	11.15	8.03	4.94	9.00	4.40	2.98	3.67
65+	8.87	4.95	4.77	1.78	4.48	2.14	1.71	1.88
Sex	x							
Male	15.48	9.21	6.87	4.91	8.86	3.83	4.22	3.18
Female	20.40	13.01	8.15	6.20	11.42	5.97	4.05	4.82
<i>Health status</i>								
Self-rated health status	x	x	x		x	x	x	x
Excellent	10.34	6.64	3.20	2.35	4.21	1.42	1.35	2.12
Very Good	17.30	10.58	5.06	6.02	7.24	2.91	2.85	2.67



Good	19.29	11.83	10.00	6.63	12.38	8.14	4.59	5.55
Fair or Poor	30.48	19.25	17.14	7.34	24.67	9.94	11.95	8.06
<b>Presence of individual chronic conditions</b>								
Arthritis	23.99*	14.49	8.59	8.25	13.32	7.86	4.88	6.51
Asthma	29.22*	18.20	16.25*	12.32*	19.67*	12.42*	5.59	6.60
Chronic Pain	36.33*	21.66*	17.19*	12.44*	23.94*	12.06*	9.99*	7.66*
Emphysema or COPD†	29.18	14.56	17.16	5.35	7.22	6.30	0.83	0.73*
Cancer	25.06	12.90	12.60	6.51	8.35	6.31	2.28	4.33
Depression	37.67*	27.17*	23.23*	12.28*	26.66*	9.80*	13.37*	10.73*
Mood Disorder	47.19*	37.84*	31.95*	4.83	44.03*	10.67	30.04*	12.39*
Diabetes	25.20	17.38	9.67	4.45	12.68	5.25	3.33	6.68
Heart Disease	22.38	14.42	10.19	5.76	12.31	7.01	2.88	5.77
Stroke	10.08	6.82	3.25	3.51	22.50	7.74	1.14	14.61
High blood pressure or hypertension	17.67	9.06	10.28	3.66*	8.79	4.02	2.68	3.98
<b>Total number of chronic conditions</b>								
None	13.22	8.44	4.30	3.80	7.23	3.26	2.86	2.93
1	20.16	11.02	9.37	8.38	11.14	5.21	5.98	3.64
2	26.37	17.00	11.98	7.10	13.62	9.45	2.60	6.95
3 or more	28.76	19.04	15.39	6.97	19.54	7.83	8.52	7.19
<i>Socioeconomic status</i>								
<b>Education</b>								
Less than secondary	12.27	7.16	4.89	3.04	8.96	4.38	2.97	3.39
Secondary	15.29	9.60	6.93	4.77	8.98	3.96	3.73	3.38
Post-secondary or greater	22.61	14.09	9.10	7.28	11.66	5.96	4.95	4.81
<b>Income</b>								
\$0 to \$19,999	21.15	13.71	10.10	5.65	14.04	8.95	4.29	6.54
\$20,000 to \$39,999	13.56	7.68	4.04	4.67	9.43	5.03	3.03	3.90

\$40,000 to \$59,999	19.13	13.87	8.20	4.08	10.69	3.78	6.78	2.80
\$60,000 to \$79,999	17.18	10.08	6.00	5.99	8.19	4.49	1.72	4.11
\$80,000 or more	21.15	13.27	9.77	7.04	10.76	5.57	4.94	3.78
Missing	13.18	6.74	5.18	4.27	8.63	2.71	2.79	4.38
Employment status	x	x			x			
Full-time	18.79	12.25	7.46	5.88	9.52	5.14	3.45	3.77
Part-time	20.90	14.19	7.80	5.55	15.15	5.02	7.71	5.79
Retired	9.93	5.35	5.13	2.25	5.07	2.81	1.49	2.23
Unemployed or not stated	20.77	11.24	9.46	7.38	13.59	5.94	6.38	5.26
<i>Health care supply</i>								
Having regular medical doctor					x	x		x
Yes	17.86	10.79	7.71	5.52	8.93	4.14	3.80	3.23
No	18.88	13.71	6.18	5.90	19.09	10.50	6.53	9.70
Province of residence	x							
Newfoundland	13.94	7.98	5.58	5.41	8.00	3.70	2.16	3.86
Prince Edward Island	13.41	7.12	6.48	3.15	8.61	5.16	3.45	3.31
Nova Scotia	13.39	8.56	4.51	2.73	6.96	4.40	1.68	2.77
New Brunswick	10.93	7.28	2.86	3.32	9.25	4.16	2.98	3.33
Quebec	18.21	9.91	8.82	6.17	13.49	6.17	5.06	6.28
Ontario	20.86	13.67	8.83	6.43	10.11	4.77	4.90	3.28
Manitoba	18.21	13.03	6.08	3.70	10.97	7.45	2.10	3.11
Saskatchewan	14.11	8.97	4.73	4.54	7.51	4.72	2.65	1.93
Alberta	16.38	10.31	5.79	4.31	7.76	3.51	3.79	2.89
British Columbia	14.09	8.39	5.43	4.76	7.82	4.00	2.33	4.12

all numbers are weighted

x indicates statistically significant difference amongst categories of that variable at  $p < 0.01$

\* indicates statistically significant difference in comparison to no presence of individual chronic conditions at  $p < 0.01$

† COPD = Chronic obstructive pulmonary disorder

Table 2 – Characteristics of study sample, overall and by primary care type

	Study sample overall		Team-based primary care		Non-team-based primary care		Statistically significant difference*
	(n = 10,858)		(n = 4,204)		(n = 6,654)		
	n	%	n	%	n	%	
<i>Demographic variables</i>							
Age							
18-24	755	6.95	256	6.09	499	7.50	
25-44	3,015	27.77	1,137	27.05	1,878	28.22	*
45-64	4,036	37.17	1,535	36.51	2,501	37.59	
65+	3,052	28.11	1,276	30.35	1,776	26.69	
Sex							
Male	4,478	41.24	1,677	39.89	2,801	42.09	
Female	6,380	58.76	2,527	60.11	3,853	57.91	
<i>Health status</i>							
Self-rated health status							
Excellent	1,923	17.71	762	18.13	1,161	17.45	
Very Good	4,163	38.34	1,619	38.51	2,544	38.23	
Good	3,204	29.51	1,196	28.45	2,008	30.18	
Fair or Poor	1,568	14.44	627	14.91	941	14.14	
Presence of individual chronic conditions							
Arthritis	1,955	18.01	812	19.31	1,143	17.18	*
Asthma	897	8.26	394	9.37	503	7.56	*
Chronic Pain	1,044	9.62	441	10.49	603	9.06	
Emphysema or COPD†	241	2.22	116	2.76	125	1.88	*
Cancer	654	6.02	289	6.87	365	5.49	*
Depression	1,138	10.48	465	11.06	673	10.11	
Mood Disorder	208	1.92	76	1.81	132	1.98	
Diabetes	1,003	9.24	415	9.87	558	8.84	
Heart Disease	909	8.37	371	8.82	538	8.09	
Stroke	228	2.10	93	2.21	135	2.03	
High blood pressure or hypertension	2,777	25.58	1,177	28.00	1,600	24.05	*
Total number of chronic conditions							
None	5,163	47.55	1,856	44.15	3,307	49.70	
1	2,690	24.77	1,110	26.40	1,580	23.75	
2	1,552	14.29	601	14.30	951	14.29	
3 or more	1,453	13.38	637	15.15	816	12.26	*

<i>Socioeconomic status</i>						
<b>Education</b>						
Less than secondary	2,505	23.07	1,022	24.31	1,483	22.29
Secondary	4,213	38.80	1,635	38.89	2,578	38.74
Post-secondary or greater	4,140	38.13	1,547	36.80	2,593	38.97
<b>Income</b>						
\$0 to \$19,999	1,219	11.23	463	11.01	756	11.36
\$20,000 to \$39,999	2,093	19.28	834	19.84	1,259	18.92
\$40,000 to \$59,999	1,751	16.13	672	15.98	1,079	16.22
\$60,000 to \$79,999	1,438	13.24	558	13.27	880	13.23
\$80,000 or more	2,615	24.08	992	23.60	1,623	24.39
Missing	1,742	16.04	685	16.29	1,057	15.89
<b>Employment status</b>						
Full-time	4,759	43.83	1,736	41.29	3,023	45.43
Part-time	1,065	9.81	423	10.06	642	9.65
Retired	2,221	20.45	891	21.19	1,330	19.99
Unemployed or not stated	2,813	25.91	1,154	27.45	1,659	24.93
<b>Health care supply</b>						
<b>Having regular medical doctor</b>						
Yes	10,122	93.22	3,391	93.51	6,191	93.04
No	736	6.78	273	6.49	463	6.96
<b>Province of residence</b>						
Newfoundland	608	5.60	169	4.02	439	6.60
Prince Edward Island	441	4.06	254	6.04	187	2.81
Nova Scotia	865	7.97	225	5.35	640	9.62
New Brunswick	813	7.49	329	7.83	484	7.27
Quebec	1,546	14.24	598	14.22	948	14.25
Ontario	1,645	15.15	771	18.34	874	13.13
Manitoba	989	9.11	446	10.61	543	8.16
Saskatchewan	1,148	10.57	393	9.35	755	11.35
Alberta	1,567	14.43	651	15.49	916	13.77
British Columbia	1,236	11.38	368	8.75	868	13.04

all numbers are unweighted

\* indicates statistically significant difference between team-based primary care and non-team-based primary care at  $p < 0.01$

†COPD = Chronic obstructive pulmonary disorder

Table 3 – Adjusted odds ratios for access problems, overall and in components

	Difficulty in access				Self-reported unmet need			
	Overall	Health information or advice	Routine /ongoing care	Immediate care	Overall	Availability	Acceptability	Accessibility
<i>Primary care type</i>								
Team-based primary care	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Non-team-based primary care	1.17	1.03	1.11	1.26	1.08	1.04	1.32	0.88
<i>Demographic variables</i>								
Age	x			x	x	x	x	
18-24	2.47*	1.87*	1.08	9.33*	3.64*	5.48*	4.18	2.95
25-44	2.85*	2.52*	1.57	5.83*	3.89*	4.49*	3.56*	4.33*
45-64	2.06*	1.84	1.39	3.72*	2.00*	2.11*	1.39	2.18
65+	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sex	x	x						
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	1.48*	1.61*	1.15	1.27	1.39	1.81	0.90	1.15
<i>Health status</i>								
Self-rated health status	x	x	x	x	x	x	x	x
Excellent	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Very Good	1.74*	1.58	1.50	2.62*	1.62	1.98	1.91	1.18
Good	1.89*	1.67	3.33*	2.85*	3.23*	6.14*	3.77*	2.34
Fair or Poor	3.43*	3.00*	5.71*	3.14*	8.46*	8.88*	12.12*	3.17*
Presence of individual chronic conditions†								

Arthritis	1.15	0.93	0.79	0.88	1.07	1.71	0.91	2.06
Age and arthritis				*				
Asthma	1.24	1.04	1.72	2.60	1.48	1.86	0.86	1.16
Age and asthma							*	
Chronic Pain	1.89*	1.19	1.70	2.81*	1.77	2.03	0.96	1.53
Emphysema or COPD‡	1.26	0.93	1.28	1.17	0.26	1.18	0.12	.01*
Age and emphysema /COPD‡				*		*		
Sex and emphysema /COPD‡								*
Cancer	1.36	0.93	1.45	1.31	0.57	1.15	0.33	0.67
Age and cancer								*
Depression	1.65	1.65	2.74*	2.77	1.55	0.97	1.13	2.24
Mood Disorder	1.62	1.74	2.27	0.25	2.70*	1.00	3.73*	1.67
Diabetes	1.54	1.69	0.98	1.01	0.98	0.96	0.52	1.59
Heart Disease	1.67	1.54	1.50	2.08	1.49	2.04	0.76	2.66
Stroke	0.36	0.43	0.27*	0.87	1.79	0.77	0.19	0.41
Sex and stroke								*
High blood pressure or hypertension	0.80	0.49	1.44	0.69	0.61	0.59	0.50	0.88
Total number of chronic conditions							x	
None	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	1.41	1.41	1.26	0.61	1.52	1.28	3.04*	1.08
2	1.83	2.61	1.10	1.95	1.54	2.08	1.39	1.28
3 or more	1.26	2.55	0.74	2.38	1.58	1.14	4.11	0.56
Age and total chronic conditions				*				
<i>Socioeconomic status</i>								
Education	x		x			x		
Less than secondary	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Secondary	1.35	1.24	1.75	1.26	1.02	0.86	1.04	1.25
Post-secondary or greater	2.18*	1.83*	2.32*	1.99	1.60	1.62	1.72	1.85
Income			x				x	
\$0 to \$19,999	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
\$20,000 to \$39,999	0.77	0.64	0.66	0.96	0.95	0.66	1.03	0.77
\$40,000 to \$59,999	1.18	1.26	1.40	0.65	1.16	0.54	2.82	0.61
\$60,000 to \$79,999	1.05	0.89	1.19	1.15	1.03	0.67	0.79	1.02
\$80,000 or more	1.27	1.08	2.04	1.34	1.47	0.97	2.38	0.96
Missing	0.82	0.62	1.02	1.02	1.21	0.47	1.61	1.16
Employment status								
Full-time	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Part-time	0.92	0.84	0.78	0.94	1.36	0.72	1.90	1.60
Retired	0.66	0.56	0.80	0.74	0.78	0.69	0.99	0.83
Unemployed or not stated	1.02	0.71	1.06	1.25	1.14	0.79	1.76	1.19
<i>Health care supply</i>								
Having regular medical doctor					x	x		x
Yes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
No	1.28	1.63	1.21	1.27	3.02*	3.25*	2.12	4.20*
Province of residence	x		x	x				
Newfoundland	0.65	0.59	0.79	0.87	0.81	0.81	0.54	1.22
Prince Edward Island	0.68	0.55	0.94	0.58	0.89	1.04	0.82	0.98
Nova Scotia	0.59*	0.59	0.54	0.39*	0.74	0.99	0.41	1.03
New Brunswick	0.44*	0.48*	0.30*	0.47	0.92	0.90	0.66	1.17
Quebec	0.97	0.69	1.18	1.23	1.53	1.20	1.21	2.27*
Ontario	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Manitoba	0.86	0.94	0.72	0.55	0.97	1.33	0.34	0.91
Saskatchewan	0.63*	0.63	0.49	0.70	0.71	1.00	0.58	0.56

Alberta	0.64	0.61	0.52	0.54	0.57	0.55	0.76	0.72
British Columbia	0.54*	0.51*	0.51	0.65	0.66	0.68	0.39*	1.16

x indicates statistically significant variable at  $p < 0.01$

\* indicates statistically significant difference from reference category at  $p < 0.01$

† Reference is no chronic condition (OR = 1.00)

‡ COPD = Chronic obstructive pulmonary disorder



Table 4 – Adjusted odds ratios for overall access problems by primary care type

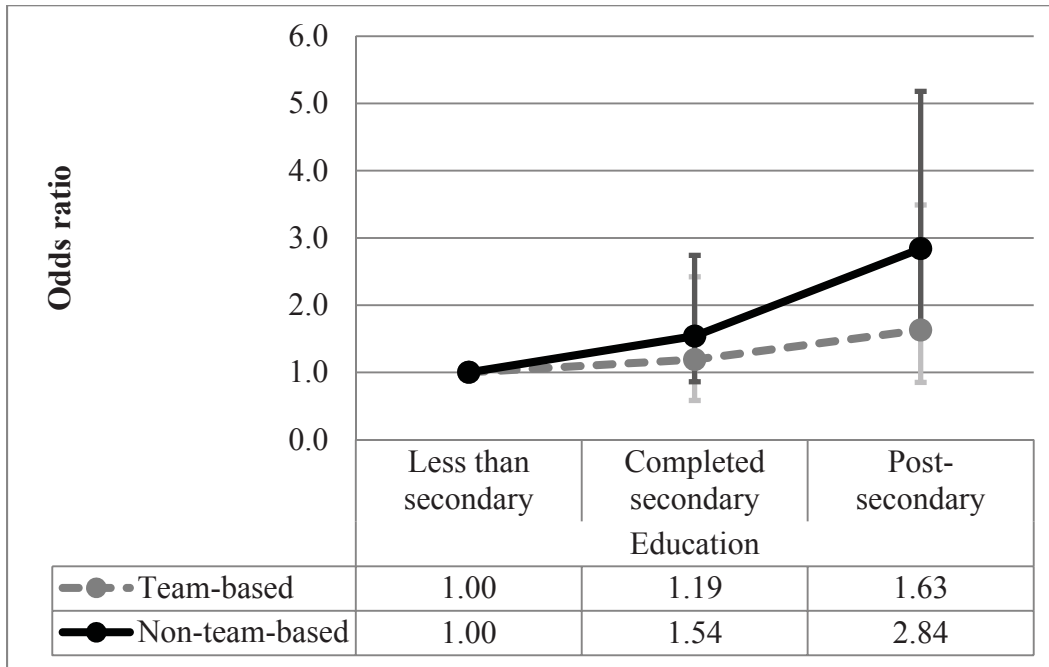
	Overall difficulty in access		Overall self-reported unmet need	
	Team-based primary care	Non-team-primary care	Team-based primary care	Non-team-primary care
<i>Demographic variables</i>				
Age	x	x	x	x
18-24	3.56*	2.89*	6.91*	4.90*
25-44	4.16*	3.17*	5.63*	5.39*
45-64	2.45*	2.31*	2.24	2.51*
65+ (ref)	1.00	1.00	1.00	1.00
Sex		x		
Male (ref)	1.00	1.00	1.00	1.00
Female	1.23	1.65*	1.32	1.48
<i>Health status</i>				
Self-rated health status	x	x	x	x
Excellent (ref)	1.00	1.00	1.00	1.00
Very Good	1.05	2.48*	0.92	2.56*
Good	1.23	2.58*	2.13	4.41*
Fair or Poor	3.18*	4.31*	5.63*	12.15*
Total number of chronic conditions	x	x	x	x
None (ref)	1.00	1.00	1.00	1.00
1	1.61	1.92*	1.32	2.09*
2	3.39*	2.69*	3.78*	1.41
3 or more	4.02*	2.73*	5.54*	2.24*
<i>Socioeconomic status</i>				
Education		x		
Less than secondary (ref)	1.00	1.00	1.00	1.00
Secondary	1.19	1.54	1.03	1.25
Post-secondary or greater	1.63	2.84*	1.73	1.95
Income				
\$0 to \$19,999 (ref)	1.00	1.00	1.00	1.00
\$20,000 to \$39,999	0.63	0.80	0.40	1.49
\$40,000 to \$59,999	1.20	1.06	0.77	1.54
\$60,000 to \$79,999	0.86	1.07	0.61	1.37
\$80,000 or more	1.16	1.22	0.84	2.15
Missing	0.84	0.66	0.97	1.30
Employment status				
Full-time (ref)	1.00	1.00	1.00	1.00
Part-time	0.97	0.89	1.97	1.21

Retired	0.65	0.62	0.62	0.71
Unemployed or not stated	0.82	1.22	0.71	1.58
<i>Health care supply</i>				
Having regular medical doctor			x	x
Yes (ref)	1.00	1.00	1.00	1.00
No	2.04	0.92	4.38*	2.30*
Province of residence	x			
Newfoundland	0.77	0.63	0.77	0.74
Prince Edward Island	0.70	0.62	0.73	1.13
Nova Scotia	0.49	0.64	0.94	0.67
New Brunswick	0.38*	0.48*	0.73	1.04
Quebec	0.89	1.04	1.63	1.44
Ontario (ref)	1.00	1.00	1.00	1.00
Manitoba	1.11	0.81	2.20	0.67
Saskatchewan	0.45*	0.73	0.65	0.75
Alberta	0.56	0.74	0.91	0.46
British Columbia	0.46	0.63	0.85	0.67

x indicates statistically significant variable at  $p < 0.01$

\* indicates statistically significant difference from reference category at  $p < 0.01$

Figure 1- Association between overall difficulty in access and education by primary care type



Solid lines indicate a statistically significant difference across the education categories ( $p < 0.01$ ); dotted lines indicate a statistically non-significant difference across the education categories. 99% confidence intervals are shown by vertical lines.

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## CHAPTER 4- CONCLUSION

The aim of this Master's thesis was to describe and understand primary care access problems in Canada, with a particular emphasis on examining differences between primary care types. Specifically we: (1) described the characteristics of persons reporting primary care access problems in Canada, (2) examined whether team-based primary care was associated with less access problems than non-team-based primary care, either overall or in components, and (3) investigated whether socioeconomic variations in overall access problems were less graded for team-based primary care than for non-team-based primary care.

Our results indicate that team-based primary care is not statistically significantly associated with less access problems, either overall or in components than and non-team-based primary care (objective 2). We did not observe any socioeconomic variations in access problems for team-based primary care but we did for non-team-based primary care (objective 3). Specifically, overall difficulty in access was statistically significantly and positively graded by education for non-team-based primary care. Although we observed greater access problems among younger individuals, women, those with poorer health status, and those with a higher total number of chronic conditions than their counterparts, we discussed the importance of cautious understanding of these findings. They may not be indicative of health policy concern but instead may be influenced by characteristics inadequately controlled for in our analyses that make some respondents more apt to report access problems than others. To conclude I discuss the major strengths and limitations of our study, the policy implications of the results, and direction for future studies.

#### 4.1 STRENGTHS AND LIMITATIONS

The major strengths of this study are that it: (1) provided detailed information about patients' primary care access problems; (2) made good adjustments for potential confounders; and (3) differentiated primary care type.

In addition to examining primary care access problems overall, we distinguished their components. Specifically we examined (1) difficulty in access to: health information or advice, routine or ongoing care, and immediate care and (2) self-reported unmet need due to availability of services, accessibility to services, and acceptability of available services. As with previous studies, we found independent associations of varying magnitudes of effect sizes between certain components of access problems and those who are younger, women, in poorer health status, higher educated, and having no regular MD. We also discussed the importance of considering components of access problems due to potential differences in health policy implications.

When examining systematic variations in access problems it is important to consider if the adjustment for confounders was appropriate. For example, to capture health status, this study went beyond self-rated health status and considered the presence of eleven individual chronic conditions (arthritis, asthma, chronic pain, emphysema or COPD, cancer, depression, mood disorder, diabetes, stroke, heart disease, and high blood pressure or hypertension) and the total number of chronic conditions. Where statistically significant, interaction terms were included in models allowing for the effects of health to vary by age and sex. When health is directly measured and measured well, then we can be confident that other confounders are measuring what they should be. For example, we believe that the socioeconomic associations observed in this study are largely attributable to an individuals' ability to navigate the health care system rather than their health status.

This study differentiated team-based primary care from non-team-based primary care. The CSE-PHC asked respondents if they had nurses or other non-GP health care providers like dieticians and nutritionists regularly involved in their care. These questions allowed us to distinguish team-based primary care from non-team-based primary care. This is a major improvement from past studies that have not been able to differentiate primary care type due to limited data availability in population health surveys that only used the GP to identify those with primary care. Stratifying the sample by primary care type also allowed us to examine the differences in associations between access problems and demographic, health status, socioeconomic status, and health care supply variables.

This study has at least the following seven important limitations: (1) cross-sectional design; (2) self-reported access problems; (3) inability to conduct regional analyses; (4) not adjusting income for household size; (5) inability to include some confounders; (6) possibility of misclassification bias in our definition of team-based primary care; and (7) not estimating standard errors using bootstrap weights.

This study is cross-sectional in design. As such, we are only able to determine correlation between two variables and not causation. The cross-sectional nature also allows for recall bias to be of greater concern as all answers to the survey were self-reported. It is not clear if some respondents would be more apt to reporting their access problems compared to others. As we do not have information on the amount of primary care used (e.g., number of GP visits) we cannot examine if those who report access problems also utilize an abundance of primary care. Due to small sample sizes, we were unable to conduct regional analyses. As a result, we could not stratify our results by province or health district and therefore could not comment on which regions are having the most benefit for team-based primary care.

This study does not adjust the income variable for household size resulting in potential under- or over-estimation of the association between income and access problems. Adjusting income for household size “standardizes” income to more accurately represent the number of persons relying on that income. For example, a household of two persons living on \$50,000 per year is different from a household of ten living on \$50,000 per year. When household size is accounted for, the inequity gap between the richest and poorest may change, however, the direction of this change is unknown and consequently the direction of bias is unknown.

This study does not adjust for some confounders because they were not available. Previous studies control for factors that have been found to be associated with access problems such as immigration status, urban/rural residence, prescription drug insurance, and ethnicity.<sup>1-4</sup> Due to the unavailability of these variables in the CSE-PHC data set we were unable to adjust for these factors which may be responsible for differences between our study and others.

It is possible that some respondents were not able to properly distinguish the professional background of their health care providers leading to misclassification of primary care type. Some respondents may have reported that their care did not involve non-GP health care providers when it did, resulting in misclassification of true team-based primary care as non-team-based primary care. Since some of the assumed positive effect of team-based primary care would be attributable to non-team-based primary care, non-team-based primary care would look artificially better than it is. Alternatively, some respondents may have reported that their primary care did involve non-GP health care providers when it did not, resulting in misclassification of non-team-based primary care as team-based primary care. Since some of the assumed negative effect of non-team-based primary care would be attributable to team-based primary care, making team-based primary care look artificially worse than it is. In either misclassification, potential minimizing of effect sizes between primary care types could lead to smaller or unobservable differences between team-based primary care and non-team-based primary care.

To estimate variance, this study used the linearization (robust variance) method rather than replication methods as recommended by Statistics Canada. Specifically, Statistics Canada recommends the use of the balanced repeated replication [BRR] methods with BRR replicate weights (“bootstrapping with bootstrap weights” in Statistics Canada’s language). These replication weights are only available for the master file of the CSE-PHC and not available for the public file, which this study used. While the linearized/robust variance estimation is considered to be appropriate for studies using a complex survey design<sup>5-7</sup> it typically gives a smaller variance than replication methods. We therefore used a conservative level of statistical significance of  $p < 0.01$ . It is possible that our use of the linearized/robust variance with the conservative statistical significance still underestimated variance (i.e., we interpreted non-statistically significant results as statistically significant) or overestimated variance (i.e., we interpreted statistically significant results as statistically not significant) compared to the recommended variance estimation using replication methods.

## 4.2 POLICY IMPLICATIONS

This study adds to the growing body of research evidence examining the impact of team-based primary care on access problems. Although disappointing not to observe positive impact of team-based primary care, it should also be noted that we did not find negative impact. Health policy decision-makers must remember that the development of team-based primary care in Canada was in its infancy in 2008 when this survey was conducted. It is likely that team-based primary care was not yet well defined and developed to demonstrate meaningful impact. In addition, research methods used to examine complex health service delivery may not yet be able to detect changes in primary care or account for the myriad of influencing factors. Studies such as this one should be repeated as measurement, design, and analytic methods improve so we can continue to measure the impact of team-based primary care.

### 4.3 FUTURE DIRECTIONS

There are several recommendations for future surveys and research into primary care access problems. Future research should differentiate primary care types. Stratifying by primary care type allowed us to show differences between team-based primary care and non-team-based primary care. Moreover, we found that associations between access problems and certain characteristics were more pronounced depending on the primary care type. Differentiation between primary care types will allow better description and understanding of primary care access problems in Canada.

The Canadian Survey of Experiences of Primary Health Care is an excellent source of data for researchers. Future editions of this survey may benefit researchers by asking more in depth questions about respondent's primary care type. Currently only two questions provide researchers with an opportunity to distinguish team-based from non-team-based primary care. Additional questions could ask respondents to identify the specific make-up of their team and about their actual use of team-based primary care. Such questions would allow researchers to distinguish and compare different models of team-based primary care on a variety of processes and outcomes of care.

Results from cross-sectional studies examining processes and outcomes of care associated with team-based primary care, as this study, are only one level of evidence.<sup>8,9</sup> As cross-sectional studies can only examine associations and cannot infer causality, future research should employ more advanced study designs such as longitudinal studies. Although expensive, studies of this nature would provide evidence for associations between team-based primary care and access problems. This evidence would allow for stronger recommendations to be made to provincial and territorial governments on team-based primary care. Conversely, decision makers may instead be interested in broad evaluations of multiple primary care reform initiatives such as changes to remuneration methods,

financial incentives to reward positive outcomes, and implementation of electronic health records. These evaluations could be planned to have a component that evaluates outcomes associated with team-based primary care. Such strategies may prove to be less expensive than conducting a longitudinal study and be more useful to decision makers.

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APPENDIX 1- STUDIES EXAMINING OVERALL GP USE USE

Variable	Relationship to Overall GP use	Adjustment †											Study
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*	
Income	Pro-disadvantaged in males, separately not consistently statistically significant	Dark		Dark	Light	Dark			Dark			Dark	Fell <i>et al.</i> , 2007
	No Association in females, separately	Dark	Dark	Dark	Light	Dark			Dark			Dark	Fell <i>et al.</i> , 2007
	No Association in both sexes combined	Dark	Dark		Light				Dark				Veugelers <i>et al.</i> , 2003
Education	No association in males or females, separately	Dark		Dark	Light	Light			Dark			Dark	Fell <i>et al.</i> , 2007
	No association in both sexes combined	Dark		Dark	Light		Dark	Dark				Dark	Laroche, 2000
Immigrant status	No association in both sexes combined	Dark	Dark	Dark	Light		Light	Dark				Dark	Laroche, 2000
Ethnicity	No association in both sexes combined	Dark	Dark	Dark	Light			Light				Dark	Blais & Maiga, 1999
		Dark	Dark	Dark	Light		Dark	Dark				Dark	Laroche, 2000
Urban or rural residence	No association in both sexes combined	Dark	Dark		Dark				Light				Veugelers <i>et al.</i> , 2003
Regular doctor status	No research identified												
Prescription drug insurance	No research identified												

Dark shaded boxes represent that this factor was adjusted for in a particular study. Lightly shaded boxes represent that this factor is of interest so is not adjusted for. Not shaded boxes represent factors that were not adjusted for in a particular study.

† HS= health status, INC = income, EDU = education, IS = immigrant status, ETH = ethnicity, RES = urban/rural residence, GP = regular GP, PDI = prescription drug insurance, \* for other variables adjusted for see appendix 5

APPENDIX 2- STUDIES EXAMINING PROBABILITY OF GP USE

Variable	Relationship to Probability of use vs. non-use	Adjustment †											Study		
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER *			
Income	Pro-disadvantaged in both sexes combined [↑ Income = ↓ probability]													Sarma & Simpson, 2006	
															Curtis <i>et al.</i> , 2007
	No Association in males or females, separately														Dunlop <i>et al.</i> , 2000
															Mclsaac <i>et al.</i> , 1997
	No Association in both sexes combined														Law <i>et al.</i> , 2005
															Glazier <i>et al.</i> , 2009
Pro-advantaged in both sexes combined [↑ Income = ↑ probability]														Rosenberg & Hanlon, 1996 Asada & Kephart, 2007	
Education	No consistent graded effect size, no consistent statistical significance													Asada & Kephart, 2007	
														Mclsaac <i>et al.</i> , 1997	
	No Association in both sexes combined													Sarma & Simpson, 2006	
														Law <i>et al.</i> , 2005	
														Glazier <i>et al.</i> , 2009	
	Pro-disadvantaged in males or females, separately effect sizes not consistently graded													Dunlop <i>et al.</i> , 2000	
	Pro-disadvantaged in both sexes combined not consistently statistically significant													Allin & Hurley, 2009	
Pro-disadvantaged in both sexes													Allin, 2006		

Variable	Relationship to Probability of use vs. non-use	Adjustment †											Study	
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*		
	combined [↑ Education = ↑ probability]													Curtis & MacMinn, 2007
Immigrant status	Pro-disadvantaged for any Immigrant in both sexes combined [Any Immigrant = ↑ probability]													Allin & Hurley, 2009
	No association for any immigrant in males or females, separately													Dunlop <i>et al.</i> , 2000
	Pro-disadvantaged for new immigrant < 10 yrs in both sexes combined [New Immigrant < 10 yrs = ↑ probability]													Wen, Goel, & Williams, 1996
	No association for new < 10 yrs or old Immigrant > 10 yrs in both sexes combined													Curtis & MacMinn, 2007
	No association for new < 10 yrs or old Immigrant > 10 yrs in both sexes combined													Sarma & Simpson, 2006
	No association for old immigrants in both sexes combined													Wen <i>et al.</i> , 1996
														Curtis & MacMinn, 2007
Ethnicity	Pro-Disadvantaged in both sexes combined													Quan <i>et al.</i> , 2006
	Visible Minority = ↑ probability													Asada & Kephart, 2007
Urban or rural residence	No Association in both sexes combined													Rosenberg & Hanlon, 1996
														Law <i>et al.</i> , 2005
														Glazier <i>et al.</i> , 2009
	Pro-advantaged in males or females, separately													Dunlop <i>et al.</i> , 2000
	Pro-advantaged in both sexes combined [Urban = ↑ probability]													Allin & Hurley, 2009
														Sarma & Simpson, 2006

Variable	Relationship to Probability of use vs. non-use	Adjustment †											Study
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*	
Regular doctor status	Pro-advantaged in males or females, separately [Regular GP = ↑ probability]	Dark	Light	Dark	Dark	Dark	Dark	Light	Dark	Light	Light	Dark	Dunlop <i>et al.</i> , 2000
Prescription drug insurance	Pro-advantaged in both sexes combined [Have insurance = ↑ probability]	Dark	Dark	Dark	Dark	Dark	Dark	Light	Dark	Light	Light	Dark	Allin & Hurley, 2009
		Dark	Dark	Dark	Dark	Dark	Light	Light	Light	Dark		S. Allin, 2006	
		Dark	Dark	Dark	Dark	Dark	Dark	Light	Dark	Light	Dark	Sarma & Simpson, 2006	

Dark shaded boxes represent that this factor was adjusted for in a particular study. Lightly shaded boxes represent that this factor is of interest so is not adjusted for. Not shaded boxes represent factors that were not adjusted for in a particular study.

† HS= health status, INC = income, EDU = education, IS = immigrant status, ETH = ethnicity, RES = urban/rural residence, GP = regular GP, PDI = prescription drug insurance, \* for other variables adjusted for see appendix 5

APPENDIX 3- STUDIES EXAMINING FREQUENCY OF GP USE

Variable	Relationship to Frequency among users	Adjustment †											Study	
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER *		
Income	Pro-disadvantaged in both sexes combined [↑ Income= ↓ frequency]													Asada & Kephart, 2007
														Curtis & MacMinn, 2007
														Glazier <i>et al.</i> , 2009
	Pro-disadvantaged in females, separately													McIsaac <i>et al.</i> , 1997
	No association in males, separately													McIsaac <i>et al.</i> , 1997
	No association in males or females, separately													Dunlop <i>et al.</i> , 2000
Education	No association in both sexes combined													Sarma & Simpson, 2006
	Pro-disadvantaged in males or females, separately													McIsaac <i>et al.</i> , 1997
														Asada & Kephart, 2007
	Pro-disadvantaged in both sexes combined [↑ Education= ↓ frequency]													Glazier <i>et al.</i> , 2009
	No consistent graded effect size, no consistent statistical significance													Curtis & MacMinn, 2007
	No association in males or females, separately													Dunlop <i>et al.</i> , 2000
No association in both sexes combined													Allin & Hurley, 2009	
													Sarma & Simpson, 2006	

Variable	Relationship to Frequency among users	Adjustment †											Study	
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*		
Immigrant status	Pro-advantaged in both sexes combined													Curtis & MacMinn, 2007
	No association in both sexes combined													Allin & Hurley, 2009
	No association in males or females, separately													Dunlop <i>et al.</i> , 2000
	Pro-disadvantaged in both sexes combined													Sarma & Simpson, 2006
Ethnicity	Pro-disadvantaged in both sexes combined [Visible Minority = ↑ frequency]													Asada & Kephart, 2007
Urban or rural residence	No Association in both sexes combined													Allin & Hurley, 2009
	No Association in females, separately													Dunlop <i>et al.</i> , 2000
	Pro-advantaged in males, separately													Dunlop <i>et al.</i> , 2000
	Pro-advantaged in both sexes combined [Urban = ↑ frequency]													Sarma & Simpson, 2006
														Glazier <i>et al.</i> , 2009
Regular doctor status	Pro-advantaged in males/females, separately [Reg. GP = ↑ frequency]													Dunlop <i>et al.</i> , 2000
Prescription drug insurance	Pro-advantaged in both sexes combined													Allin & Hurley, 2009
	[Have insurance = ↑ frequency]													Sarma & Simpson, 2006

Dark shaded boxes represent that this factor was adjusted for in a particular study. Lightly shaded boxes represent that this factor is of interest so is not adjusted for. Not shaded boxes represent factors that were not adjusted for in a particular study.

† HS= health status, INC = income, EDU = education, IS = immigrant status, ETH = ethnicity, RES = urban/rural residence, GP = regular GP, PDI = prescription drug insurance, \* for other variables adjusted for see appendix 5

APPENDIX 4- STUDIES EXAMINING SELF-REPORTED UNMET NEED

Variable	Relationship	Adjustment †											Study	
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*		
Age	↑ Age = ↓ unmet need													Hanley, 2009
														Kasman & Badley, 2004
														Sibley & Glazier, 2009
														Sanmartin & Ross, 2006
	↑ Age = ↓ unmet need related to accessibility												Law <i>et al.</i> , 2005	
	No association to unmet need related to availability/ acceptability												Chen & Hou, 2002	
Sex	Women = ↑ unmet need													Hanley, 2009
														Kasman & Badley, 2004
														Hurley <i>et al.</i> , 2008
														Sibley & Glazier, 2009
														Sanmartin & Ross, 2006
	No association												Law <i>et al.</i> , 2005	
	No association to unmet need related to availability, accessibility, or acceptability												Chen & Hou, 2002	
Health status	↓ Health status = ↑ unmet need													Hanley, 2009
														Kasman & Badley, 2004



Variable	Relationship	Adjustment †											Study	
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*		
														Hurley <i>et al.</i> , 2008
														Sibley & Glazier, 2009
														Sanmartin & Ross, 2006
														Law <i>et al.</i> , 2005
	↓ Health status = ↑ unmet need related to availability/acceptability													Chen & Hou, 2002
No association to unmet need related to accessibility													Chen & Hou, 2002	
Income	No association													Kasman & Badley, 2004
														Hurley <i>et al.</i> , 2008
														Sanmartin & Ross, 2006
														Law <i>et al.</i> , 2005
	Income = potential ↓unmet need trend not consistent													Hanley, 2009
	↑Income = ↓unmet need													Lasser <i>et al.</i> , 2006
	↑Income = ↓unmet need related to accessibility													Sibley & Glazier, 2009
	No association with unmet need related to availability/acceptability													Chen & Hou, 2002
Education	↑Education = potential ↑unmet need trend not consistent													Hanley, 2009
														Sibley & Glazier, 2009
														Hurley <i>et al.</i> , 2008

Variable	Relationship	Adjustment †											Study	
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*		
	↑ Education = ↑ unmet need													Kasman & Badley, 2004
														Sanmartin & Ross, 2006
	No Association													Law <i>et al.</i> , 2005
	No association to unmet need related to availability, accessibility, or acceptability													Chen & Hou, 2002
Immigrant status	No association													Lasser <i>et al.</i> , 2006
	Immigrants = ↓ unmet need													Sanmartin & Ross, 2006
														Wu, Penning, & Schimmele, 2005
														Hurley <i>et al.</i> , 2008
	No association to unmet need related to availability, accessibility, or acceptability													Chen & Hou, 2002
Ethnicity	No relationship													Sibley & Glazier, 2009
	Being white = ↑ unmet need													Kasman & Badley, 2004
Urban or rural residence	No relationship													Sanmartin & Ross, 2006
	Rural = ↓ unmet needs													Sibley & Glazier, 2009
														Sibley & Weiner, 2011
														Hurley <i>et al.</i> , 2008
														Law <i>et al.</i> , 2005

Variable	Relationship	Adjustment †											Study	
		AGE	SEX	HS	INC	EDU	IS	ETH	RES	GP	PDI	OTHER*		
	No association to unmet need related to availability, accessibility, or acceptability													Chen & Hou, 2002
Regular doctor status	No regular GP = ↑unmet need													Talbot <i>et al.</i> , 2001
														Sibley & Glazier, 2009
														Sanmartin & Ross, 2006
Drug insurance	No insurance = ↑ unmet need													Hanley, 2009
														Sibley & Glazier, 2009

Dark shaded boxes represent that this factor was adjusted for in a particular study. Lightly shaded boxes represent that this factor is of interest so is not adjusted for. Not shaded boxes represent factors that were not adjusted for in a particular study.

† HS= health status, INC = income, EDU = education, IS = immigrant status, ETH = ethnicity, RES = urban/rural residence, GP = regular GP, PDI = prescription drug insurance, \* for other variables adjusted for see appendix 5

APPENDIX 5- OTHER VARIABLES ADJUSTED FOR IN STUDIES

<b>Study</b>	<b>*Other Factors</b>
Sibley & Glazier, 2009	marital status and occupational class
Chen & Hou, 2002	marital status, employment status, aboriginal status, GP/specialist consultations in past year, doctor's authority score, self-care score, chronic conditions/pain
Sanmartin & Ross, 2006	region of Canada, number of children, lone-parent status, job status, and some restriction of activities
Wu <i>et al.</i> , 2005	years in Canada, marital status
Sibley & Weiner, 2011	marital status, occupational class
Kasman & Badley, 2004	three or more consultations with a GP, at least one consultation with a specialist or physiotherapist. Health status included long-term disability, two-week disability, pain, number of chronic conditions, and self-reported health
Hurley J., Jamal T., Grignon M. and S. Allin,	health-related behaviors smoking, drinking, marital status, employment status
Law <i>et al.</i> , 2005	Live alone, language spoken at home, GP visit time, emotional distress, chronic conditions
S. Allin, 2008	employment status, activity status
Asada & Kephart, 2007	Home ownership, belonging to community, stress levels, types of chronic conditions, smoking status, alcohol consumption, eating lifestyle, province of residence
van Doorslaer <i>et al.</i> , 2006	degree of limitation, activity status
S. Allin & Hurley, 2009	employment status, activity limitations
Jimenez-Rubio <i>et al.</i> , 2008	economic status, province of residence
Dunlop <i>et al.</i> , 2000	Marital status, children, employment status, region, household smokers, alcohol consumption, physical activity index.
Rice & Smith, 2001	employment status, health region of residence within province,
McIsaac <i>et al.</i> , 1997	marital status, immigration status men only, physical activity, smoking
Quan <i>et al.</i> , 2006	marital status, length of stay in Canada, speaking English or French
van Doorslaer <i>et al.</i> , 2002	province of residence
Fell <i>et al.</i> , 2007	work hours, occupation, province of residence, number of chronic conditions, multiple jobs, marital status, restricted activity, smoking, BMI, alcohol use, and physical activity.
Sarma & Simpson, 2006	marital status, physical activity level, number of chronic conditions, alcohol consumption, smoking status, province of residence
Blais & Maiga, 1999	level of access to teaching hospitals
Law <i>et al.</i> , 2005	language spoken at home, living alone, emotional distress, chronic conditions
Veugelers <i>et al.</i> , 2003	life expectancy
Laroche, 2000	labour force status, marital status, number of children, province of residence, occupation, province, smoking status, weight, language
L. Curtis and W. MacMinn, 2007	labour force participation, marital status, smoking, activity levels, heavy drinking, negative health behaviours, province of residence.
Glazier, <i>et al.</i> 2009	Chronic conditions, aggregated diagnosis groups, resource utilization groups, disability

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