Examining Unmet Healthcare Needs by Immigration Status among Canadian Adults

by

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Abstract

Immigrants have 18% lower risk of reporting unmet healthcare needs compared to non-immigrants which can be explained by the "healthy immigrant effect", whereby the health of immigrants is better at the time of arrival and gradually deteriorates and converges with the Canadian-born population. People with high unmet healthcare needs are higher utilizers of health services. There was no information on how (and if) unmet healthcare needs predict health service utilization and its impact on life satisfaction among immigrant populations and if the relationship varies by length of stay in Canada. The study objectives were to: 1) estimate and compare reported unmet healthcare needs by immigration status. 2) estimate and compare reasons for reported unmet healthcare needs by immigration status; 3) examine relationship between unmet healthcare needs and health service utilization by immigration status. 4) examine relationship between unmet healthcare needs and life satisfaction by immigration status. 5) determine if there is a significant association between health service utilization and life satisfaction by immigration status, controlling for unmet healthcare needs. This was a secondary analysis of cross-sectional data from the Canadian Community Health Survey, cycle 2014 master data file. Individuals who were 18 years of age and older at the time of survey were included and divided into three groups based upon their years of residence in Canada: 1) recent immigrants (≤ 5 years); 2) Long-term immigrants (>5 years); and 3) Canadian-born population. Results indicated that Canadian-born population reported a significantly higher proportion of unmet healthcare needs followed by recent-immigrants and long-term immigrants. "Cost" was the most commonly reported reason for unmet healthcare need among recent immigrants and third most common among long-term immigrants and non-immigrants. Individuals with unmet healthcare needs were more likely to use physician services and reported low life satisfaction after adjusting for demographics and

health-related characteristics. Individuals who used dental services were less likely to report unmet healthcare needs and low life satisfaction after adjusting for demographics and health-related characteristics. This study focuses on challenges accessing health services, especially, by immigrant population and has the potential to inform policy implications to address barriers accounting for health inequity.

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Dedication

To my beloved parents,

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And to my brother,

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Chapter 1: Introduction

Immigrants account for about 22% (7.5 million) of the population in Canada and this proportion was estimated to be the highest in the past century (Statistics Canada, 2017a). In 2017-18, international migration resulted in 80% of the overall population growth in Canada (Immigration, Refugees and Citizenship Canada, 2018). Owing to a large number of people immigrating to Canada, it is important to study its effects on the Canadian population in general. In the context of immigration to Canada, and the immigrant population, the focus has mostly been on studying economic and social burden on the society that immigration comes with, and less on health-related needs and well-being of the immigrant families themselves (Wu, Penning, & Schimmele, 2005). The escalating growth of immigrants raises policy concerns as their health is an important determinant of the health of Canadians at the population-level (McDonald & Kennedy, 2004). Keeping in mind, the egalitarian approach that emphasizes equal rights and opportunities for all (Emery & Kneebone, 2013), it is important to understand how migration affects access to health services.

According to the Canada Health Act (Government of Canada, 2018), all the Canadians are entitled to equitable access to health services regardless of where in Canada they live. The term "health equity" prohibits discrimination for accessing health services and other determinants of health on the basis of gender, race, ethnic origin, disability, etc. (Jackson & Huston, 2016). Although Canada has a publicly-funded healthcare system, where residents of Canada have access to free primary healthcare, the issue of inequitable access to healthcare is significantly prominent (National Collaborating Centre for Aboriginal Health, 2011). A commonly used indicator to indicate difficulties that people face while accessing health services is self-reported unmet healthcare needs (Organization for economic co-operation and development, 2012;

Ronksley et al., 2012). Unmet healthcare need can be defined as either an insufficient or untimely treatment to a health problem (Wu et al., 2005). The proportion of Canadians reporting unmet healthcare needs has almost tripled between 1994-95 and 2000-01 (Sibley & Glazier, 2009; Wojkowski, Richardson, Chowhan, Boyle, & Birch, 2016). This is especially noteworthy as it indicates the presence of issues related to limited access to health services (Wu et al., 2005). There are various reasons for reported unmet healthcare needs and they are mainly grouped as barriers related to "availability", "acceptability" and "affordability". (Sibley & Glazier, 2009; Wojkowski et al., 2016). These are explained in detail in further sections.

Previous research has shown that there are significant differences in the reported unmet healthcare needs among immigrants and non-immigrants. Although according to Statistics Canada's report on unmet healthcare needs (2016), the difference in the proportion of unmet healthcare needs by immigration status is insignificant, it is important to study unmet healthcare needs depending upon immigration status because reasons for unmet healthcare needs are specific to each individual. Moreover, this study examines unmet needs based upon the years of residence in Canada in order to reflect how they change over time which was reflected in this report. Differences in their ethnic composition, socio-economic status, stress levels, social support and other help-seeking characteristics may form grounds in their variations of reported unmet healthcare needs which may also lead to the differences in their patterns of health services' utilization among immigrants and non-immigrants (Allin, Grignon, & Le Grand, 2010; Wu et al., 2005). The prevalence of unmet healthcare needs is found to be higher among certain population groups like females, those with poor health status, low-income groups and those living with chronic health conditions (Guend & Tesseron, 2009). It is also found that individuals reporting higher unmet healthcare needs are also higher service utilizers compared to those who

have reported no unmet healthcare needs (Barham, Bataineh, & Devlin, 2017). To have a better understanding of these variations among different groups of population in Canada and problems pertaining to health inequity, it is important to examine unmet healthcare needs and healthcare utilization. According to the Canadian Institute for Health Information (Canadian Institute for Health Information, 2019) measuring and understanding health inequity is an important step towards facilitating health equity. This study mainly focuses on reported unmet healthcare needs and underlying factors among the immigrant and non-immigrant groups of population in Canada and whether these are related to their length of stay in Canada.

This study also aims at understanding life satisfaction which is an indicator of physical and mental well-being, wherein people who report good physical and mental health are more likely to be satisfied with their life compared to those who have poor physical and/or mental health (Prasoon & Chaturvedi, 2016; Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008). Prior studies found that unmet healthcare needs are more prevalent among those with poor health status (Barham et al., 2017; Chen et al., 2002; Guend & Tesseron, 2009; Law et al., 2005; Sibley & Glazier, 2009; Wojkowski et al., 2016). Less is known about the association between reported unmet healthcare needs, and individual's life satisfaction, or their use of health services. To the best of my knowledge, no study has investigated the association between reported unmet healthcare needs and life satisfaction and health services' use by immigration status among Canadians.

Study Purpose

The overall goal of this study was to explore the association between reported unmet healthcare needs with health services' use and life satisfaction among Canadians using data from a national health survey by immigration status and length of stay in Canada.

Study Objectives

The five specific objectives of this research were to:

1) estimate and compare the proportion of population who reported unmet healthcare needs by immigration status.
2) compare reasons for reported unmet healthcare needs by immigration status.
3) examine the relationship between reported unmet healthcare needs and health service utilization by immigration status.
4) examine the relationship between unmet healthcare needs and life satisfaction by immigration status.
5) determine if there is a significant association between health service use and individuals' life satisfaction, controlling for reported unmet healthcare needs by immigration status.

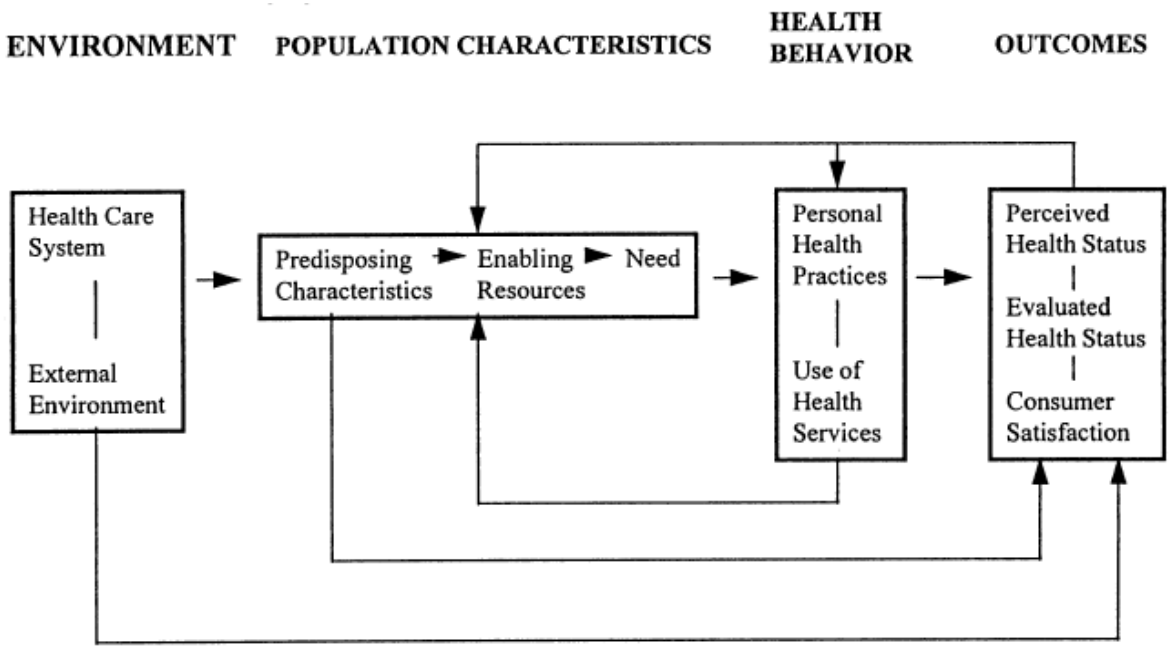
The scope of this study is to broaden the current knowledge on challenges and barriers for immigrants to access health services that they need. The knowledge gained can be used for the development of policies and programs that would help with more equitable access to services. As a result, it will assist in promoting the health and life satisfaction of all Canadians including those who are new and long-term immigrants to Canada.

Conceptual Framework

The study utilized Andersen and Newman framework of health service utilization as the theoretical framework. This model has been used to study health service use among Canadian general population and is one of the most commonly used models (Andersen, 1995; McDonald & Conde, 2010). This model is also the most influential and accepted model for examining health service utilization, and related unmet needs among immigrants (Yang & Hwang, 2016).

There are several studies on the immigrant population that have used this model (Akresh, 2009; S. Lee, Choi, & Jung, 2014; Vargas Bustamante et al., 2012; Wu et al., 2005). The Andersen and Newman's model of health service was first developed in 1960 and there have been four revisions. It was mainly developed to understand the utilization of health services by families, to define and measure equitable access to healthcare and to develop policies promoting equitable access (Andersen, 1995). Andersen's model suggests that "people's use of health services is a function of their predisposition to use services, factors which enable or impede use, and their need for care" (Andersen, 1995, pg. 1). For the purpose of this study, we will use this model as the conceptual framework. **(Figure 1)**

Figure 1 – Andersen and Newman Framework of Health Service Utilization.



Andersen, R. (1995). Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7738325

An individual's access to and use of health services is influenced by three factors. Predisposing characteristics (demographic, health beliefs and social structure) that mainly include age, sex, education, ethnicity and they influence the individual's likelihood to use healthcare. Enabling resources comprise all the factors that facilitate health service use like factors pertaining to healthcare facility or healthcare personnel, income, health insurance, urban/rural location, etc. Perceived need is individual's self-assessment of his/her need to seek medical help or utilize health services, which is found to be associated with factors such as presence of chronic health condition, level of stress, self-rated health status etc. (Aday & Andersen, 1974; Andersen & Newman, 2005; Anderson, 1995). Andersen (1995) has explained a concept of mutability, whereby, a variable is considered as mutable based upon its extent of promoting equitable access and directing towards policy changes that might affect utilization of health services. He labeled predisposing characteristics to have "low" mutability as demographic factors (age, sex) or ethnicity etc. cannot be readily altered and labeled enabling factors to be of "high" mutability. Need factors were viewed to have "low" mutability as they are basically the immediate reasons to seek care.

There are other models like sociological model (Parsons, 1951), socio-psychological model (Stoeckle, Zola, & Davidson, 1963), institutional models (Koopman et al., 2002), etc. but they do not focus as extensively on individual factors as Andersen's model (Yang & Hwang, 2016). We examine the relationship between unmet healthcare needs and health service utilization with a series of regression models using Anderson's theoretical framework. This model helped in selecting predictor variables to be included in a series for the multivariate regression models.

Chapter 2: Literature Review

This section provides an overview of current research related to reported unmet healthcare needs among Canadian adults and its relationship with health service utilization and life satisfaction by immigration status. The relevant literature review is summarized and discussed in six sections. In the first section, an overview of the Canadian population and the extent of immigration is provided. The second section is focused on the health of immigrants in Canada and the healthy immigrant effect. The third section provides an overview of the Canadian healthcare system and the provincial variations in the coverage and services provided. In the fourth section, prevalence, and reasons for reported unmet healthcare needs among Canadians are reviewed. The fifth section summarizes studies that examined the association between reported unmet healthcare needs and health service utilization. In the last section, a summary of the literature on the association between reported unmet healthcare needs and life satisfaction is provided.

2.1: Canadian Population and the Extent of Immigration

Immigration is the process by which people migrate to Canada to reside there. There are four categories of immigrants in Canada: economic immigrants, family-class, refugees and others (Statistics Canada, 2019a). According to the 2016 census, approximately 22% of the Canadian population was foreign-born compared to 20.6% in 2011, 19.8% in 2006 and 18.5% in 2004 (Statistics Canada, 2017b). The rate of immigration has been exponentially rising since 1951-1991 when it ranged from 14.7% to 16.1% and is expected to reach between 24.5% to 30.0 % by 2036 (Statistics Canada, 2017b). According to the 2016 population Census, almost

two-thirds of newly-arrived immigrants to Canada are from Asia (61.8%), followed by Africa (13.4%) and Europe. More than half of the total immigrant population resides in Toronto, Vancouver, and Montreal and the remaining population mainly settles down in Prairies and in the Atlantic provinces (Statistics Canada, 2017c). According to the National Household Survey (Statistics Canada, 2013), Canada has the highest proportion of foreign-born population among the G8 countries and second highest after Australia, outside G8 countries.

To measure and maintain the adequacy of the Canadian healthcare system it is imperative to account for the diversity in terms of the socio-demographic and ethno-cultural characteristics of the Canadian population. Prior studies (e.g., Lu & Ng, 2019) found that recent immigrants are relatively younger than their Canadian born counterparts. A higher proportion of immigrant men are also found to be married and have higher education compared to non-immigrants, but lower household income than Canadian born men. A lower proportion of female immigrants were employed than Canadian-born females. On the contrary, more male immigrants were employed compared to Canadian-born males. It was also observed that immigrants regardless of gender were less likely to be smokers and more likely to be physically inactive compared to the native-born population.

2.2: Health of Immigrants and Healthy Immigrant Effect

The recent upsurge in the proportion of Immigrants entering the country has brought some concerns over their social and economic adaptation to the society in a fashion similar to that of immigrants in the previous years (Card, 2005). The growing number of immigrants has potential implications for health practitioners, health systems and the health of individuals (Gushulak, Pottie, Hatcher Roberts, Torres, & DesMeules, 2011). According to the National

Health Expenditure Trends, the average total health expenditure rate is rising by 1.7% every year. Out of which, in 2016, the out-of-pocket health expenditure rate increased by 4.6% annually (CIHI, 2018). It is hypothesized that the experience of migration has an impact on the health status of immigrants (Glaesmer et al., 2011). A common phenomenon "healthy immigrant effect" as explained by studies done mainly in Canada, USA and Australia finds that the health status of immigrants is better at the time of arrival but it subsequently diminishes and converges with the native-born population (Kennedy, Kidd, McDonald, & Biddle, 2015; Lu & Ng, 2019; McDonald & Kennedy, 2004; Newbold & Filice, 2007; Ng, Wilkins, Gendron, & Berthelot, 2005). A study that was done by Chui (2003) using data from the first wave of LSIC (Longitudinal Survey of Immigrants to Canada) reported that about six months after their arrival, 97% immigrants rated their health as good, very good or excellent, in contrast to, 88% of Canadian population overall. In another study by Setia and colleagues (2011) analyzed three waves (2001-2004) of LSIC data and reported increased proportions of immigrants rating their health as poor in subsequent waves.

Kennedy and colleagues in 2014 compared the phenomenon of "healthy immigrant effect" in four countries – USA, UK, Canada, and Australia and found that immigrants from developed countries were comparatively healthier than the native-born population of both their destination country as well as home country, in spite of having differences in the immigration policy of each country. They also found that immigrants from both developed and developing countries were less likely to have a chronic condition, less likely to smoke, less likely to be obese and had better self-reported health status compared to the host population of the four countries even after accounting for observable differences. The healthy immigrant effect is stronger for immigrants from developing countries compared to developed countries (Kennedy et al., 2015).

There are several possible explanations for this pattern of variation in health status among immigrants. Positive selection means individuals who have better educational attainment and are more skilled have more chances of getting an entry by immigration officials and self-selection means applicants who are in good health and believe they are a better fit to migrate. Both positive selection and self-selection may give rise to "healthy immigrant effect" (Kennedy et al., 2015). However, on the flip side, findings from European studies show that immigrants have a poorer health status compared to the natives in France, Belgium and Spain, whereas immigrants report a better health status compared to the natives in Italy after controlling for socio-economic status (Moullan & Jusot, 2014).

Despite the fact that immigrants have to undergo a systematic selection through medical screening before being admitted to Canada that disqualifies those with serious medical conditions (Lu & Ng, 2019; K. B. Newbold & Filice, 2007), immigration legislation does not guarantee the maintenance of health status over time (Laroche, 2000). Difficulties while adjusting to a new environment, adoption of risky health behaviors, issues securing employment, increased stress levels due to financial constraints, lack of social support network, are some of the common factors that may take a toll on the well-being of immigrants (Lu & Ng, 2019; Ng et al., 2005; Vang, Sigouin, Flenon, & Gagnon, 2015). Poor access to healthcare is considered as a major contributing factor affecting the health advantage of immigrants (Setia, Quesnel-Vallee, Abrahamowicz, Tousignant, & Lynch, 2011). Riedel (1998)in his study has thrown light over some of the barriers to healthcare access among immigrants. Structural barriers involve immigrants who arrive from the source country having a totally distinct healthcare system, may find understanding the inner workings of the new healthcare system challenging (Duleep & Dowhan, 2008). Institutional barriers like immigrants who arrive from

developing countries tend to have lower income levels, which may arise financial constraints making healthcare-seeking a lower priority task (DeVoretz, C.D. Howe Institute., & Laurier Institution., 1995). Language problems like difficulty in conveying their symptoms to healthcare professionals (R. Lee, Rodin, Devins, & Weiss, 2001), personal beliefs like the use of traditional practices as a healthcare measure or biases among healthcare providers etc. form cultural and personal barriers (Edge & Newbold, 2013; Kuo & Torres-Gil, 2001).

Based upon the available literature it can be reiterated that issues pertaining to healthcare access tend to be more common among recent immigrants and they gradually improve among long-term immigrants depending upon their length of stay in Canada and gets similar to that of the native-born population.

2.3 Canadian Healthcare System and Provincial Variations

The main objective of the Canadian healthcare system is to provide universal coverage for "medically necessary" health services on the basis of need rather than the ability to pay (Government of Canada, 2017). The basic value of the Canadian health policy is to protect, promote and restore the physical and mental health of all the residents and to ensure equal access to healthcare services (Allin, 2008). The organization of the Canadian healthcare system is governed by both federal and provincial and territorial governments. The actual enactment of the Canadian health policy occurs at the provincial level as the provincial government is primarily responsible for planning and funding most health services and supervising providers (Government of Canada, 2017). Many provinces have established regional health authorities that plan and deliver publicly funded services locally. The federal government on the other hand, co-finances provincial and territorial governments in providing medically necessary

services (hospital, physician and diagnostic services) on a prepaid basis, without having to pay out of pocket. “Medically necessary services” are not defined in the Canada Health Act. It is entirely up to the provincial and territorial government to decide in consultation with their physician colleges or groups as to which services are covered under public health insurance (Government of Canada, 2017). The list of insured services and the generosity of coverage evolves over time and is dependent on the economic burden and budget pressures of provincial governments (Emery & Kneebone, 2013). Hence, as these pressures differ by provinces, the services under the rim of medically necessary, change over time and place. Provincial insurance mainly covers physician and hospital services but services such as prescription drugs, home care, long-term care, and the services for non-physician providers such as physiotherapists, chiropractors, etc. vary from one province to another (Hutchison, Levesque, Strumpf, & Coyle, 2011). The majority of individuals who are not covered in a provincial plan are privately insured through employer-sponsored insurance (Allin, 2008). However, those who do not have adequate coverage may have to bear the additional cost of healthcare out of pocket.

This section will describe the four most commonly used health services by residents in Canada in terms of their coverage under the public health insurance:

Hospital services. The majority of hospital services are under universal coverage and are regulated by provincial and territorial health authorities. Most provinces that have their regional health authorities, the hospitals are funded through an annual budget as opposed to fee-for-service charges. However, in Ontario, they are predominantly privately funded non-profit organizations, but insured residents are fully covered for the in-patient services (Government of Canada, 2017).

Physician services. The majority of physician services are covered under public insurance.

Canadians are entitled to see a physician for medically necessary care without having to pay out of pocket. (Government of Canada, 2017).

Dental and physiotherapy services. Most dentists and physiotherapists work in the private sector and their services are not covered under public insurance, except when these services are used during a hospital stay like dental surgery or in-patient physiotherapy services are covered publicly (Government of Canada, 2017). Provinces and territories provide supplementary coverage to certain groups of people (elders, children, low-income residents) for services that are not covered under public insurance, but the coverage varies across the country.

2.4 Prevalence and Reasons for Reported Unmet Healthcare Needs

Unmet healthcare need refers to the gap between medically necessary services and actual treatment received for a specific health problem (Sanmartin, Houle, Tremblay, & Berthelot, 2002). Previous research has shown that the proportion of Canadians who reported that they did not receive healthcare they thought they needed, meaning those who reported unmet healthcare needs saw a rise from 4.2% in 1994-95, 5.1% in 1996-97, 6.3% in 1998-99 to 12.5% in 2000-01 (Sibley & Glazier, 2009; Wojkowski et al., 2016). Comparing the global statistics of reported unmet healthcare needs, it was found that almost 19% of the US adult population reported unmet healthcare needs in 2008 (Hargreaves, Elliott, Viner, Richmond, & Schuster, 2015). However, another article that studied 28 European countries found that 26.5% (almost a quarter) of the population aged 15 years and older reported unmet healthcare needs in 2014 (Eurostat, 2018). The proportion for reported unmet healthcare needs was quite high among the Korean population too, comprising almost 23% of the total adult population studied in 2012

(Hwang, 2018). Recently, a report published by Statistics Canada (2016), observed that some population groups like young adults are more prone to reporting unmet healthcare needs. **Table 1** provides a list of different population groups and their corresponding proportions of self-reported unmet healthcare needs (Statistics Canada, 2016).

Table 1: Proportions of reported unmet healthcare needs among different population groups in Canada.

Population Groups	Unmet healthcare needs (%)
Overall population	11.2
Gender	
• Male	10.0
• Female	12.4
Income level	
• Low income	12.8
• Middle or higher income	10.2
Province	
• Yukon (Highest)	16.9
• Newfoundland (Lowest)	7.9
Geographic region	
• Urban	11.4
• Rural	10.4
Aboriginal status	
• Aboriginal	16.2
• Non-Aboriginal	11.2
Immigration status	
• Immigrant	10.5
• Non-immigrant	11.5
Medical doctor	
• Has a regular doctor	10.0
• No regular doctor	18.2
Chronic condition	
• At least one chronic condition	14.0
• No chronic condition	7.6

Source: Statistics Canada (2016)

Other than the above-mentioned factors, lack of insurance coverage, unemployment, high education attainment, and poor health status are some other factors that predict the occurrence

of unmet healthcare needs (Barham et al., 2017; Chen et al., 2002; Guend & Tesseron, 2009; Law et al., 2005; Pappa et al., 2013; Sibley & Glazier, 2009; Wojkowski et al., 2016). It is also observed that unmet healthcare needs may adversely affect the quality of life and increase the risk of mortality (Alonso, Orfila, Ruigómez, Ferrer, & Antó, 1997; McCarberg, Nicholson, Todd, Palmer, & Penles, 2008). Several factors are related to the increase in the reported unmet healthcare needs over time such as a change in health reforms like fiscal restraint, downsizing, budget cuts, etc. Unmet healthcare needs may also be affected by the uneven distribution of resources across provinces, delivery of specific services or availability of general practitioners or specialists in a particular area (Sanmartin et al., 2002).

There could be more than one reason responsible for reporting unmet healthcare needs and the existing literature categorizes them in mainly three broad headings **(Table 2)**:

Availability. Physical access to services (i.e. care can be received at the time of need). This category of reasons has the strongest policy implications as they can be potentially altered by government or health authorities (Sibley & Glazier, 2009; Wojkowski et al., 2016).

Acceptability. Cultural access to services, i.e. the fit between the patient and the provider, person's attitude towards healthcare (Sibley & Glazier, 2009; Wojkowski et al., 2016). The more patients trusted their doctors, the lower odds of reporting unmet healthcare needs because of this reason (Chen et al., 2002). These can also be described as the acceptability of available services relating to personal preferences or circumstances of individuals (Sibley & Glazier, 2009). As these reasons are more related to personal characteristics, their policy implications are unclear.

Affordability. Financial access or the ability to pay for services. Not all services are not covered under universal insurance, like prescription drugs or services outside third party

coverage and thus these have policy implications (Sibley & Glazier, 2009; Wojkowski et al., 2016).

Table 2: Reasons for unmet healthcare needs.

Availability	Acceptability	Affordability
Care not available in the area.	Felt would receive inadequate care.	Cost
Care not available at the time required (e.g. doctor on holidays, inconvenient hours).	Too busy.	
Waiting time too long.	Didn't get around to it / didn't bother.	
	Decided not to seek care.	
	Doctor – didn't think it was necessary.	
	Other- specify	

Source: Sibley & Glazier, 2009; Wojkowski et al., 2016

"Long waiting times" has been the most commonly reported reason for unmet healthcare needs among Canadians and "cost" being the most common reason reported by Americans as per a report presented by CIHI (2003) using data from the Joint Canada/US Survey of Health (JCUSH). Other commonly reported reasons among the Canadian population aged 12 years and older were "services unavailable at the time required", "cost" and "felt would be inadequate" (Statistics Canada, 2016; Wu et al., 2005). There is no information in the literature regarding the trend of reasons reported for unmet healthcare needs based upon the immigrants' country of birth. Although the country of birth might not be the same as the immigrant's source country, it is still interesting to examine in our study.

It is evident from the existing literature that immigrants have an 18% lower risk of reporting unmet healthcare needs compared to non-immigrants which can be attributed to the

"Healthy Immigrant Effect". Moreover, when controlling for various determinants for healthcare access, the risk still remains lower by 12% among immigrants (Wu et al., 2005). Allin and his colleagues (2009; 2010) said that subjective unmet healthcare need reflects an individual's experience with the healthcare system and the complexity of their health problem. As mentioned earlier, ethno-cultural and/or socio-demographic differences, lack of social support are some characteristics contributing to the variation of reported unmet healthcare needs among the immigrant and non-immigrant populations. Our study will analyze the magnitude of prevalence of these differences in reported unmet healthcare needs and whether they vary with the length of stay in Canada among the immigrant population.

2.5 Unmet Healthcare Needs and Health Service Utilization

Health service utilization is considered as a measure of access to healthcare (Sibley & Glazier, 2009). In our study, it is characterized by contact with healthcare professionals or the use of different health services in the past 12 months (Barham et al., 2017; Fisher, Harrison, Reeder, Sari, & Chad, 2015). To understand the extent of health inequity in a healthcare system, measuring only the number of visits and type of services used would not give an accurate idea, mainly because of two reasons: a) we won't get information about those who did not use these services, and b) whether the services used were of low quality or inappropriate (Allin et al., 2010; Sibley & Glazier, 2009). Hence, to maintain the adequacy of healthcare access to the general public it is important to examine their subjective unmet healthcare needs with health service utilization.

Previous research focusing on analyzing unmet healthcare needs and health service use is inconclusive. While most studies have observed that people who have more frequent visits to a

GP, specialist or physiotherapist have increased odds of reporting unmet healthcare needs (Chen et al., 2002; N. M. Kasman & Badley, 2004; Nelson & Park, 2006a). A study by Barham and colleagues (2017) among the Canadian population reported that individuals who use more health services are more likely to have their needs met. Unmet healthcare need is considered as a determinant of health service utilization by some studies and they hypothesized that unmet healthcare needs are associated with health service use based upon individuals' health status and personal characteristics. Allin and Masseria (2009) studied data from 12 European countries and found that people who reported forgone care (unmet healthcare needs) were more likely to have visited a specialist and had spent significantly more out-of-pocket expenses compared to those who did not report unmet healthcare needs after accounting for socio-economic status and demographics. A study conducted among the US general population for treatments related to substance use disorders found that individuals who had a perceived need were more likely to use services in follow-up, whereas individuals who perceived a need but did not have confidence in the treatment were less likely to use services in follow-up (Mojtabai & Crum, 2013). Findings from Korea also show that subjects with low income have a greater risk of experiencing unmet healthcare needs and utilizing community health centres (Han, Park, & Kim, 2016).

In context of immigration status, no significant differences among health service utilization between the immigrant and non-immigrant population were found by Laroche (2000), but Newbold (2005) in his study found that immigrants were more likely to use health services and another study found that recent Asian immigrants were less likely to use emergency services (Wen, Goel, & Williams, 1996). Through the proposed study we wish to address this research gap to get a more stable understanding of this relationship across the immigrant and non-

immigrant populations and their length of stay in Canada.

2.6 Unmet Healthcare Needs and Life Satisfaction

Life satisfaction is referred to as "an assessment of the overall conditions of existence as derived from a comparison of one's aspiration to one's actual achievement"(Prasoon & Chaturvedi, 2016, pg. 26). Research has shown that people who have good mental and physical health are more likely to be satisfied with life (Prasoon & Chaturvedi, 2016; Strine et al., 2008). In 2016, 92.5% of Canadians aged 12 and older reported that they were satisfied or very satisfied with their life (Statistics Canada, 2017). It is found that variations in life satisfaction levels can be attributable to differences in national characteristics of the immigrants' source country (Frank, Hou, & Schellenberg, 2014). The life satisfaction level of immigrants is generally higher than their source country population especially if they migrated from less socio-economically developed countries (Bartram, 2011). It is also reported that most immigrants have higher levels of life satisfaction than people in their home countries (Frank, Hou, & Schellenberg, 2014). When compared with native-born population immigrants tend to report lower levels of life satisfaction even after accounting for socio-demographic characteristics (Burton & Phipps, 2010; Safi, 2010; Verkuyten, 2008). This could be because of their reason for migration, for instance, immigrants from Hong Kong to Canada have lower levels of life satisfaction if they migrated due to economic reasons compared to if they migrated due to social, political or educational reasons (Chow, 2007). Personal sacrifices, separation from family and cultural changes may impact life satisfaction levels (Bartram, 2011; Mara & Landesmann, 2013). On the other hand, immigration might lead to a sense of achievement among certain groups of people who tend to experience increased levels of life satisfaction

(Frank, Hou, & Schellenberg, 2016).

There is extremely limited literature examining the association between unmet healthcare needs and life satisfaction. A study by Heinemann and colleagues (2002), among individuals with traumatic brain injury, reported that people with high unmet healthcare needs tend to report lower levels of life satisfaction. There is no information on whether there is any relationship between unmet healthcare needs and life satisfaction by immigration status. However, there is an inverse relationship observed between life satisfaction and health service utilization. High levels of life satisfaction are associated with fewer doctor visits and vice-versa (Goel, Rosella, Fu, & Alberga, 2018; E. S. Kim, Park, Sun, Smith, & Peterson, 2014). This is especially important in terms of reducing healthcare costs. The relationship between unmet healthcare needs and health service utilization is not yet examined among the immigrant and non-immigrant populations.

2.7 Summary

The literature reviewed highlights that unmet healthcare need which is an indicator used for assessing barriers related to healthcare access has seen a rise over the past few decades. According to 2000-01 data, unmet healthcare need is found to be lower among newly arrived immigrants compared to non-immigrants and then it gradually increases with years of residence in Canada to merge with the Canadian-born population. This pattern is in accordance with the "healthy immigrant effect". Previous studies also give details about the reasons for reported unmet healthcare needs and how they vary by immigration status, but we don't know if these reasons have changed over time. There is no recent information on the pattern of reported unmet healthcare needs or its reasons by immigration status and whether there is any difference based

on the length of stay in Canada. This study addresses the gap by using the most recent data available based on a national population survey that is representative of the total Canadian population.

Additionally, the majority of the previous research also suggests that those who have higher unmet healthcare needs are more likely to use health services (for e.g. hospitalization or physician services) compared to those who have no unmet healthcare needs. As this will have a direct implication on the healthcare costs, it is important to examine this relationship by immigration status considering the rise in the immigrant population every year. Although it is evident that the mean number of visits to a physician or hospitalization is higher among the immigrants compared to non-immigrants, there is no evidence about whether the health service utilization varies in the presence of unmet healthcare needs. This study suffices this gap by examining the average frequency of health services' use in the presence and absence of unmet healthcare needs among the immigrant and non-immigrant population depending upon their length of stay in Canada.

There is extensive literature focusing on how high satisfaction with life is related to better physical and mental health and good quality of life. As unmet healthcare need too, is found to be more prevalent among those with poor health status and adversely affects the quality of life. For this reason, it is important to examine whether the presence of unmet healthcare need influences an individuals' life satisfaction level. There is very limited literature addressing this relationship. This study focuses on analyzing this relationship not only by immigration status but also by the years of residence in Canada. This will enhance our understanding of health-related outcomes due to the presence of reported unmet healthcare needs. On the contrary, there is relatively stronger evidence in the existing literature on the relationship between individual life satisfaction

and health services' utilization. It is found that individuals with high life satisfaction tend to use fewer health services compared to those with poor life satisfaction. However, it is not known whether there are any differences in terms of immigration status. This is to the best of my knowledge, the first study to determine the relationship with individuals' life satisfaction and health service utilization controlling for unmet healthcare needs by immigration status. It is framed in a way to compare the relationship among immigrants and non- immigrants, also by their length of stay in Canada and among the total Canadian population in general based upon the most recent data available.

Chapter 3: Methods

3.1: Study Design

This was a cross-sectional study, which involved an analysis of secondary data.

3.2: Data Source

This study was based on data from the annual component of the 2014 cycle of the Canadian Community Health Survey (CCHS) master data file.

3.2.1 Canadian Community Health Survey.

The CCHS is a cross-sectional survey conducted by Statistics Canada starting 2000 and is still active. Initially, when it started in 2000, it was conducted every two years until 2005 with 2001, 2003 and 2005 as reference periods. Starting in 2007, the survey is conducted annually. The CCHS collects a wide range of information related to health status, health service utilization, and the determinants of health for the Canadian population (Statistics Canada, 2014) and hence, it was selected as an appropriate data source for addressing my research questions.

The CCHS has three components:

a) ***Annual/core content.*** This content remains relatively stable over the years while other common modules fluctuate from year to year.
b) ***Optional content.*** This is chosen by health regions and is usually coordinated at the provincial level and may vary from year to year.
c) ***Rapid response.*** These are mainly cost-recovery projects asked of all respondents living in the provinces usually for one collection period.

3.2.2 The CCHS Target Population and Sample Size.

The CCHS covers a nationally representative population of Canadians aged 12 and over living in ten provinces and three territories excluding some population groups like persons living on reserves and other aboriginal settlements in the provinces; full-time members of the Canadian forces; the institutionalized population and persons living in some remote areas of Quebec (Région du Nunavik and Région des Terres-Cries-de-la-Baie-James). This excluded population comprise less than 3% of the overall Canadian population aged 12 and over.

The sample size of CCHS is 130,000 respondents over a two-year basis and 65,000 on an annual basis. For my study, I have used the 2014 cycle of CCHS as the questionnaire covers all the variables required to address our research objectives in the core component.

3.2.3 Sampling and Data Collection.

The CCHS data provides estimates at the health-region level. In the first step, the sample is allocated among the provinces corresponding to the population size of the province and the number of health regions in that province. Then each province's sample is allocated among its different health regions proportionally to the square root of the population in each health region. A multi-stage cluster sampling technique was used to collect data. The sample is collected using three sampling frames: 40.5% sample of households is collected through area frame, 58.5% are selected through a list frame of telephone numbers and 1% through Random Digit Dialing (RDD). Data were collected using computer-assisted interview (CAI) and the response to the survey was voluntary. After the data is collected, it is cleaned and edited at the Statistics Canada headquarters for further use. For the 2014 cycle of CCHS, the data were collected from a period

of 1st January 2014 to 31st December 2014. Proxy responses were allowed and comprised of around 1.8% of the total responses.

For the purpose of this study, micro-level data from the CCHS Master data file were used. This is the confidential data file that is available through the Research Data Centres (RDC). The data file contains all the information as they were collected from the respondents and researchers need to sign an oath of confidentiality before accessing master data files. The CCHS 2014 master data file was accessed through the Manitoba RDC after the approval of the project by Statistics Canada.

The proposed research study utilized data from the CCHS master data file as opposed to Public Use Microdata File (PUMF) for the flowing two reasons:

a) Master data files allow access to bootstrap weights in addition to the sample weights. Bootstrapping is a statistical "…technique for estimating the variance and the bias of an estimator by repeatedly drawing random samples with replacement from the observations" (Last, 1995, pg. 18). Bootstrap weights take the complex survey design into consideration and are necessary for the accurate estimations of variance and confidence intervals.

b) Master data files allow access to all the variables in their original formats in contrast to the PUMF's. For instance, the age variable in PUMF is categorized in a way to protect the confidentiality of the respondents, but, in the master data file, age is defined as a continuous variable, which gives freedom to us to re-categorize this variable in any way that is more meaningful to our research study.

3.3: Study Population

For the purpose of the proposed study, we selected the CCHS respondents, who were at least 18 years of age at the time of the survey. To address the stated research objectives, the study population was divided into three groups:

- **Recent immigrants.** Foreign-born population who lived in Canada for ≤ 5 years.
- **Long-term immigrants.** Foreign-born population who lived in Canada for > 5 years.
- **Canadian-born population.** Individuals who were born in Canada**.**

This division of study population by immigration status is derived from the classification by Statistics Canada, where individuals who arrived in Canada for less than or equal to 5 years were considered as recent immigrants (Statistics Canada, 2017b).

3.4: Study Variables

The dependent and independent variables for this study vary as per each objective. The following section describes the independent and dependent variables subjective to each study objective.

3.4.1 Key variables for research objective 1.

The two key variables for this objective are unmet healthcare needs and immigration status that are described in the following section.

Unmet healthcare needs.

Unmet healthcare need was the key dependent variable in the first research objective. This measure has been used as an indicator to assess inadequate access to healthcare in Canada (Barham et al., 2017; Chen et al., 2002; Wu et al., 2005). In the 2014 CCHS, the survey respondents were asked, “During the past 12 months was there ever a time when

you felt that you needed healthcare but did not receive it?" Respondents who answered "yes" to this question were coded as "1" and defined as those who reported having unmet healthcare needs. Those who answered "no" were coded as "2" and defined as those without unmet healthcare needs. The remaining response categories, "not applicable", "don't know", "refusal" and "not stated" were coded as "missing" and excluded from the analysis (0.1%).

Immigration status.

The independent variable for this objective was "immigration status". The study population was divided into three categories as described in section 3.3. Individuals who reported being Canadian-born were coded as "0", those who fell under the "recent immigrant" category were coded as "1" and for long-term immigrants, a code of "2" was given. Out of the total 27,290,444 people who were reported by the CCHS 2014 sample, a total of 26,146,046 (95.8%) reported their immigration status. The remaining 4.2% population was excluded from the analysis when only immigration status was compared.

3.4.2 Key variables for research objective 2.

The three key variables for this objective are reasons for unmet healthcare needs, immigration status and respondents' country of birth that are described in the following section.

Reasons for unmet healthcare needs.

In the CCHS 2014, the survey respondents who reported having unmet healthcare needs were asked a subsequent question on reasons for reported unmet healthcare needs. The question and the responses are as follows:

"Thinking of the most recent time, why you didn't get care?"

a) Care not available in the area.
b) Care not available at the time required (e.g. doctor on holidays, inconvenient hours).
c) Waiting time too long.
d) Felt would receive inadequate care.
e) Cost
f) Too busy.
g) Didn't get around to it / didn't bother.
h) Decided not to seek care.
i) Doctor – didn't think it was necessary.
j) Other- specify.

There were ten variables in the questionnaire subjective to each reason for reported unmet healthcare needs. Those who answered, "yes" to at least have experienced that one of the listed reasons were coded as "1" and classified as those with reported unmet healthcare needs and those who said, "no" were coded as "2" and were classified as those with no reported unmet healthcare needs. The remaining categories such as "not applicable", "don't know", "refusal" and "not stated" were coded as "missing" were excluded from the analysis. The missing values for all the reasons for reported unmet healthcare needs comprised on an average of around 88.2% of the total population as these mainly included those respondents who said "no" to having an unmet healthcare need.

Immigration status.

This variable was treated in a similar fashion as in research objective 1. The reasons for reported unmet healthcare needs as categorical variables were compared by immigration status.

Respondents' Country of birth.

In research objective 2, the reasons for reported unmet healthcare needs were compared with their country of birth as well. This was a derived variable in the CCHS 2014 with eight response categories. For the purpose of this study, the country of birth was re-coded and kept as a categorical variable but with five response categories. Those who were Canadian-born were coded as "1", respondents born in other parts of North America (including Greenland, Saint Pierre and United States) were coded as "2", respondents born in South America (including South Georgia and South Sandwich islands) along with Oceania (including Christmas Island, Cocos Island, United States minor outlying islands) Antarctica and adjacent islands (including Bouvet island, French Southern Territories, Heard island and McDonald Islands) were coded as "3", respondents born in Europe were coded as "4", those born in Africa were coded as "5" and respondents born in Asia were coded as "6". The remaining categories such as "not applicable", "don't know", "refusal" and "not stated" were coded as "missing" were excluded from the analysis (3.4%).

3.4.3 Key variables for research objective 3.

Dependent variable: Health service utilization

As immigrants and non-immigrants tend to have different patterns of health services' use (Barham et al., 2017), I have compared four different types of services and their frequency of use among the three study groups. The following four binary variables were examined as dependent variables in this research objective:

a) *Hospitalization.* The CCHS respondents were asked, "In the past 12 months have you been a patient overnight in a hospital, nursing home or convalescent home? Those who responded "yes" to this question were coded as "1" and classified as one category. Those who responded "no", were coded as "0" and classified as the second category. An average number of hospitalizations were also estimated and compared among the three study groups as the CCHS respondents who answered "yes" to the question on hospitalization, were asked, "For how many nights in the past 12 months? Respondents who said, "not applicable", "don't know", "refusal" and "not stated" were coded as "missing" and were excluded from the analysis (0.1%).

b) *Use of Physician services.* The CCHS respondents were asked, "Have you seen or talked to a family doctor or a general practitioner (about your physical, mental or emotional health)?" Those who responded "yes" to this question were coded as "1" and classified as one category. Those who responded "no" were coded as "0" and classified as the second category. The average number of contacts with a family doctor (or general practitioner) was also estimated and compared among the three study groups as the CCHS respondents, who answered "yes" to the question stated above, were asked to report how many times in the past 12 months. Respondents who said, "not applicable",

"don't know", "refusal" and "not stated" were coded as "missing" and were excluded from the analysis (0.1%).

c) Use of Dental service. The CCHS respondents were asked, "have you seen or talked to a dentist, dental hygienist or orthodontist (about your physical, mental or emotional health)?" Those who responded "yes" to this question were coded as "1" and classified as one category. Those who responded "no", will be coded as "0" and classified as the second category. The average number of dental services' use was also estimated and compared among the three study groups as the CCHS respondents, who answered "yes" to the question on dental services use, were asked how many times in the past 12 months they used such services. Respondents who said, "not applicable", "don't know", "refusal" and "not stated" were coded as "missing" and were excluded from the analysis (0.1%).

d) Use of Physiotherapy services. The CCHS respondents were asked, "have you seen or talked to a physiotherapist (about your physical, mental or emotional health)?" Those who responded "yes" to this question were coded as "1" and classified as one category. Those who responded "no", were coded as "0" and classified as the second category. The average number of physiotherapy services use were also estimated and compared among the three study groups as the CCHS respondents, who answered "yes" to the question on physiotherapy services use, were subsequently asked" how many times in the past 12 months.? Respondents who said, "not applicable", "don't know", "refusal" and "not stated" were coded as "missing" and were excluded from the analysis (0.1%).

Independent variable: Unmet healthcare needs.

This variable was treated in the same way as described in research objective 1 (Section: 3.4.1).

3.4.4 Key variables for research objective 4.

Dependent variable: Life Satisfaction.

In the CCHS, the respondents were asked "Using a scale of 0 to 10, where 0 means "very dissatisfied" and 10 means "very satisfied", how do you feel about your life as a whole right now?" This measure of life satisfaction based on a single question has been widely used to study life satisfaction in the literature and has found to be a reliable and valid measure (Blanchflower, 2009; Diener, Inglehart, & Tay, 2013; Goel et al., 2018). Previous research supports the stability of this measure over time (Bonikowska, Helliwell, Hou, & Schellenberg, 2014; Corrigan, Kolakowsky-Hayner, Wright, Bellon, & Carufel, 2013; Vassar, 2008). As this variable has shown to remain stable over time, scores obtained from cross-sectional data are likely to be quite valid. However, when the distribution of the responses to this variable was examined it was found to be skewed, with the mean value being 9.02 and the median and mode having a value of 8.0. The skewed distribution would make the interpretation of the findings difficult if we left this variable as a categorical variable with 11 categories. Hence, using the median value as the cut-off point, life satisfaction variable was recoded and defined as a binary variable. Those who scored between 0-7 were assigned a code of "1" and classified as those "with low life satisfaction". Those who scored 8 or more were assigned a code of "0" and were classified

as those with "high life satisfaction. The remainder of the responses, "not applicable", "don't know", "refusal" and "not stated" were coded as "missing" and excluded from the analysis (0.7%).

Independent variable: Unmet healthcare needs.

This variable was treated in the same way as described in research objective 1 (Section: 3.4.1).

3.4.5 Key variables for research objective 5.

Dependent variable: Life Satisfaction.

This variable was treated in the same way as described in research objective 4 (Section: 3.4.4).

Independent variables

a) *Health service utilization.* For addressing this research objective, two types of health services were considered, which were, physician services and dental services, in order to examine the effect of publicly covered as well as privately covered services on individuals' life satisfaction.
b) *Unmet healthcare needs.* This variable was treated in the same way as described in research objective 1 (Section: 3.4.1).

3.4.6 Covariates

Informed by the selected theoretical framework we identified a number of factors that were considered as covariates in our analyses as they helped to predict use of health services

and/or were associated with unmet healthcare needs. These factors were selected based upon the review of the literature and their availability in the CCHS 2014 data file. The covariates were categorized into three broad categories according to Anderson's model: Predisposing characteristics, enabling factors and need factors. This sequence was followed to construct a series of models for multivariate analysis.

I. Predisposing characteristics.

a) Age. The respondents' age at the time of the CCHS as a continuous variable was recorded. For the purpose of this study, the study participants' age was recoded as a categorical variable. Each survey respondent was classified into one of the following age categories: 1) 18-55 years (coded as "1"); and 2) 56 years and above (coded as "2"). We were interested in comparing results with the younger and older Canadians but had to select the minimum age as 56 for the second category because reducing the range further was giving lower cell counts. Achieving the minimum permissible count of unweighted data was needed in order to release the output from the RDC. There were no missing responses.

b) Sex. The survey respondents were classified into two groups based on their self-reported sex: males were coded as "1" and females were coded as "2". There were no missing responses.

c) Marital status. The variable in CCHS is categorized into 6 categories. For the purpose of this study, the responses were categorized into two groups based on

their marital status: 1) “married/living in common-law” were coded as “1”; and 2) “separated/widowed/single” were coded as “2”. The remaining responses such as, “not applicable”, “don’t know”, “refusal” and “not stated” were coded as “missing” and excluded from the analysis (0.2%).

d) *Province of residence.* This variable has 13 categories in the CCHS questionnaire pertaining to ten provinces and three territories. For the purpose of this study, some of the categories were grouped and recoded and the variable was recoded into 6 categories. Respondents who reported to reside in 1) Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick or Quebec were coded as “1”; 2) Ontario were coded as “2”; 3) Manitoba or Saskatchewan were coded as “3”; 4) Alberta were coded as “4”; 5) British Columbia were coded as ‘5”; and 6) Yukon, North-west Territories, Nunavut were coded as “6”. There were no missing responses.

e) *Education.* The CCHS respondents were classified into one of the following five categories based on their highest level of education: 1) Less than high school diploma or its equivalent; 2) High school diploma or Trade certificate; 3) Non-university or University certificate or diploma below bachelor’s level; 4) Bachelor’s degree; and 5) University certificate/ diploma/ degree above bachelor’s level. Respondents who fell under the category of “not applicable”, “don’t know”, “refusal” and “not stated” were categorized as missing and were excluded from the study (1.7%).

f) *Labour force status.* Respondents were asked whether they worked at a job or business at any time in the past 12 months. Those who responded "yes" to this question were classified as one category, coded as "1" and labeled as those 'employed". Those who responded "no" were classified as "unemployed" coded as "2". Categories such as "not applicable", "don't know", "refusal" and "not stated" were coded as missing and excluded from the study (6.1%).

g) *Sense of belonging to community.* CCHS Respondents were asked to describe their sense of belonging to their local community. They were categorized into one of the following categories based on their responses: 1) those who reported "very strong" sense of belonging and coded as "1"; 2) those who reported "somewhat strong" sense of belonging and coded as "2"; 3) those who responded "somewhat weak" sense of belonging and coded as "3"; and 4) those who reported "very weak" sense of belonging and were coded as "4".The missing responses from remaining categories, "not applicable", "don't know", "refusal" and "not stated" comprised of 1.2% and hence, were excluded from the study.

II. Enabling resources.

h) *Total Household income.* Respondents were asked to give the best estimate of their total family income in Canadian dollars from all the sources in the past 12 months of the survey. Based on responses to this variable was classified into two categories depending upon the median household income in Canada (Statistics

Canada, 2017): "1" less than $50,000 CAD; and "2" more than $50,000 CAD. There were no missing responses. The cut-off for median household income was selected based upon the most recent census data prior to CCHS 2014.

i) *Urban / rural indicator.* The respondents were classified into one of the following two categories based upon their responses to the question on the location of residence. Those who reported that they live in an urban/population centre were classified as one group and coded as "1". Those whose location of residence was in rural areas were classified as the other group and coded as "2". There were no missing responses.

III. Need factors.

j) *Chronic health conditions.* Respondents were asked separate questions about 20 different chronic health conditions. For this study, I categorized respondents as "1" who reported "yes" to at least one chronic health condition; and "2" with "no" chronic health condition. There were no missing responses.

k) *General health status.* This indicator for self-rated health measured the overall health status of the respondent on a 5-point scale from excellent to poor. The responses were categorized as "1" excellent/very good/good; and "2" Fair/poor. The missing responses from remaining categories, "not applicable", "don't

know", "refusal" and "not stated" were coded as missing and excluded from the study (0.1%).

l) *Level of stress.* Respondents were asked to report the level of stress in their lives and were categorized into five categories. For this study, this variable was recoded as a categorical with 3 response categories: "1" not at all stressful/not very stressful; "2" quite a bit stressful; and "3" extremely stressful. Respondents who fell under the category of "not applicable", "don't know", "refusal" and "not stated" were categorized as missing and were excluded from the study (0.3%).

A Codebook with a list of all the variables is summarized in Appendix B.

3.5 Data Analyses

The study population was limited to the CCHS respondents who were at least 18 years of age at the time of the survey. Since reported unmet healthcare needs, reasons for unmet healthcare needs and life satisfaction are all subjective measures, respondents who answered these survey questions by proxy (1.8%) were excluded. The proposed study had five main objectives. Types of data analyses that were performed to address each one of the stated research objectives are described in the following section.

3.5.1 Research objective 1.

To estimate and compare the proportion of population who reported unmet healthcare needs by immigration status.

The study population consisted of 27,290,444 Canadian adults, who were at least 18 years of age at the time of the CCHS survey in 2014. Descriptive univariate analyses

were conducted by running weighted and unweighted frequency distribution of data on reported unmet healthcare needs and all other study variables. Out of the overall population of 27,290,444, a sub-sample of 26,146,046 (95.8%) respondents who reported their immigration status was extracted. Descriptive univariate analysis was conducted on the sub-sample in order to get a better understanding of the socio-demographic and health-related characteristics of all the three study groups. It was ensured to maintain at least a minimum cell count of 5 in all the unweighted analyses. After the preliminary analysis, to address this objective the proportion of population within each study group who reported unmet healthcare needs was estimated and compared across the three study groups using chi-square test and the p-value at 99% CI was reported.

3.5.2 Research objective 2.

To examine and compare reasons for reported unmet healthcare needs by immigration status.

The weighted frequencies and proportions of reasons for reported unmet healthcare needs were compared among the three study groups and the p-value at 99% CI was reported. I also analyzed the reasons for reported unmet healthcare needs by respondents' country of birth by conducting chi-square tests. The reasons for reported unmet healthcare needs were grouped into three sub-headings: availability, acceptability and affordability. Weighted proportions were calculated and p-value at 99% CI was reported.

3.5.3 Research objective 3.

To examine the relationship between unmet healthcare needs and health service utilization by immigration status.

To address this objective, bivariate and multivariable analyses were conducted.

For bivariate analysis, cross-tabulations between each type of health service use were conducted with reported unmet healthcare needs for all three study groups. Chi-square test was used to examine any statistically significant association between health service use and reported unmet healthcare needs for each group in the sub-sample. To compare the number of visits in each study group, Analysis of variance (ANOVA) among people who reported unmet healthcare needs was conducted to identify significant differences among the three study groups in terms of their average frequency of use.

For multivariate analysis, the dependent variable for the purpose of this objective was "physician services' use" (dichotomous) as it was reported as the most commonly used service with 76.1% respondents stating they had seen a physician at least once in the past year. Four separate models of physician service use were developed for the total population and three study groups. Dental services' use was also selected as the dependent variable with dichotomous response categories. These two services were selected because physician service is covered under public insurance and dental service is under private insurance so to help in understanding the different predictors for each type of health service, these two services were considered. The chosen conceptual framework, Andersen's theoretical framework for health service use, helped in selecting the independent variables to be included in each model. The

primary independent variable for this objective was unmet healthcare needs and all the covariates were selected as controlling variables. The variables were entered in blocks in the following sequence: the first block consisted of unmet healthcare needs. The second block included predisposing characteristics. The third block consisted of enabling resources and the final block comprised of need factors. For each model, the multivariate logistic regression analyses were conducted separately. Adjusted odds ratio (AOR) and their 99% CI were used to identify the factors that were significantly associated with the utilization of physician services. An odds ratio (OR) is a measure of association between an exposure and an outcome. Szumilas explained that "OR represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure" (2010, pg. 27). An interaction effect was also tested between reported unmet healthcare needs and immigration status in order to understand if the results among the three study groups are statistically different from each other.

The Hosmer-Lameshow test for goodness of fit was used to predict the fit of the model meaning it determines whether the outcome is adequately described by the model. It can be concluded that a model is a "good fit" if the differences between the observed and the predicted values are small and there are no significant differences contributing to the overall error structure of the model. The Hosmer-Lemeshow tests are suitable for running the goodness-of-fit test in STATA for logistic regression model fitted using survey sample data (Newton et al., 2006). Goodness-of-fit test determined how fit the model was in each population group.

3.5.4 Research objective 4.

To examine the relationship between unmet healthcare needs and life satisfaction by immigration status

To address this objective, bivariate analyses were first conducted to determine the variables that were significantly associated with either life satisfaction or reported unmet healthcare needs in order to determine their inclusion in the multivariate logistic regression model. Weighted cross-tabulations were conducted based on data for the total sample and three sub-samples, and p-values at 99% CI were reported. Variables that had a significant association with either life satisfaction or reported unmet healthcare needs were considered as independent variables for the logistic regression model. The primary independent variable was unmet healthcare needs and dependent variable was life satisfaction (dichotomous). Four multivariate models were developed for the total population and three sub-population groups and goodness-of-fit test was used to determine the fit of the model. AOR and their 99% CI were used to identify the factors that were significantly associated with low life satisfaction.

3.5.5 Research objective 5.

To determine if there is a significant association between health service use and individuals' life satisfaction, controlling for unmet healthcare needs by immigration status.

Logistic regression analyses were conducted with life satisfaction (dichotomous) as the dependent variable and health service use as the key independent variable. Various factors were controlled for including reported unmet healthcare needs. Variables in the

model were included in a similar fashion as explained in research objective 4 and AOR with 99% CI were calculated to predict the association of factors with life satisfaction.

It is important to note that not any observed difference that is statistically significant is important from a clinical perspective in terms of programming, planning or service delivery. The findings were interpreted with this point taken into consideration.

3.6: Methodological Considerations

The following methodological considerations were taken into account while conducting the data analysis:

1) Sampling weights were used to estimate parameters of interest at the population-level. As the analyses were conducted based on data for a nationally representative sample, the weighting of the data by sampling weights helped to estimate parameters of interest at the national level. A "master weight" variable was available that was specific to the CCHS dataset in the master data file and its application in the analysis gave the weighted output that had population-level estimates.
2) In addition to sampling weights, bootstrapped weights were used to account for the complex survey design incorporated by Statistics Canada while collecting the data. Accurate calculation of coefficients of variance or confidence intervals is not possible using simple formulae for the Statistics Canada surveys, hence, bootstrapping is a re-sampling technique that was used. For CCHS 2014, a total of 500 bootstrap weights were available in the dataset which means the resampling would have been done 500 times and the output of any analysis was based upon the average of all the sampling. Hence, by

using these weights, we not only have the output for the whole Canadian population but also have accurate estimations of variance and confidence intervals.

3) For the output to be vetted/ released, there was a minimum cell count that must be observed to protect the confidentiality of the survey respondents. The minimum cell count required for CCHS unweighted data is 5, to have the corresponding weighted data released. The minimum cell count required for unweighted data is 15. All the cells in the bivariate crosstabulations had an unweighted count of at least 5. The final descriptive results are all weighted and bootstrapped weights were applied to all the bivariate and multivariate analyses, where statistical testing was required.
4) Given the large sample size, a more conservative p-value *(P<0.01)* was used instead of *p<0.05* to determine the significant levels.

3.7 Software Used

All the data were analyzed with statistical software of SPSS version 25.0 and STATA version 15.0.

3.8 Ethics and Other Approvals

Ethics approval was obtained from the Health Research Ethics Board (HREB) of the University of Manitoba, (H2019:281). I also completed the TCPS 2 Course on Research Ethics (CORE). To access the master data file an application was made to Social Sciences and Humanities of Canada (SSHRC) and Statistics Canada and approval was obtained. The data were accessed and analyzed at the Manitoba Research Data Centre.

Chapter 4: Results

In this chapter, a description of the study sample and each sub-sample is presented. As well, results are presented in accordance with each objective.

4.1 Description of the Study Population

The study sample consisted of 57,560 individuals representing 27,290,444 Canadian adults aged 18 years and above living in ten provinces and three territories. Of these, a total of 26,146,046 (95.8%) reported their immigration status. The study population was further divided into three categories by immigration status: 1) Canadian-born population (74% of the total population); 2) recent immigrants (4.3% of the total population); and 3) long-term immigrants (21.6% of the total population). The descriptive results for the total population; and three sub-populations are presented in the following sections.

4.1.1 Characteristics of the total study population.

Table 3 displays the characteristics of the total population. Out of the total weighted population (N = 27,290,444), an estimated 63.7% were 18-55 years of age and the remaining 36.3% were at least 56 years of age or above at the time of the CCHS survey. The majority of respondents were females (51%) and were either married or living in common-law (62.6%). A large proportion of the study population resided in Ontario (38.4%). The five eastern provinces of Canada (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec) were grouped together and comprised of 30.4% of the study population. Almost one-third (32.5%) of the total population reported having less than high school diploma or its equivalent. The majority of the respondents (72.3%) reported being employed in the past 12 months. It was also found that almost half of the total

population (47.8%) reported a “somewhat strong” sense of belonging to their community.

Most of the respondents (65.9%) came from financially well-off families as they reported an annual household income that was higher than the median Canadian household income. The majority of the respondents (81.7%) were living in urban areas and reported having at least one type of chronic health condition (56.7%). 58.7% of the total population reported their general health status as “excellent/very good” and 34.3% reported their life as “not at all stressful/ not very stressful”.

An estimate of 11.8% of the total population reported having unmet healthcare needs and the three most common reasons for reported unmet healthcare needs were: 1) Waiting time too long; 2) Not available at the time required; and 3) Cost. As for health services, an estimated 76.1% of the total population reported having seen a physician at least once in the past 12 months for their physical or mental health. Slightly a lower proportion of the total population reported having seen a dentist (65.3%) at least once in the past 12 months. Only 11.8% of the total population reported having seen a physiotherapist, and an even lower proportion reported being hospitalized at least once in the past 12 months (8.0%). The majority of the total population (69%) reported having a high level of life-satisfaction.

Table 3: Characteristics of total population.

(N = 27,290,444)

Study variables	Total population	
	Weighted Counts (n)	Percentage (%)
Population size	27,290,444	100
Predisposing Characteristics		
Age		
18-55	17,377,970	63.7
56 and above	9,912,470	36.3
(Weighted Mean: 47.22)		
Sex		
Male	13,365,748	49.0
Female	13,924,696	51.0
Marital status		
Married, living common-law	17,071,590	62.6
Widowed, separated, Divorced, single	10,161,506	37.2
Missing	57,347	0.2
Province of Residence		
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	8,288,300	30.4
Ontario	10,525,487	38.6
Manitoba, Saskatchewan	1,712,254	6.3
Alberta	3,102,637	11.4
British Columbia	3,579,269	13.1
Yukon, The North-west territories, Nunavut	82,497	0.3
Education		
Less than high school diploma or its equivalent	8,875,222	32.5
High school diploma or Trade certificate	4,134,892	15.2
Non-university or University certificate or diploma below bachelor's level	6,914,456	25.3
Bachelor's degree	4,777,231	17.5
University certificate/ diploma/ degree above bachelor's level	2,136,517	7.8
Missing	452,126	1.7
Labour Force Status		
Worked in the past year	19,734,832	72.3
Did not work in the past year	5,890,952	21.6
Missing	1,664,659	6.1

Study variables	Total population	
	Weighted Counts (n)	Percentage (%)
Sense of Belonging to Community		
Very Strong	4,576,180	16.8
Somewhat strong	13,035,504	47.8
Somewhat weak	7,206,964	26.4
Very weak	2,142,692	7.9
Missing	329103	1.2
Enabling Resources		
Household Income		
Less or equal to $49,999	9,295,449	34.1
More than or equal to $50,000	17,994,995	65.9
Urban/ Rural		
Population Centre / Urban	22,293,454	81.7
Rural	4,996,990	18.3
Need Factors		
Chronic Health conditions		
1 or more	15,480,465	56.7
No	11,809,979	43.3
General Health Status		
Excellent, Very good	16018616	58.7
Good	8080743	29.6
Fair, Poor	3,164,214	11.6
Missing	26,871	0.1
Amount of stress in life		
Not at all stressful or Not very stressful	9,348,243	34.3
A bit stressful	11,518,135	42.2
Quite a bit stressful or Extremely stressful	63,353,634	23.2
Missing	88,702	0.3
Unmet healthcare needs		
Reported Unmet Healthcare Needs		
Yes	3,213,620	11.8
No	24,040,032	88.1
Missing	36,792	0.1

Study variables	Total population	
	Weighted Counts (n)	Percentage (%)
Reasons for reported Unmet healthcare needs		
Not available in the area	321,674	1.2
Not available at time required	445,026	1.6
Wait too long	1,084,650	4.0
Felt inadequate	129,932	0.5
Cost	373,930	1.4
Too busy	245,267	0.9
Didn't get around	207,847	0.8
Decided not to seek care	254,499	0.9
Doctor did not think necessary	196,294	0.7
Other	759,697	2.8
Missing (Including those who did not report unmet healthcare needs)	24,082,954	88.2
Contact with health professionals in the past year		
Hospitalization		
Yes	2,189,222	8.0
No	25,090,578	91.9
Missing	10,644	0.1
General Practitioner		
Yes	20,764,992	76.1
No	6,494,339	23.8
Missing	31,113	0.1
Dentist		
Yes	17,826,283	65.3
No	9,441,181	34.6
Missing	22,980	0.1
Physiotherapist		
Yes	3,214,669	11.8
No	24,055,430	88.1
Missing	20,344	0.1
Life Satisfaction		
Low	824,6208	30.2
High	18,849,476	69.1
Missing	194,759	0.7
(Median: 8.0)		

Note: Weighted frequencies and weighted proportions

4.1.2 Characteristics of the study population by immigration status.

Table 4 presents the characteristics of the study population by immigration status. As shown in the table, the majority of recent immigrants (92.8%) were between the ages of 18 and 55 years, which were a much higher number compared to those in this age group among long-term immigrants (58.35%) and those born in Canada (63.92). Also, only 7.7% of recent immigrants were 56 years and older, compared to 41.65% of long-term immigrants and 36.08% of non-immigrants in this age category. This makes sense as most immigrants would generally take up the challenging task of migration while they are young. Immigrants (both recent and long-term) were more likely to be married or living in common-law (63.8% and 70.8%, respectively) compared to non-immigrants (60.1%). In terms of education, recent immigrants were more likely to have a bachelor's degree (34.1%) compared to long-term immigrants (22.8%) and non- immigrants (15.0%). There were no differences among the three groups in terms of their labour force participation (recent immigrants (73.4%); long-term immigrants (68.6%); non-immigrants (73.7%)). Individuals who were >75 years of age were not asked to report their labour force status. Hence, they were categorized as "not applicable" and grouped as missing. As a higher proportion of long-term immigrants were 56 years and older, the missing category for this group comprised 8% of total responses, compared to 5.6% among non-immigrants and only 0.5% among recent-immigrants. A higher proportion of recent immigrants (12.0%) reported a weak sense of belonging to the community compared to long-term immigrants (6.4%) and non-immigrants (8.0%).

It is especially noteworthy that almost half of the recent-immigrant population (51.2%) reported having lower than average household income levels, followed by long-term immigrants (37.6%) and Canadian-born population (30.8%). Immigrants (both recent and long-term)

preferred to settle in urban areas than rural compared to non-immigrants. Results in regard to the presence of chronic health conditions and general health status were found in accordance to the phenomenon of "healthy immigrant effect" where recent-immigrants were less likely to report having a chronic health condition (71.0%) in contrast to long-term immigrants (45%) who had stats very similar to that of non-immigrants (41.1%). In terms of general health status, only 4.3% of recent immigrants reported a fair/poor general health status compared to long-term immigrants (13.1%) and non-immigrants (11.4%). There were no remarkable differences noted in terms of the amount of stress in life among the three groups of study population.

Table 4: Characteristics of three study populations: Canadian-born population, recent immigrants and long-term immigrants.

Study variables	Study Population					
	Canadian born Population		Recent Immigrants (≤ 5 years)		Long- term Immigrants (>5 years)	
	Weighted Counts	%	Weighted Counts	%	Weighted Counts	%
Population size	19,383,190	74.1	1,112,228	4.3	5,650,628	21.6
Predisposing Characteristics						
Age						
18-55	12,389,100	63.92	1,032,430	92.83	3,296,880	58.35
56 and above	6,994,090	36.08	79,800	7.17	2,353,740	41.65
Sex						
Male	9,477,461	48.9	562,206	50.5	2,798,503	49.5
Female	9,905,730	51.1	550,021	49.5	2,852,124	50.5
Marital status						
Married, living common-law	11,644,278	60.1	709,371	63.8	3,998,628	70.8
Widowed, separated, Divorced, single	7,700,135	39.7	399,114	35.9	1,642,249	29.1
Missing	38,777	0.2	3742	0.3	9,751	0.1
Province of Residence						
NFL & Labrador, PEI, Nova Scotia, New Brunswick, Quebec	6,758,908	34.9	238,254	21.4	859,243	15.2
Ontario	6,580,233	33.9	442,564	39.8	3,016,509	53.4
Manitoba, Saskatchewan	1,395,405	7.2	90,242	8.1	201,308	3.6
Alberta	2,330,353	12.0	155,676	14.0	537,080	9.5
British Columbia	2,244,903	11.6	183,575	16.5	1,031,245	18.3
Yukon, The North-west territories, Nunavut	7,3388	0.4	1,917	0.2	5,242	0.1
Education						
Less than high school diploma or its equivalent	6,541,579	33.7	231,410	20.8	1,715,285	30.4
High school diploma or Trade certificate	3,255,735	16.8	76,393	6.9	619,623	11.0
Non-university or University certificate or diploma below	5,144,307	26.5	201,909	18.2	1,327,466	23.5
Bachelor's degree	2,909,011	15.0	378,782	34.1	1,285,707	22.8
University certificate/ diploma/ degree above bachelor's level	1,250,957	6.5	189,552	17.0	609,151	10.8
Missing	281,600	1.5	34,180	3.1	93,396	1.7
Labour Force Status						
worked in the past year	14,277,958	73.7	815,886	73.4	3,878,378	68.6
Did not work in the past year	4,011,200	20.7	290,481	26.1	1,320,816	23.4
Missing	1,094,032	5.6	5,861	0.5	451,433	8.0

Study variables	Study Population					
	Canadian born Population		Recent Immigrants (≤ 5 years)		Long- term Immigrants (>5 years)	
	Weighted Counts	%	Weighted Counts	%	Weighted Counts	%
Sense of Belonging to Community						
Very Strong	3,102,463	16.0	174,745	15.7	1,113,685	19.7
Somewhat strong	9,171,812	47.3	492,827	44.3	2,819,108	49.9
Somewhat weak	5,388,507	27.8	297,440	26.7	1,263,739	22.4
Very weak	1,545,585	8.0	133,104	12.0	363,872	6.4
Missing	174,823	0.9	14,113	1.3	90,224	1.6
Enabling Resources						
Household Income						
Less or equal to $49,999	5,962,867	30.8	569,365	51.2	2,124,295	37.6
More than or equal to $50,000	13,420,323	69.2	542,863	48.8	3,526,333	62.4
Urban/ Rural						
Population Centre / Urban	14,887,581	76.8	1,087,775	97.8	5,337,803	94.5
Rural	4,495,610	23.2	24,453	2.2	312,825	5.5
Need Factors						
Chronic Health conditions						
1 or more	11,420,535	58.9	322,251	29.0	3,110,583	55.0
No	7,962,655	41.1	789,977	71.0	2,540,045	45.0
General Health Status						
Excellent, Very good	11577742	59.7	750674	67.5	3065890	54.3
Good	5574563	28.8	313259	28.2	1837748	32.5
Fair, Poor	2,217,481	11.4	48,294	4.3	738,331	13.1
Missing	13,404	0.1	0	0.0	8,659	0.1
Amount of stress in life						
Not at all stressful or Not very stressful	6,588,717	34.0	376,018	33.8	1,958,083	34.7
A bit stressful	8,176,138	42.2	475,601	42.8	2,422,608	42.9
Quite a bit stressful or Extremely stressful	4,569,522	23.6	259,122	23.3	1,243,980	22.0
Missing	48,813	0.2	1,487	0.1	25,957	0.4
Unmet healthcare needs						
Reported unmet healthcare needs						
Yes	2,361,018	12.2	130,927	11.8	594,643	10.5
No	17,000,549	87.7	979,769	88.1	5,046,975	89.3
Missing	21,623	0.1	1,531	0.1	9,009	0.2

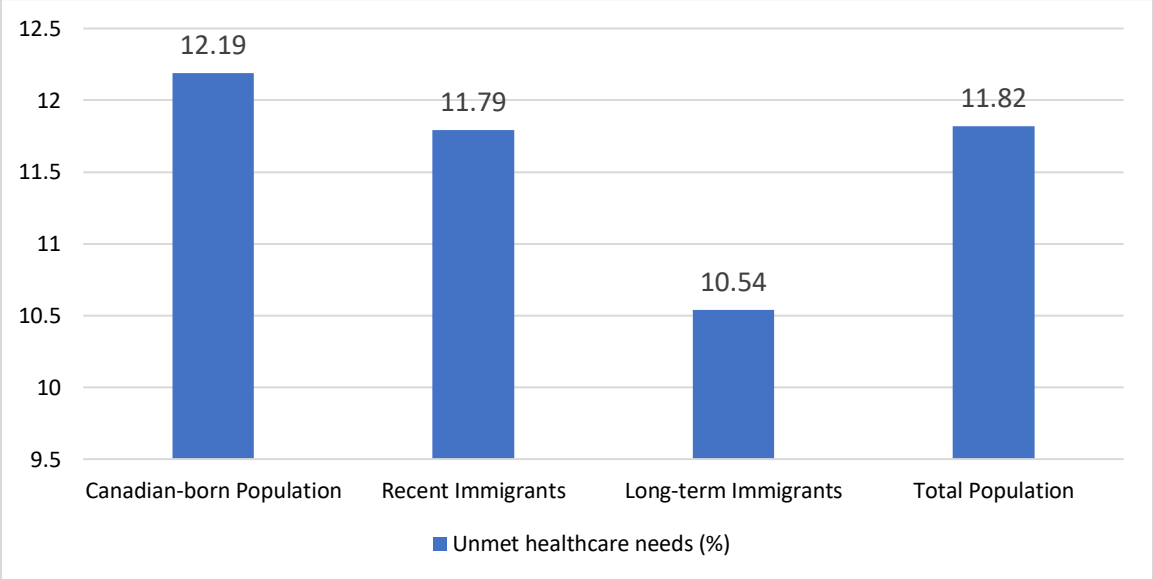
Study variables	Study Population					
	Canadian born Population		Recent Immigrants (≤ 5 years)		Long- term Immigrants (>5 years)	
	Weighted Counts	%	Weighted Counts	%	Weighted Counts	%
Reasons for reported unmet healthcare needs						
Not available in the area	254,506	1.3	8,889	0.8	43,085	0.8
Not available at time required	325,194	1.7	14,959	1.3	86,822	1.5
Wait too long	777,382	4.0	33,072	3.0	234,500	4.1
Felt inadequate	87,284	0.5	10,511	0.9	30,966	0.5
Cost	255,824	1.3	33,815	3.1	71,214	1.3
Too busy	164,481	0.1	11,751	1.1	59,620	1.1
Didn't get around	167,567	0.9	4,951	0.4	27,724	0.5
Decided not to seek care	199,212	1.0	7,046	0.6	42,360	0.7
Doctor did not think necessary	153,238	0.8	8,398	0.8	30,291	0.5
Other	541,113	2.8	31,276	2.8	145,680	2.6
Missing (Including those who did not report unmet healthcare needs)	17,028,224	87.9	981,301	88.2	5,055,985	89.5
Contact with health professionals in the past year						
Hospitalization						
Yes	1,613,586	8.3	581,76	5.2	440,204	7.8
No	17,761,062	91.6	10,540,52	94.8	5,209,043	92.2
Missing	8,543	0.1	0	0	1,382	0.0
General Practitioner						
Yes	14,811,573	76.4	650,642	58.5	4,449,711	78.7
No	4,547,794	23.5	459,872	41.3	1,198,268	21.2
Missing	23,824	0.1	1,714	0.2	2,649	0.0
Dentist						
Yes	12,865,487	66.4	483,483	43.5	3,761,314	66.6
No	6,501,945	33.5	628,745	56.5	1,885,789	33.4
Missing	15,759	0.1	0	0.0	3525	0.0
Physiotherapist						
Yes	2,385,255	12.3	51,750	4.7	639,703	11.3
No	16,984,104	87.6	1,060,478	97.3	5,007,403	88.6
Missing	13,832	0.1	0	0	3522	0.1
Life Satisfaction						
Low	5,564,535	28.7	401,135	63.6	1,946,074	34.5
High	13,712,838	70.8	707,485	36.1	3,651,444	64.6
Missing	105,818	0.5	3,608	0.3	53,109	0.9

Note: Weighted frequencies and weighted proportions

4.2 Results for Research Objective 1.

The first research objective was to estimate and compare the proportion of population who reported unmet healthcare needs by immigration status. To address this objective reported unmet healthcare needs was cross-tabulated with immigration status. As Chart 1 displays a higher proportion of Canadian-born population reported having unmet healthcare needs (12.19%) followed by recent-immigrants (11.79%) and then long-term immigrants (10.54%). Results if the chi-square test showed a significant association between reported unmet healthcare needs and immigration status *(p <0.001)*.

Chart 1: Proportion of reported unmet healthcare needs by immigration status.



Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

χ^2= **24.29*****

4.3 Results from Research Objective 2.

The second objective was to compare reasons for reported unmet healthcare needs by immigration status. Chi-square test was conducted to determine if the proportion of population, who reported a specific reason for the reported unmet healthcare needs were statistically significant across three study groups. Furthermore, the frequency distributions of the three types of reasons for the reported unmet healthcare needs were examined by country of birth.

4.3.1. Reasons for unmet healthcare needs by immigration status.

All the individuals who said "yes" to having reported unmet healthcare needs were asked to report the reasons for their unmet healthcare needs. A total of ten reasons were asked and respondents could select more than one answer. Table 5 compares the reasons for reported unmet healthcare needs by immigration status. Statistically significant differences are highlighted in the table.

Table 5: Reasons for reported unmet healthcare needs by immigration status.

Reasons for Unmet healthcare needs*	Canadian-born population (%)	Recent Immigrants (≤5 years) (%)	Long-term Immigrants (>5 years) (%)	χ^2
Not available in the area	10.81	6.79	7.25	**15.98*** **
Not available at time required	13.81	11.43	14.60	1.80
Wait too long	33.01	25.26	39.44	**25.81*** **
Felt would be inadequate	3.71	8.03	5.21	**14.97** **
Cost	10.86	25.83	11.98	**53.13*** **
Too busy	6.98	8.98	10.03	**12.69** **
Didn't get around to it	7.12	3.78	4.66	**12.33** **
Decided not to seek care	8.46	5.38	7.12	4.79
Doctor did not think necessary	6.51	6.41	5.09	3.16
Other	22.98	23.89	24.50	1.24

Note: Weighted frequencies and bootstrapped proportions
* Multiple responses were allowed
Computed from chi-square test of independence with d.f. = 2
***p <0.001, **p <0.01, *p <0.05

As table 5 shows the top three reasons for reported unmet healthcare needs among the recent-immigrant population were cost (25.83%), waiting time too long (25.26%) and not available at the time required (11.43%). However, for long-term immigrants and the Canadian-born population, the top three reasons for reported unmet healthcare needs were different than those reported by recent immigrants. They included waiting time too long, not available at the time required and cost, respectively. Some of the observed differences were statistically significant. They included cost, waiting time too long, not available in the area, felt would be inadequate, too busy and didn't get around to it.

4.3.2. Reasons for unmet healthcare needs by country of birth.

Due to small cell sizes, it was not possible to examine the differences in reasons for reported unmet healthcare needs by respondents' country of birth for each respondent. To overcome this problem, the reasons for reported unmet healthcare needs were grouped in one of the following three categories: availability, acceptability and affordability. The three broad categories of reasons were defined as binary variables with two response categories: yes/no. Tables 6, 7 and 8 summarize the results where each group of reasons was cross-tabulated with respondents' country of birth. Results from chi-square tests showed statistically significant associations between respondents' country of origin and reasons related to "acceptability" and "affordability" of health services.

Table 6: Availability reasons for unmet healthcare needs by respondents' country of birth.

Country of Birth	Availability*		χ^2
	Yes [99% CI]	No [99% CI]	
Canada	50.59 [47.09 – 54.08]	49.41 [45.92 – 52.91]	7.76
Other - North America	53.35 [28.43 – 76.70]	46.65 [23.30 – 71.57]	
South, Central America and Caribbean, Oceania Antarctica and Adjacent Islands	47.29 [27.02 – 68.49]	52.71 [31.51 – 72.98]	
Europe	51.31 [39.85 – 62.64]	48.69 [37.36 – 60.15]	
Africa	54.83 [34.70 – 73.49]	45.17 [26.51 – 65.30]	
Asia	55.74 [43.12 – 67.67]	44.26 [32.33 – 56.88]	

Note: Weighted frequencies and bootstrapped proportions
* Multiple responses were allowed
Computed from chi-square test of independence with d.f. = 5
***p <0.001, **p <0.01, *p <0.05
Availability reasons include: Not available in the area; Not available at time required; Wait too long

Table 7: Acceptability reasons for unmet healthcare needs by respondents' country of birth.

Country of Birth	Acceptability *		χ^2
	Yes [99% CI]	No [99% CI]	
Canada	49.12 [45.69 – 52.55]	50.88 [47.45 – 54.31]	**20.08*** **
Other - North America	46.52 [23.58 – 71.03]	53.48 [28.97 – 76.42]	
South, Central America and Caribbean, Oceania Antarctica and Adjacent Islands	41.94 [23.53 – 62.91]	58.06 [37.09 – 76.47]	
Europe	47.85 [36.69 – 59.23]	52.15 [40.77 – 63.31]	
Africa	43.57 [26.09 – 62.81]	56.43 [37.19 – 73.91]	
Asia	56.73 [44.26 – 68.40]	43.27 [31.60 – 55.74]	

Note: Weighted frequencies and bootstrapped proportions
* Multiple responses were allowed
Computed from chi-square test of independence with d.f. = 5
***p <0.001, **p <0.01, *p <0.05
Acceptability reasons include: Felt would be inadequate; Too busy; Didn't get around to it; Decided not to seek care; Doctor did not think necessary; Other

Table 8: Affordability reasons for unmet healthcare needs by respondents' country of birth.

Country of Birth	Affordability*		χ^2
	Yes [99% CI]	No [99% CI]	
Canada	10.86 [8.74 – 13.43]	89.14 [86.57 – 91.26]	**20.14*** **
Other - North America	17.05 [3.45 – 54.15]	82.95 [45.85 – 96.55]	
South, Central America and Caribbean, Oceania Antarctica and Adjacent Islands	18.94 [6.91 – 42.38]	81.06 [57.62 – 93.09]	
Europe	14.95 [7.92 – 26.43]	85.05 [73.57 – 92.08]	
Africa	11.23 [2.39 – 39.58]	88.77 [60.42 – 97.61]	
Asia	12.28 [6.46 – 22.12]	87.72 [77.88 – 93.54]	

Note: Weighted frequencies and bootstrapped proportions
* Multiple responses were allowed
Computed from chi-square test of independence with d.f. = 5
***p <0.001, **p <0.01, *p <0.05
Affordability reasons include: Cost

Overall a high proportion of respondents (almost 50%) reported that they did not receive the care they thought they needed due to reasons related to the availability of care, or services. More specifically 55.74%, of respondents who were born in Asia reported reasons for reported unmet healthcare needs that were related to the availability of services. Among those born in Africa, 54.83% reported such reasons for their reported unmet healthcare needs. Among those born in other parts of North America except Canada, an estimated 53.35% reported such reasons. The differences were not statistically significant. The reasons for reported unmet healthcare need due to acceptability issues were reported the most frequently among respondents who were born in Asia (56.73%), followed by those born in Canada (49.12%) and then those born in Europe (47.85%). Results of the chi-square test showed that the observed difference was statistically significant (χ^2= 20.08, df = 5, *p <0.001*). Lastly, the reasons for unmet healthcare need due to affordability were reported the

most frequently among respondents who were born in South or Central America or Antarctica and adjacent Islands (18.94%), followed by those born in other parts of North America but Canada (17.05%) and those born in Europe (14.95%). A much smaller proportion of respondents born in Canada reported cost-related reasons for their reported unmet healthcare needs (10.86%).

4.4. Results from Research Objective 3.

The third objective was to examine the relationship between reported unmet healthcare needs and health service utilization by immigration status. To address this objective three sets of analyses were conducted. First, I investigated the bivariate associated between reported unmet healthcare needs and health service utilization by immigration status. Second, I investigated the independent effect of reported unmet healthcare needs on health services use controlling for the effects of all other factors that are found to be associated with either reported unmet healthcare needs, or health services use. Third, I compared the volume of health services used among Canadian-borns, recent immigrants and long-term immigrants who reported unmet healthcare needs and those who did not report unmet healthcare needs. Results are presented in the following three sections.

4.4.1 Bivariate relationship between reported unmet healthcare needs and health service utilization by immigration status.

Reported unmet healthcare need was cross-tabulated with four types of health services' use (hospitalization, physician services, dental services, and physiotherapy services) for each

group based on their immigration status. Results are summarized in Tables 9, 10 and 11.

Among the Canadian-born population, the relationship between unmet healthcare needs was strongly associated (highly significant) with all the four types of health services' use. It was found that individuals who reported unmet healthcare needs were significantly more likely to be hospitalized or use physician or physiotherapy services in the past 12 months compared to those who did not report having unmet healthcare needs. However, this was not the case when dental service use was examined. Individuals who reported unmet healthcare needs were statistically significantly less likely to visit a dentist in the past 12 month period compared to those who did not report any unmet healthcare needs (Table 9).

Table 9: Bivariate relationship between unmet healthcare needs and health service utilization among the Canadian-born population.

Health Service Utilization	**Canadian-born population**		
	Unmet Healthcare Needs		χ^2
	Yes % [99% CI]	No % [99% CI]	
Hospitalization			
At least once	18.66 [16.20-21.39]	81.34 [78.61-83.80]	**167.48*** **
Not at all	11.59 [10.82-12.41]	88.41 [87.59-89.18]	
Physician services			
Used at least once	12.83 [11.98-13.74]	87.17 [86.26-88.02]	**57.60*** **
Not used at all	10.13 [8.75-11.70]	89.87 [88.30-91.25]	
Dental services			
Used at least once	11.22 [10.35-12.14]	88.78 [87.86-89.65]	**83.50*** **
Not used at all	14.14 [12.81-15.59]	85.86 [84.41-87.19]	
Physiotherapy services			
Used at least once	19.27 [16.62-22.24]	80.73 [77.76- 83.38]	**310.86*** **
Not used at all	11.18 [10.45- 11.95]	88.82 [88.05- 89.55]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence with d.f. = 1
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Among the recent-immigrant population, it was found that individuals who reported unmet healthcare needs were more likely to get hospitalized or use physician or dental services. However, the relationship was only statistically significant with hospitalization. On the contrary, physiotherapy services' use was found to be less among those who reported having unmet healthcare needs compared to those who said "no" to having unmet healthcare needs, although the difference was not statistically significant (Table 10).

Table 10: Bivariate relationship between unmet healthcare needs and health service utilization among recent immigrants.

Health Service Utilization	**Recent Immigrants**		
	Unmet Healthcare Needs		χ^2
	Yes % [99% CI]	No % [99% CI]	
Hospitalization			
At least once	24.98 [9.46-51.49]	75.02 [48.51-90.54]	**7.93****
Not at all	11.06 [7.41-16.18]	88.94 [83.82-92.59]	
Physician services			
Used at least once	12.84 [8.01-19.96]	87.16 [80.04-91.99]	1.24
Not used at all	10.34 [5.67-18.12]	89.66 [81.88-94.33]	
Dental services			
Used at least once	13.18 [7.74-21.55]	86.82 [78.45-92.26]	1.22
Not used at all	10.72 [6.37-17.48]	89.28 [82.52-93.63]	
Physiotherapy services			
Used at least once	9.95 [2.09- 36.43]	90.05 [63.57- 97.91]	0.14
Not used at all	11.88 [8.16- 16.97]	88.12 [83.03- 91.84]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence with d.f. = 1
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

The pattern of relationship between unmet healthcare needs with all the four types of health services' use among the long-term immigrant population was similar to that of the Canadian-born population. Individuals who reported unmet healthcare needs were more likely to be hospitalized or use physician or physiotherapy services in the past 12 months compared to those who did not report having unmet healthcare needs. However, this relationship was inverse in terms of dental services. The association of unmet healthcare needs was found to be statistically significant with all the four types of health services' use among long-term immigrants (Table 11).

Table 11: Bivariate relationship between unmet healthcare needs and health utilization among long-term immigrants.

Health Service Utilization	**Long-term Immigrants**		
	Unmet Healthcare Needs		χ^2
	Yes % [99% CI]	No % [99% CI]	
Hospitalization			
At least once	17.83 [11.42-26.76]	82.17 [73.24-88.58]	**35.23*** **
Not at all	9.93 [8.52-11.53]	90.07 [88.47-91.48]	
Physician services			
Used at least once	11.46 [9.85-13.30]	88.54 [86.70-90.15]	**24.65*** **
Not used at all	7.13 [4.62-10.87]	92.87 [89.13-95.38]	
Dental services			
Used at least once	9.49 [7.81-11.49]	90.51 [88.51-92.19]	**17.49*** **
Not used at all	12.65 [9.94-15.97]	87.35 [84.03-90.06]	
Physiotherapy services			
Used at least once	13.08 [9.64- 17.51]	86.92 [82.49- 90.36]	**6.46** **
Not used at all	10.22 [8.71- 11.96]	89.78 [88.04- 91.29]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence with d.f. = 1
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

4.4.2. Multivariate relationship between unmet healthcare needs and health service utilization.

The main objective of this analysis was to examine the independent effect of reported unmet healthcare needs on health services use controlling for the effects of all other factors that are found to be associated with either reported unmet healthcare needs, or health services use. The factors that we controlled for their effects were grouped into three main categories based on the selected conceptual framework (i.e., Anderson and Newman's theoretical framework for health service utilization). These factors were selected based on the results of bivariate analysis between unmet healthcare needs and other covariates (Tables 36, 37, 38, 39 and 40 in Appendix A) and based on the availability of data in CCHS. Four sets of logistic regression analyses were conducted for examining the predictors for physician services' use, one set based on data for the total population and one set for each one of the three study groups. Table 12 presents the multivariate results for the total population. Results for the three study groups are summarized in Tables 13, 14 and 15. AOR and their 99% CI were used to identify the significant predictors in each model. The results for the total population and three study groups are summarized in the following sections. The results from logistic regression analysis for examining the predictors of dental services' use are described in Table 18 for the total population.

- **Predictors for physician services' use by immigration status.**

I. Total population.

In the first block, unmet healthcare need was found to be a significant predictor of physician services' use [OR = 1.365; 99%CI = 1.165-1.599], but there were no control variables. In the second block when predisposing characteristics (age, sex, marital status,

province of residence, education, labour force status and sense of belonging to the community) were used as control variables, unmet healthcare needs was still found to be a highly significant predictor of physician services' use [AOR = 1.493; 99%CI = 1.258-1.770], but the magnitude of estimate attenuates slightly. In the third block enabling resources (household income and urban/rural location) were introduced as control variables along with predisposing characteristics and unmet needs was found to a highly significant predictor of physician services' use and this time with the higher odds compared to first and second block [AOR = 1.506; 99%CI = 1.268-1.788]. In the final block when need factors (chronic health conditions, general health status, and stress level) were introduced along with predisposing characteristics and enabling resources, unmet healthcare needs stayed as a significant predictor for use of physician services, although the magnitude of estimate declines compared to the previous three blocks [AOR = 1.198; 99%CI = 1.001-1.434]. It can be concluded from Table 12 that Canadian adults age 18 years and above with unmet healthcare needs are 19.8% (100 x (1.198 – 1)) more likely to visit a physician at least once a year compared to those with no unmet healthcare needs and differences are statistically significant ($p < 0.01$).

According to the Hosmer-Lameshow test for goodness of fit, the calculated chi-square statistic for the final logistic regression model among the total study population is found to be not significant at p-value <0.05, which means that the final model is a good fit in terms of predicting physician services' use.

II. Canadian-born population.

Unmet healthcare need was found to a significant predictor for utilization of physician services in block one of the analysis [OR = 1.306; 99%CI = 1.092-1.562]. In the second

block when predisposing characteristics were added, unmet healthcare need stayed a significant predictor for physician services' use but with higher odds [AOR = 1.390; 99%CI = 1.145-1.687]. In the third block too unmet healthcare need was a significant predictor with AOR = 1.393 [99%CI = 1.17-1.692], after controlling for predisposing characteristics and enabling resources. In the final block, when the need factors were added in the sequence of controlling variables, unmet healthcare need was no longer a significant predictor of physician services' use and reported a lower odds ratio [AOR = 1.140; 99%CI = 0.933-1.393]. It can be concluded from Table 13 that Canadian-born adults with unmet healthcare needs are 14% more likely to visit a physician at least once a year compared to those with no unmet healthcare needs, but the differences are not statistically significant.

The goodness-of-fit test (Hosmer-Lameshow test) for the final model gave a chi-square statistic significant at p-value <0.05, which means there are differences in the observed and predicted probabilities, suggesting the model to be not a proper fit.

III. Recent immigrants.

In the first block, unmet healthcare need was not found to be a significant predictor of physician services' use [OR = 1.277; 99%CI = 0.558-2.921]. In the second block controlling for predisposing characteristics, unmet healthcare need was still found to be not a significant predictor of physician services' use [AOR = 1.555; 99%CI = 0.606-3.988]. In the third block after controlling for enabling resources along with predisposing characteristics, unmet need was not found to be a significant predictor of physician services' use, but this time had higher odds compared to first and second block [AOR = 1.594; 99%CI = 1.268-1.788]. In the final block when need factors were introduced along

with predisposing characteristics and enabling resources, unmet healthcare needs stayed as an insignificant predictor for use of physician services, but the magnitude of estimate declined compared to block 2 & 3 [AOR = 1.408; 99%CI = 0.498-3.982]. It can be concluded from Table 14 that immigrants who lived in Canada for ≤ 5 years and with unmet healthcare needs are 40.8% more likely to visit a physician at least once a year compared to those with no unmet healthcare needs, but the differences are not statistically significant.

There were no statistically significant differences found in terms of the goodness-of-fit test (Hosmer-Lameshow test) among the logistic regression model for recent-immigrants, hence the final model is a good fit in terms of explaining physician services' use.

IV. Long-term immigrants.

Unmet healthcare need was found to a significant predictor for utilization of physician services in the first block of the analysis [OR = 1.68; 99%CI = 1.036-2.742]. With the addition of predisposing characteristics, for the second block in the model, unmet healthcare need was again found to be a significant predictor of physician services' use with an increase in the magnitude of estimate [AOR = 1.950; 99%CI = 1.144-3.324]. Adding enabling resources and holding other variables as constant, didn't make any notable change in the pattern and unmet healthcare need was found to be a significant predictor with AOR = 1.960 [99%CI = 1.145-3.354]. However, in the final model, adding need factors dropped the magnitude of estimate between unmet healthcare needs and physician services' use to an insignificant value [AOR = 1.417; 99%CI = 0.825-2.432]. It can be concluded from Table 15 that those immigrants who lived in Canada for > 5 years

and with unmet healthcare needs are 41.7% more likely to visit a physician at least once a year compared to those with no unmet healthcare needs, but the differences are not statistically significant.

The Hosmer-Lameshow test for goodness-of-fit found that the final model for long-term immigrants is a good fit to predict physician services' use.

A summary table (Table 16) is also presented comparing the final regression models for all the four groups (one for the total study population and three sub-population groups).

Table 17 describes the interaction effect between reported unmet healthcare needs and immigration status. It is evident from the table that although recent immigrants who reported unmet healthcare needs by itself have a significant relationship with the utilization of physician services, there is no significant interaction effect between reported unmet healthcare needs and immigration status in terms of predictors for physician services' use. In other words, the AOR's for the final models (Model 4) for the three sub-population groups as described in Table 16 are not statistically different from each other.

Table 12: Predictors of physician Services' use among the total population.

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Reported unmet healthcare needs				
Yes	1.365*** (1.165-1.599)	1.493*** (1.258 – 1.770)	1.506*** (1.268-1.788)	1.198** (1.001- 1.434)
Age				
18 – 55 years		0.427*** (0.377- 0.484)	0.423*** (0.373- 0.478)	0.523 (0.462- 0.594)
Sex				
Male		0.540*** (0.484 – 0.601)	0.536*** (0.481- 0.597)	0.557 (0.499- 0.623)
Marital Status				
Married/ common-law		1.336*** (1.200-1.487)	1.307*** (1.168- 1.464)	1.265 (1.126- 1.422)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec		0.776*** (0.680- 0.886)	0.789*** (0.690- 0.902)	0.808* (0.703- 0.929)
Manitoba, Saskatchewan		0.769*** (0.654 – 0.904)	0.766*** (0.652- 0.901)	0.757 (0.640- 0.895)
Alberta		0.857* (0.714 - 1.029)	0.843** (0.702- 1.012)	0.836** (0.692- 1.010)
BC		1.098 (0.916 - 1.317)	1.094 (0.913- 1.313)	1.117 (0.929- 1.343)
Yukon, The North-west territories, Nunavut		0.497*** (0.381 – 0.648)	0.506*** (0.389- 0.660)	0.496 (0.369- 0.666)
Education				
Less than high school diploma or its equivalent		0.733*** (0.582- 0.924)	0.767** (0.608- 0.968)	0.709 (0.559- 0.900)
High school diploma or Trade certificate		0.732*** (0.570- 0.940)	0.757** (0.589- 0.973)	0.709 (0.549- 0.915)
Non-university or University certificate or diploma below bachelor's level		0.878 (0.696-1.106)	0.899 (0.713- 1.133)	0.839 (0.662- 1.064)
Bachelor's degree		0.934 (0.730-1.200)	0.944 (0.737- 1.208)	0.959 (0.746- 1.231)
Labour force status				
Did not work in the past year		1.064 (0.922 – 1.227)	1.105 (0.954- 1.279)	1.013 (0.871- 1.179)

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Sense of belonging to community				
Somewhat strong		0.964 (0.822-1.131)	0.957 (0.816- 1.122)	0.937 (0.795- 1.104)
Somewhat weak		0.919 (0.772 – 1.093)	0.914 (0.769- 1.087)	0.850 (0.710- 1.018)
Very weak		0.971 (0.772 – 1.221)	0.972 (0.773- 1.223)	0.826 (0.649- 1.051)
Household income				
less than $50,000 CAD			0.861** (0.760- 0.977)	0.816 (0.719- 0.927)
Location of Residence				
Urban			1.090 (0.970- 1.224)	1.124 (0.999-1.265)
Chronic health condition				
Present – 1 or more				2.427** (2.169-2.716)
General health status				
Poor				1.591 (1.230- 2.059)
Amount of stress in life				
Quite a bit stressful				1.185 (1.057- 1.330)
Extremely stressful				1.315 (1.135- 1.524)
Constant	3.089*** (2.934- 3.253)	8.829*** (6.646- 11.729)	8.557*** (6.349-11.534)	4.542 (3.321- 6.210)
Goodness-of-fit (Hosmer-Lameshow test)		34.43***	32.65***	16.40

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

Table 13: Predictors of physician services' use among the Canadian-born population.

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Reported unmet healthcare needs				
Yes	1.306*** (1.092-1.562)	1.390*** (1.145 – 1.687)	1.393*** (1.17-1.692)	1.140 (0.933- 1.393)
Age				
18 – 55 years		0.477*** (0.416- 0.548)	0.473*** (0.412- 0.544)	0.559*** (0.484- 0.647)
Sex				
Male		0.500*** (0.446 – 0.560)	0.498*** (0.445- 0.558)	0.518*** (0.461- 0.583)
Marital Status				
Married/ common-law		1.355*** (1.196-1.535)	1.356*** (1.188- 1.549)	1.291*** (1.125- 1.481)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec		0.836** (0.719- 0.971)	0.847** (0.729- 0.985)	0.870* (0.744- 1.017)
Manitoba, Saskatchewan		0.842** (0.705- 1.005)	0.840** (0.703- 1.003)	0.838** (0.698- 0.007)
Alberta		0.964 (0.796- 1.166)	0.949 (0.783- 1.149)	0.941 (0.769- 1.152)
BC		1.224** (1.000 – 1.497)	1.211* (0.989- 1.481)	1.232** (1.002- 1.513)
Yukon, The North-west territories, Nunavut		0.476*** (0.352- 0.643)	0.489*** (0.362- 0.660)	0.494*** (0.354- 0.689)
Education				
Less than high school diploma or its equivalent		0.628*** (0.478- 0.824)	0.652*** (0.496- 0.856)	0.613*** (0.461- 0.814)
High school diploma or Trade certificate		0.653*** (0.484- 0.881)	0.673*** (0.498- 0.908)	0.649*** (0.475- 0.888)
Non-university or University certificate or diploma below bachelor's level		0.790* (0.594-1.050)	0.807* (0.608- 1.073)	0.780* (0.580- 1.048)
Bachelor's degree		0.892 (0.662-1.201)	0.899 (0.668- 1.209)	0.928 (0.682- 1.263)
Labour force status				
Did not work in the past year		1.177** (1.004 – 1.380)	1.195** (1.013- 1.409)	1.089 (0.918- 1.293)

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Sense of belonging to community				
Somewhat strong		0.904 (0.757-1.080)	0.899 (0.753- 1.073)	0.895 (0.742- 1.079)
Somewhat weak		0.843* (0.692 – 1.028)	0.836* (0.686- 1.018)	0.797** (0.647- 982)
Very weak		0.909 (0.700 – 1.181)	0.905 (0.697- 1.174)	0.789* (0.599- 1.039)
Household income				
less than $50,000 CAD			0.942 (0.819- 1.082)	0.865** (0.749- 0.999)
Location of Residence				
Urban			1.136** (1.007- 1.282)	1.139** (1.007-1.289)
Chronic health condition				
Present				2.282*** (2.028 –2.569)
General health status				
Poor				1.521*** (1.127- 2.054)
Stress				
Quite a bit stressful				1.173** (1.030- 1.335)
Extremely stressful				1.256*** (1.060- 1.489)
Constant	3.159*** (2.993- 3.334)	9.855*** (7.061- 13.754)	8.944*** (6.333-12.632)	5.008*** (3.487- 7.191)
Goodness-of-fit (Hosmer-Lameshow test)		46.67***	51.85***	19.07*

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

Table 14: Predictors of physician services' use among the recent immigrant population.

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Reported unmet healthcare needs				
Yes	1.277 (0.558-2.921)	1.555 (0.606 – 3.988)	1.594 (1.268-1.788)	1.408 (0.498- 3.982)
Age				
18 – 55 years		1.372 (0.260- 7.237)	0.423 (0.373- 0.478)	1.948 (0.339-
Sex				
Male		0.796 (0.437 – 1.449)	0.536 (0.481- 0.597)	0.737 (0.403- 1.348)
Marital Status				
Married/ common-law		1.371 (0.718-2.617)	1.359 (0.703- 2.626)	1.269 (0.633- 2.542)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec		0.439** (0.187- 1.030)	0.449* (0.192- 1.047)	0.474* (0.197- 1.139)
Manitoba, Saskatchewan		0.580 (0.251 – 1.341)	0.582 (0.247- 1.371)	0.582 (0.238- 1.427)
Alberta		0.357** (0.138 – 0.927)	0.321** (0.119- 0.862)	0.308** (0.117- 0.806)
BC		0.864 (0.379 – 1.967)	0.840 (0.363- 1.942)	0.863 (0.357- 2.086)
Yukon, The North-west territories, Nunavut		0.761 (0.195 – 2.969)	0.984 (0.200- 4.844)	0.914 (0.169- 4.933)
Education				
Less than high school diploma or its equivalent		0.685 (0.258- 1.819)	0.737 (0.274- 1.980)	0.766 (0.276- 2.121)
High school diploma or Trade certificate		0.347* (0.010- 1.211)	0.381* (0.105- 1.379)	0.380 (0.096- 1.506)
Non-university or University certificate or diploma below bachelor's level		0.854 (0.321-2.273)	0.877 (0.327- 2.356)	0.878 (0.305- 2.522)
Bachelor's degree		0.810 (0.351-1.870)	0.813 (0.344- 1.920)	0.863 (0.355- 2.094)
Labour force status				
Did not work in the past year		1.130 (0.547 – 2.334)	1.163 (0.558- 2.423)	1.219 (0.588- 2.526)

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Sense of belonging to community				
Somewhat strong		0.870 (0.365-2.171)	0.855 (0.347- 2.108)	0.779 (0.301- 2.013)
Somewhat weak		0.628 (0.245 – 1.609)	0.603 (0.233- 1.560)	0.505 (0.184- 1.381)
Very weak		0.844 (0.264 – 2.695)	0.806 (0.255- 2.543)	0.676 (0.191- 2.392)
Household income				
less than $50,000 CAD			0.685 (0.359- 1.307)	0.643 (0.330- 1.253)
Location of Residence				
Urban			1.811 (0.449- 7.301)	1.954 (0.470-8.127)
Chronic health condition				
Present – 1 or more				2.060** (1.040 –4.081)
General health status				
Poor				2.892 (0.170-49.280)
Amount of stress in life				
Quite a bit stressful				0.867 (0.420- 1.790)
Extremely stressful				1.511 (0.609- 3.749)
Constant	1.374** (1.028- 1.838)	2.113 (0.245- 18.225)	1.459 (0.130- 6.383)	0.918 (0.073- 3.749)
Goodness-of-fit (Hosmer-Lameshow test)		7.08	2.31	6.16

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

Table 15: Predictors of physician services' use among the long-term immigrant population.

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Reported unmet healthcare needs				
Yes	1.685** (1.036-2.742)	1.950*** (1.144 – 3.324)	1.960*** (1.145-3.354)	1.417 (0.825- 2.432)
Age				
18 – 55 years		0.360*** (0.260- 0.498)	0.357*** (0.258- 0.493)	0.504*** (0.358- 0.707)
Sex				
Male		0.667*** (0.486 – 0.916)	0.665*** (0.484- 0.914)	0.679** (0.492- 0.937)
Marital Status				
Married/ common-law		1.361** (0.999-1.855)	1.344* (0.976- 1.849)	1.333* (0.959- 1.854)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec		0.586** (0.376- 0.915)	0.597** (0.378- 0.944)	0.671* (0.416- 1.081)
Manitoba, Saskatchewan		0.521** (0.302 – 0.898)	0.524** (0.303- 0.909)	0.500** (0.280- 0.893)
Alberta		0.790 (0.485 - 1.286)	0.790 (0.485- 1.286)	0.831 (0.506- 1.366)
BC		1.081 (0.708 - 1.652)	1.087 (0.709- 1.665)	1.169 (0.750- 1.820)
Yukon, The North-west territories, Nunavut		0.821 (0.330 – 2.038)	0.835 (0.334- 2.085)	0.868 (0.353- 2.132)
Education				
Less than high school diploma or its equivalent		0.944 (0.540- 1.649)	0.977 (0.562- 1.701)	0.939 (0.531- 1.661)
High school diploma or Trade certificate		0.784 (0.431- 1.425)	0.805 (0.441- 1.471)	0.719 (0.381- 1.357)
Non-university or University certificate or diploma below bachelor's level		0.884 (0.524-1.494)	0.903 (0.533- 1.529)	0.747 (0.433- 1.292)
Bachelor's degree		1.002 (0.600-1.672)	1.012 (0.606- 1.690)	0.950 (0.558- 1.620)
Labour force status				
Did not work in the past year		1.037 (0.733 – 1.469)	1.068 (0.740- 1.541)	0.939 (0.650- 1.357)

Predictors	Model 1 Unadjusted OR (99% CI)	Model 2 Adjusted OR (99% CI)	Model 3 Adjusted OR (99% CI)	Model 4 Adjusted OR (99% CI)
Sense of belonging to community				
Somewhat strong		1.221 (0.833-1.789)	1.217 (0.829- 1.785)	1.154 (0.777- 1.713)
Somewhat weak		1.301 (0.843 – 2.010)	1.304 (0.843- 2.016)	1.201 (0.772- 1.867)
Very weak		1.453 (0.819 – 2.578)	1.458 (0.819- 2.600)	1.182 (0.667- 2.093)
Household income				
less than $50,000 CAD			0.893 (0.621- 1.284)	0.855 (0.596- 1.228)
Location of Residence				
Urban			1.138 (0.705- 1.838)	1.267 (0.784-2.050)
Chronic health condition				
Present - 1 or more				3.325*** (2.360 –4.686)
General health status				
Poor				1.893** (1.047- 3.424)
Amount of stress in life				
Quite a bit stressful				1.337* (0.950- 1.882)
Extremely stressful				1.441* (0.923- 2.251)
Constant	3.535*** (3.061- 4.082)	6.694*** (3.355- 13.356)	6.079*** (2.746-13.456)	2.460** (1.072- 5.648)
Goodness-of-fit (Hosmer-Lameshow test)		8.11	11.24	3.61

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

Table 16: Summary table comparing the final regression model for the total population and the three sub-population groups.

Predictors	Total Population Adjusted OR (99% CI)	Canadian-born Population Adjusted OR (99% CI)	Recent-Immigrants Adjusted OR (99% CI)	Long-term Immigrants Adjusted OR (99% CI)
Reported unmet healthcare needs				
Yes	1.198** (1.001- 1.434)	1.140 (0.933- 1.393)	1.408 (0.498- 3.982)	1.417 (0.825- 2.432)
Age				
18 – 55 years	0.523 (0.462- 0.594)	0.559*** (0.484- 0.647)	1.948 (0.339- 11.180)	0.504*** (0.358- 0.707)
Sex				
Male	0.557 (0.499- 0.623)	0.518*** (0.461- 0.583)	0.737 (0.403- 1.348)	0.679** (0.492- 0.937)
Marital Status				
Married/ common-law	1.265 (1.126- 1.422)	1.291*** (1.125- 1.481)	1.269 (0.633- 2.542)	1.333* (0.959- 1.854)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec	0.808* (0.703- 0.929)	0.870* (0.744- 1.017)	0.474* (0.197- 1.139)	0.671* (0.416- 1.081)
Manitoba, Saskatchewan	0.757 (0.640- 0.895)	0.838** (0.698- 0.007)	0.582 (0.238- 1.427)	0.500** (0.280- 0.893)
Alberta	0.836** (0.692- 1.010)	0.941 (0.769- 1.152)	0.308** (0.117- 0.806)	0.831 (0.506- 1.366)
BC	1.117 (0.929- 1.343)	1.232** (1.002- 1.513)	0.863 (0.357- 2.086)	1.169 (0.750- 1.820)
Yukon, The North-west territories, Nunavut	0.496 (0.369- 0.666)	0.494*** (0.354- 0.689)	0.914 (0.169- 4.933)	0.868 (0.353- 2.132)
Education				
Less than high school diploma or its equivalent	0.709 (0.559- 0.900)	0.613*** (0.461- 0.814)	0.766 (0.276- 2.121)	0.939 (0.531- 1.661)
High school diploma or Trade certificate	0.709 (0.549- 0.915)	0.649*** (0.475- 0.888)	0.380 (0.096- 1.506)	0.719 (0.381- 1.357)
Non-university or University certificate or diploma below	0.839 (0.662- 1.064)	0.780* (0.580- 1.048)	0.878 (0.305- 2.522)	0.747 (0.433- 1.292)
Bachelor's degree	0.959 (0.746- 1.231)	0.928 (0.682- 1.263)	0.863 (0.355- 2.094)	0.950 (0.558- 1.620)
Labour force status				
Did not work in the past year	1.013 (0.871- 1.179)	1.089 (0.918- 1.293)	1.219 (0.588- 2.526)	0.939 (0.650- 1.357)

Predictors	Total Population Adjusted OR (99% CI)	Canadian-born Population Adjusted OR (99% CI)	Recent-Immigrants Adjusted OR (99% CI)	Long-term Immigrants Adjusted OR (99% CI)
Sense of belonging to community				
Somewhat strong	0.937 (0.795- 1.104)	0.895 (0.742- 1.079)	0.779 (0.301- 2.013)	1.154 (0.777- 1.713)
Somewhat weak	0.850 (0.710- 1.018)	0.797** (0.647- 982)	0.505 (0.184- 1.381)	1.201 (0.772- 1.867)
Very weak	0.826 (0.649- 1.051)	0.789* (0.599- 1.039)	0.676 (0.191- 2.392)	1.182 (0.667- 2.093)
Household income				
less than $50,000 CAD	0.816 (0.719- 0.927)	0.865** (0.749- 0.999)	0.643 (0.330- 1.253)	0.855 (0.596- 1.228)
Location of Residence				
Urban	1.124 (0.999-1.265)	1.139** (1.007-1.289)	1.954 (0.470-8.127)	1.267 (0.784-2.050)
Chronic health condition				
Present- 1 or more	2.427** (2.169-2.716)	2.282*** (2.028 –2.569)	2.060** (1.040 –4.081)	3.325*** (2.360 –4.686)
General health status				
Poor	1.591 (1.230- 2.059)	1.521*** (1.127- 2.054)	2.892 (0.170-49.280)	1.893** (1.047- 3.424)
Amount of stress in life				
Quite a bit stressful	1.185 (1.057- 1.330)	1.173** (1.030- 1.335)	0.867 (0.420- 1.790)	1.337* (0.950- 1.882)
Extremely stressful	1.315 (1.135- 1.524)	1.256*** (1.060- 1.489)	1.511 (0.609- 3.749)	1.441* (0.923- 2.251)
Constant	4.542 (3.321- 6.210)	5.008*** (3.487- 7.191)	0.918 (0.073- 3.749)	2.460** (1.072- 5.648)
Goodness-of-fit (Hosmer-Lameshow test)	16.40	19.07*	6.16	3.61

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

Table 17: Predictors of physician services' use among the total population studying the interaction effect.

Predictors	Model 5 Adjusted OR (99% CI)
Reported unmet healthcare needs	
Yes	1.121 (0.918-1.370)
Study Population	
Recent Immigrants	0.557*** (0.394-0.788)
Long-term Immigrants	0.961 (0.813-1.137)
Reported unmet healthcare needs x Study Population	
Yes x Recent Immigrants	1.108 (0.417-2.940)
No x Long-term Immigrants	1.289 (0.746-2.227)
Age	
18 – 55 years	0.549*** (0.481-0.626)
Sex	
Male	0.562*** (0.502-0.630)
Marital Status	
Married/ common-law	1.291*** (1.143-1.458)
Province	
NFL and Labrador, PEI, NS, New Brunswick, Quebec	0.795*** (0.684-0.923)
Manitoba, Saskatchewan	0.760*** (0.639-0.904)
Alberta	0.836 (0.693-0.903)
BC	1.153 (0.952-1.396)
Yukon, The North-west territories, Nunavut	0.490*** (0.361-0.666)
Education	
Less than high school diploma or its equivalent	0.678*** (0.526-0.873)
High school diploma or Trade certificate	0.671*** (0.512-0.882)
Non-university or University certificate or diploma below bachelor's level	0.806* (0.626-1.038)
Bachelor's degree	0.929 (0.713-1.210)

Predictors	Model 5 Adjusted OR (99% CI)
Labour force status	
Did not work in the past year	1.061 (0.907-1.240)
Sense of belonging to community	
Somewhat strong	0.941 (0.795-1.114)
Somewhat weak	0.848* (0.705-1.018)
Very weak	0.849 (0.659-1.093)
Household income	
less than $50,000 CAD	0.846** (0.738-0.970)
Location of Residence	
Urban	1.156** (1.027-1.210
Chronic health condition	
Present – 1 or more	2.408*** (2.150-2.697)
General health status	
Poor	1.585*** (1.210-2.077)
Amount of stress in life	
Quite a bit stressful	1.176*** (1.043-1.326)
Extremely stressful	1.324*** (1.135-1.545)
Constant	4.504*** (3.259-6.224)
Goodness-of-fit (Hosmer-Lameshow test)	11.88

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

- **Predictors for dental services' use by immigration status.**

It was evident from Table 18 that reported unmet healthcare needs are significantly related to the utilization of dental services among Canadian residents aged 18 years and above controlling for predisposing characteristics, enabling factors and need factors. Individuals who reported unmet healthcare needs had lower odds of visiting a physician in the past 12 months compared to those who did not report having unmet healthcare needs controlling for predisposing characteristics, enabling factors and need factors [AOR= 0.808; 99%CI = 0.697-0.937]. Other significant predictors for dental services' use among the total population were age, sex, marital status, province, education, labour force status, household income, urban/rural location, chronic health conditions and general health status (Table 18).

Table 19 describes the interaction effect between reported unmet healthcare needs and immigration status. It is evident from the table that although recent immigrants and long-term immigrants who reported unmet healthcare needs by itself have a significant relationship with the utilization of dental services, there is no significant interaction effect between reported unmet healthcare needs and immigration status in terms of predictors for dental services' use.

Table 18: Predictors of dental Services' use among the total population.

Predictors	Model 1 Unadjusted OR	Model 2 Adjusted OR	Model 3 Adjusted OR	Model 4 Adjusted OR
Reported unmet healthcare needs				
Yes	0.768*** (0.671-0.877)	0.754*** (0.651-0.875)	0.789*** (0.681-0.915)	0.808*** (0.697-0.937)
Age				
18 – 55 years		0.908* (0.819-1.006)	0.865*** (0.780-0.959)	0.859*** (0.773-0.955)
Sex				
Male		0.713*** (0.651-0.781)	0.680*** (0.619-0.746)	0.689*** (0.627-0.757)
Marital Status				
Married/ common-law		1.295*** (1.178-1.423)	1.096* (0.987-1.218)	1.087* (0.979-1.208)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec		0.672*** (0.596-0.759)	0.703*** (0.621-0.796)	0.702*** (0.619-0.795)
Manitoba, Saskatchewan		0.647*** (0.548-0.764)	0.618*** (0.523-0.730)	0.614*** (0.519-0.762)
Alberta		0.634*** (0.537-0.749)	0.579*** (0.490-0.684)	0.571*** (0.483-0.675)
BC		0.902 (0.766-1.062)	0.682 (0.552-0.843)	0.889 (0.752-1.051)
Yukon, The North-west territories, Nunavut		0.582*** (0.459-0.738)	0.804*** (0.642-1.007)	0.587*** (0.458-0.753)
Education				
Less than high school diploma or its equivalent		0.340*** (0.277-0.418)	0.410*** (0.334-0.503)	0.420*** (0.342-0.515)
High school diploma or Trade certificate		0.495*** (0.399-0.615)	0.569*** (0.485-0.706)	0.577*** (0.464-0.716)
Non-university or University certificate or diploma below		0.620*** (0.499-0.769)	0.682*** (0.552-0.843)	0.690*** (0.558-0.852)
Bachelor's degree		0.766** (0.609-0.964)	0.804** (0.642-1.007)	0.812 (0.648-1.016)
Labour force status				
Did not work in the past year		0.621*** (0.554-0.697)	0.758*** (0.673-0.854)	0.797*** (0.706-0.900)
Sense of belonging to community				
Somewhat strong		1.105 (0.965-1.266)	1.067 (0.930-1.226)	1.063 (0.924-1.222)
Somewhat weak		1.021 (0.879-1.186)	1.003 (0.859-1.171)	0.998 (0.853-1.167)
Very weak		0.859* (0.703-1.049)	0.872 (0.708-1.073)	0.893 (0.722-1.104)

Predictors	Model 1 Unadjusted OR	Model 2 Adjusted OR	Model 3 Adjusted OR	Model 4 Adjusted OR
Household income				
less than $50,000 CAD			0.437*** (0.391-0.489)	0.440*** (0.393-0.493)
Location of Residence				
Urban			1.106* (0.992-1.232)	1.112** (0.999-1.239)
Chronic health condition				
Present – 1 or more				1.084* (0.977-1.204)
General health status				
Poor				0.684*** (0.589-0.794)
Amount of stress in life				
Quite a bit stressful				1.082 (0.963-1.216)
Extremely stressful				1.110 (0.963-1.216)
Constant	1.952*** (1.866-2.041)	5.758*** (4.480-7.401)	7.131*** (5.434-9.358)	1.110*** (0.965-1.277)
Goodness-of-fit (Hosmer-Lameshow test)		5.16	13.52	20.21*

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Table 19: Predictors of dental services' use among the total population studying the interaction effect.

Predictors	Model 5 Adjusted OR (99% CI)
Reported unmet healthcare needs	
Yes	0.797*** (0.679-0.935)
Study Population	
Recent Immigrants	0.314*** (0.220-0.448)
Long-term Immigrants	0.828** (0.707-0.970)
Reported unmet healthcare needs x Study Population	
Yes x Recent Immigrants	1.721 (0.660-4.490)
No x Long-term Immigrants	0.991 (0.643-1.527)
Age	
18 – 55 years	0.916 (0.820-1.022)
Sex	
Male	0.692*** (0.628-0.762)
Marital Status	
Married/ common-law	1.127** (1.012-1.256)
Province	
NFL and Labrador, PEI, NS, New Brunswick, Quebec	0.665*** (0.583-0.758)
Manitoba, Saskatchewan	0.607*** (0.583-0.758)
Alberta	0.560*** (0.473-0.663)
BC	0.906 (0.764-1.073)
Yukon, The North-west territories, Nunavut	0.567*** (0.438-0.735)
Education	
Less than high school diploma or its equivalent	0.362*** (0.292-0.448)
High school diploma or Trade certificate	0.489*** (0.390-0.613)
Non-university or University certificate or diploma below bachelor's level	0.597*** (0.479-0.746)
Bachelor's degree	0.755** (0.598-0.953)

Predictors	Model 5 Adjusted OR (99% CI)
Labour force status	
Did not work in the past year	0.844*** (0.746-0.955)
Sense of belonging to community	
Somewhat strong	1.066 (0.923-1.230)
Somewhat weak	0.986 (0.840-1.157)
Very weak	0.901 (0.724-1.122)
Household income	
less than $50,000 CAD	0.457*** (0.406-0.513)
Location of Residence	
Urban	1.194*** (1.071-1330)
Chronic health condition	
Present – 1 or more	1.044 (0.940-1.161)
General health status	
Poor	0.666*** (0.570-0.778)
Amount of stress in life	
Quite a bit stressful	1.069 (0.948-1.204)
Extremely stressful	1.099 (0.950-1.270)
Constant	0.733*** (5.444-9.882)
Goodness-of-fit (Hosmer-Lameshow test)	18.89*

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

4.4.3. Volume of health services used by immigration status among those who reported unmet healthcare needs.

Table 20 and Table 21 compares the average number of visits in the past 12-month period to a physician, dentist, physiotherapist and the average number of nights stayed in the hospital among the three study groups who reported unmet healthcare needs and those who did not report having unmet healthcare needs. It was found that Long-term immigrants reported the highest mean in terms of nights stayed in the hospital (1.3), the number of physician visits (4.8) and the number of visits to a dentist (1.4) in the past 12-month period compared to recent immigrants and non-immigrants among those who reported unmet healthcare needs. The highest mean number of visits to a physiotherapist was reported by the Canadian-born population (2.5), followed by long-term immigrants (2.2) and then by recent immigrants (0.3) among those who reported unmet healthcare needs (Table 20).

Table 20: Average frequency of health services' use by immigration status among those who reported unmet healthcare needs.

Health Service Utilization	Canadian-born Population Mean [99%CI]	Recent Immigrants (≤ 5 years) Mean [99%CI]	Long-term Immigrants (> 5 years) Mean [99%CI]	Results from ANOVA (p-value) #
Hospitalization	0.9 [0.6- 1.1]	0.3 [0- 0.6]	1.3 [0.3- 2.2]	**0.00*** **
Physician services	4.0 [3.6- 4.3]	2.2 [1.2- 3.3]	4.8 [3.7- 5.9]	**0.00*** **
Dental services	1.4 [1.2- 1.5]	0.9 [0.5- 1.2]	1.4 [1.1- 1.7]	**0.00*** **
Physiotherapy services	2.5 [1.8 – 3.1]	0.3 [0 – 0.8]	2.2 [0.5 – 3.9]	**0.00*** **

Note: Weighted frequencies and bootstrapped proportions
Computed from Analysis of variance among those who reported unmet healthcare needs
***p <0.001, **p <0.01, *p <0.05
Hospitalization – Number of nights stayed in the hospital in the past 12-month period
Physician/Dental/Physiotherapy services – Number of visits in the past 12-month period

Table 21: Average frequency of health services' use by immigration status among those who reported no unmet healthcare needs.

Health Service Utilization	Canadian-born Population Mean [99%CI]	Recent Immigrants (≤ 5 years) Mean [99%CI]	Long-term Immigrants (> 5 years) Mean [99%CI]	Results from ANOVA (p-value) #
Hospitalization	0.6 [0.5- 0.7]	0.1 [0 - 0.2]	0.4 [0.3- 0.6]	**0.00*** **
Physician services	2.4 [2.3- 2.5]	1.8 [1.4- 2.1]	2.7 [2.5- 3.0]	**0.00*** **
Dental services	1.3 [1.3- 1.4]	1.0 [0.7- 1.3]	1.5 [1.4- 1.6]	**0.00*** **
Physiotherapy services	1.2 [0.9 – 1.5]	0.6 [0 – 1.7]	1.1 [0.8 – 1.4]	**0.00*** **

Note: Weighted frequencies and bootstrapped proportions
Computed from Analysis of variance among those who reported unmet healthcare needs
***p <0.001, **p <0.01, *p <0.05
Hospitalization – Number of nights stayed in the hospital in the past 12-month period
Physician/Dental/Physiotherapy services – Number of visits in the past 12-month period

In contrast to those who did not report having unmet healthcare needs had a lower frequency of health services' use among hospitalization and physician services compared to those who reported having unmet healthcare needs (Table 21). In relation to dental and physiotherapy services, recent immigrants had a higher mean number of visits among those who did not report having unmet healthcare needs compared to those who reported having unmet healthcare needs (1.0 and 0.6, respectively). When the average frequency of utilization was compared across all three groups of the population using ANOVA, it was found to be highly significant ($p<0.001$), for all the four types of health services. Hence, the differences across the three groups are significant in terms of the mean number of visits among those who reported unmet healthcare needs and those who did not report unmet healthcare needs.

4.5. Results from Research Objective 4.

The fourth objective was to examine the relationship between unmet healthcare needs and life satisfaction by immigration status. To address this objective, first, I explored the bivariate association between reported unmet healthcare needs and a number of other factors with respondents' life satisfaction. Results from bivariate analyses informed the selection of predictors to be included in the second set of analyses that involved testing a multivariate regression model to investigate the independent effect of reported unmet healthcare needs on respondents' life satisfaction controlling for immigration status and a number of other factors. The results are summarized in the following sections.

4.5.1 Bivariate relationship between reported unmet healthcare needs and respondents' life satisfaction.

Table 22 shows the results of cross-tabulations. Respondents' life satisfaction was cross-tabulated with their reported unmet healthcare needs and a number of other characteristics of the respondents. The study factors were selected based on a review of the literature and the availability of data from the CCHS. Chi-square tests were conducted and it was found that respondents who were between the ages of 18 and 55 years, males, those who were single/ widowed/ separated, less educated, unemployed, those from low-income families, living in urban areas and also those who had at least one chronic health condition were significantly more likely to report low life satisfaction. Low life satisfaction was also more commonly reported by those who reported poor sense of community belonging, fair/poor health status and more stressful life. It was also found that individuals who reported unmet healthcare needs were significantly more likely to report low life satisfaction compared to those who did not report having unmet healthcare needs.

Tables 23, 24 and 25 show the results of bivariate analyses for the three study groups. Factors that are found to be significantly associated with respondents' life satisfaction by the study group are listed in Table 26.

Table 22: Factors associated with respondents' life satisfaction among the total population.

Study variables	Life Satisfaction		$\chi^{2\#}$
	Low	High	
	% [99% CI]	% [99% CI]	
Age			
18-55	30.84 [29.59 – 32.12]	69.16 [67.88 – 70.41]	**7.76****
56 and above	29.72 [28.52 – 30.95]	70.28 [69.05 – 71.48]	
Sex			
Male	31.10 [29.70 – 32.55]	68.90 [67.45 – 70.30]	**11.65*****
Female	29.79 [28.62 – 30.98]	70.21 [69.02 – 71.38]	
Marital status			
Married, living common-law	25.01 [23.89 – 26.16]	74.99 [73.84 – 76.11]	**1327.58*****
Widowed, separated, Divorced, single	39.55 [37.97 – 41.15]	60.45 [58.85 – 62.03]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	29.13 [27.45 – 30.87]	70.87 [69.13 – 72.55]	**88.32 *****
Ontario	32.43 [30.86 – 34.04]	67.67 [65.96 – 69.14]	
Manitoba, Saskatchewan	27.00 [24.59 – 34.04]	73.00 [70.44 – 75.41]	
Alberta	28.46 [25.78 – 31.30]	71.54 [68.70 – 74.22]	
British Columbia	30.85 [28.33 – 33.49]	69.15 [66.51 -71.67]	
Yukon, The North-west territories, Nunavut	33.69 [29.47 – 38.19]	66.31 [61.81 – 70.53]	
Education			
Less than high school diploma or its equivalent	35.20 [33.49 – 36.95]	64.80 [63.05 – 66.51]	**425.75*****
High school diploma or Trade certificate	29.46 [27.28 – 31.74]	70.54 [68.26 – 72.72]	
Non-university or University certificate or	28.80 [27.05 – 30.61]	71.20 [69.39 – 72.95]	
Bachelor's degree	27.41 [25.13 – 29.81]	72.59 [70.19 – 74.87]	
University certificate/ diploma/ degree above bachelor's level	22.77 [19.83 – 26.00]	77.23 [74.00 – 80.17]	
Labour Force Status			
worked in the past year	28.28 [27.14 – 29.44]	71.72 [70.56 – 72.86]	**343.43*****
Did not work in the past year	36.85 [35.04 – 38.70]	63.15 [61.30 – 64.96]	
Sense of Belonging to Community			
Very Strong	19.50 [17.59 – 21.56]	80.50 [78.44 – 82.41]	**2068.0*****
Somewhat strong	26.30 [25.08 – 27.55]	73.73 [72.45 – 74.92]	
Somewhat weak	38.70 [36.74 – 40.69]	61.30 [59.31 – 63.26]	
Very weak	49.94 [46.38 – 53.51]	50.06 [46.49 – 53.62]	

Study variables	Life Satisfaction		χ^2
	Low	High	
	% [99% CI]	% [99% CI]	
Household Income			
Less or equal to $49,999	41.89 [40.21 – 43.59]	58.11 [56.41 – 59.79]	**1804.0*** **
More than or equal to $50,000	24.57 [23.46 – 25.71]	75.43 [74.29 – 76.54]	
Urban/ Rural			
Population Centre / Urban	31.58 [30.55 – 32.63]	68.42 [67.37 – 69.45]	**156.71*** **
Rural	25.33 [23.59 – 27.16]	74.67 [72.84 – 76.41]	
Chronic Health conditions			
1 or more	35.78 [34.56 – 37.02]	64.22 [62.98 – 65.44]	**1004.3*** **
No	23.44 [22.02 – 24.93]	76.56 [75.07 – 77.98]	
General Health Status			
Excellent, Very good, Good	25.80 [24.83 – 26.79]	74.20 [73.21 – 75.17]	**4426.2*** **
Fair, Poor	66.07 [63.45 – 68.60]	33.96 [34.10 –36.55]	
Amount of stress in life			
Not at all stressful or Not very stressful	19.12 [17.90 – 20.41]	80.88 [79.59 – 82.10]	**2512.3*** **
A bit stressful	31.57 [30.15 – 33.03]	68.43 [66.97 – 69.85]	
Quite a bit stressful or Extremely stressful	45.02 [42.75 – 47.30]	54.98 [52.70 – 57.25]	
Unmet healthcare needs			
Yes	51.60 [48.54 – 54.65]	48.40 [45.35 – 51.46]	**1611.6*** **
No	27.58 [26.66 – 28.53]	72.42 [71.47 – 73.34]	

Note: Weighted frequencies and bootstrapped proportions
computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Table 23: Factors associated with respondents' life satisfaction among Canadian-born population.

Study variables	Life Satisfaction		χ^2
	Low	High	
	% [99% CI]	% [99% CI]	
Age			
18-55	29.64 [28.28 – 31.03]	70.36 [68.97 – 71.72]	**24.12****
56 and above	27.49 [26.30 – 28.71]	72.51 [71.29 – 73.70]	
Sex			
Male	29.46 [27.94 – 31.03]	70.54 [68.97 – 72.06]	**7.70****
Female	28.30 [27.09 – 29.54]	71.70 [70.46 – 72.91]	
Marital status			
Married, living common-law	21.88 [20.67 – 23.15]	78.12 [76.85 – 79.33]	**1672.70*****
Widowed, separated, Divorced, single	39.43 [37.76 – 41.13]	60.57 [58.87 – 62.24]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	27.91 [26.21 – 29.68]	72.09 [70.32 – 73.79]	**29.35 *****
Ontario	30.07 [28.30 – 31,91]	69.93 [68.09 – 71.70]	
Manitoba, Saskatchewan	27.36 [24.85 – 30.02]	72.64 [69.98 – 75.15]	
Alberta	27.93 [25.06 – 30.99]	72.07 [69.01 – 74.94]	
British Columbia	29.96 [27/14 – 32.93]	70.04 [67.07 -72.86]	
Yukon, The North-west territories, Nunavut	33.27 [28.64 – 38.26]	66.73 [61.74 – 71.36]	
Education			
Less than high school diploma or its equivalent	33.59 [31.89 – 35.34]	66.41 [64.66 – 68.11]	**452.60*****
High school diploma or Trade certificate	29.53 [27.17 – 32.01]	70.47 [67.99 – 72.83]	
Non-university or University certificate or	27.78 [25.85 – 29.79]	72.22 [70.21 – 74.15]	
Bachelor's degree	23.69 [21.41 – 26.14]	76.31 [73.86 – 78.59]	
University certificate/ diploma/ degree above bachelor's level	17.76 [14.71 – 21.28]	82.24 [78.72 – 85.29]	
Labour Force Status			
worked in the past year	26.94 [25.73 – 28.20]	73.06 [71.80 – 74.27]	**243.82*****
Did not work in the past year	35.34 [33.47 – 37.25]	64.66 [62.75 – 66.53]	
Sense of Belonging to Community			
Very Strong	18.67 [16.63 – 20.90]	81.33 [79.10 – 83.37]	**1731.3*****
Somewhat strong	24.09 [22.86 – 25.36]	75.91 [74.64 – 77.14]	
Somewhat weak	37.03 [34.98 – 39.14]	62.97 [60.86 – 65.02]	
Very weak	48.44 [44.25 – 52.64]	51.56 [47.36 – 55.75]	

Study variables	Life Satisfaction		χ^2
	Low	High	
	% [99% CI]	% [99% CI]	
Household Income			
Less or equal to $49,999	40.83 [39.10 – 42.59]	59.17 [57.41 – 60.90]	**1435.7*** **
More than or equal to $50,000	23.59 [22.44 – 24.78]	76.41 [75.22 – 77.56]	
Urban/ Rural			
Population Centre / Urban	29.91 [28.73 – 31.12]	70.09 [68.88 – 71.27]	**82.10*** **
Rural	25.40 [23.53 – 27.37]	74.60 [72.63 – 76.47]	
Chronic Health conditions			
1 or more	34.09 [32.77 – 35.44]	65.91 [64.56 – 67.23]	**886.21*** **
No	21.40 [19.91 – 22.98]	78.60 [77.02 – 80.09]	
General Health Status			
Excellent, Very good, Good	24.29 [23.24 – 25.37]	75.71 [74.63 – 76.76]	**3726.6*** **
Fair, Poor	64.74 [61.95 – 67.44]	35.26 [32.56 –38.05]	
Amount of stress in life			
Not at all stressful or Not very stressful	18.06 [16.77 – 19.44]	81.94 [80.56 – 83.23]	**2029.6*** **
A bit stressful	29.48 [27.94 – 31.06]	70.52 [68.94 – 72.06]	
Quite a bit stressful or Extremely stressful	43.39 [40.90 – 45.91]	56.61 [54.09 – 59.10]	
Unmet healthcare needs			
Yes	49.63 [46.28 – 52.99]	50.37 [47.01 – 53.72]	**1360.5*** **
No	25.97 [24.96 – 27.00]	74.03 [73.00 – 75.04]	

Note: Weighted frequencies and bootstrapped proportions
computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Table 24: Factors associated with respondents' life satisfaction among recent immigrant population.

Study variables	Life Satisfaction		χ^2
	Low	High	
	% [99% CI]	% [99% CI]	
Age			
18-55	36.41 [30.07 – 43.26]	63.59 [56.74 – 69.93]	0.25
56 and above	33.23 [13.34 – 61.67]	66.77 [38.33 – 86.66]	
Sex			
Male	35.73 [26.70 – 45.90]	64.27 [54.10 – 73.30]	0.08
Female	36.65 [27.94 – 46.33]	63.35 [53.67 – 72.06]	
Marital status			
Married, living common-law	34.23 [27.22 – 42.01]	65.77 [57.99 – 72.78]	2.83
Widowed, separated, Divorced, single	40.01 [28.78 – 52.39]	59.99 [47.61 – 71.22]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	42.63 [30.57 – 55.64]	57.37 [44.36 – 69.43]	**21.08*** **
Ontario	41.46 [29.45 – 54.57]	58.54 [45.43 – 70.55]	
Manitoba, Saskatchewan	21.65 [11.60 – 36.80]	78.35 [63.20 – 88.40]	
Alberta	27.04 [15.44 – 42.93]	72.96 [57.07 – 84.56]	
British Columbia	29.63 [17.00 – 46.40]	70.37 [53.60 – 83.00]	
Yukon, The North-west territories, Nunavut	62.64 [34.07 – 84.47]	37.36 [15.53 – 65.93]	
Education			
Less than high school diploma or its equivalent	35.27 [23.06 – 49.77]	64.73 [50.23 – 76.94]	5.58
High school diploma or Trade certificate	33.79 [17.50 – 55.11]	66.21 [44.89 – 82.50]	
Non-university or University certificate or Bachelor's degree	32.48 [18.82 – 49.95]	67.52 [50.05 – 81.18]	
	40.47 [29.33 – 52.67]	59.53 [47.33 – 70.67]	
University certificate/ diploma/ degree above bachelor's level	30.30 [18.63 – 45.22]	69.70 [54.78 – 81.37]	
Labour Force Status			0.69
worked in the past year	37.14 [29.60 – 45.36]	62.86 [54.64 – 70.40]	
Did not work in the past year	34.03 [22.91 – 47.23]	65.97 [52.77 – 77.09]	
Sense of Belonging to Community			
Very Strong	27.08 [13.35 – 47.23]	72.92 [52.77 – 86.65]	**25.21*** **
Somewhat strong	32.36 [24.26 – 47.23]	67.64 [58.32 – 75.74]	
Somewhat weak	40.89 [29.12 – 53.81]	59.11 [46.19 – 70.88]	
Very weak	55.34 [35.55 – 73.58]	44.66 [26.42 – 64.45]	

Study variables	Life Satisfaction		χ^2
	Low	High	
	% [99% CI]	% [99% CI]	
Household Income			
Less or equal to $49,999	46.72 [37.57 – 56.10]	53.28 [43.90 – 62.43]	**43.05*** **
More than or equal to $50,000	25.15 [17.68 – 34.46]	74.85 [65.54 – 82.32]	
Urban/ Rural			
Population Centre / Urban	36.46 [30.30 – 43.10]	63.54 [56.90 – 69.70]	1.29
Rural	23.75 [7.80 – 53.43]	76.25 [46.57 – 92.20]	
Chronic Health conditions			
Yes	42.67 [31.25 – 54.93]	57.33 [45.07 – 68.75]	**6.37***
No	33.53 [26.60 – 41.25]	66.47 [58.75 – 73.40]	
General Health Status			
Excellent, Very good, Good	34.76 [28.45 – 41.65]	65.24 [58.35 – 71.55]	**16.64*** **
Fair, Poor	67.65 [36.52 – 88.38]	32.35 [11.62 – 63.48]	
Stress			
Not at all stressful or Not very stressful	22.11 [14.43 – 32.33]	77.89 [67.67 – 85.57]	**47.69*** **
A bit stressful	38.51 [29.49 – 48.38]	61.49 [51.62 – 70.51]	
Quite a bit stressful or Extremely stressful	52.19 [38.10 – 65.94]	47.81 [34.06 – 61.90]	
Unmet healthcare needs			
Yes	60.63 [42.93 – 75.92]	39.37 [24.08 – 57.07]	**29.73*** **
No	32.82 [26.15 – 40.27]	67.18 [59.73 – 73.85]	

Note: Weighted frequencies and bootstrapped proportions
computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Table 25: Factors associated with respondents' life satisfaction among long-term immigrant population.

Study variables	Life Satisfaction		χ^2
	Low	High	
	% [99% CI]	% [99% CI]	
Age			
18-55	34.06 [30.62 – 37.68]	65.94 [62.32 – 69.38]	2.28
56 and above	35.77 [32.29 – 39.41]	64.23 [60.59 – 67.71]	
Sex			
Male	35.61 [32.02 – 39.36]	64.39 [60.64 – 67.98]	2.23
Female	33.94 [30.57 – 37.48]	66.06 [62.52 – 69.43]	
Marital status			
Married, living common-law	32.25 [29.22 – 35.44]	67.75 [64.56 – 70.78]	**49.98*** **
Widowed, separated, Divorced, single	40.93 [36.80 – 45.19]	59.07 [54.81 – 63.20]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	37.07 [30.17 – 44.54]	62.93 [55.46 – 69.83]	**20.14** **
Ontario	36.12 [32.57 – 39.83]	63.88 [60.17 – 67.43]	
Manitoba, Saskatchewan	27.20 [19.03 – 37.26]	72.80 [62.74 – 80.97]	
Alberta	31.23 [24.68 – 38.63]	68.77 [61.37 – 75.32]	
British Columbia	32.21 [26.98 – 37.92]	67.79 [62.08 – 73.02]	
Yukon, The North-west territories, Nunavut	26.20 [12.67 – 46.49]	73.80 [53.51 – 87.33]	
Education			
Less than high school diploma or its equivalent	41.57 [36.43 – 46.90]	58.43 [53.10 – 63.57]	**73.09*** **
High school diploma or Trade certificate	31.75 [24.98 – 46.90]	68.25 [60.60 – 63.57]	
Non-university or University certificate or	32.72 [28.07 – 37.73]	67.28 [62.27 – 71.93]	
Bachelor's degree	30.80 [25.95 – 36.11]	69.20 [63.89 – 74.05]	
University certificate/ diploma/ degree above bachelor's level	29.31 [23.10 – 36.39]	70.69 [63.61 – 76.90]	
Labour Force Status			
worked in the past year	31.62 [28.65 – 34.74]	68.38 [65.26 – 71.35]	**61.84*** **
Did not work in the past year	42.62 [37.55 – 47.85]	57.38 [52.15 – 62.45]	
Sense of Belonging to Community			
Very Strong	21.33 [16.65 – 26.90]	78.67 [73.10 – 83.35]	**287.16*** **
Somewhat strong	32.13 [28.67 – 35.80]	67.87 [64.20 – 71.33]	
Somewhat weak	45.15 [39.60 – 50.82]	54.85 [49.18 – 60.40]	
Very weak	54.92 [45.25 – 64.23]	45.08 [35.77 – 54.75]	

Study variables	Life Satisfaction		χ^2
	Low	High	
	% [99% CI]	% [99% CI]	
Household Income			
Less or equal to $49,999	45.32 [40.85 – 49.87]	54.68 [50.13 – 59.15]	**213.49*** **
More than or equal to $50,000	28.50 [25.52 – 31.67]	71.50 [68.33 – 74.48]	
Urban/ Rural			
Population Centre / Urban	35.25 [32.75 – 37.84]	64.75 [62.16 – 67.25]	**13.05*** **
Rural	26.47 [20.26 – 33.79]	73.53 [66.21 – 79.74]	
Chronic Health conditions			
Yes	41.00 [37.70 – 44.37]	59.00 [55.63 – 62.30]	**153.37*** **
No	27.14 [23.43 – 31.20]	72.86 [68.80 – 76.57]	
General Health Status			
Excellent, Very good, Good	29.38 [26.77 – 32.14]	70.62 [67.86 – 73.23]	**609.64*** **
Fair, Poor	70.23 [63.15 – 76.46]	29.77 [23.54 – 36.85]	
Stress			
Not at all stressful or Not very stressful	21.83 [18.52 – 25.54]	78.17 [74.46 – 81.48]	**363.79*** **
A bit stressful	37.16 [33.20 – 41.31]	62.84 [58.69 – 66.80]	
Quite a bit stressful or Extremely stressful	50.28 [44.26 – 56.28]	49.72 [43.72 – 55.74]	
Unmet healthcare needs			
Yes	56.57 [48.68 – 64.14]	43.43 [35.86 – 51.32]	**181.39*** **
No	32.19 [29.67 – 34.82]	67.81 [65.18 – 70.33]	

Note: Weighted frequencies and bootstrapped proportions
computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Table 26: List of factors significantly associated with respondents' life satisfaction by study group.

Variables	Canadian-born Population	Recent Immigrants	Long-term immigrants	Total population
Age	X	-	-	X
Sex	X	-	-	X
Marital status	X	-	X	X
Province	X	X	X	X
Education	X	-	X	X
Income	X	X	X	X
Urban/Rural	X	-	X	X
Sense of belonging	X	X	X	X
Labour force status	X	-	X	X
Chronic health condition	X	X	X	X
General health status	X	X	X	X
Stress	X	X	X	X
Reported unmet healthcare needs	X	X	X	X

Note: Computed from chi-square test of independence
Significance level reported at *p-value <0.05*
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

4.5.2. Independent effect of reported unmet healthcare needs on respondents' life satisfaction.

The main objective of this analysis was to examine the independent effect of reported unmet healthcare needs on respondents' life satisfaction controlling for the effects of all the other factors that are found to be significantly associated with either reported unmet healthcare needs, or respondents' life satisfaction. The factors that we controlled for their effects were selected based upon a review of the literature and the availability of data in CCHS. Four sets of logistic regression analyses were conducted: one set based on data for the total population and one set for each one of the three study groups. Table 27 summarizes the results from the final multivariate logistic regression models per each total population and each study group. A consistent finding was that reported unmet healthcare need was a significant predictor of respondents' life satisfaction when a large number of other factors such as respondents' demographic, socio-economic and health-related characteristics were taken into account.

Among the total population (Model 1) it was found that controlling for the effects of all the other factors, those who reported unmet healthcare needs had an odds of reporting low life satisfaction that was almost two times higher than the odds of reporting low life satisfaction by those who did not report any unmet healthcare needs [AOR = 1.986; 99%CI: 1.698 – 2.323].

Among those born in Canada (Model 2), and long-term immigrants (Model 4), a very similar AOR was obtained. However, among recent immigrants (Model 3) the odds reporting low life satisfaction among those who reported unmet healthcare needs was almost 2.5 times greater than the odds of reporting low life satisfaction among those who did not report unmet healthcare needs [AOR = 2.536; 99%CI: 0.947 – 6.788].

According to the goodness-of-fit test (Hosmer-Lameshow test) on the multiple logistic models it was found that all the models except model-3 for recent-immigrants were a good fit to predict low life satisfaction. The reason for model-3 not being a good fit could be because of the low sample size for the recent immigrant population.

Table 28 describes the interaction effect between reported unmet healthcare needs and immigration status. It is evident from the table that although long-term immigrants who reported unmet healthcare needs by itself have a significant relationship with low life satisfaction, there was no significant interaction effect between reported unmet healthcare needs and immigration status in terms of predictors for low life satisfaction. In other words, the AOR's for the three sub-population groups as described in Table 27 are not statistically different from each other.

Table 27: Predictors of low life satisfaction by study group.

Predictors	Model 1 Total Population Adjusted OR (99% CI)	Model 2 Canadian-born Population Adjusted OR (99% CI)	Model 3 Recent-Immigrants Adjusted OR (99% CI)	Model 4 Long-term Immigrants Adjusted OR (99% CI)
Reported unmet healthcare needs				
Yes	1.986*** (1.698- 2.323)	1.984*** (1.652 – 2.383)	2.536* (0.947 – 6.788)	1.870*** (1.281 – 2.729)
Age				
18 – 55 years	1.137** (1.006 – 1.285)	1.144** (1.009 – 1.298)	0.858 (0.091 – 8.083)	1.116 (0.804 – 1.548)
Sex				
Male	1.264*** (1.126 – 1.419)	1.239*** (1.100 – 1.396)	1.013 (0.468 -2.192)	1.228 (0.919 – 1.642)
Marital Status				
Married/ common-law	0.568*** (0.506 – 0.638)	0.468*** (0.413 – 0.530)	0.820 (0.376 – 1.790	0.769* (0.572 – 1.034)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec	0.794*** (0.688 – 0.917)	0.839** (0.722 – 0.976)	1.267 (0.493 – 3.259)	1.040 (0.679 – 1.592)
Manitoba, Saskatchewan	0.849* (0.718 – 1.003)	0.986 (0.827 – 1.176)	0.459 (0.154 – 1.371)	0.684 (0.385 – 1.214)
Alberta	0.879 (0.736 – 1.050)	0.961 (0.790 – 1.169)	0.604 (0.193 – 1.885)	0.888 (0.558 – 1.412)
BC	0.959 (0.812 – 1.133)	1.048 (0.859 – 1.278)	0.652 (0.213 – 1.997)	0.881 (0.608 – 1.278)
Yukon, The North-west territories, Nunavut	1.214* (0.974 – 1.513)	1.313** (1.027 – 1.678)	3.013 (0.401 – 22.61)	0.848 (0.246 – 2.920)
Education				
Less than high school diploma or its equivalent	1.359*** (1.065 – 1.734)	1.694*** (1.264 – 2.270)	1.293 (0.433 – 3.860)	1.338 (0.807 – 2.218)
High school diploma or Trade certificate	1.077 (0.842 – 1.378)	1.485*** (1.090 – 2.024)	0.943 (0.226 – 3.924)	0.834 (0.492 – 1.414)
Non-university or University certificate or diploma below bachelor's level	1.181 (0.936 – 1.489)	1.513*** (1.134 – 2.020)	1.338 (0.432 – 4.147)	0.995 (0.632 – 1.567)
Bachelor's degree	1.220* (0.957 – 1.555)	1.405** (1.036 – 1.906)	1.728 (0.620 – 4.816)	0.941 (0.582 – 1.521)

Predictors	Model 1	Model 2	Model 3	Model 4
	Total Population Adjusted OR (99% CI)	Canadian-born Population Adjusted OR (99% CI)	Recent-Immigrants Adjusted OR (99% CI)	Long-term Immigrants Adjusted OR (99% CI)
Labour force status				
Not employed	1.171** (1.019 – 1.346)	1.250*** (1.074 – 1.456)	0.623 (0.279 – 1.388)	1.135 (0.814 – 1.582)
Sense of belonging to community				
Somewhat strong	1.580*** (1.331 – 1.875)	1.555*** (1.294 – 1.868)	1.349 (0.434 – 4.189)	1.822*** (1.191 – 2.787)
Somewhat weak	2.499*** (2.079 – 3.005)	2.577*** (2.113 – 3.143)	1.761 (0.487 – 6.371)	2.960*** (1.880 – 4.664)
Very weak	3.035*** (2.423 – 3.801)	3.049*** (2.356 – 3.947)	2.636 (0.657– 10.585)	3.466*** (1.903 – 6.312)
Household income				
less than $50,000 CAD	1.788*** (1.567 – 2.040)	1.547*** (1.346 – 1.779)	2.907*** (1.403 – 6.023)	1.819*** (1.298 – 2.548)
Location of Residence				
Urban	1.270*** (1.114 – 1.447)	1.118 (0.969 – 1.290)	1.385 (0.249 – 7.713)	1.489* (0.916 – 2.423)
Chronic health condition				
Present	1.367*** (1.209 – 1.546)	1.451*** (1.267 – 1.661)	1.054 (0.513 – 2.163)	1.374** (1.015 – 1.858)
General health status				
Poor	3.678*** (3.118 – 4.339)	3.688*** (3.139 – 4.333)	3.131 (0.457 – 21.44)	3.702*** (2.293 – 5.977)
Stress				
Quite a bit stressful	1.938*** (1.706 – 2.201)	1.953*** (1.706 -2.236)	1.774 (0.780 – 4.038)	2.056*** (1.475 – 2.865)
Extremely stressful	3.110*** (2.691 – 3.595)	3.267*** (2.770 – 3.854)	3.271*** (1.315 – 8.135)	3.032*** (2.046 – 4.494)
Constant	0.058*** (0.041 – 0.083)	0.049*** (0.032 – 0.074)	0.090* (0.004 – 2.067)	0.052*** (0.022 – 0.124)
Goodness-of-fit (Hosmer-Lameshow test)	6.86	13.58	17.75*	7.57

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

Table 28: Predictors of low life satisfaction among the total population studying the interaction effect.

Predictors	Model 5 Adjusted OR (99% C0I)
Reported unmet healthcare needs	
Yes	1.982*** (1.656-2.372)
Study Population	
Recent Immigrants	1.490 (1.028-2.162)
Long-term Immigrants	1.487 *** (1.259-1.755)
Reported unmet healthcare needs x Study Population	
Yes x Recent Immigrants	1.396 (0.569-3.424)
No x Long-term Immigrants	0.927 (0.613-1.403)
Age	
18 – 55 years	1.139 (1.005-1.291)
Sex	
Male	1.239*** (1.098-1.397)
Marital Status	
Married/ common-law	0.543*** (0.484-0.610)
Province	
NFL and Labrador, PEI, NS, New Brunswick, Quebec	0.878 (0.756-1.018)
Manitoba, Saskatchewan	0.901 (0.759-1.069)
Alberta	0.914 (0.762- 1.097)
BC	0.960 (0.807- 1.141)
Yukon, The North-west territories, Nunavut	1.301 (1.038-1.631)
Education	
Less than high school diploma or its equivalent	1.502*** (1.165-1.936)
High school diploma or Trade certificate	1.226 (0.9498-1.583)
Non-university or University certificate or diploma below bachelor's level	1.294 (1.015-1.651)
Bachelor's degree	1.248 (0.970-1.606)

Predictors	Model 5 Adjusted OR (99% C0I)
Labour force status	
Did not work in the past year	1.158** (1.006-1.332)
Sense of belonging to community	
Somewhat strong	1.582*** (1.329-1.883)
Somewhat weak	2.547*** (2.112-3.073)
Very weak	3.078*** (2.444-3.876)
Household income	
less than $50,000 CAD	1.706*** (1.493-1.950)
Location of Residence	
Urban	1.175** (1.030-1.341)
Chronic health condition	
Present – 1 or more	1.405*** (1.237-1.597)
General health status	
Poor	3.700*** (3.145-4.354)
Amount of stress in life	
Quite a bit stressful	1.953*** (1.711-2.231)
Extremely stressful	0.0510*** (0.035-0.074)
Constant	0.051 *** (0.354-0.736)
Goodness-of-fit (Hosmer-Lameshow test)	10.38

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

4.6. Results from Research Objective 5.

The fifth objective was to determine if there is a significant association between individuals' life satisfaction and their health service use, controlling for reported unmet healthcare needs by immigration status. To address this objective three sets of analyses were conducted. First, I explored the bivariate association between health service use with respondents' life satisfaction. Results from bivariate analyses informed the selection of predictors to be included in the second set of analyses that involved testing multivariate regression models to investigate the independent effect of health service use on respondents' life satisfaction controlling for reported unmet healthcare needs among the total population and three study groups. Third, I ran another four sets of multivariate regression analyses to investigate the independent effect of health service use on respondents' life satisfaction controlling for reported unmet healthcare needs and a number of other factors. The results are summarized in the following sections.

4.6.1 Bivariate relationship between life satisfaction and health service utilization.

Tables 30, 31, 32 and 33 displays the results from cross-tabulations between life satisfaction and four types of health services' use (hospitalization, physician services, dental services, and physiotherapy services) in the past 12-month period of the survey. The tables cross-tabulate individuals who reported low and high life satisfaction with different types of health services' use and the results are compared among the total population and the three study groups. Chi-square values are presented at 99% CI.

Among the total population and the Canadian-born population, it was found that individuals who reported low life satisfaction were significantly more likely to be hospitalized or use physician or physiotherapy services in the past 12 months compared to

those reported high life satisfaction. However, individuals who reported low life satisfaction were less likely to visit a dentist in the past 12 month period compared to those who reported high life satisfaction. (Tables 30 and 31).

Table 29: Bivariate relationship between life satisfaction and health service utilization among the total population.

Health service Utilization	**Total Population**		
	Life Satisfaction		χ^2
	Low % [99% CI]	High % [99% CI]	
Hospitalization			
At least once	39.91 [36.74 – 43.16]	60.09 [56.84 – 63.26]	**210.50*** **
Not at all	29.61 [28.65 – 30.58]	70.39 [69.42 – 71.35]	
Physician services			
Used at least once	31.34 [30.38 – 32.31]	68.66 [67.69 – 69.62]	**69.75*** **
Not used at all	27.55 [25.63 – 29.56]	72.45 [70.44 – 74.37]	
Dental services			
Used at least once	27.28 [26.18 – 28.40]	72.72 [71.60 – 73.82]	**508.18*** **
Not used at all	36.43 [34.79 – 38.10]	63.57 [61.90 – 65.21]	
Physiotherapy services			
Used at least once	31.93 [29.12 – 34.87]	68.07 [65.13 – 70.88]	**8.09** **
Not used at all	30.23 [29.25 – 31.22]	69.77 [68.78 – 70.75]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence with d.f. = 1
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Table 30: Bivariate relationship between life satisfaction and health service utilization among the Canadian-born population.

Health service Utilization	Canadian-born Population		
	Life Satisfaction		χ^2
	Low % [99% CI]	High % [99% CI]	
Hospitalization			
At least once	37.50 [34.41 – 40.68]	62.50 [59.32 – 65.59]	**153.31*** **
Not at all	28.08 [27.02 – 29.17]	71.92 [70.83 – 72.98]	
Physician services			
Used at least once	29.48 [28.40 – 30.58]	70.52 [69.42 – 71.60]	**27.67*** **
Not used at all	26.87 [24.70 – 30.58]	73.13 [70.84 – 75.30]	
Dental services			
Used at least once	25.65 [24.44 – 26.89]	74.35 [73.11 – 75.56]	**468.45*** **
Not used at all	35.27 [33.55 – 37.04]	64.73 [62.96 – 66.45]	
Physiotherapy services			
Used at least once	31.08 [27.96 – 34.38]	68.92 [65.62 – 72.04]	**15.80*** **
Not used at all	28.54 [27.47 – 29.64]	71.46 [70.36 – 72.53]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence with d.f. = 1
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Among the recent-immigrant population, it was found that individuals who reported low life satisfaction were more likely to use physician or physiotherapy services. However, the relationship was only statistically significant with the use of physician services. Surprisingly, individuals who were admitted at least once or visited a dentist in the past year were less likely to report low life satisfaction, but the differences are not statistically significant. (Table 32).

Table 31: Bivariate relationship between life satisfaction and health service utilization among recent immigrants.

Health service Utilization	Recent Immigrants		
	Life Satisfaction		χ^2
	Low % [99% CI]	High % [99% CI]	
Hospitalization			
At least once	23.34 [9.20 – 47.77]	76.66 [52.23 – 90.80]	3.38
Not at all	36.89 [30.48 – 43.81]	63.11 [56.19 – 69.52]	
Physician services			
Used at least once	40.27 [31.95 – 49.19]	59.73 [50.81 – 68.05]	**8.84****
Not used at all	30.35 [22.38 – 39.70]	69.65 [60.30 – 77.62]	
Dental services			
Used at least once	34.09 [25.31 – 44.12]	65.91 [55.88 – 74.69]	1.25
Not used at all	37.80 [29.83 – 46.48]	62.20 [53.52 – 70.17]	
Physiotherapy services			
Used at least once	40.23 [20.09 – 64.30]	59.77 [35.70 – 79.91]	0.30
Not used at all	35.99 [29.75 – 42.73]	64.01 [57.27 – 70.25]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence with d.f. = 1
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Among the long-term immigrant population, individuals who reported low life satisfaction were more likely to be hospitalized or use physician in the past 12 months compared to those who reported high life satisfaction. However, this was the opposite of dental and physiotherapy services' use. Long- term immigrants who reported low life satisfaction were less likely to visit a dentist or a physiotherapist in the past 12 months compared to those who reported high life satisfaction. The association between life satisfaction was found to be statistically significant with three types of health services' use among long-term immigrants such as hospitalization, physician and dental services (Table 33).

Table 32: Bivariate relationship between life satisfaction and health service utilization among long-term immigrants.

Health service Utilization	**Long-term Immigrants**		
	Life Satisfaction		χ^2
	Low % [99% CI]	High % [99% CI]	
Hospitalization			
At least once	49.90 [39.23 – 60.58]	50.10 [39.42 – 60.77]	**62.40*** **
Not at all	33.49 [31.11 – 60.58]	66.51 [64.04 – 68.89]	
Physician services			
Used at least once	36.21 [33.54 – 38.97]	63.79 [61.03 – 66.46]	**25.14*** **
Not used at all	29.37 [24.07 – 35.29]	70.63 [64.71 – 75.93]	
Dental services			
Used at least once	31.96 [28.98 – 35.09]	68.04 [64.91 – 71.02]	**50.68*** **
Not used at all	40.38 [35.86 – 45.06]	59.62 [54.94 – 64.14]	
Physiotherapy services			
Used at least once	32.30 [26.13 – 39.17]	67.70 [60.83 – 73.87]	2.52
Not used at all	35.09 [32.44 – 37.83]	64.91 [62.17 – 67.56]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence with d.f. = 1
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

4.6.2. Multivariate relationship between life satisfaction and health service utilization controlling for unmet healthcare needs.

Table 34 presents results from multiple logistic regression analysis with low life satisfaction as the outcome variable and all the four types of health services' use (hospitalization, physician, dental and physiotherapy services) as independent variables controlling for unmet healthcare needs. Four models, each for the total population and three sub-population groups were compared with one another and AOR's at 99% CI were used to determine the predictors for low life satisfaction.

It is evident that for total population and Canadian-born population, individuals who

were hospitalized or used physician or physiotherapy services had higher odds of reporting low life satisfaction controlling for unmet healthcare needs [AOR = 1.364 (99%CI = 1.166-1.594), 1.128 (99%CI = 0.994-1.280) and 1.048 (99%CI = 0.891-1.233), respectively]. The relationship was significant for hospitalization and physician services. For dental services, those who used these services were significantly less likely to report low life satisfaction adjusting for unmet healthcare needs [AOR = 0.644; 99%CI = 0.582-0.713] (Table 34).

For recent immigrants, only physician services' use was a significant predictor for low life satisfaction controlling for unmet healthcare needs [AOR = 1.588; 99%CI = 0.881-2.862]. Among long-term immigrants, hospitalization and physician services' use was significantly associated with reporting low life satisfaction controlling for unmet healthcare needs [AOR = 1.789 (99%CI = 1.116-2.866) and 1.383 (99%CI = 1.019-1.878], respectively). Among those who used dental or physiotherapy services were less likely to report low life satisfaction adjusting for unmet healthcare needs although this relationship was only significant with dental services' use [AOR = 0.703 (99%CI = 0.548-0.902) and 0.835 (99%CI = 0.584-1.194), respectively] (Table 34).

Hosmer-Lameshow goodness-of-fit test for all the four models showed an insignificant p-value ($p>0.05$), meaning that the models were a good fit.

Table 33: Predictors of low life satisfaction among the total population and the three sub-population groups controlling for unmet healthcare needs.

Predictors	Model 1 Total Population Unadjusted OR (99% CI)	Model 2 Canadian-born Population Adjusted OR (99% CI)	Model 3 Recent-Immigrants Adjusted OR (99% CI)	Model 4 Long-term Immigrants Adjusted OR (99% CI)
Hospitalization				
At least once	1.401*** (1.200 - 1.635)	1.364*** (1.166 - 1.594)	0.376 (0.0892 - 1.590)	1.789*** (1.116 - 2.866)
Physician services				
Used at least once	1.199*** (1.074 - 1.338)	1.128** (0.994 - 1.280)	1.588* (0.881 - 2.862)	1.383** (1.019 - 1.878)
Dental services				
Used at least once	0.663*** (9.603 - 0.729)	0.644*** (0.582 - 0.713)	0.793 (0.446 - 1.409)	0.703*** (0.548 - 0.902)
Physiotherapy services				
Used at least once	1.012 (0.872 - 1.174)	1.048 (0.891 - 1.233)	1.254 (0.378 - 4.156)	0.835 (0.584 - 1.194)
Reported unmet healthcare needs				
Yes	2.682*** (2.352 - 3.057)	2.696*** (2.339 - 3.107)	3.421*** (1.463 - 8.000)	2.577*** (1.844 - 3.602)
Constant	0.420*** (0.375 - 0.470)	0.412*** (0.361 - 0.470)	0.419*** (0.256 - 0.686)	0.452*** (0.329 - 0.620)
Goodness of fit (Hosmer-Lameshow test)	6.45	4.27	1.24	1.37

Note: Reference categories are: Not hospitalized; physician services not used at all; dental services not used at all; physiotherapy services not used at all; No unmet healthcare needs
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

4.6.3. Multivariate relationship between life satisfaction and health service utilization controlling for unmet healthcare needs and other characteristics.

Table 35 presents multivariate results comparing 4 models each for the total population and three sub-population groups and investigates the relationship between life satisfaction and health services' use controlling for unmet healthcare needs and other demographic,

socio-economic and health-related characteristics. It is evident from model-1 for the total population that hospitalization, physician services' use, and physiotherapy services' use are not statistically significant predictors for low life satisfaction when unmet healthcare needs and other variables are considered as control variables. However, individuals who used dental services were 18% (highly significant) less likely to report low life satisfaction compared to those who did not use dental services at all in the past 12-month period, holding constant the other variables in the model (Table 35).

For the Canadian-born population (Model-2), it is evident that although hospitalization, physician services' use and physiotherapy services' use were predictors for low life satisfaction, the relationship was not statistically significant. Similar to the results from the total population, Canadian-born people who used dental services in the past 12 months were 16% less likely to report low life satisfaction compared to those who did not use dental services at all, holding the other variables as constant (Table 35).

Model-3 for recent immigrants show that individuals who were hospitalized or used dental services in the past 12 months were 80% and 37% less likely to report low life satisfaction compared to those who were not hospitalized or did not use dental services at all, holding constant all other variables in the model. Physician services' use was a predictor of low life satisfaction; however, the relationship was borderline significant. It was surprising to find that physiotherapy services' use showed more than 2 times higher odds of reporting low life satisfaction among the recent immigrant population holding all other variables as constant in the model (Table 35).

The Model-4 for long-term immigrants showed that hospitalization and physician services' use were predictors for low life satisfaction, whereas, dental and physiotherapy

services' use was not associated with low levels of life satisfaction. However, none of these variables showed a significant relationship with low life satisfaction when all other variables in the model were held as constant (Table 35).

The chi-square values obtained after running Hosmer- Lameshow goodness-of-fit test, showed an insignificant value ($p>0.05$) for all the four models, hence, it can be said that the models for predicting low life satisfaction controlling for unmet healthcare needs, demographic factors, socio-economic factors, and health-related characteristics were a good fit.

Table 34: Predictors of low life satisfaction among the total population and the three sub-population groups controlling for unmet needs and other characteristics.

Predictors	Model 1	Model 2	Model 3	Model 4
	Total Population Unadjusted OR (99% CI)	Canadian-born Population Adjusted OR (99% CI)	Recent-Immigrants Adjusted OR (99% CI)	Long-term Immigrants Adjusted OR (99% CI)
Hospitalization				
At least once	1.049 (0.856 - 1.285)	1.011 (0.820 - 1.247)	0.194** (0.039 - 0.973)	1.357 (0.754 - 2.442)
Physician services				
Used at least once	1.082 (0.952 - 1.229)	1.041 (0.905 - 1.197)	1.671* (0.847 - 3.298)	1.086 (0.742 - 1.589)
Dental services				
Used at least once	0.819*** (0.726 - 0.924)	0.841*** (0.745 - 0.965)	0.630 (0.315 - 1.256)	0.814 (0.595 - 1.113)
Physiotherapy services				
Used at least once	1.035 (0.870 - 1.233)	1.089 (0.901 - 1.316)	2.229 (0.551 - 9.018)	0.789 (0.514 - 1.211)
Reported unmet healthcare needs				
Yes	1.954*** (1.671 - 2.284)	1.947*** (1.624 - 2.334)	3.030** (1.139 - 8.057)	1.836*** (1.256 - 2.683)

Predictors	Model 1 Total Population Unadjusted OR (99% CI)	Model 2 Canadian-born Population Adjusted OR (99% CI)	Model 3 Recent-Immigrants Adjusted OR (99% CI)	Model 4 Long-term Immigrants Adjusted OR (99% CI)
Age				
18 – 55 years	1.141** (1.009 - 1.291)	1.154** (1.017 - 1.310)	0.670 (0.085 - 5.293)	1.102 (0.793 - 1.531)
Sex				
Male	1.258*** (1.117 - 1.416)	1.235*** (1.094 - 1.393)	0.928 (0.415 - 2.075)	1.218 (0.907 - 1.636)
Marital Status				
Married/ common-law	0.568*** (0.505	0.469*** (0.414 - 0.531)	0.827 (0.375 - 1.822)	0.772** (0.573 - 1.039)
Province				
NFL and Labrador, PEI, NS, New Brunswick, Quebec	0.784*** (0.679 - 0.905)	0.828*** (0.713 - 0.963)	1.464 (0.552 - 3.882)	1.015 (0.664 1.551)
Manitoba, Saskatchewan	0.829** (0.701 - 0.981)	0.964 (0.809 - 1.149)	0.418 (0.122 - 1.427)	0.666 (0.3705 -
Alberta	0.858* (0.718 - 1.025)	0.940 (0.773 - 1.142)	0.624 (0.196 - 1.985)	0.860 (0.539 - 1.373)
BC	0.952 (0.806 - 1.125)	1.040 (0.852 - 1.271)	0.643 (0.203 - 2.043)	0.889 (0.614 - 1.287)
Yukon, The North-west territories, Nunavut	1.197 (0.958 - 1.496)	1.292** (1.010 - 1.654)	2.840 (0.284 -	0.838 (0.240 - 2.931)
Education				
Less than high school diploma or its equivalent	1.329** (1.040 - 1.697)	1.665*** (1.243 - 2.230)	1.471 (0.474 - 4.565)	1.285 (0.769 - 2.148)
High school diploma or Trade certificate	1.064 (0.831 - 1.360)	1.468*** (1.076 - 2.003)	1.016 (0.217 - 4.760)	0.822 (0.483 - 1.397)
Non-university or University certificate or diploma below bachelor's level	1.174 (0.931 - 1.480)	1.509*** (1.132 - 2.012)	1.488 (0.468 - 4.731)	0.968 (0.614 -1.526)
Bachelor's degree	1.218* (0.954 - 1.554)	1.408** (1.038 - 1.9113)	1.826 (0.628 - 5.312)	0.926 (0.570 - 1.504)
Labour force status				
Did not work in the past year	1.156** (1.006 - 1.328)	1.243*** (1.067 - 1.448)	0.561 (0.242 - 1.302)	1.100 (0.787 - 1.539)

Predictors	Model 1 Total Population Unadjusted OR (99% CI)	Model 2 Canadian-born Population Adjusted OR (99% CI)	Model 3 Recent-Immigrants Adjusted OR (99% CI)	Model 4 Long-term Immigrants Adjusted OR (99% CI)
Sense of belonging to community				
Somewhat strong	1.589*** (1.339 - 1.886)	1.558*** (1.296 - 1.873)	1.515 (0.495 - 4.634)	1.858*** (1.219 -2.832)
Somewhat weak	2.505*** (2.086 - 3.009)	2.566*** (2.103 3.130)	1.978 (0.559 - 6.996)	3.034*** (1.932 - 4.763)
Very weak	3.032*** (2.426 - 3.790)	3.053*** (2.358 - 3.952)	3.201* (0.834 -12.278)	3.497*** (1.919 - 6.374)
Household income				
less than $50,000 CAD	1.730*** (1.512 - 1.979)	1.511*** (1.311 - 1.742)	3.155*** (1.510 - 6.594)	1.729*** (1.224 - 2.443)
Location of Residence				
Urban	1.280*** (1.122 - 1.462)	1.280* (0.978 - 1.301)	1.291 (0.194 - 8.602)	1.470* (0.900 - 2.403)
Chronic health condition				
1 or more	1.351*** (1.192 -1.531)	1.434*** (1.249 - 1.646)	0.904 (0.418 - 1.953)	1.387** (1.020 -1.887)
General health status				
Poor	3.592*** (3.037 - 4.249)	3.615*** (3.070 - 4.256)	3.337 (0.494 –22.532)	3.577*** (2.203 - 5.810)
Amount of stress in life				
Quite a bit stressful	1.937*** (1.706 - 2.201)	1.950*** (1.703 - 2.234)	1.806 (0.784 - 4.158)	2.052*** (1.471 - 2.862)
Extremely stressful	3.121*** (2.698 - 3.611)	3.271*** (2.770 - 3.865)	3.312*** (1.274 - 8.611)	3.064*** (2.051 - 4.577)
Constant	0.064*** (0.044 - 0.094)	0.054*** (0.035 - 0.084)	0.093 (0.003 - 2.787)	0.060*** (0.023 -0.153)
Goodness of fit (Hosmer-Lameshow test)	5.73	10.12	9.16	4.12

Note: Reference categories are: Not hospitalized; physician services not used at all; dental services not used at all; physiotherapy services not used at all; No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 year

Table 36 describes the interaction effect between reported unmet healthcare needs and immigration status. It is evident from the table that although recent immigrants and long-term immigrants who reported unmet healthcare needs by itself have a significant relationship with low life satisfaction, there was no significant interaction effect between reported unmet healthcare needs and immigration status in terms of predictors for low life satisfaction. In other words, the AOR's for the three sub-population groups as described in Table 35 were not statistically different from each other.

Table 35: Predictors of low life satisfaction among the total population and the three sub-population groups controlling for unmet healthcare needs studying for interaction effect.

Predictors	Model 5 Adjusted OR (99% C0I)
Reported unmet healthcare needs	
Yes	1.950 *** (1.632-2.330)
Study Population	
Recent Immigrants	1.442 ** (0.995-2.090)
Long-term Immigrants	1.476*** (1.251-1.745)
Reported unmet healthcare needs x Study Population	
Yes x Recent Immigrants	1.425 (0.585-3.473)
No x Long-term Immigrants	0.930 (0.613-1.410)
Hospitalization	
At least once	1.049 (0.855-1.287)
Physician services	
Used at least once	1.084 (0.950-1.236)
Dental services	
Used at least once	0.833*** (0.738-0.941)

Predictors	Model 5 Adjusted OR (99% C0I)
Physiotherapy services	
Used at least once	1.027 (0.860-1.225)
Age	
18 – 55 years	1.147 (1.010-1.302)
Sex	
Male	1.234*** (1.091-1.396)
Marital Status	
Married/ common-law	0.543*** (0.483-0.610)
Province	
NFL and Labrador, PEI, NS, New Brunswick, Quebec	0.867 (0.747-1.006)
Manitoba, Saskatchewan	0.882 (0.742-1.047)
Alberta	0.894 (0.746-1.134)
BC	0.954 (0.802-1.134)
Yukon, The North-west territories, Nunavut	1.285 (1.023-1.615)
Education	
Less than high school diploma or its equivalent	1.467 *** (1.138-1.891)
High school diploma or Trade certificate	1.209 (0.937-1.559)
Non-university or University certificate or diploma below bachelor's level	1.284 (1.008-1.636)
Bachelor's degree	1.245 (0.967-1.602)
Labour force status	
Did not work in the past year	1.145** (0.994-1.318)
Sense of belonging to community	
Somewhat strong	1.592 *** (1.337-1.895)
Somewhat weak	2.553 *** (2.118-3.076)
Very weak	3.081*** (2.451-3.874)
Household income	
less than $50,000 CAD	1.658*** (1.447-1.899)

Predictors	Model 5 Adjusted OR (99% C0I)
Location of Residence	
Urban	1.185** (1.038-1.354)
Chronic health condition	
Present – 1 or more	1.389 *** (1.220-1.580)
General health status	
Poor	3.612*** (3.063-4.260)
Amount of stress in life	
Quite a bit stressful	1.9522*** (1.709-2.230)
Extremely stressful	3.154 *** (2.712-3.670)
Constant	0.056 *** (0.374-0.826)
Goodness-of-fit (Hosmer-Lameshow test)	7.35

Note: Reference categories are: No unmet healthcare needs; 56 years & above; Female; Widowed/Single; Ontario; University Degree; Employed; very strong sense of belonging; High income; Rural; Absence of chronic health condition; Excellent health status; Not at all stressful

***p <0.001, **p <0.01, *p <0.05

Recent immigrants: Living in Canada ≤ 5 years

Long-term immigrants: Living in Canada >5 years

4.7. Summary of Results

According to CCHS (cycle 2014), the Canadian-born population reported the highest proportion of unmet healthcare needs followed by recent immigrants and long-term immigrants. The most common reason for reported unmet healthcare needs among the recent-immigrant population was “cost”. However, for long-term immigrants and the Canadian-born population, the most common reasons for reported unmet healthcare need was similar and it was, waiting time too long. Unmet healthcare needs were more commonly reported by certain population groups such as 18- 55 age group, females, unemployed, low-income groups, those living in urban areas and those who had at least chronic health conditions. It was also found that among individuals who reported unmet healthcare needs were more likely to be hospitalized or use physician services in the past 12 months compared to those who did not report having unmet healthcare needs. Only among recent immigrants, those who reported unmet healthcare needs were more likely to visit a dentist and less likely to visit a physiotherapist in the past 12 month period compared to those who did not report any unmet healthcare needs. Canadian adults age 18 years and above with unmet healthcare needs were 19.8% more likely to visit a physician at least once in the past 12 months prior to the survey compared to those who reported no unmet healthcare needs after controlling for predisposing characteristics, enabling resources and need factors.

With regards to respondents’ life satisfaction, it was found that Canadian adults age 18 years and above who reported having unmet healthcare needs had twice greater odds of reporting low life satisfaction compared to those who did not report unmet healthcare needs. This was the case after controlling for the effects of all other demographic, socio-economic and health-related characteristics. At last, when life satisfaction was examined with health service use, it was found

that Canadian residents who used dental services at least once in the past 12-month period were 18% less likely to report low life satisfaction compared to those who did not use dental services at all in the past 12 months, controlling for unmet healthcare needs and demographic, socio-economic and health-related characteristics. Utilization of hospitalization, physician and physiotherapy services' use were found as predictors for low life satisfaction controlling for all other variables. However, only dental services' use showed a significant relationship with low life satisfaction.

Chapter 5: Discussion

This was a population-based study that aimed at examining unmet healthcare needs, and reasons for reported unmet healthcare needs by immigration status among Canadian adults. This is the first of its kind because of two main reasons. First, this study compared the prevalence and reasons for reported unmet healthcare needs not only between immigrants and non-immigrants but also explored the differences among immigrants themselves based upon their length of stay in Canada. Second, this study examined the effect of reported unmet healthcare needs on individuals' overall life satisfaction and their use of health services by immigration status extending the previous work done on this topic. This study was based on national-level data which allowed us to examine these important issues at the population level for Canadians. As CCHS collects a wide range of information on health status, health service utilization and health determinants for the Canadian population it was possible to examine the contribution of a number of factors that are found to be related to unmet healthcare needs and facilitate or impede health service use. The conceptual framework used allowed us to specifically examine the combination of three groups of factors including predisposing factors, enabling resources and need factors. The analyses were informed by the conceptual framework and revealed a number of important findings that are discussed below.

5.1 Unmet Healthcare Needs by Immigration Status

Our main finding was that prevalence of reported unmet healthcare needs was the highest among the Canadian-born population (12.19%), closely followed by recent-immigrants (11.79%) and then long-term immigrants (10.54%). A potential explanation to this pattern is

that the high proportion of unmet needs among non-immigrants is because of their actual need to seek care due to a comparatively higher prevalence of chronic health conditions and poor health status, but among recent immigrants, it can be attributed to their issues pertaining to healthcare access. A similar finding was reported by Statistics Canada (2016), however, they only compared immigrants with non-immigrants. It is important to note that although the overall prevalence of reported unmet healthcare needs among immigrant population was estimated at 10.5% (Statistics Canada, 2016), but when bifurcated based upon recent and long-term immigrants, the proportion of recent immigrants reporting unmet needs is found to be higher (11.8%) suggesting more barriers faced by newly arrived immigrants obtaining required care. It is also evident from previous studies that due to differences in socio-economic status, financial constraints, increased emotional stress due to low social support and unemployment are contributing factors (Lu & Ng, 2019; Ng et al., 2005) for making recent immigrants more prone to structural, institutional or cultural barriers accessing healthcare system (Duleep & Dowhan, 2008; R. Lee et al., 2001; Riedel, 1998; Singh Setia et al., 2011). Although, with an increase in the time since immigration, the barriers get reduced and healthcare access improves, making long-term immigrants less likely to report having unmet healthcare needs (Singh Setia et al., 2011). This is however, in contrast to the study by Wu et al., (2005), who observed an increase in the proportion of reported unmet healthcare needs with increasing years of residence in Canada, but this study was done using data from 2000-01 cycle of CCHS, and there is a fair chance that the difference is due to increase in the proportion of immigrants entering Canada over the years and their issues with healthcare access. The class of immigrants entering Canada has also changed over time. According to the 2016 Census, more than half of the immigrants were

admitted under the economic category (business class or through skilled workers program), whereas a smaller proportion of immigrants were admitted in this category during the 1980s (Statistics Canada, 2018a).

Among the total population, certain population groups more likely to report unmet healthcare needs were younger adults, females, widowed or separated or single, those who live in the territories, educated, unemployed, low-income groups, those living in urban areas, those with weak community belonging, those having chronic health conditions, those with fair or poor health status and with high stress level in life. This finding is consistent with previous studies (Barham et al., 2017; Chen et al., 2002; Guend & Tesseron, 2009; Law et al., 2005; Pappa, Kontodimopoulos, Papadopoulos, Tountas, & Niakas, 2013; Sibley & Glazier, 2009; Wojkowski et al., 2016). However, when the three study groups were compared, it was found that the Canadian-born population and long-term immigrants had the same likelihood in terms of factors responsible for reported unmet healthcare needs. In contrast to this, among the recent immigrant population, older adults and those who were married or living in common-law were more likely to report unmet healthcare needs. This makes sense as newly arrived immigrants who are young are generally healthier due to the medical screening process during migration (Bonnie, Stroud, & Breiner, 2015).

It is important to keep in mind that although there are highly significant differences among all the three study groups in terms of the proportion of population who reported unmet healthcare needs, the differences were quite small, and maybe not significant from a clinical perspective because of large sample size.

5.2 Reasons for Reported Unmet Healthcare Needs by Immigration Status

This study found that the order of the three most common reasons for reported unmet healthcare needs among non-immigrants and long-term immigrants was the same, waiting time too long, care not available at the time required and cost. On the other hand, the order of the three most common reasons for reported unmet healthcare needs among recent immigrants was cost, waiting time too long and not available at the time required. These findings vary in comparison to previous data. According to a study by Wu and colleagues which is based on 2000-01 data, the three most common reasons reported by immigrants and non-immigrants (note: there was no further bifurcation among immigrants in terms of length of stay in Canada) was the same in order, waiting time too long, not available when required and felt would be inadequate. It is surprising to find how the reasons due to cost have become so prominent over the years especially among the recent-immigrant population. "Cost" related reasons comprise the most commonly reported reasons for health-related unmet needs among recent immigrants and third most common among long-term immigrants and Canadian-born population in a country that has universal health coverage for all its residents for physician and hospitalization services. However, this survey also considered dental and physiotherapy services which are not covered under public insurance in most situations across the country. These results should be interpreted with caution as "cost" reported as a reason for reported unmet healthcare needs might mean different things for different groups of people (younger adults v/s an older adult) but also is open to subjective interpretations.

Moreover, when the reasons for reported unmet healthcare needs were compared with respondents' country of birth, it was an interesting finding that Asian-born people reported

the most proportion of availability and acceptability reasons for unmet healthcare needs. According to some U.S.-based studies (Clough, Lee, & Chae, 2013.; Kim & Keefe, 2010) it is found that Asian immigrants have barriers accessing healthcare mainly because: (1) issues related to health-related beliefs and cultural norms prevent Asian immigrants to seek health services thus leading to poorer outcomes; (2) lack of language proficiency makes Asians more difficult to adjust to the new healthcare system leading to differences between healthcare providers and patients; (3) perceived discrimination within the healthcare system (e.g. racism); (4) lack of health insurance because Asian immigrants tend to work mainly for small business or low-wage jobs that do not typically offer health insurance. Although these studies are based on the U.S., the results can be generalized to an extent among the Canadian population too as Asian immigrants comprise the largest source of immigrants to Canada (Statistics Canada, 2018a). As per the best of my knowledge, there is no study in Canada that compares reasons for reported unmet healthcare needs with respondents' country of birth.

Availability reasons for unmet healthcare needs were also reported more among African-born immigrants and those who were born in other parts of North America except Canada. Acceptability reasons for unmet healthcare needs were also reported more among Canadian born and European born people. Affordability reasons for unmet healthcare needs were reported more among people who were born among the South or Central America including the Carribean and among those born in North America but Canada. This pattern might have something to do with the difference in the healthcare system of Canada compared to the healthcare system in the immigrants' host country, but it cannot be said for sure as there are not enough studies examining this relationship in the existing literature.

5.3 Reported Unmet Healthcare Needs and Health Service Utilization

With respect to service contacts, our study found that individuals who reported unmet healthcare needs were more likely to use health services especially hospitalization and physician services, which is consistent with findings from some of the previous studies (Chen et al., 2002; N. Kasman & Badley, 2004; Nelson & Park, 2006b). There is a greater proportion of individuals who have unmet healthcare needs if they went to a physician but who do not go to a physician have lower proportion of unmet healthcare needs, this can be explained as individuals who perceive that they haven't received adequate treatment for their health problem, they tend to seek more care in order to meet their needs. Also, those individuals who are looking to get care for a specific problem but are unaware of where to get it from possibility due to barriers related to availability or accessibility or unawareness would try to go to a physician for any kind of medical issue, in other words, physicians act as gatekeeper for access to any type of medical treatment. In contrast to this, the utilization of dental visits does not follow a direct relationship with unmet healthcare needs in all three study groups. Recent immigrants reported the highest unmet healthcare needs among those who used dental services because of two reasons: lack of dental insurance and cost barriers due to low income (Mehra, Costanian, Khanna, & Tamim, 2019). A similar result was also observed by Calvasina and colleagues (2014), and they stated that recent immigrants have a poor dental health compared to Canadian born population and they are more likely to visit a dentist for treatment purposes such as emergency procedures or fillings, extractions, etc. whereas long-term immigrants and Canadian-born people tend to visit a dentist for preventive care like regular check-up or cleaning (Mehra et al., 2019). For non-immigrants and long-term immigrants, individuals were more likely to report unmet healthcare needs

who did not use dental services.

An interesting point to be noted here is, although the proportion of individuals who reported being hospitalized was much lower among recent-immigrants compared to long-term immigrants and Canadian-born population, the proportion of recent immigrants who reported unmet healthcare needs was significantly higher among those who were hospitalized at least once in the past year. This is an indicator that recent-immigrants face more barriers when using hospitalization services than long-term immigrants or non-immigrants. The same goes for dental services too. In terms of physician services' use, there were no major differences in the three population groups in terms of reported unmet healthcare needs and physician services' utilization which is consistent with previous studies (Newbold, 2009; Quan et al., 2006). In terms of physiotherapy services, Canadian born population and long-term immigrants who reported unmet healthcare needs were significantly higher users of physiotherapy services. In contrast to this, recent immigrants who reported unmet healthcare needs were less likely to visit a physiotherapist however, this difference was not found to be significant. This is the first study to examine reported unmet healthcare needs with physiotherapy service utilization by immigration status using national-level survey data, hence, there is no comparison study found in the literature. This trend is in accordance with the "healthy immigrant effect" wherein the characteristics of service use among immigrants get similar to non-immigrants with an increase in time of residence.

This study found that recent immigrants who reported unmet healthcare needs are 41% more likely to use physician services compared to those who did not report having unmet healthcare need after controlling for predisposing characteristics, enabling resources and need factors. The likelihood of using physician services among long-term immigrants who

reported unmet healthcare needs was also very similar to that of recent immigrants. However, among the native-born population, it was found that those who reported unmet healthcare needs were 14% more likely to use physician services compared to those who did not report unmet healthcare needs. Hence, there are differences in the odds of physician services' use by immigration status. In terms of dental services use individuals who reported unmet healthcare needs had 19% lower odds of visiting a dentist in the past 12 months compared to those who did not report unmet healthcare needs controlling for predisposing characteristics, enabling resources and need factors. Although there were no significant interaction differences by immigration status in predicting utilization of physician services or dental services.

A previous study by Barham et al., (2017) found that individuals who reported unmet healthcare needs were less likely to use health services. In other words, those who used the system much had a higher likelihood of having their needs met. As mentioned earlier, most part of literature finds that individuals who reported unmet healthcare needs had higher odds of visiting a GP, specialist or physiotherapist even after adjusting for health status and demographics (Chen et al., 2002; N. Kasman & Badley, 2004; Nelson & Park, 2006b).

In terms of volume of services, when healthcare utilization is compared with immigration status, it is observed that immigrants generally have a higher mean number of visits to a physician or to hospital compared to non-immigrants according to a study in Germany (Glaesmer et al., 2011). But this study went a step further and analyzed this relationship in the presence of unmet healthcare needs. It was found that recent immigrants reported a higher mean than long-term immigrants for dental services. The Canadian-born population reported the highest mean number of nights stayed at the hospital and the highest mean

physiotherapy visits in the past 12 months. For physician services, long-term immigrants reported the highest mean number of visits among all the three sub-population groups. It can be evident, how unmet healthcare needs can affect an individuals' overall healthcare use.

5.4 Reported Unmet Healthcare Needs and Life Satisfaction

It is evident from this study that individuals who reported unmet healthcare needs are almost twice likely to experience low life satisfaction after adjusting for health status and demographics. In terms of immigration status, recent immigrants who reported unmet healthcare needs had significantly higher odds almost 2.5 times more to report low life satisfaction after adjusting for all other health-related characteristics. It was observed at the beginning of the analysis that the life satisfaction of long-term immigrants was better than non-immigrants and life satisfaction of recent immigrants was even better than for long-term immigrants. This was a consistent finding with a report on life satisfaction published by Statistics Canada (Frank et al., 2014). But as soon as unmet healthcare need was examined in the presence of other control variables like age, sex, marital status, province of residence, education, labour force status, household income, community belonging, urban or rural location, chronic health conditions, general health status and life stress, the likelihood of reporting low life satisfaction among recent-immigrants reached the highest. In comparison to the recent immigrant population, the Canadian-born population and then long-term immigrants reported low life satisfaction when examined in the presence of unmet healthcare needs. This could be because of the high proportion of reported unmet healthcare needs in recent immigrants and the Canadian-born population.

The significant predictors for low life satisfaction among Canadian-born population were presence of unmet healthcare needs, age category 18-55 years, males, widowed /separated /single, those living in territories, less educated, unemployed, those with weak sense of belonging, low-income group, those with chronic health conditions, poor health status, those who report having stressful life. These factors were in sync with the existing literature (Frank et al., 2014; Statistics Canada, 2019b) except for unmet healthcare need which was unique to this study. The significant predictors for low life satisfaction among recent immigrants were the presence of unmet healthcare needs, low-income group and those who reported having a stressful life. The significant predictors for low life satisfaction among long-term immigrants were the presence of unmet healthcare needs, those with a weak sense of belonging, low-income groups, those with chronic health conditions, poor health status, those who reported having a stressful life.

5.5 Life Satisfaction and Health Service Utilization

It was found that when health service utilization was examined with low life satisfaction controlling only for unmet healthcare needs, the odds ratios show more significant relationship, but as soon as other variables like age sex, marital status, education, labour force status, sense of belonging, income, urban/rural, chronic health condition, general health status; life stress were introduced most variables lost their significant relationship.

Also, as hospitalization, physician services fall under the umbrella of public insurance, their utilization acted as predictors for low life satisfaction among non-immigrants and long-term immigrants. Dental services, on the other hand, are primarily privately covered, hence lower utilization of dental services was associated with low life satisfaction and this is consistent for all the three groups of the study population. This can be because generally,

people tend to visit a dentist for prophylactic reasons and not necessarily for treatment purposes. Moreover, the costs associated with dental services are quite high especially if the patient belongs to a low-income group or has a lack of additional coverage. Lastly, physiotherapy services although, are privately covered, acted as predictors for low life satisfaction among Canadian-born population and recent immigrants. A possible explanation could be because it is not common for individuals to visit a physiotherapist for preventive reasons, it is generally for therapeutic purpose.

As previous studies have found that those with high life satisfaction tend to use fewer health services (E. S. Kim et al., 2014). In our study, we analyzed this in the presence of unmet healthcare need along with other help-seeking characteristics of an individual. The results show that higher utilization of services affects an individuals' overall life satisfaction especially for services that are publicly covered which is very interesting because, in spite of not having to pay for services, higher utilization has a negative impact on the health. This does not indicate higher utilization of privately covered services is not a predictor for low life satisfaction, in-fact recent immigrants were twice likely to report low life satisfaction if they had used physiotherapy services in the past 12 months controlling for unmet needs and other socio-demographic characteristics. Only for dental services' use the rationale that "individuals with high life satisfaction are less likely to use health services" holds true. A valid explanation is, as these services are not covered publicly, those who have additional coverage from the employer or those with good income can use these services more often as compared to those who are only covered under public insurance and have lower income.

5.6 Study Limitations

The findings from this study should be inferred in light of some limitations. Owing to the cross-sectional design of this study the outcome measures have been based on self-reported data. Due to this reason, there is a risk of recall bias among respondents as a lot of questions are based upon individual experiences in the past 12-month period of the survey, for example, questions based on hospitalization days, number of visits to a physician or dentist or a physiotherapist have all been based on the past 12 months. In addition, the survey asked respondents about the presence or absence of chronic condition and it was considered to be present only if it was diagnosed by a physician and the respondent had it at least since the past six months, but still, the measure was self-reported which makes it more prone to recall bias.

In addition to recall bias, another limitation that is most common with cross-sectional data especially survey data is an inability to detect causal relationships. As both the predictor and outcome are assessed at the same time, a correlation could be examined but a temporal sequence of events cannot be established as it would have been with longitudinal data or using path analysis. For instance, it cannot be said whether unmet healthcare needs lead to high health service utilization or high health service utilization lead to an increase in reported unmet healthcare needs or whether reported unmet healthcare needs lead to low life satisfaction or low life satisfaction caused reported unmet healthcare needs.

This study revolves around the main topic of unmet healthcare needs and the question that was asked in order to capture respondents with unmet healthcare needs was, “During the past 12 months, was there ever a time when you felt that you needed health care, but did not receive it?” The response options were: 1) ‘yes’ meaning during the past 12 months there was at least one instance where the person felt that they needed health care, but did not receive it; and 2) ‘no’

meaning during the past 12 months there was not at least one instance where the person felt that they needed health care, but did not receive it. However, there is a third possibility and that is, the respondent might not have needed any health care in the past 12 months. As the result, those who responded no to this question might be a combination of two groups: those who did not need any health care to begin with and those who needed health care and received it.

This study uses data from CCHS, cycle 2014. CCHS is an ongoing survey and has a new release every year but since 2014 was the most recent cycle available that had a question on unmet healthcare needs, the data is based on the year 2014. Also, CCHS has combined data available for two consecutive cycles (for example, cycle 2012-13, cycle 2014-15, cycle 2015-16, etc.), which gives double the number of sample size, however as cycle 2015 did not have a question on unmet healthcare needs, the combined 2014-15 data for CCHS could not be used. Also, in regard to the reasons for reported unmet healthcare needs, there is no category for barriers related to "transportation" or "language" in cycle 2014, but these categories were asked in the previous cycle of CCHS such as 2000-01.

As one of the objectives focusses on examining the relationship of unmet healthcare needs and health service utilization, it cannot be examined which particular service was responsible for an individual's reported unmet healthcare need as there is no direct question on which type of health service was not received in accordance to the respondents' needs. Although, the bivariate relationship between a specific health service use with unmet healthcare needs gives a good idea about which service has the most proportion of reported unmet healthcare needs among each population group, but a direct question would have created a clearer and broader picture. As this study is based upon secondary data analysis, there is no room for adding new information in the dataset. If this study involved a primary data collection, there would have been an opportunity to

ask other types of questions especially about unmet healthcare needs as it relates to a specific type of health service. Although, primary data collection with such a large sample size that is representative of the total Canadian population seems quite infeasible.

There is no information in the survey about the immigration class such as refugees or economic class or family class etc. Thus, the variations depending upon the immigration class regarding barriers related to healthcare access cannot be examined. Also, from the data, the respondents' country of birth is known, but there is no detail about where the immigrants come from, in Canada. In addition to this, it must be acknowledged that data on the presence or type or severity of a disability, a direct question on an individual's health insurance and social support in the core component of the survey could have been of benefit in analyzing the objectives for this study and in getting more in-depth results. As this study involved secondary data analysis, a limitation of this type of research is the researcher's inability to make any changes to the questions already asked and a lack of opportunity to add new questions.

Another limitation of the study is that while the study population was differentiated between recent immigrants and long-term immigrants, but it was not examined if (and how) the length of stay in Canada among long-term immigrants impacted the results meaning there was no further bifurcation among long-term immigrants based on their years of residence in Canada.

In addition, in order to abide by the vetting rules of the RDC, some of the categories of the variables had to be collapsed due to low cell counts. For example, the age variable was recoded as a dichotomous variable (18-55 years; 56 years and above) because making this as a categorical variable or increasing the range of the first category was giving low cell counts especially among the recent-immigrant group. Also, for the variable to record the province of residence and respondents' country of birth, some of the categories were grouped leading to

some specific information getting lost.

The distribution for the outcome variable, life satisfaction, was found to be skewed and not normally distributed due to most people reporting their life satisfaction to be quite high. Due to this reason, life satisfaction was recoded as a dichotomous variable with categories defined in relation to the median of the sample data.

Chapter 6: Conclusions and Study Implications

6.1. Conclusions

This study has served the purpose of examining reported unmet healthcare needs by immigration status using data that is representative of more than 27 million Canadian residents. According to the 2016 Census (Statistics Canada, 2018b), the proportion of immigrants to Canada was 21.8% out of the total Canadian population. Out of which 3.5% were recent immigrants who arrived between the period of 2011-2016. This is very similar to the proportions that were observed from the CCHS 2014 data which is an indicator that the sample very well represents the immigrant population in Canada. This is the first study that has investigated the most recent data available on reported unmet healthcare needs and its association with different types of health services' utilization and studied its impact on overall life satisfaction by comparing immigrants and non-immigrants based on their length of residence in Canada. As the host population reported the highest proportion of unmet healthcare needs in Canada which could be linked to healthy immigrant effect, the relatively high proportion of unmet healthcare needs among recent immigrant population strikes some concern over their initial access to the Canadian healthcare system. One of the most noteworthy findings of this study was "cost" as the most commonly reported reason for unmet healthcare needs among recent immigrants indicating the prevalence of financial barriers in our one-of-a-kind healthcare system with universal health coverage.

It was found that individuals who reported unmet healthcare needs were more likely to use physician services even after adjusting for demographics and health-related characteristics. It was a common finding for all three groups of the population, but the magnitude of effect was

higher among immigrants (same for both recent and long-term) than non-immigrants. It was also evident that those who reported unmet healthcare needs had compromised health status with high prevalence of chronic health conditions and increased stress levels, so it requires a deeper insight to say for sure, whether it is the medical need that leads to high service utilization among those with unmet healthcare needs or it is actually because of the presence of barriers relating to healthcare access. Although, as recent immigrants have better health status, their needs are not being met.

The presence of unmet healthcare needs has a negative influence on individuals' life satisfaction. This was a consistent finding in all the three groups even after taking demographics and health-related characteristics into account. The recent immigrants are most likely to report low life satisfaction with the presence of reported unmet healthcare needs followed by Canadian-born population and long-term immigrants. Lastly, this study also found that high service utilization especially physician services is related to reporting low life satisfaction after controlling for unmet healthcare needs and other demographics and health-related characteristics. Canadian-born adults who did not use dental services were significantly more likely to report low life satisfaction after adjusting for their unmet needs and other characteristics (demographic and health-related).

This study throws some light over this less explored area of equity in terms of healthcare access as Canada is known to be amongst those countries having a very strengthened healthcare system. But owing to the heterogeneity in terms of ethnicity and cultural background of Canadian residents, it is important to understand the needs of the population coming from different groups in order to provide appropriate and timely care. Now since the immigrant population is rising every year, it is of prime importance to focus on this area of research to help

them in the process of acculturation. As the immigrant population forms a substantial proportion of Canadians, focusing on their health-related needs will indirectly improve the health of Canadians in general.

6.2. Study Implications and Future Directions for Research

Despite the fact that Canada has full access to "free" primary healthcare, there is no single national healthcare plan. Provinces and territories have different healthcare insurance plans., although regardless of where people live, all Canadian residents must have reasonable access to hospital and physician services at no cost to them (without paying out-of-pocket). A possible explanation for significant differences in terms of unmet healthcare needs reported among different groups of the population is that the universal health coverage does not cover all the services like the cost of prescription drugs (Barham et al., 2017; Marshall, 2011).

This study suggests that there are certain population groups that are more prone to report unmet healthcare needs, such as 18- 55 age group, females, unemployed, low-income group, those living in urban areas and those having chronic health conditions. This finding emphasizes the importance of social determinants of health in relation to reported unmet healthcare needs. Hence, these groups of the population who are most vulnerable to unmet healthcare needs could be given more support in terms of proper access to healthcare and proper allocation of scarce health resources. Findings like these must be of importance to a wide range of health professionals including family physicians, dentists, physiotherapists and all those involved in the provision of primary healthcare to Canadians.

Another finding that individuals who report unmet healthcare needs were more likely to

use health services is very crucial in terms of healthcare delivery as it impacts the overall budget of healthcare. Clinicians and health providers should take into consideration the fact that the frequency of health service use has an impact on the needs not getting met. Systematic procedure in terms of adequate appointments scheduled to avoid the occurrence of reported unmet healthcare needs. The referrals and recommendations made by a physiotherapist further inform an individual's utilization of physiotherapy services depending upon the recommendation for conservative treatment or review by a surgeon or referring to diagnostic imaging. I speculate that public coverage for prescription drugs could also assist in reducing the occurrence of reported unmet healthcare needs.

As life satisfaction is found to be associated with unmet healthcare needs in a negative way, meaning, this study found that individuals who reported unmet healthcare needs were more likely to report low life satisfaction even after controlling for demographic, socio-economic and health-related characteristics. This association if examined in a longitudinal way would facilitate our understanding of long-term consequences of reported unmet healthcare needs. But even from this cross-sectional study, the negative consequences of reported unmet healthcare needs are quite evident.

In terms of future research, as previously mentioned in limitations, examining the impact of unmet healthcare needs on health service utilization and life satisfaction using longitudinal data would give results that are more accurate and reliable. Even in terms of cross-sectional data, taking the advantage of data linkage with provincial administrative data or hospital data available from Canadian Institute for Health Information (CIHI) would give information based on an actual number of visits to the hospital or physician or other types of health services, hence abolishing the error due to recall bias. Future studies inculcating a qualitative component will

also help in informing more detail related to barriers accessing a specific type of health services.

In reference to the results from this study, a recommendation could be put forth to Statistics Canada to revise the question on unmet healthcare needs and ask the respondents in two parts. Part one should ask respondents, “In the past 12 months have you ever felt that you needed healthcare?” The responses to this question should be binary (yes; or no) and those who answer yes, should be asked a subsequent question which is, “Was there ever a time that you felt you didn’t receive healthcare?” This will comprise part two with binary response categories (yes; or no). This will help in capturing the actual proportion of respondents who did not receive the necessary medical treatment when needed and hence, will give a more accurate estimate about barriers related to healthcare access. Moreover, a recommendation to include a question on unmet healthcare needs in recent cycles of CCHS would be beneficial as the presence of unmet healthcare needs is found to have implications not only on an individuals’ social determinants of health but also on the Canadian healthcare system in terms of healthcare cost.

It is also recommended to include questions related to transportation barriers or language problems faced by the immigrant population in subsequent cycles of CCHS. Also, as from the data it cannot be concluded how the reported unmet healthcare need is related to the type of health service that is used or not used. A question addressing this would be very beneficial.

It is important to know for policy making how unmet healthcare needs vary with specific health services, as policies could be introduced to increase the number of physicians in a particular area or policies to address the reasons for unmet healthcare needs reported could be launched. Policies like, increasing coverage of public drug insurance and increasing the number of general physicians in health regions can help reduce access barriers. Policies to improve the dental coverage for immigrants by the expansion of public insurance either by providing

subsidized/free of charge access to dental care, especially for immigrants. Also, developing programs that will help immigrants in securing permanent employment that includes dental insurance will be beneficial. Access barriers for physiotherapy services can be reduced by introducing awareness programs, especially for immigrant population groups. Ensuring the availability of culturally and linguistically competent healthcare providers locally will potentially reduce the access barriers due to availability among the immigrant population.

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Appendices

Appendix A – Cross-tabulations Between Unmet Healthcare Needs and Other Covariates by Immigration Status

Table 36: Factors associated with reported unmet healthcare needs among total population.

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Age			
18-55	13.19 [12.24- 14.20]	86.81 [85.80- 87.76]	**190.11*** **
56 and above	9.33 [8.56- 10.17]	90.67 [89.83- 91.44]	
Sex			
Male	10.60 [9.60-11.68]	89.40 [88.32-90.40]	**75.71 *** **
Female	12.94 [12.04-13.89]	87.06 [86.11-87.96]	
Marital status			
Married, living common-law	10.64 [9.78-11.57]	89.36 [88.43-90.22]	**116.13*** **
Widowed, separated, Divorced, single	13.64 [12.62-14.72]	86.36 [85.28-87.38]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	13.71 [12.49-15.02]	86.29 [84.98-87.51]	**124.23*** **
Ontario	10.85 [9.72-12.09]	89.15 [87.91-90.28]	
Manitoba, Saskatchewan	9.17 [7.67-10.92]	90.83 [89.08-92.33]	
Alberta	10.36 [8.61-12.41]	89.64 [87.59-91.39]	
British Columbia	12.52 [10.78-14.48]	87.48 [85.52-89.22]	
Yukon, The North-west territories, Nunavut	16.31 [13.25-19.93]	83.69 [80.07-86.75]	
Education			
Less than high school diploma or its equivalent	10.72 [9.59-11.97]	89.28 [88.03-90.41]	**35.52 *** **
High school diploma or Trade certificate	12.91 [11.34-14.65]	87.09 [85.35-88.66]	
Non-university or University certificate or diploma below bachelor's level	11.97 [10.78-13.27]	88.03 [86.73-89.22]	
Bachelor's degree	12.37 [10.66-14.31]	87.63 [85.69-89.34]	
University certificate/ diploma/ degree above bachelor's level	12.24 [10.02-14.89]	87.76 [85.11-89.98]	
Labour Force Status			
worked in the past year	11.83 [11.03-12.69]	88.17 [87.31-88.97]	**14.70 *** **
Did not work in the past year	13.16 [11.84-14.60]	86.84 [85.40-88.16]	

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Sense of Belonging to Community			
Very Strong	10.27 [8.82-11.92]	89.73 [88.08-91.18]	**573.46*** **
Somewhat strong	9.50 [8.67-10.40]	90.50 [89.60-91.33]	
Somewhat weak	14.55 [13.16-16.06]	85.45 [83.94-86.84]	
Very weak	20.21 [17.34-23.41]	79.79 [76.59-82.66]	
Household Income			
Less or equal to $49,999	14.27 [13.10-15.51]	85.73 [84.49-86.90]	**174.37*** **
More than or equal to $50,000	10.52 [9.73-11.36]	89.48 [88.64-90.27]	
Urban/ Rural			
Population Centre / Urban	11.99 [11.23-12.79]	88.01 [87.21-88.77]	**9.39** **
Rural	10.92 [9.66-12.32]	89.08 [87.68-90.34]	
Chronic Health conditions			
Yes	14.20 [13.30-15.16]	85.80 [84.84-86.70]	**420.76*** **
No	8.63 [7.70-9.67]	91.37 [90.33-92.30]	
General Health Status			
Excellent, Very good, Good	10.04 [9.38-10.75]	89.96 [89.25-90.62]	**1291.61*** **
Fair, Poor	25.17 [22.57-27.98]	74.83 [72.02-77.43]	
Stress			
Not at all stressful or Not very stressful	7.99 [7.08-9.01]	92.01 [90.99-92.92]	**1155.80*** **
A bit stressful	10.39 [9.48-11.38]	89.61 [88.62-90.52]	
Quite a bit stressful or Extremely stressful	19.88 [18.10-21.79]	80.12 [78.21-81.90]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Table 37: Factors associated with reported unmet healthcare needs among Canadian-born Population.

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Age			
18-55	13.67 [12.61- 14.79]	86.33 [85.21- 87.39]	**168.47*** **
56 and above	9.59 [8.75- 10.49]	90.41 [89.51-91.25]	
Sex			
Male	11.04 [9.95-12.23]	88.96 [87.77-90.05]	**56.17 *** **
Female	13.30 [12.33-14.34]	86.70 [85.66-87.67]	
Marital status			
Married, living common-law	11.03 [10.05-12.08]	88.97 [87.92-89.95]	**85.57 *** **
Widowed, separated, Divorced, single	13.88 [12.72-15.11]	86.12 [84.89-87.28]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	12.95 [11.67-14.35]	87.05 [85.65-88.33]	**56.41 *** **
Ontario	11.96 [10.61-13.44]	88.04 [86.56-89.39]	
Manitoba, Saskatchewan	9.25 [7.71-11.07]	90.75 [88.93-92.29]	
Alberta	11.00 [9.04-13.32]	89.00 [86.68-90.96]	
British Columbia	13.55 [11.65-15.70]	86.45 [84.30-88.35]	
Yukon, The North-west territories, Nunavut	16.19 [13.09-19.86]	83.81 [80.14-86.91]	
Education			
Less than high school diploma or its equivalent	11.34 [10.08-12.74]	88.66 [87.26-99.92]	**31.01 *** **
High school diploma or Trade certificate	13.68 [11.90-15.69]	86.32 [84.31-88.10]	
Non-university or University certificate or diploma below bachelor's level	12.60 [11.23-14.11]	87.40 [85.89-88.77]	
Bachelor's degree	11.95 [10.08-14.10]	88.05 [85.90-89.92]	
University certificate/ diploma/ degree above bachelor's level	11.44 [8.72-14.87]	88.56 [85.13-91.28]	
Labour Force Status			
worked in the past year	12.52 [11.60-13.50]	87.48 [86.50-88.40]	0.05
Did not work in the past year	12.61 [11.32-14.02]	87.39 [85.98-88.68]	
Sense of Belonging to Community			
Very Strong	11.14 [9.47-13.07]	88.86 [86.93-90.53]	**416.80*** **
Somewhat strong	9.78 [8.88-10.75]	90.22 [89.25-91.12]	
Somewhat weak	14.76 [13.17-16.51]	85.24 [83.49-86.83]	
Very weak	19.94 [16.79-23.51]	80.06 [76.49-83.21]	

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Household Income			
Less or equal to $49,999	15.35 [13.96-16.85]	84.65 [83.15-86.04]	**193.49*** **
More than or equal to $50,000	10.80 [9.92-11.74]	89.20 [88.26-90.08]	
Urban/ Rural			
Population Centre / Urban	12.59 [11.72-1352]	87.41 [86.48-88.28]	**23.05 *** **
Rural	10.88 [9.55-12.36]	89.12 [87.64-90.45]	
Chronic Health conditions			
Yes	14.42 [13.54-15.56]	85.48 [84.44-86.46]	**340.85*** **
No	8.86 [7.78-10.07]	91.14 [89.93-92.22]	
General Health Status			
Excellent, Very good, Good	10.49 [9.73-11.30]	89.51 [88.70-90.27]	**991.02*** **
Fair, Poor	25.43 [22.63-28.45]	74.57 [71.55-77.37]	
Stress			
Not at all stressful or Not very stressful	8.04 [7.03-9.17]	91.96 [90.83-92.97]	**994.27*** **
A bit stressful	10.85 [9.80-12.00]	89.15 [88.00-90.20]	
Quite a bit stressful or Extremely stressful	20.43 [18.48-22.53]	79.57 [77.47-81.52]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada $\leq$ 5 years
Long-term immigrants: Living in Canada >5 years

Table 38: Factors associated with reported unmet healthcare needs among recent immigrants.

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Age			
18-55	11.71 [7.95-16.92]	88.29 [83.08- 92.05]	0.07
56 and above	12.84 [2.95-41.65]	87.16 [58.35- 97.05]	
Sex			
Male	11.31 [6.23-19.64]	88.69 [80.36-93.77]	0.20
Female	12.28 [7.97-18.46]	87.72 [81.54-92.03]	
Marital status			
Married, living common-law	12.89 [8.32-19.43]	87.11 [80.57-91.68]	1.63
Widowed, separated, Divorced, single	9.95 [4.97-18.90]	90.05 [81.10-95.03]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	17.78 [9.93-29.79]	82.22 [70.21-90.07]	9.44
Ontario	10.31 [5.17-19.51]	89.69 [80.49-94.83]	
Manitoba, Saskatchewan	6.02 [2.24-15.21]	93.98 [84.79-97.76]	
Alberta	11.29 [3.86-28.73]	88.71 [71.27-96.14]	
British Columbia	11.29 [4.30-24.70]	89.17 [75.30-95.70]	
Yukon, The North-west territories, Nunavut	12.34 [2.69-41.80]	87.66 [58.20-97.31]	
Education			
Less than high school diploma or its equivalent	10.11 [4.24-22.23]	89.89 [77.77-95.76]	**11.15***
High school diploma or Trade certificate	13.12 [4.79-31.20]	86.88 [68.80-95.21]	
Non-university or University certificate or diploma below bachelor's level	5.07 [1.83-13.29]	94.93 [86.71-98.17]	
Bachelor's degree	15.30 [8.74-25.40]	84.70 [74.60-91.26]	
University certificate/ diploma/ degree above bachelor's level	13.07 [5.73-27.11]	86.93 [72.89-94.27]	
Labour Force Status			
worked in the past year	10.44 [6.69-15.95]	89.56 [84.05-93.31]	**4.57***
Did not work in the past year	15.82 [8.24-28.22]	84.18 [71.78-91.76]	
Sense of Belonging to Community			
Very Strong	12.00 [3.99-30.95]	88.00 [69.05-96.01]	9.00
Somewhat strong	8.51 [4.46-15.64]	91.49 [84.36-95.54]	
Somewhat weak	15.84 [9.02-26.32]	84.16 [73.68-90.98]	
Very weak	15.81 [6.67-33.05]	84.19 [66.95-93.33]	

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Household Income			
Less or equal to $49,999	13.71 [8.35-21.70]	86.29 [78-91.65]	3.20
More than or equal to $50,000	9.77 [5.66-16.34]	90.23 [83.66-94.34]	
Urban/ Rural			
Population Centre / Urban	11.94 [8.22-17.01]	88.06 [82.99-91.78]	0.80
Rural	5.21 [1.11-21.27]	94.79 [78.73-98.89]	
Chronic Health conditions			
Yes	16.11 [9.59-25.79]	83.89 [74.21-90.41]	**6.28 ** **
No	10.02 [6.02-16.22]	89.98 [83.78-93.98]	
General Health Status			
Excellent, Very good, Good	10.89 [7.30-15.94]	89.11 [84.06-92.70]	**14.74*** **
Fair, Poor	31.73 [11.75-61.88]	68.27 [38.12-88.25]	
Stress			
Not at all stressful or Not very stressful	6.98 [3.49-13.47]	93.02 [86.53-96.51]	**11.43** **
A bit stressful	12.98 [7.71-21.04]	87.02 [78.96-92.29]	
Quite a bit stressful or Extremely stressful	16.64 [8.17-30.93]	83.36 [69.07-91.83]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada $\leq$ 5 years
Long-term immigrants: Living in Canada >5 years

Table 39: Factors associated with reported unmet healthcare needs among Long-term immigrants.

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Age			
18-55	11.82 [9.77- 14.24]	88.18 [85.76- 90.23]	**18.16*** **
56 and above	8.74 [6.94- 10.96]	91.26 [89.04- 93.06]	
Sex			
Male	9.36 [7.35-11.85]	90.64 [88.15-92.65]	**10.74** **
Female	11.70 [9.70-14.05]	88.30 [85.95-90.30]	
Marital status			
Married, living common-law	9.32 [7.63-11.34]	90.68 [88.66-92.37]	**28.40*** **
Widowed, separated, Divorced, single	13.51 [10.83-16.72]	86.49 [83.28-89.17]	
Province of Residence			
Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Quebec	18.17 [13.66-23.76]	81.83 [76.24-86.34]	**92.04*** **
Ontario	8.99 [7.06-11.38]	91.01 [88.62-92.94]	
Manitoba, Saskatchewan	9.99 [5.39-17.78]	90.01 [82.22-94.61]	
Alberta	6.67 [3.83-11.37]	93.33 [88.63-96.17]	
British Columbia	10.78 [7.85-14.63]	89.22 [85.37-92.15]	
Yukon, The North-west territories, Nunavut	21.68 [9.16-43.19]	78.32 [56.81-90.84]	
Education			
Less than high school diploma or its equivalent	8.33 [5.82-11.77]	91.67 [88.23-94.18]	**28.98*** **
High school diploma or Trade certificate	10.35 [6.96-15.13]	89.65 [84.87-93.04]	
Non-university or University certificate or diploma below bachelor's level	10.25 [7.41-14.01]	89.75 [85.99-92.59]	
Bachelor's degree	12.56 [9.19-16.92]	87.44 [83.08-90.81]	
University certificate/ diploma/ degree above bachelor's level	13.99 [10.10-19.06]	86.01 [80.94-89.90]	
Labour Force Status			
worked in the past year	9.85 [8.07-11.96]	90.15 [88.04-91.93]	**18.31*** **
Did not work in the past year	13.74 [10.43-17.89]	86.26 [82.11-89.57]	
Sense of Belonging to Community			
Very Strong	7.87 [5.08-11.99]	92.13 [88.01-94.92]	**128.27*** **
Somewhat strong	8.61 [6.80-10.85]	91.39 [89.15-93.20]	
Somewhat weak	13.96 [10.60-18.17]	86.04 [81.83-89.40]	
Very weak	23.42 [16.02-32.90]	76.58 [67.10-83.98]	

Study variables	Unmet Healthcare Needs		χ^2
	Yes	No	
	% [99% CI]	% [99% CI]	
Household Income			
Less or equal to $49,999	12.07 [9.64-15.02]	87.93 [84.98-90.36]	**11.14*** **
More than or equal to $50,000	9.62 [7.83-11.76]	90.38 [88.24-92.17]	
Urban/ Rural			
Population Centre / Urban	10.43 [8.95-12.13]	89.57 [87.87-91.05]	1.49
Rural	12.34 [8.04-18.47]	87.66 [81.53-91.96]	
Chronic Health conditions			
Yes	12.93 [10.82-15.37]	87.07 [84.63-89.18]	**54.85 *** **
No	7.62 [5.76-10.02]	92.38 [89.98-94.24]	
General Health Status			
Excellent, Very good, Good	8.40 [7.04-9.99]	91.60 [90.01-92.96]	**244.51*** **
Fair, Poor	25.00 [18.63-32.67]	75.00 [67.33-81.37]	
Stress			
Not at all stressful or Not very stressful	8.16 [5.87-11.24]	91.84 [88.76-94.13]	**132.77*** **
A bit stressful	8.55 [6.75-10.78]	91.45 [89.22-93.25]	
Quite a bit stressful or Extremely stressful	18.33 [14.24-23.27]	81.67 [76.73-85.76]	

Note: Weighted frequencies and bootstrapped proportions
Computed from chi-square test of independence
***p <0.001, **p <0.01, *p <0.05
Recent immigrants: Living in Canada $\leq$ 5 years
Long-term immigrants: Living in Canada >5 years

Table 40: Factors significantly associated with reported unmet healthcare needs by study group.

Sample Characteristics	Variables	Study Population		
		Canadian-born Population	Recent Immigrants	Long-term Immigrants
Pre-disposing characteristics	Age	X	-	X
	Sex	X	-	X
	Marital status	X	-	X
	Province of residence	X	-	X
	Education	X	X	X
	Labour force status	-	X	X
	Sense of belonging	X	-	X
Enabling resources	Income	X	-	X
	Location of residence	X	-	-
Need factors	Chronic health condition	X	X	X
	General health status	X	X	X
	Stress	X	X	X

Note: Computed from chi-square test of independence
Significance level reported at *p-value <0.05*
Recent immigrants: Living in Canada ≤ 5 years
Long-term immigrants: Living in Canada >5 years

Appendix B - Codebook

1. Reported Unmet Healthcare Needs

Original Variable UCN_Q010	Label Dichotomous	New Variable UCN_SEP	Label Categorical
During the past 12 months, was there ever a time when you felt that you needed healthcare, but did not receive it?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No (Ref.) 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

2. Reasons for Reported Unmet Healthcare Needs.

Original Variable UCN_Q020A	Label Categorical	New Variable UCN_REAA	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Not available – in the area	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020B	Label Categorical	New Variable UCN_REAB	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Not available – at time required (e.g. doctor on holidays, inconvenient hours)	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing

CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99

Original Variable UCN_Q020C	Label Categorical	New Variable UCN_REAC	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Waiting time too long	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020D	Label Categorical	New Variable UCN_READ	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Felt would be inadequate	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020E	Label Categorical	New Variable UCN_REAE	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Cost	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020F	Label Categorical	New Variable UCN_REAF	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Too busy	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020G	Label Categorical	New Variable UCN_REAG	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Didn't get around to it / didn't bother	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020H	Label Categorical	New Variable UCN_REAH	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Decided not to seek care	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020I	Label Categorical	New Variable UCN_REAI	Label Categorical

Thinking of the most recent time, why didn't ^YOU1 get care? Doctor – didn't think it was necessary	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable UCN_Q020J	Label Categorical	New Variable UCN_REAJ	Label Categorical
Thinking of the most recent time, why didn't ^YOU1 get care? Other – specify	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

3. Country of Birth.

Original Variable SDCGCB10	Label Categorical	New Variable COB_DEV	Label Categorical
	1- Canada 2- Other - North America 3- South, Central America and Caribbean 4- Europe 5- Africa 6- Asia 7- Oceania 8- Antarctica and Adjacent Islands 96- Not applicable 97- Don't Know 98- Refusal 99-Not stated		1- Canada 2- Other - North America 3- South, Central America and Caribbean, Oceania Antarctica and Adjacent Islands 4- Europe 5- Africa 6- Asia 99- missing
CODING	If value 1 then 1; if value 2 then 2; if value 3|7|8| then 3; if value 4 then 4; if value 5 than 5; if value 6 then 6; If value 96|97|98|99, then 99		

4. Year of Immigration.

Original Variable SDC_Q3	Label Continuous	New Variable DEM_IMY	Label Categorical
In what year did you first come to Canada to live?	Year of immigration 9995 – CA citizen at birth 9996 – Not applicable 9997- Don't Know 9998- Refusal 9999-Not stated		1- 2009 – 2030 2- 1890- 2008 98 – CA citizen at birth 99- Missing
CODING	If value >=2009 then 1; if value <2009 then 2; if value 9995 then 98; if value 9996|9997|9998|9999, then 99 98 – Not shown in frequency table		

5. Study Population.

Original Variable DEM_COB & DEM_IMY	Label Categorial	New Variable STU_POP	Label Categorical
		0 – if DEM_COB = 1 1 – if DEM_COB = 2 & DEM_IMY = 1 2 – if DEM_COB = 2 & DEM_IMY = 2	0 – Non – immigrants 1- Recent immigrants 2 – Non – recent immigrants
CODING			

6. Contacts with Health Professionals.

I. Hospitalization.

Original Variable CHP_Q01	Label Dichotomous	New Variable CHP_HOS1	Label Categorical

In the past 12 months, ^HAVE ^YOU2 been a patient overnight in a hospital, nursing home or convalescent home?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable CHP_Q02	Label Continuous	New Variable CHP_HOS2	Label Continuous
For how many nights in the past 12 months?	Number of nights 996 – Not applicable 997- Don't Know 998- Refusal 999-Not stated		99 – Missing
CODING	If value 996|997|998|999, then 99		

II. Physician or General Practitioner services.

Original Variable CHP_Q03	Label Dichotomous	New Variable CHP_GP1	Label Categorical
In the past 12 months, ^HAVE ^YOU2 seen or talked to any of the following health professionals about ^YOUR1 physical, emotional or mental health: A family doctor, ^DT_PED or general practitioner?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No (Ref. = 0) 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable CHP_Q04	Label Continuous	New Variable CHP_GP2	Label Continuous

For how many visits in the past 12 months?	Number of times 996 – Not applicable 997- Don't Know 998- Refusal 999-Not stated		99 – Missing
CODING	If value 996|997|998|999, then 99		

III. Dental Services.

Original Variable CHP_Q14	Label Dichotomous	New Variable CHP_DEN1	Label Categorical
In the past 12 months, ^HAVE ^YOU2 seen or talked to any of the following health professionals about ^YOUR1 physical, emotional or mental health: A dentist, dental hygienist or orthodontist?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable CHP_Q15	Label Continuous	New Variable CHP_DEN2	Label Continuous
For how many visits in the past 12 months?	Number of times 996 – Not applicable 997- Don't Know 998- Refusal 999-Not stated		99 – Missing
CODING	If value 996|997|998|999, then 99		

IV. Physiotherapy Services

Original Variable CHP_Q18	Label Dichotomous	New Variable CHP_PT1	Label Categorical
In the past 12 months, ^HAVE ^YOU2 seen or talked to any of the following health professionals about ^YOUR1 physical, emotional or mental health: A Physiotherapist?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 6|7|8|9, then 99		

Original Variable CHP_Q19	Label Continuous	New Variable CHP_PT2	Label Continuous
For how many visits in the past 12 months?	Number of times 996 – Not applicable 997- Don't Know 998- Refusal 999-Not stated		99 – Missing
CODING	If value 996|997|998|999, then 99		

7. Life satisfaction.

Original Variable GEN_02A2	Label Dichotomous	New Variable DEM_LS	Label Categorical
	0 – Very dissatisfied 1 2 3 4 5 6 7		0 -1 1-1 2-1 3-1 4-1 5-1 6-1 7-1

	8 9 10 96 – Not applicable 97- Don't Know 98- Refusal 99-Not stated		8-0 9-0 10-0 96-99 97-99 98-99 99-99
CODING	If value 0|1|2|3|4|5|6|7, then 1; if value 8|9|10, then 0, if value 96|97|98|99, then 99		

8. Predisposing Characteristics.

I. Age.

Original Variable [DHH_AGE]	Label Continuous	New Variable DEM_AGE	Label Categorical
Age of respondent	Age in years 996 – Not applicable 997- Don't Know 998- Refusal 999-Not stated		1- 18-55 2- 56 and above (Ref.) 9- 12-17 (missing) 99- Missing
CODING	If value >=18 & <=58 then 1; if value > or equal to 60 then 2; if value,18 then 4; if value is 996|997|998|999, then 99		

II. Sex.

Original Variable SEX _Q01 [DHH_SEX]	Label Continuous	New Variable DEM_SEX	Label Categorical
Sex of respondent	1 – Male 2- Female 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Male 2- Female (Ref.) 99 – Missing
CODING	If male, then 1; if female then 2		

III. Marital Status.

Original Variable MSNC_Q01 [DHH_MS]	Label Continuous	New Variable DEM_MS	Label Categorical
Sex of respondent	1- Married 2- Living common-law 3- Widowed 4- Separated 5- Divorced 6- Single, never married 96 – Not applicable 97- Don't Know 98- Refusal 99-Not stated		1 – Married, living common-law 2 – Widowed, separated, Divorced, single (Ref.) 99 – Missing
CODING	If 1|2 then 1; if 3|4|5|6 then 2; if value is 96|97|98|99, then 99		

IV. Province of Residence.

Original Variable GEO_PRV	Label Categorical	New Variable DEM_PRV	Label Categorical
Province of residence of the respondent	10-Newfoundland and Labrador 11- Prince Edward Island 12- Nova Scotia 13- New Brunswick 24- Quebec 35- Ontario 46- Manitoba 47- Saskatchewan 48- Alberta 59- British Columbia 60- Yukon 61-The North-west territories 62- Nunavut 96 – Not applicable 97- Don't Know 98- Refusal		1-Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec 2- Ontario (Ref.) 3- Manitoba, Saskatchewan 4- Alberta 5- British Columbia 6- Yukon, The North-west territories, Nunavut 99- Missing

	99-Not stated		
CODING	10|11|12|13|24 then 1, if 35 then 2, if 46|47 then 3, if 48 then 4, if 59 then 5, if 60|61|62 then 6		

V. Education

Original Variable EHG2_Q04 EDUDR10	Label Categorical	New Variable SEC_EDU	Label Categorical
Highest level of education attainment	1- Grade 8 or Lower 2- Grade 9-10 3- Grade 11-13 4- Secondary/ Post-secondary 5–Some post secondary 6 -Trade certificate or diploma 7- College, CEGEP or other non-university certificate/ diploma 8- University certificate or diploma below bachelor's level 9- Bachelor's degree (B.A., B.Sc., L.L.B.) 10- University certificate/ diploma/ degree above bachelor's level 96 – Not applicable 97- Don't Know 98- Refusal 99-Not stated		1 –Less than high school diploma or its equivalent 2 –High school diploma or Trade certificate 3- Non-university or University certificate or diploma below bachelor's level 4- Bachelor's degree 5- University certificate/ diploma/ degree above bachelor's level (Ref.) 99-Missing
CODING	If 1|2|3|4 then 1; if 5|6 then 2, if 7|8 then 3, if 9 then 4, if 10 then 5		

VI. Labour force status.

Original Variable GEN_08	Label Categorical	New Variable SEC_LFS	Label Categorical

Have you worked at a job or business at any time in the past 12 months?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 2- No (Ref.) 99- Missing
CODING	Excluded if age >75 If value 1 then 1, if value 2 then 2, if 6|7|8|9 then 99 High not applicable value because >75 age is excluded		

VII. Sense of belonging to the community.

Original Variable GEN_Q10	Label Categorical	New Variable SEC_SBG	Label Categorical
How would you describe your sense of belonging to your local community? Would you say it is…?	1- Very Strong 2- Somewhat strong 3- Somewhat weak 4- Very weak 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Very Strong (Ref.) 2- Somewhat strong 3- Somewhat weak 4- Very weak 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if value 3 then 3; if value 4 then 4; if 6|7|8|9 , then 99		

9. Enabling Factors.

I. Total Household Income.

Original Variable INCDHH	Label Categorical	New Variable SEC_THI	Label Categorical
Can you estimate in which of the following groups ^YOUR1 household income falls? Was ^YOUR1 total household	1- No income 2- Less than $5,000 3- $5,000 to $9,999 4- $10,000 to $14,999 5- $15,000 to $19,999 6- $20,000 to $29,999		1- Less or equal to $49,999 2- More than or equal to $50,000 (Ref.) 97- Not stated 98- Refused 99- Missing

income in the past 12 months…?	7- $30,000 to $39,999 8- $40,000 to $49,999 9- $50,000 to $59,999 10- $60,000 to $69,999 11- $70,000 to $79,999 12- $80,000 to $89,999 13- $90,000 to $99,999 14- $100,000 to <$150K 15- $150,000 and over 96 – Not applicable 97- Don't Know 98- Refusal 99-Not stated		
CODING	If 1|2|3|4|5|6|7|8 then 1; if 9|10|11|12|13|14|15 then 2		

II. Location of Residence.

Original Variable	Label	New Variable	Label
GEODUR2	Dichotomous	SEC_URG	Categorical
Rural or Urban area	1- GEODUR = 1,2,4 or 6 and sometimes 9 2- GEODUR = 0 and sometimes 9 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Population Centre / Urban 2- Rural (Ref.) 99- Missing
CODING	If value 1 then 1; if value 2 then 2; if 6|7|8|9 then 99		

10. Need factors.

I. Chronic Conditions.

Original Variable	Label	New Variable	Label
	Dichotomous	CCC_SCORE	Categorical

	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated	Select Cases (CCC_AST=1 OR CCC_FIB=1 OR CCC_ART=1 OR CCC_BAC=1…) Compute variable with filter	1- Yes 0- No
CODING			

Original Variable CCC_Q031	Label Dichotomous	New Variable CCC_AST	Label Categorical
Long term conditions which are expected to last or have already lasted 6 months or more and that been diagnosed by a health professional. ^DOVERB_C ^YOU2 have asthma?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q041	Label Dichotomous	New Variable CCC_FIB	Label Categorical
^DOVERB_C ^YOU2 have Fibromyalgia?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q051	Label Dichotomous	New Variable CCC_ART	Label Categorical

^DOVERB_C ^YOU2 have arthritis, excluding fibromyalgia?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q061	Label Dichotomous	New Variable CCC_BAC	Label Categorical
^DOVERB_C ^YOU2 have back problems, excluding fibromyalgia and arthritis?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q071	Label Dichotomous	New Variable CCC_HBP	Label Categorical
^DOVERB_C ^YOU2 have high blood pressure?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q081	Label Dichotomous	New Variable CCC_MIG	Label Categorical
^DOVERB_C ^YOU2 have migraine headaches?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal		1- Yes 0- No 99- Missing

	9-Not stated		
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q091	Label Dichotomous	New Variable CCC_COP	Label Categorical
^DOVERB_C ^YOU2 have chronic bronchitis, emphysema, or chronic obstructive pulmonary disease or COPD?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q101	Label Dichotomous	New Variable CCC_DIA	Label Categorical
^DOVERB_C ^YOU2 have diabetes?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q121	Label Dichotomous	New Variable CCC_HRT	Label Categorical
^DOVERB_C ^YOU2 have heart disease?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing

CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99

Original Variable CCC_Q131	Label Dichotomous	New Variable CCC_CAN	Label Categorical
^DOVERB_C ^YOU2 have cancer?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q141	Label Dichotomous	New Variable CCC_ULC	Label Categorical
^DOVERB_C ^YOU2 have intestinal or stomach ulcers?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q151	Label Dichotomous	New Variable CCC_STR	Label Categorical
^DOVERB_C ^YOU2 suffer from the effects of a stroke?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q161	Label Dichotomous	New Variable CCC_UTC	Label Categorical
^DOVERB_C ^YOU2 have urinary incontinence?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q171	Label Dichotomous	New Variable CCC_BOD	Label Categorical
^DOVERB_C ^YOU2 have bowel disorder such as Crohn's disease, ulcerative colitis, irritable bowel syndrome or bowel incontinence?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q173	Label Dichotomous	New Variable CCC_SCO	Label Categorical
^HAVE_C ^YOU1 been diagnosed with scoliosis?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q181	Label Dichotomous	New Variable CCC_ALZ	Label Categorical

^DOVERB_C ^YOU2 have Alzheimer's disease or any other dementia?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q251	Label Dichotomous	New Variable CCC_CFS	Label Categorical
^DOVERB_C ^YOU2 have chronic fatigue syndrome?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q261	Label Dichotomous	New Variable CCC_MCS	Label Categorical
^DOVERB_C ^YOU2 suffer from multiple chemical sensitivities?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q280	Label Dichotomous	New Variable CCC_MOD	Label Categorical
^DOVERB_C ^YOU2 have a mood disorder such as depression, bipolar	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal		1- Yes 0- No 99- Missing

disorder, mania or dysthymia?	9-Not stated		
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable CCC_Q290	Label Dichotomous	New Variable CCC_ANX	Label Categorical
^DOVERB_C ^YOU2 have an anxiety disorder such as phobia, obsessive-compulsive disorder or a panic disorder?	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Yes 0- No 99- Missing
CODING	If value 1 then 1; if value 2 then 0; if value 6|7|8|9 , then 99		

Original Variable	Label Dichotomous	New Variable CCC_SCORE	Label Categorical
	1- Yes 2- No 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated	Select Cases (CCC_AST=1 OR CCC_FIB=1 OR CCC_ART=1 OR CCC_BAC=1…) Compute variable with filter	1- Yes 0- No (Ref.)
CODING			

II. General Health Status.

Original Variable GEN_01	Label Categorical	New Variable HRB_GHS	Label Categorical
In general, would you say ^YOUR1 health is…?	1- Excellent 2- Very good 3- Good 4- Fair 5- Poor 6- Not applicable		1- Excellent, Very good, Good (Ref.) 2- Fair, Poor 99- Missing

	7- Don't Know 8- Refusal 9-Not stated		
CODING	If 1|2|3 then 1, if 4|5 then 2		

III. Stress.

Original Variable GEN_07	Label Categorical	New Variable HRB_STR	Label Categorical
Thinking about the amount of stress in ^YOUR1 life, would you say that most days are…?	1- Not at all stressful 2- Not very stressful 3- A bit stressful 4- Quite a bit stressful 5- Extremely stressful 6- Not applicable 7- Don't Know 8- Refusal 9-Not stated		1- Not at all stressful or Not very stressful (Ref.) 2- A bit stressful 3- Quite a bit stressful or Extremely stressful 99- Missing
CODING	If 1|2 then 1; if 3 then 2; if 4|5 then 3		

Appendix C – Ethics Approval

UNIVERSITY OF MANITOBA | Research Ethics and Compliance

Research Ethics - Bannatyne
P126-770 Bannatyne Avenue
Winnipeg, MB
Canada R3E 0W3
Phone +204-789-3255
Fax +204-789-3414

HEALTH RESEARCH ETHICS BOARD (HREB)
CERTIFICATE OF FINAL APPROVAL FOR NEW STUDIES
Delegated Review

STUDENT PRINCIPAL INVESTIGATOR:	INSTITUTION/DEPARTMENT:	ETHICS #:
Dimple Bhojwani	U of M and MCHP/Rehabilitation Sciences	HS23001 (H2019:281)
APPROVAL DATE: July 9, 2019	**EXPIRY DATE:** July 9, 2020	
STUDENT PRINCIPAL INVESTIGATOR SUPERVISOR (If applicable): Dr. Shahin Shooshtari		

PROTOCOL NUMBER:	PROJECT OR PROTOCOL TITLE;
	Examining Unmet healthcare needs by Immigration status among Canadian adults
SPONSORING AGENCIES AND/OR COORDINATING GROUPS: None	

Submission Date of Investigator Documents:	HREB Receipt Date of Documents:
May 21, 2019	June 6, 2019

THE FOLLOWING ARE APPROVED FOR USE:

Document Name	Version(if applicable)	Date
Protocol: Proposal		May 21, 2019
Consent and Assent Form(s):		
Other: Master List (Data Capture) - Canadian Community Health Survey (2014 Cycle) Comprehensive List of Variables used for the Study (Undated)		Received June 6, 2019

CERTIFICATION
The above named research study/project has been reviewed in a ***delegated manner*** by the University of Manitoba (UM) Health Research Board (HREB) and was found to be acceptable on ethical grounds for research involving human participants. The study/project and documents listed above was granted final approval by the Chair or Acting Chair, UM HREB.

HREB ATTESTATION
The University of Manitoba (UM) Research Board (HREB) is organized and operates according to Health Canada/ICH Good Clinical Practices, Tri-Council Policy Statement 2, and the applicable laws and regulations of Manitoba. In respect to clinical trials, the HREB complies with the membership requirements for Research Ethics Boards defined in Division 5 of the Food and Drug Regulations of Canada and carries out its functions in a manner consistent with Good Clinical Practices.

QUALITY ASSURANCE
The University of Manitoba Research Quality Management Office may request to review research documentation from this research study/project to demonstrate compliance with this approved protocol and the University of Manitoba Policy on the Ethics of Research Involving Humans.

CONFLICT OF INTEREST
Any Principal or Co-Investigators of this study who are members of the UMBREB did not participate in the review or voting of this study.

CONDITIONS OF APPROVAL:

1. The study is acceptable on scientific and ethical grounds for the ethics of human use only. ***For logistics of performing the study, approval must be sought from the relevant institution(s).***
2. This research study/project is to be conducted by the local principal investigator listed on this certificate of approval.
3. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to the research study/project, and for ensuring that the authorized research is carried out according to governing law.
4. **This approval is valid until the expiry date noted on this certificate of approval. A Bannatyne Campus Annual Study Status Report** must be submitted to the HREB within 15-30 days of this expiry date.
5. Any changes of the protocol (including recruitment procedures, etc.), informed consent form(s) or documents must be reported to the HREB for consideration in advance of implementation of such changes on the **Bannatyne Campus Research Amendment Form.**
6. Adverse events and unanticipated problems must be reported to the HREB as per Bannatyne Campus Research Boards Standard Operating procedures.
7. The UM HREB must be notified regarding discontinuation or study/project closure on the **Bannatyne Campus Final Study Status Report.**

Sincerely,

Chair, Health Research Ethics Board
Bannatyne Campus

Please quote the above Human Ethics Number on all correspondence.
Inquiries should be directed to the REB Secretary **Telephone:** (204) 789-3255/ **Fax:** (204) 789-3414