Reinvestigating Access to Healthcare Services and Unmet Healthcare Needs Among Immigrants in Canada: Results from the 2014 Canadian Community Health Survey

by

Allan Puran

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including and required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Abstract

Objective: To compare the differences in the reported experience of unmet healthcare needs of recent immigrants (i.e. immigrants living in Canada for five years or less) and Canadian-born adults and to determine if the factors that contribute to unmet healthcare needs risk have changed from 2000/01 to 2014.

Methods: Data used are from the 2014 Canadian Community Health Survey, conducted by Statistics Canada. The study sample includes 6,710 immigrants and 50,227 Canadian-born adults aged 18 and older living in Canada. For the analysis, a number of multivariate binary logistic regression models were created.

Results: That the risk of a recent immigrant reporting unmet healthcare needs was 9.5% lower than a Canadian-born adult's risk (OR=0.905, p=0.8310) after adjusting for immigrant status, age, gender, and other variables identified in the Andersen Behavioural Model of Healthcare Utilization. The factors that contributed to the unmet healthcare needs risk remained similar to those previously identified by Wu et al. (2005), however their effect on reporting an unmet healthcare need has changed slightly since 2000/01. Additionally, this study found that an immigrant's length of residence in Canada was also associated with their risk of reporting an unmet healthcare need. After adjusting for individual population-based factors, the risk of reporting an unmet healthcare need by a long-term immigrant (i.e. an immigrant who has lived in Canada for 15 years or more) was similar to a Canadian-born adult's risk; higher than a recent immigrant. However, immigrants living in Canada between 5 and 9 years had the highest risk of reporting an unmet healthcare need when compared those in Canada for 5 years or less.

Conclusions: This study found that differences in UHN experiences by immigrants and Canadian-born adults in 2014 declined from 2000/01. While immigrant status was not significantly associated with UHNs risk during 2014, their risk of experiencing UHN was 9.5% lower than Canadian-born adults' risk, findings similar to other studies (e.g. Wu et al. 2005). After adjusting for immigrant status, age, sex, and individual factors, 11 variables were identified that significantly contributed to unmet healthcare need experiences in 2014. These include age, sex, highest level of education; sense of community belonging, access to regular sources of care (e.g. family and general practitioners) or specialist services; income; and self-rated health status and stress levels. Furthermore, although immigrants' risk of experiencing unmet healthcare needs do change over time, their length of time in Canada was not significantly associated with this change. This research highlights the importance of understanding how individual factors can affect access to healthcare services and UHN experiences.

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Table of Contents

List of Figures

List of Tables

Introduction

A goal of Canada's healthcare system is to ensure equal access to healthcare services to all Canadians. To promote this goal and to ensure equal opportunities for citizens to access healthcare services, provincial and territorial governments must ensure their healthcare insurance plans follow the five core principles outlined by the Canada Health Act. These principles are universality, accessibility, portability, comprehensiveness, and public administration (Statistics Canada, 2018). Adherence to these core principles is intended to eliminate financial and other barriers to accessing healthcare services that could disproportionately affect some populations (Asada & Kephart, 2007).

Irrespective of these principles, evidence from health researchers suggests that equal access to healthcare services is not always present and that some vulnerable populations will have needs that go unmet (Ali, McDermott, & Gravel; 2004; Wu, Penning, & Schimmele, 2005; Quesnel-Valée et al., 2001). Some unmet healthcare needs exist in Canada despite the principle of accessibility, whereby all insured persons are guaranteed access to medical services without barriers

To measure the effectiveness of Canada's healthcare system in meeting the healthcare needs of Canadians, some population health surveys, such as the Canadian Community Health Survey, have included questions about the respondents' unmet healthcare need (UHN) experiences. Depending on the survey and the respondent's understanding of and interpretation of UHNs, responses to these questions will be different. Some health literature often finds common ground in explaining UHNs as a situation in which individuals were "unable to receive a necessary healthcare service within 12 months of when it was needed" (Statistics Canada, 2016b; Wu et al., 2005).

Reporting UHN experiences by Canadians is not uniform, nor would we expect it to be. At the same time, research has identified several sub-populations as potentially "vulnerable" to UHNs; these include immigrants, as well as women and those in low-income households (Bataineh et al., 2019; Lake, 2016; Marshall, 2011; Wu et al., 2005). In 2016, approximately 7.5 million Canadians were immigrants, almost 22% of the population, and it is expected that about one million more immigrants will have had migrated into Canada by 2020 (Lu & Ng, 2019). Most immigrants come to Canada with the expectation that they will positively contribute to the workforce and economy and, as a result of the characteristics of Canada's immigration system, they generally arrive with skills that will allow them to integrate into Canadian society (Aydemir & Skuterud, 2005).

Every year, the number of immigrants admitted into Canada is increasing and the number of immigrants allowed entry into Canada is continuously growing. In 2016, approximately 21.9% of the population identified as a foreign-born individual, which according to Statistics Canada (2017) was the second-highest level since Confederation. A majority of the immigrants who migrated to Canada between 2011 and 2016 migrated as skilled workers (60.3%), while the remainder migrated for family reunification purposes (26/8%) or were refugees (11.6%) (Statistics Canada, 2017). On one hand, since a majority of immigrants arrived to Canada as skilled workers, it is expected that they would remain in good health as their admission into Canada is dependent on many characteristics associated with favourable health outcomes. On the other hand, it might be expected that other immigrants (e.g. family class immigrants or refugees) might face some barriers towards accessing healthcare services which might include linguistic or cultural barriers. However, a lack of information about Canada's healthcare system upon arrival could result in higher rates of UHNs for all immigrants regardless of their class of immigration.

In addition to the factors that contribute to the experience of UHN, the changing health of immigrants as their length of residence in Canada increases is of particular concern. Besides identifying the differences in reporting UHNs by immigrants and Canadian-born adults and the factors that could predict UHNs, Wu et al. (2005) examined the relationship between an immigrant's length of time in Canada and their risk of experiencing UHNs in 2000/01. This secondary analysis found that immigrants' risk of experiencing UHNs varied based on the number of years living in Canada. Results from Wu et al. (2005) show that compared to those who identified as Canadian-born adults, the risk of experiencing UHN by immigrants who had lived in Canada for less than five years was the lowest (OR=0.659), followed by immigrants who lived in Canada between 10 – 14 years (OR=0.738) and those living in Canada between 5 – 9 years (OR=0.833) (Wu et al. 2005). Immigrants living in Canada for 15 years or more had the highest risk of reporting an UHN (OR=0.937) and were expected to show similarities to reporting UHN to Canadian-born adults (Wu et al. 2005).

There remain, however, important questions about immigrants' UHN experiences, how these experiences might change over time, and the factors that might contribute to the probability of experiencing UHNs. Given that nearly one-fifth of Canada's population was born outside of the country, immigrant health is of great concern for population health and health policy researchers (McDonald & Kennedy, 2004). Since the late 1980s, Canada's immigration has transformed. The number of immigrants migrating to Canada from non-European countries has been increasing; about half of all immigrants who migrated to Canada were from countries located in Asia or the Middle East, while approximately 27.7% of immigrants to Canada were from countries located within Europe (Statistics Canada, 2017). The number of immigrants who migrated to Canada from countries located within Africa also increased in 2011 (Statistics Canada, 2016a, 2016c, 2017).

Skills which recent immigrants arrive in Canada with might be different from those possessed by earlier cohorts of immigrants. A potential change in the skills that immigrants arrive to Canada with might be reflective of changes that have occurred in the immigration selection process and could foreshadow the degree to which they might be able to adapt to Canadian society and Canada's workforce (Aydemir & Skuterud, 2005). Noteworthy is that some studies have suggested that recent immigrant cohorts have had a greater overall difficulty with integration into the Canadian labour market than earlier cohorts despite the "newer" sets of skills they arrive to Canada with (Aydemir & Skuterud, 2005). At the same time, recent immigrants arriving to Canada also face an increased risk of low income compared to immigrants who migrated prior to them (Aydemir & Skuterud, 2005). These findings are of significant potential importance given that lower-income is a recognized barrier contributing to the experience of UHN (Wu et al., 2005; Statistics Canada, 2016b).

Besides changes in the source country of immigrants to Canada, the composition of immigrant classes, and changes to Canada's immigration process, Canada's healthcare system itself has changed over time. On one hand, the greater emphasis being placed on "cultural competence" or "cultural safety" in health care (e.g., Srivastava & Craig, 2007) would seem likely to improve the outcomes for recent immigrants and might reduce the rates at which they report UHNs. On the other hand, changes to the provision of healthcare to immigrants, including a waiting period before they can access publicly funded healthcare, have potentially affected healthcare use by some immigrants and Canadian-born adults (Goel & Beder, 2012; Barnes, 2013).

Although data from the 2000/01 CCHS showed that immigrants' risk of experiencing UHNs was lower than Canadian-born adults' risk, it is unknown how the UHNs of these groups

have changed after adjusting for age, sex, immigrant status, and some individual factors, as well as immigrants' length of time in Canada.

The apparent consistency in the relative risk of UHN among immigrants between 2000/01 and 2014 might conceal changes in the importance of various correlates. For example, changes in the economic experience of immigrants to Canada could indicate that the roles of socioeconomic and demographic predictors of UHN have also changed. The changing policies associated with immigration could also indicate that immigrants enter Canada with skills better suited to help them integrate and live healthier lifestyles yet remain at risk of experiencing UHNs. In particular, immigrant status, education and income, as well as gender and other predictors may have different relationships to UHNs than those found in earlier studies.

The purpose of the present study is to identify the differences in reporting experiences of UHN between immigrants and Canadian-born adults during 2014 using the Canadian Community Health Survey (CCHS). These data are used to examine whether the correlates of UHNs among immigrants that were identified in previous studies (e.g. Ali et al., 2004, Quesnel-Valée et al. 2011 and Wu et al. 2005) continued to remain significant in 2014, as well as to examine whether the reported reasons that have contributed to UHN among immigrants and Canadian-born adults remained the same since 2000/01. Guided by the Andersen Behavioural Model of Healthcare Utilization (Andersen, 1995; 2008), this study incorporates factors specific to immigrants such as immigrant status and their length of time in Canada, which might help explain differences in the UHN experiences of immigrants and Canadian-born adults. Additionally, this study will examine how immigrants' UHN risk is related to their length of time in Canada.

Background and Literature Review

Migration is the process of moving from one environment to another. Throughout this process, the health of migrants might be affected due to the differences in the health parameters between the origin and host countries (Rivera, Casal & Currais, 2015; Trovato, 2017). In addition to the change in context, the realized and potential access to healthcare services by migrants might be related to new health behaviours, differences in health literacy related to language, and awareness about the available healthcare services (Rivera, Casal, & Currais, 2015).

Some studies focused on UHN have been guided by the Andersen Behavioural Model of Healthcare Utilization (ABM), otherwise known as The Socio-Behavioural Model of Health Services (Andersen, 1995; 2008; Wu et al., 2005). Included in this model are three sets of predictor variables—predisposing, enabling, and medical need—which has been identified as population-based characteristics that might influence health outcomes and can contribute to UHN risk. Variations of the ABM model have been proposed, such as the Behavioural Model for Vulnerable Populations (ABM-VP), which includes factors that are specific to the health outcomes of immigrants (Gelberg, Andersen, & Leake, 2000). These proposed models have been used to identify barriers towards accessing healthcare services and that might contribute to precarious health outcomes, while other factors have been identified that might help reduce UHN experiences and precarious health outcomes.

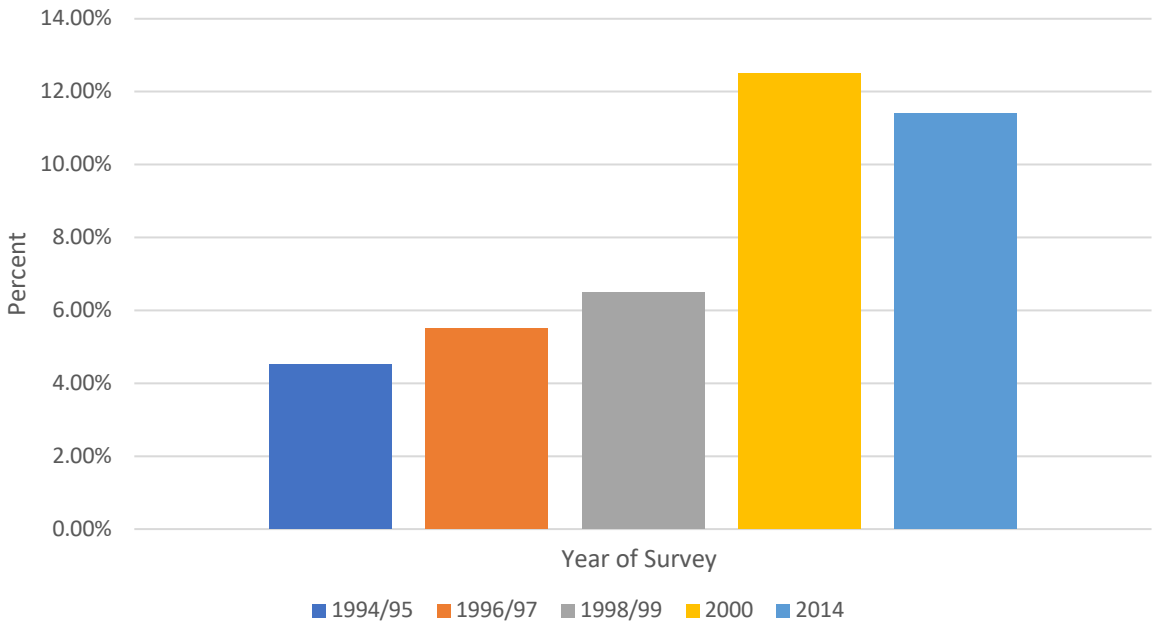
Unmet Healthcare Needs in Canada

Results from health reports (e.g. Chen and Hou, 2002, Sanmartin, 2002, and Sanmartin and Ross, 2006) show that between 1994 and 2002, the experience of UHN among Canadians has risen. A common question used in the Canadian Community Health Survey to measure the performance and quality of Canada's healthcare system is: "During the last 12 months, did you

ever need a healthcare service but not receive it?". When measured in 1994/95 and 1998/99, the estimated percentage of those reporting UHNs was low. However, the experience of UHNs nearly doubled when remeasured in 2000/01, and the reasons for this change remain unknown (Chen and Hou, 2002; Statistics Canada, 2016b)

Some of the potential reasons that contributed to the increase in UHNs between 1994 and 2000/01 have been identified by health researchers. For example, research by Chen and Hou (2002) identified factors related to the access of healthcare services (e.g. the unavailability of healthcare services and long wait-times to access services), personal reasons (e.g. the belief that that healthcare services would be inadequate, being too busy, or dislike or fear of doctors), and income, such as cost (e.g. living in a low-income household) and transportation, as contributing to this increase.

Figure 1: Percent Reporting Unmet Healthcare Needs, Canada, 1994 – 2014



Sources: Chen and Hou, 2002; Statistics Canada, 2016b

Immigrants as a Vulnerable Population

Vulnerable groups are typically defined as those with "higher risk for disease and injury and face an increased risk of experiencing unmet healthcare needs" (Sanmartin et al., 2002). Among those who might face an increased risk of UHNs are women, children and youth, and those belonging to low-income households (Chen & Hou, 2002; Wu et al. 2005). Immigrants have also been identified as a vulnerable group, whose vulnerability is affected by a number of factors, some of which include class of immigration (e.g. economic immigrant, family class immigrant, or refugee), aspects of the migration process and resettlement stress, and changes to health policies regarding immigrants' access to healthcare services (Beiser, 2005; Derose, Escarce, and Lurie, 2007; Hyman, 2004; Lake, 2016).

Immigrants migrate to Canada under three general categories: those migrating to Canada as skilled workers under the economic class, for family reunification purposes under the family class, or as refugees (Hyman, 2004; Statistics Canada, 2017). The vulnerable status of migrants might sometimes be affected depending on the program under which they apply for entry to Canada. This might be particularly true for immigrants migrating to Canada as skilled workers as they are selected for migration under different criteria than those migrating to Canada as refugees, with a different set of expectations upon arrival (Beiser, 2005). Regardless of the immigrant class, the healthcare needs and ability to access these services will be different for all migrants.

While it is understood that most immigrants arrive in Canada with a better self-rated health status than their Canadian-born counterparts, a phenomenon known as the Healthy Immigrant Effect (HIE) (McDonald & Kennedy, 2004), for some immigrants, migration to a new social or cultural environment can be stressful and might sometimes contribute to the decline in their health status subsequent to their arrival (Hyman, 2004). Resettlement stress, a result of the migration

process, along with inadequate social supports and the negative effects of some social determinants of health might result in an increased risk for experiencing precarious health outcomes. While the effect of some social factors on immigrants' health is not well known (Dunn & Dyck, 2000), nor is it understood how factors related to migration might affect immigrants' risk of experiencing UHNs, it is hypothesized that the declining health of immigrants might be due the exposure of these negative effects of resettlement stress and changes to some social factors. Specifically, changes that occur to immigrants' income, help-seeking behaviours, level of social support once in Canada, and their access to and use of healthcare services might be reflected in the health outcomes of immigrants regardless of their class of immigration (Hyman, 2004).

Finally, changes that have occurred to policies regarding immigrants' access to healthcare services after their arrival is another factor that might contribute to differences in their vulnerable status, health outcomes, and potential risk for experiencing UHNs. For example, those who arrive to Canada as refugees are able to apply for emergency medical services within the IFHP which will allow them to have access to medical coverage similar to those that Canadians receive. However, depending on the province that immigrants migrate to after arriving to Canada, some immigrants who migrate to Canada as a skilled worker or for family reunification purposes must go through a three-month waiting period before becoming eligible for access to healthcare services under a provincial healthcare plan, if applicable (Barnes, 2014; Lake, 2016). Differential access to healthcare insurance plans between immigrant classes not only affects the degree to which they are vulnerable but also their potential risk of experiencing an UHN or precarious health outcomes.

Models of Healthcare Utilization

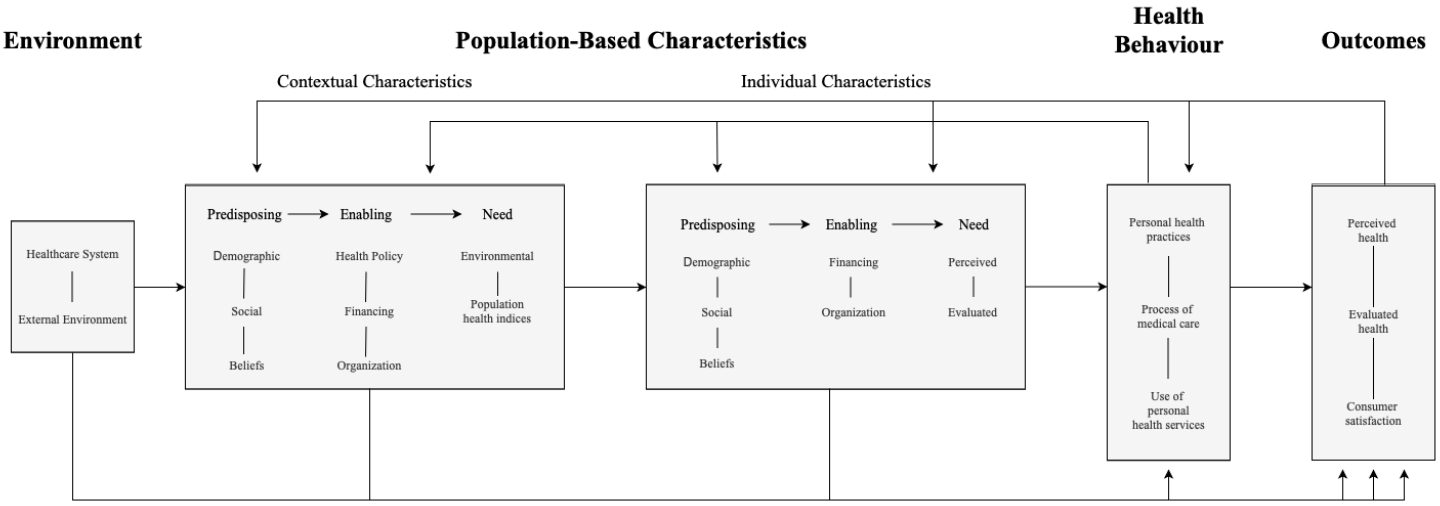
The Andersen Behavioural Model of Healthcare Utilization (ABM) was proposed by Andersen in 1990 as a means to understand the use of healthcare services, identify predictors of

use, understand health behaviours, and to assess whether healthcare services are equitably distributed based on need or other factors. (Andersen, 1995, 2008; Babitsch, Gohl, and Von Lengerke, 2012; Wade, Bourgeault, and Neiterman, 2011). Initially created to focus on the health behaviours of families, the ABM was intended to help inform health policies and to help explain why families use healthcare services (Andersen, 1995). Earlier versions of the ABM explained that the use of healthcare services by families was a function of their demographic, social, and economic characteristics. However, over time, revisions of the model began to focus on the characteristics of the individual rather than the family unit (Andersen, 1995, 2008). This shift in focus was the result of many difficulties in developing measures that considered the diversity of family members and their individualised health outcomes (Andersen, 1995).

While the general focus of the ABM is to identify key factors that contribute to the UHNs of the population, variations of this model have been used for specific groups. In particular, The Andersen Behavioural Model for Vulnerable Populations (ABM-VP) is an example of an important variation of the ABM. The purpose of these modified models is to identify additional factors that might contribute to the health outcomes of these specific groups that are absent from the ABM (Gelberg et al., 2000).

The general ABM depicted in Figure 2 considers the impact of the environment, individual population-based factors, and health behaviours on health outcomes of a population. An important characteristic of this model is the cyclical nature of the factors included in the model, recognizing that all factors in the model will impact each other to some degree.

Figure 2: Andersen Behavioural Model of Healthcare Utilization



Source: Andersen 1995; Andersen and Davidson, 2007.

Environmental factors in the model include health policies, the resources available to users, and the organization of healthcare services (Andersen, 1995; 2008). The recognition of the healthcare system is important as it acknowledges the impact of health policies on healthcare use and outcomes, as well as recognizes the available resources and organizations as important determinants of healthcare use (Andersen, 1995).

Population-based factors include both contextual and individual predisposing, enabling, and needs-based factors (Andersen and Davidson, 2007). Contextual factors include characteristics of communities that influence health outcomes of community members, whereas individual population-based factors are those that are specific to individuals. The inclusion of contextual factors in the ABM is important as it recognizes the characteristics of a community that might contribute to community members' health outcomes. At the same time, the inclusion of individual factors in the model is necessary as it recognizes factors unique to individuals and how the presence of these characteristics might shape the use of healthcare services, and health outcomes.

Predisposing factors include the demographic characteristics that contribute to health outcomes. These include age, gender, marital status, race, education, and immigrant status

(Babitsch et al., 2012; Gelberg et al., 2000; Ronald and Pamela, 2007). Contextual predisposing factors include those related to the demographic composition of the community (e.g. mean age of community members or household composition of the community) and the social contextual characteristics of that community (e.g. those that describe how supportive or detrimental communities are to the health of those who live and work there). Examples of contextual predisposing factors include the mean highest level of education among community members, the communities ethnic and racial composition, the proportion of immigrants residing in the community, and crime rate (Ronald and Pamela, 2007). On the other hand, individual predisposing factors are those unique to an individual and includes biological characteristics. Common individual predisposing factors include age, sex, an individual's highest level of education, and health beliefs and attitudes (Andersen, 1995; Gelberg et al., 2000; Ronald and Pamela, 2007). Individual predisposing factors have been recognized as factors that do affect UHNs risk and health outcomes (Wu et al. 2005).

Enabling factors[1] refer to the social and structural resources that contribute to accessing and the use of healthcare services. According to Andersen (1995), community and individual enabling resources must be present for use of healthcare services to take place (i.e. health professionals must be available where people live). Enabling contextual factors include the resources available within a community (e.g. per capita community income, affluence, rate of health insurance coverage, the relative price of goods and services) while individual enabling factors are those specific to individuals which promote their use of the healthcare system. These

[1] Enabling factors identified by Babitsch et al. (2012) include: Income/finances, health insurance/ access to regular sources of care, education, social/emotional support, accessibility to care, socioeconomic structure of neighbourhood, employment, language proficiency, physician diagnosis, availability of charity care or public policy support, proportion of residents who are uninsured, health insurance reimbursement characteristics, region of residence (urban or rural), availability of health information, crime rates, language of physician, and unemployment rate.

include individual or household income, the ability access to regular sources of care, level of language proficiency, and the presence of supplemental health insurance (Babitsch et al., 2012; Gelberg et al., 2000). Level of social support received from the community and the quality of social relationships individuals have within the community are other individual enabling factors that need to be considered that might affect access to healthcare services (Gelberg et al., 2000; Ronald and Pamela, 2007).

Needs-based factors[2] capture the presence of symptoms related to health conditions that make the use of healthcare services necessary. Factors related to medical need represent a person's general state of health and are typically evaluated on diagnostic criteria or perceived criteria (Gelberg et al., 2000; Wade et al., 2011). Contextual needs-based characteristics are health-related measures of the physical environment, for example, the quality of housing, water, and air (i.e. residing in a country where the national ambient air quality standards are met yearly), injury or death rate, as well as death by homicide, vehicular accidents, or firearms (Babitsch et al., 2012; Ronald and Pamela, 2007). At the same time, individual medical needs factors are those that indicate how individuals view their health status and include factors such as self-rated health, the presence of chronic conditions, and self-rated stress levels.

Unique to the ABM is the inclusion of individual health behaviours such as personal health practices, diet, and exercise (Andersen, 2008). Important for health policy, the inclusion of health behaviours within the AMB models might distinguish factors that impact how users of the healthcare system navigate it. Equally as important, this model also recognizes that health

[2] Needs-based factors identified by Babitsch et al. (2012) include: evaluated health status (mental or physical), self-reported/perceived health, diabetes, depressive symptoms, hypertension, heart disease, cancer, number of prior medical/chronic conditions, daily activities/limitations, high cholesterol, stoke, asthma, other risk factors, psychological distress, disability trend, thyroid disease, arthritis.

behaviours (e.g. use of general practitioners, dentists and other specialists) and the use of healthcare services work together to influence health outcomes (Allin, 2008; Andersen, 2008).

Feedback loops are included in the models to illustrate the dynamic and recursive nature of the interactions among the healthcare system, health service use, and health outcomes (Andersen, 1995; 2008). These loops demonstrate how health outcomes affect population-based factors and future health outcomes (Andersen, 1995; 2008).

Immigrant Status and Unmet Healthcare Needs

The health outcomes of immigrants living in Canada is an important public health policy concern since a majority of Canadians have identified as being an immigrants to Canada. At the same time, immigrant health is an important public health policy concern since Canada accepts many immigrants each year. When compared to Canadian-born adults, studies found that in 2000/01, immigrants' risk of experiencing UHNs was low (Ali et al. 2004; Quesnel-Valée et al. 2011; Wu et al. 2005). Among immigrants who did experience UHNs in 2000/01, the most common type of UHN were those related to physical healthcare, followed by injury and emotional or mental health problems (Wu et al. 2005). The most common reasons contributed to immigrants' UHN experiences during 2000/01 included "[Not} getting around to it", "[Not knowing] where to go", and "Language Problems" (Wu et al. 2005). Other reasons, such as those related to the access of healthcare services (e.g. unavailability of healthcare services or long wait-times) and personal reasons were also identified, that potentially contribute to immigrants' UHN experiences (Sanmartin et al. 2002; Sanmartin and Ross, 2006).

Some immigrant specific barriers have been identified that might contribute to UHN experiences for immigrants. These include periods of economic strain, underemployment or

unemployment, acculturation or resettlement stress, language barriers, and the lack of familiarity with Canadian institutions (Ali et al. 2004; Wu et al. 2005).

Potential Reasons for Reporting Unmet Healthcare Needs

Among the most common reasons that contribute to UHN experiences, problems related to accessing healthcare services or those related to a lack of available services have been cited in health literature. These problems typically are the result of healthcare reforms and restructuring (Sanmartin et al. 2002; Sanmartin & Ross, 2006; Wu et al. 2005).

At the same time, immigrants' risk for UHNs might also be influenced by some immigrant specific barriers. These barriers include immigrants' ability to adapt to a new environment, changes to immigrant screening protocols, and changes to accessing healthcare services by immigrants once in Canada.

Health Reforms

As the nature of medicine continues to evolve, the delivery of healthcare services will face challenges (Canadian Institute for Health Information [CIHI], 2009; Statistics Canada, 2018). To be responsive to change, modifications to Canada's healthcare system have occurred through health reforms and restructuring. Specifically, the transformation of the healthcare system, access to and the availability of healthcare services, and wait-times have all been impacted by health reforms. Unfortunately, the attempts at restructuring Canada's healthcare system have resulted in decreased access to healthcare services and have also been cited as the main contributor to long wait-times. (Quesnel-Valée et al., 2011; Sanmartin & Ross, 2006; Statistics Canada 2016b).

Cuts to Canada's healthcare system can result in changes that might make accessing healthcare services difficult (e.g. long wait times or lack of available services). Difficulty in accessing healthcare services can result in increasing inequalities that deteriorate population

health, contribute to worse health outcomes for those facing precarious health outcomes, and can also worsen existing differences in the quality of care (De Belvis, Ferre, Specchia, Valerio, Fattore, & Riccirdi, 2012). Furthermore, funding cuts might add to other long-term negative consequences to healthcare. In particular, compromising efforts to improve wait-times, continuity of care and patient-centeredness, as well as the integration between social care and health care could be negatively impacted (De Belvis et al., 2012).

Immigration Adaptation to a New Physical and Social Environment after Arrival

Upon arrival to Canada, new migrants must navigate through Canada's healthcare system, a process which is described by Lake (2016) as one that might present several challenges and can act as a barrier towards receiving care. On top of this, new migrants to Canada might also face additional barriers that impact their access to healthcare services, such as overcoming major language and cultural barriers, and administrative barriers (Lake, 2016).

Two factors that might contribute to access to healthcare services and how well some immigrants navigate through the healthcare system include resettlement stress or the convergence of health behaviours by some immigrants, normally practised by members of the host country (Beiser, 2005; Namer & Razum, 2018). The process of immigration will increase the likelihood that some immigrants will experience resettlement stress of the convergence of health behaviours, potentially affecting their health outcomes and risk of experiencing UHNs.

Resettlement Stress

Settlement into a new country can potentially add to the risk of experiencing precarious health outcomes by immigrants. Although some migrants are allowed to Canada based on several favourable characteristics to keep them healthy, Beiser (2005) explains that some immigrants might experience stress, thereby contributing to their probability of experiencing an UHN. Factors

that contribute to resettlement stress include but are not limited to new types of employment or unemployment, ethnic identify attachment, discrimination, and lack of fluency of the dominant society's language (Beiser & Hou, 2006). During this time of navigating the transition to a new context, recent immigrants might have limited or fewer resources than native-born Canadians to help them achieve optimal health outcomes (Beiser, 2005).

Convergence of Host Society Behaviours

On average, immigrants will experience a "health transition" whereby their health advantages gradually become reduced. Changes to the health of immigrants might be caused by the introduction of predominantly "western" lifestyle practices. For example, it is believed that some "western" practices that some migrants express after their arrival include smoking and drinking in excess, eating junk food, and abandoning protective health behaviours specific to immigrant populations (Beiser, 2005; Beiser and Hou, 2006). Over time, however, practising these behaviours might contribute to differences in health status from when they initially migrated to Canada, approximately 10 years earlier. Exposure to the physical, social, cultural, and environmental influences in the destination country might reflect rates of mortality and morbidity of immigrants until these risks become similar to that of the host population (Beiser, 2005). As a result, the once protective health status that immigrants exhibited upon their arrival to a host country will decline until it becomes similar to that of the native-born population in the host population (Beiser, 2005).

Changes to immigration and immigrant experiences/expectations that influence UHNs.

Changes have occurred to the immigration process, which might influence immigrants' healthcare—their access to and use of services and their health outcomes, after their arrival to Canada. Since immigrants arrive to Canada under different classes of immigration, understanding

the impact of the immigration process on immigrants' access to healthcare services and health outcomes is important. Some changes that are expected to influence immigrant health include those related to immigrants' countries of origin and the cultures and cultural behaviours they bring to Canada. Moreover, changes to the immigration process itself, such as those related to the medical screening process, are expected influence their UHNs risk. Finally, immigrants' expectations of the healthcare system and their belief on how services should be delivered, their prior experiences navigating the healthcare system, and how well they transition into the Canadian workforce can also contribute to their UHN experiences.

Changes to immigrant source countries

One of the most notable changes to immigration includes the new sources countries immigrants arrive to Canada from. Recently, a majority of immigrants who arrived to Canada are from countries located in Asia, the Middle East, and Africa, rather than from countries that were once considered "traditional," that is, countries in Europe or the British Isles, the United States, and Australia (Statistics Canada, 2016c). As of 2016, the top ten immigrant source countries for Canada immigration included: the Philippines, India, China, Iran, Pakistan, the United States, Syria, the United Kingdom, France, and South Korea (Statistics Canada, 2016c). A potential consequence of new immigrant source countries is the different expectations that immigrants might have of the healthcare system or different ideas about when to use healthcare services and how these services should be delivered; factors that change across cultures.

Table 1: Foreign-born population by region of birth, Canada, 1991 – 2016.

	1991	1996	2001	2006	2011	2016
British Isles	17.2%	13.8%	11.6%	9.7%	8.3%	7.0%
Europe (Excluding British Isles)	37.2%	33.1%	30.4%	27.1%	23.1%	20.7%
United States	5.7%	4.9%	4.4%	4.0%	3.9%	3.4%
Caribbean, Bermuda, Central and South America	10.4%	11.1%	11.0%	11.3%	11.7%	11.6%
Africa	3.8%	4.6%	5.2%	6.1%	7.3%	8.5%
Asia and the Middle East	24.6%	31.4%	36.5%	40.8%	44.9%	48.1%
Oceania and Others	1.1%	1.0%	1.0%	1.0%	0.8%	0.8%

Sources: Statistics Canada, Census of Population, 1871 to 2006; National Household Survey, 2011; Immigration and Diversity: Population Projections and its Regions, 2011 to 2016 (Statistics Canada, 2016c).

Cultural beliefs related to healthcare

Some immigrants might arrive to Canada with expectations about the healthcare system or the use of healthcare services, that are different from the dominant culture. These different expectations might contribute to the differences in UHN experiences by immigrants and Canadian-born adults. Furthermore, these differences might also contribute to some variation in UHNs between immigrants (Kustec, 2012; Statistics Canada, 2016a; 2016c). At the same time, cultural insensitivity on the part of some healthcare providers towards the differences in the ideologies held by immigrants have produced negative effects on the use of healthcare services by these immigrants (Brar et al., 2009; George, Lennox Terrion, and Ahmed, 2014; T. Lee et al., 2014; Reitmanova and Gustafson, 2008).

Some immigrants who self-identify as belonging to particular cultural groups might report having a preference regarding the gender and ethnicity of physicians who are providing care to them. Many health researchers have found that some immigrant women, for example, indicate a preference for having access to a female physician or one who share similar a cultural backgrounds

as them (Chugh, Dillmann, Kurtz, Lockyer, and Parboosingh, 1993; Donnelly, 2008; Ng and Newbold, 2011). This preference reflects the belief that access to a physician with a similar racial background might mean that the problems of the patient could be understood in the context of their own culture, as it relates to the health practices of physicians in their country of origin (Cave et al., 1995; Dastjerdi, 2012; Dastjerdi et al., 2012). The inability of Canadian physicians to meet these expectations might deter patients from seeking healthcare services, thereby contributing to immigrants' low expectations of healthcare the healthcare system and a reduction in their use of services.

Changes to Immigrant Medical Screening

Changes were made to Canada's immigration process in 1967 to allow only healthy applicants to become admissible into Canada under the assumption that these individuals add to Canada's economic strength (Lu & Ng, 2009). In order to be selected for migration to Canada, some immigrants must be screened for eligibility. The screening process allocates a number of points to immigrant applicants and selects immigrants according to a human capital criteria (to determine the economic value that they will add to the Canadian work-force. During this screening process, points are awarded to immigrants based on education, language skills, work experience, age, arranged employment in Canada, and adaptability (Li, Q, 2007). The number of points awarded to immigrants during this screening process and their level of self-rated health status upon arrival to Canada are mutually inclusive since immigrants who have a higher score are expected have exposure to factors that are associated with better success in Canada and also better health outcomes (Li, Q, 2017). However, in 2002 changes to the Immigration and Refugee Protection Act modernized the screening process whereby some immigrants, such as those identifying as refuges and some family-class immigrants, were exempted from medical screening (Laroche,

2000; Lu & Ng, 2019). According to Lu & Ng (2019), approximately 27% of immigrants admitted to Canada between 2007 and 2014 were excused from medical screening. While the initial purpose of these medical screening tests is to determine an immigrant's eligibility for admission into Canada and if they would pose a public health risk or economic strain on healthcare and other social services, the exemption of some migrants from the medical screening process might conceal some precarious health characteristics (Laroche, 2000). Specifically, for those being admitted under the family reunification class of immigrants, medical screening is not as intense since it is expected that family members will be able to provide for them once in Canada (Laroche, 2000). As a result, a considerable number of immigrants entering Canada are not being screened before their arrival (Laroche, 2000).

Immigrant expectations of the healthcare system and unmet healthcare needs

Immigrants' expectations of the healthcare system are initially lower than the expectations held by Canadian-born adults. A result of reduced expectations of the healthcare system held by immigrants might be reflected in their lower use of healthcare services (Cave, Maharaj, Gibson, and Jackson, 1995; Dastjerdi, 2012; Dastjerdi, Olson, and Ogilvie, 2012). Various health studies (e.g. Ali et al., 2004; Quesnel-Valée et al., 2011; Sanmartin & Ross, 2006; Shi & Stevens, 2005; Statistics Canada, 2016b; Wu et al., 2005) have shown that the factors that guide immigrants' reduced use of healthcare service include the following:

(i) immigrants' racial background;

(ii) past negative experiences with Canada's healthcare system;

(iii) insufficient communication with healthcare providers;

(iv) a lack of knowledge about available healthcare services.

Past negative experiences: Minority Immigrants vs. White Non-Immigrants

Racialization is another factor that might help explain the experience of UHNs. A study by Shi and Stevens (2005) concluded that white non-immigrants felt more empowered to obtain care and to speak up when they believe that they have experienced an UHN. Since white non-immigrants report fewer UHNs, it is believed that their interaction with the healthcare system is positive. On the other hand, immigrants' different experiences with the healthcare system might be explained as the result of a long history of negative experiences. Negative experiences can include discrimination, distrust of healthcare practitioners, and negative interpersonal experiences. These negative experiences can potentially add to past experiences that have created the belief that the healthcare system is unable to meet their needs, thereby affecting immigrants' use of healthcare services.

Communication with healthcare providers and lack of healthcare knowledge

Several studies have found that a lack of communication, in particular, the communication between healthcare providers and their immigrant patients can contribute to decreased access to healthcare services and increased UHN experiences (Cave et al., 1995; Lebrun, 2012). Those who lack communication with healthcare providers may be unaware of services available to them. Additionally, they might lack the opportunity to adequately communicate their healthcare problems to their service provider. Either obstacle can increase the risk of experiencing UHNs, but are common among immigrants arriving to Canada from non-English speaking countries, who known to have a low probability of having regular care with a healthcare provider (Cave et al., 1995; Lebrun, 2012).

The degree of integration and entry earnings of immigrants

Integration into the Canadian economy by immigrants typically is measured by their employment earnings. This is another factor that might reflect immigrants UHN experiences. Wile many changes to the immigration process have been intended to help recent immigrants during this transitioning period, Aydemir and Skuterud (2005) noted that this requirement has not helped. A study by Aydemir and Skuterud (2005) compared the degree of integration into Canada's economy by immigrants who migrated to Canada between 1965 – 1969 and 1995 – 1999. It was concluded that on average, immigrants who migrated to Canada between 1995 and 1999 were unable to integrate into Canada's economy to the same degree as those who immigrated between 1965 and 1969 (Aydemir & Skuterud, 2005). The finding that those who migrated to Canada a part of later cohorts (e.g. between 1995 – 1999) is surprising because it is expected that skills immigrants are screened for would help them better transition into Canada's economy. Moreover, it is surprising since immigrants a part of earlier cohorts faced additional challenges of living in poorer economic conditions than those arriving in later cohorts (Aydemir & Skuterud, 2005). Nevertheless, this study reported that immigrants who arrived in Canada during the mid-'60s earned on average 22% to 27% more than those who immigrated during the mid-'90s (Aydemir & Skuterud, 2005).

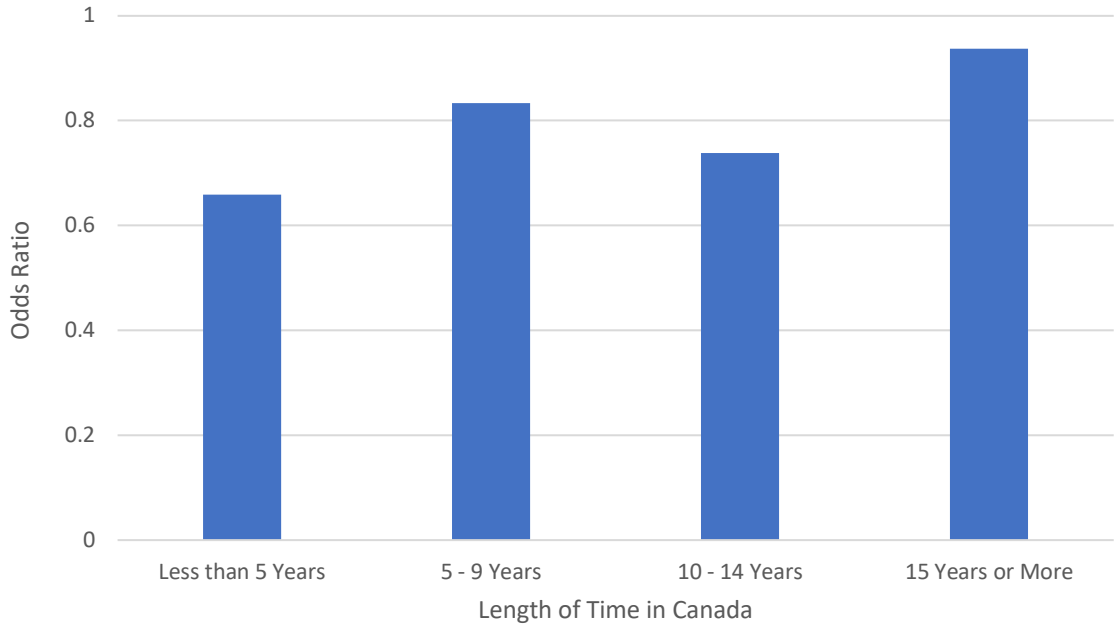
There are two factors identified in the literature that are believed to contribute to immigrants' lack of adaptation to Canada's economy. First, those who migrated to Canada during the mid-'90s migrated with a set of skills useful to adapting to a society dominated by the information and technology (IT) sector as this was a time of growth in this field (Krustec, 2012). However, although equipped with the skills necessary for IT-related jobs, the collapse of the IT sector during the early 2000s resulted in lower earnings and lower rates of employment for these

immigrants (Aydemir & Skuterud, 2005). Secondly, the increasing size of immigrant cohorts might also help explain why the entry earnings of immigrants who migrated to Canada during the mid-'90s is lower than that of those who migrated to Canada during the mid-'60s (Shi & Stevens, 2005). The increase in immigrant cohort size by the mid-'90s created competition for entry-level jobs, resulting in a decrease in the starting wages. Subsequent research by Hou and Picot (2014) found that a 10% increase in immigrant cohort size results in a 0.86% decrease in the entry earnings for immigrants of that cohort. Between 1980 and 1984 and again in 2005 and 2009, large incoming immigrant cohorts caused a 9% decrease in the entry earnings for immigrant men, and a 3% decrease for immigrant women, indicating both a difficulty in finding employment and experiencethe negative impacts of low income and precarious socioeconomic position (Aydemir & Skuterud, 2005; Hou & Picot, 2014).

Immigrants' Length of Residence and Unmet Healthcare Needs

An immigrant's length of time living in Canada might affect their experiences with UHNs (Ali et al., 2004; Wu et al., 2005; Quesnel-Valée et al., 2011). Results from the study by Wu et al. (2005) found that among all immigrant cohorts, the risk of reporting an UHN during 2000/01 was low when compared to Canadian-born adults (Figure 3). This immigrant health advantage was shown to be present for four different cohorts of immigrants, those living in Canada for less than 5 years, between 5 – 9 years, between 10 – 14 years, and 15 years or more. However, when controlled variables were added to the models (e.g. individual population-based factors), the healthy immigrant advantage began to disappear and this was apparent for immigrants who had been living in Canada 15 years or more (Wu et al., 2005).

Figure 3: Odds of Reporting UHN, Immigrants, 2000/01 CCHS



Source: Wu et al., (2005)

The Healthy Immigrant Effect

The Healthy Immigrant Effect (HIE) refers to the epidemiological phenomenon wherein immigrants arriving to Canada are healthier than Canadian-born adults, irrespective of sharing similar sociodemographic characteristics (McDonald & Kennedy, 2004). Research indicates that at the time of their arrival, immigrants to Canada display better health status since they have been selected for immigration and admitted based on favourable characteristics. Moreover, this health advantage might also be due to the self-selection process and medical screening before their arrival into Canada. Unfortunately, this health advantage that immigrants display declines approximately 10 years after their arrival. The decline in immigrants' health advantage is expected to be the result of many factors, some of which might include acculturation into a new society, a process known as convergence, resettlement stress, reporting of health conditions that were overlooked at the time

of migration, or socio-economic disadvantage (Gee et al., 2004; McDonald & Kennedy, 2004; Riveria et al., 2015; Trovato, 2017).

Under Canada's immigration process, applicants with favourable characteristics are selected for migration as it is expected that they are less likely to return to their sending country, are able to adapt to Canadian lifestyles more easily than those without these characteristics, and are expected to remain healthier, longer (McDonald & Kennedy, 2004; Riveria et al., 2015). Intended to help immigrants contribute to Canada's economy, characteristics used to help admit immigrants add to their human capital. The screening and removal of undesirable applicants who could pose a threat to Canada's economy and public health, along with changes to the Immigration and Refugee Protection Act disclose reasons why immigrants might report better health status at the time of their arrival in Canada and report fewer UHNs (Gee et al., 2004; Lu & Ng, 2019; Trovato, 2017; Wu & Schimmele, 2005).

Acculturation is understood as the process by which immigrants begin to adopt the mainstream beliefs, attitudes, and lifestyle behaviours of the dominant population (Gee et al., 2004). After migration, adopting characteristics associated with a predominantly 'Canadian lifestyle' can change some immigrants' behaviours, thereby increasing their risk of experiencing UHN (McDonald & Kennedy, 2004). The process of acculturation brings incremental changes to the cultural ideas that immigrants might have once had about the healthcare system before migration. Reshaped cultural ideas about the healthcare system, in turn, might contribute to a decline in immigrants' health insofar as begin to gain a different understanding of health or new ideas about when to use healthcare services. These changes can potentially contribute to adverse health outcomes, making the use of healthcare services necessary, resulting in higher rates of UHNs (Newbold, 2005). Although some cultural behaviours might buffer the effects of

acculturation, this buffering effect is eventually eliminated and immigrants' behaviours begin to impact their health (Trovato, 2017).

Important Factors Potentially Related to Unmet Healthcare Needs

Specific variables that contribute to UHN experiences have been identified in health research, particularly research using the ABM and the ABM-VP (Aday & Andersen, 1975; Andersen, 2005; 2008; Gelberg et al., 2000; Wu et al., 2005). As these models promote the understanding of the relationship between UHN risk, it also identifies factors for UHN, some of which include immigrant status, age, gender, country of origin and ethnicity, the relationship between educational attainment and income, socioeconomic group placement, marital status, language proficiency, access to regular sources of healthcare, community and social support, self-rated health status, the presence of at least one or more chronic conditions, and some geographic factors (Aday and Andersen, 1974; Andersen, 1995; 2008; Bradley et al., 2002; Gelberg et al., 2000).

Immigrant Status

Immigrant status has been identified as an important predisposing variable that might be able to predict UHN experiences (Ali et al., 2004; Quensel-Valée et al., 2011; Wu et al., 2005). Studies by Ali et al. (2004) and Wu et al. (2005) have established the expectation that immigrants' experiences with UHN are sometimes associated with some factors as identified by the ABM and ABM-VP. The negative effects of these factors on their own, as well as when interacting with each other might contribute to the belief that immigrants will experience more UHNs than their Canadian-born counterparts.

Age

Age has been identified as another predisposing factor associated with UHNs (Marshall, 2011; Statistics Canada, 2016b). Across age groups, individuals might experience barriers towards accessing healthcare services and therefore an increased risk in experiencing UHNs. It is acknowledged, however, that people of any age can be faced with significant events that can their vulnerability to UHNs (Marshall, 2011).

Gender

Gender is a predisposing factor related to UHNs. Gender, defined as the socially constructed roles, behaviours, expressions and identities of males, females, and gender-diverse individuals and has the potential to influence the distribution of power and resources to which individuals have access to, and therefore might influence UHNs risk (Canadian Institutes of Health Research (CIHR), 2018).

Country of Origin and Ethnicity

Ideas about the healthcare system and when to use services can change depending on the users' ethnicity, and for immigrants, country of origin (Bradley et al., 2002; Castanada et al., 2015). Country of origin and ethnicity change individuals' experience of health, illness, and disease. For example, those belonging to specific ethnic groups from a particular region might have a greater predisposition for experiencing UHN. As explained by Marmot and Syme (1976), social and cultural factors might account for the increase in coronary heart disease (CHD) among men with a common Japanese ancestry living in three regions—Japan, the United States of America, and Hawaii. Japanese men with close ties to Japanese culture and those living in Japan had a significantly reduced rate of CHD (Marmot & Syme, 1976). On the other hand, the presence of CHD was highest for those living in the United States of America with no close ties to Japanese culture (Marmot & Syme, 1976). The risk of CHD among Japanese men living in Hawaii was

slightly lower than for those living in the United States but slightly higher than that of those living in Japan (Marmot & Syme, 1976).

Educational Attainment and Income

Individuals' highest level of education has been identified as a factor that can potentially influence their experiences with UHNs. At the same time, education might be able to influence other variables associated with UHNs such as income, employment, and socioeconomic status. On one hand, those who have completed higher education (e.g. the completion of post-secondary education) might be able to access healthcare services and therefore experience few UHN experiences. This is common among those a part of middle and higher income groups (Ungerleider et al., 2009; Quesnel-Valée et al., 2011; Wu et al., 2005). In spite of that, however, it might not be unreasonable to assume that as educational attainment increases, so do expectations of the healthcare services, potentially increasing UHN experiences.

Income and Socioeconomic Status

Since Canada's healthcare system is publicly funded and follows principles of universality, financial status should not be a factor that contributes to access to or use of healthcare services (Wu et al., 2005). Notwithstanding, however, studies have recognized that income and socioeconomic status can sometimes act as enabling factors that might affect the use of healthcare services and UHNs risk (Bryant et al., 2009; Curry-Stevens, 2009). At the same time, these factors can also act as a barrier to accessing healthcare services (Bryant et al., 2009; Curry-Stevens, 2009). According to Curry-Stevens (2009), a small proportion of those who experience UHN are among the wealthiest in society, whereas a large proportion of those who experience UHNs in Canada are among Canada's poorest. Those who reported a household income of $40,000 or more in 2009 were more likely than those with a household income of less than $40,000 to use specialist services

or seek care (Bryant et al. 2009). Similarly, those a part of low-income groups were less likely to frequently access specialist services (Bryant et al., 2009; Lebrun, 2012).

Marital Status

Marital status has been identified as another factor that potentially affects UHN experiences as those who are married have a decreased probability of experiencing UHNs (Joung et al., 1995). Research shows that these individuals seek out and use more healthcare services and report better self-rated health status than those who have never been married (Joung et al., 1995).

Language Proficiency

The ability to speak an official language has been identified as another factor that contributes to UHN experiences. Those able to speak one of Canada's official languages have the potential for increased communications with healthcare providers (Lebrun, 2012; Ronson and Rootman, 2009; Wu et al., 2005). Increased communication with healthcare providers allows users to communicate any healthcare problems they might be facing. Furthermore, increased communication with healthcare providers will increase users' awareness of services that are potentially available to them.

Regular Source of Care

Access to a regular source of care is an enabling factor that reduces the probability of experiencing UHNs (Levesque et al., 2008; Shi & Stevens, 2005). Those who report no regular sources of care often report not having a regular place to access healthcare services or the inability to benefit from certain benefits (e.g. reminders from physicians about necessary healthcare services) and might have limited access to healthcare services (Levesque et al. 2008; Shi & Stevens, 2005).

Community and Social Support

Community and social support are enabling factors associated with a decreased risk of experiencing UHNs (Bryant et al., 2009). Information about where to access healthcare services and when to use these services is shared among community members. Those with close community ties are therefore exposed to more opportunities to discuss their healthcare concerns and speak about opportunities to meet their healthcare needs (Bryant et al., 2009).

Self-Rated Health, Stress and Chronic Conditions

Self-reported health status, stress levels, and the presence of at least one chronic condition are factors associated with experiencing UHNs (Barham et al., 2017; Sibley and Glazier, 2009; Levesque et al., 2008). According to Sibley and Glazier (2009) and Barham et al. (2017), experiencing UHNs is common among those who report poor self-rated health status. On the other hand, the probability of experiencing UHNs is higher among those who report having at least one or more chronic conditions (Barham et al., 2017; Ronksley et al., 2013; Sibley and Glazier, 2009). Those with at least one chronic condition will have an actual need to use healthcare services and have a higher risk of experiencing UHNs (Silver and Stein, 2001).

Potential Barriers to Accessing Care

Geographic Variables

Many geographic variables have been linked to UHN. Specific geographic variables of interest include the province of residence and whether respondents lived in a rural or urban population centre in 2014 (Allin, 2008; Barham, Bataineh, & Devlin, 2017; Sibley & Weiner, 2011).

Prior research shows that between provinces and territories, the experience of UHN differs (Allin, 2008; Dunlop et al., 2000; Rudmik et al., 2015). There are many reasons that contribute to the differences in UHN experiences between provinces and territories and are typically related to

the access of healthcare services, the availability of healthcare services, acceptability of healthcare services, or other personal reasons (Allin, 2008; Dunlop et al., 2000; Rudmik et al., 2015). The variation in provincial rates of UHN might reflect systematic factors related to the delivery of and access to healthcare services unique to each provincial healthcare system. The delivery of healthcare services and factors that affect access to healthcare services in each province might be influenced by the decentralization of each healthcare system at the local and regional levels are different and might influence the variation in UHN experiences (Allin, 2008; Lewis, 2015).

The effect of population centre on UHN experiences is similar to the effect of the province of residence insofar as differences in UHN experiences between population centre might be related to access to healthcare services, the availability of healthcare services, acceptability of healthcare services, and personal reasons. Specifically, residents of large urban centers are expected to have increased access to healthcare services than those living in small rural centres, contributing to the expectation that these residents will have a lower probability of experiencing UHNs (Sibley & Weiner, 2011). Despite this, residents of urban population centres reported higher rates of UHN than those living in rural areas. This finding is unusual due to the widespread availability of walk-in clinics in urban areas and might reflect a lack of commitment to specialists, family doctors, or regular sources of care or the personal ideas of residents towards accessing and use of healthcare services (Sibley & Weiner, 2011).

Research Questions

Various health studies have established that UHN experiences continue to be reported and therefore, remains a problem in Canada (Ali et al., 2004; Quesnel-Valée et al., 2011; Wu et al., 2005). Although Canadian immigrants generally reported fewer UHN experiences than Canadian-born adults in 2000/01, it is unclear how this might have changed over time or whether the factors that were significantly associated with UHN experiences in 2000/01 have changed since. An updated analysis of health data that focuses on the relationship between immigrant status and UHN experiences in Canada is needed to better understand factors that contribute to the differences in UHN experiences for immigrants and Canadian-born adults in 2014.

Using the 2014 Canadian Community Health Survey (CCHS), this research aimed to determine the differences in experiencing UHNs based on immigrant status after controlling for age, gender, and other individual factors known to significantly affect UHNs risk. This research also examined whether the reasons that contributed to UHNs in 2014 among immigrants and Canadian-born adults have changed since 2000/01. Furthermore, this research reconsiders immigrants' length of time in Canada and how this might affect their relative risk of experiencing UHNs.

The following research questions will be used to model the UHN of immigrants and Canadian-born adults as predicted by immigrant status, age, gender; the various individual factors from the ABM and ABM-VP; and length of time in Canada.

Question 1: What were the age and gender-adjusted risks of experiencing unmet healthcare needs for immigrants and Canadian-born adults in 2014?

Question 2: What were the individual factors that were associated with UHNs in 2014 and how have they changed since 2000/01?

Question 3: How does time since immigration along with individual population-based variables affect immigrants' risk of reporting unmet healthcare needs?

Methods and Data

Canadian Community Health Survey

Data from the master files of the 2014 Canadian Community Health Survey (CCHS), collected by Statistics Canada were used for this analysis. The CCHS is a national computer-assisted telephone interview (CATI) survey that provides cross-sectional information about the health, health behaviours, and the healthcare use of Canadians. Although it collects information from approximately 60,000 non-institutionalized Canadians aged 12 and older, the target population for this research were individuals aged 18 and older, who identified as either a Canadian citizen or immigrant to Canada, and who answered questions about their UHNs experiences. The responses in the CCHS do not reflect those living on First Nations Reserves, on Canadian Forces Bases, or in medical institutions (Wu et al., 2005).

Questions used in the CCHS are important for analyzing the UHNs of Canadians. Specifically, the questions used in the CCHS captured experiences with a wide range of barriers to accessing healthcare services, as well as some of the respondent's socioeconomic and demographic characteristics. Furthermore, some questions used in the CCHS asked about the respondents' immigration status, including the year of arrival in Canada (Statistics Canada, 2014).

Although more recent versions of the CCHS are available (e.g. 2015 and 2016), changes implemented to the 2015 cycle make the surveys from 2014 and earlier comparable. Before 2015, the sampling frame used to select households included one sampling area frame, telephone numbers within that area frame, and a random digit dialling frame. The 2015 CCHS sample draws responses from two sampling area frames and has undergone major content revisions to some questions. For example, a change to the 2015 CCHS included modifications to the provincial questionnaires and while questions concerning the UHN of respondents remained the same in the 2015 CCHS as to those used in cycles from 2014 and prior, these data were collected in only three

provinces in 2015. For purposes of comparability and national generalizability, it is appropriate to use CCHS surveys from 2014 and prior.

Analytical Approaches

To examine the differences in UHN experiences between immigrants and Canadian-born adults, a series of multivariate logistic regression models were created. These models include factors identified in the ABM and ABM-VP.

The following question was used to identify those who experienced UHNs: "During the past 12 months, was there ever a time you needed healthcare services but did not receive them?". For those who answered 'Yes' the follow-up questions were asked: "Reason for experiencing an unmet healthcare need" and "Type of unmet healthcare need experienced". The purpose of these follow-up questions was to determine the type of UHN experienced and the potential reasons that might have contributed to respondents' experiences.

Multivariable Binary Logistic Regression Models

The models used to determine the effect of individual factors on UHNs takes into consideration the effect that two or more independent variables (X_i) have on predicting the experience of UHNs. The dependent variable (UHN) is a dichotomous yes/no variable indicating whether or not the individual experienced UHNs in 2014. Individual factors included within the models are those such as the predisposing, enabling, and needs-based factors as well as certain health behaviours. The risk of UHN can be modelled using the following equation:

Equation 1: Risk Logit Function

$$\text{Logit}(\widehat{\text{UHN}}) = \text{Ln}\left(\frac{\pi}{1-\pi}\right) + \varepsilon_i$$

Risk or Odds Ratio

The risk (odds ratio) is a measure of association that compares the odds of experiencing a disease for those exposed to certain environments or conditions to the odds of experiencing a disease for those who are not exposed to an environment or a condition. Calculating the risk (odds ratio) of experiencing an UHN can be modelled using Equation 2:

Equation 2: Odds Ratio

$$\text{Odds Ratio} = \frac{\text{Odds of disease in exposed}}{\text{Odds of disease in non} - \text{exposed}} = e^{\beta}$$

An odds ratio of 1 indicates that there are no differences in experiencing an outcome between two groups (for example, being an immigrant or born in Canada). On the other hand, an odds ratio greater than 1 would suggest that being an immigrant is positively associated with the experience of UHN.

Chi-Square (χ^2) and Yates Correction for Continuity

The Chi-Square (χ^2) (Equation 3) statistic is used to determine if there are significant differences in the observed and expected frequencies of one or more categories used in the analysis. For this study, the χ^2 will be calculated to determine if the observed and expected frequencies of UHN between immigrants and Canadian-born adults are statistically significant using a threshold significance value of p=0.05.

Equation 3: Chi-Square Statistic

$$\chi^2 = \sum^{k} \frac{(f_o - f_e)^2}{f_e}$$

For comparisons with only one degree of freedom (e.g. a 2x2 contingency table), the Yates Correction for Continuity (χ^2_{Yates}) (Equation 4) will be used. The Yates Correction for Continuity

corrects for the upwards bias that might be included in a χ^2 test. Chi-square tests, while also increasing the accuracy of the p-value (Camilli, G., & Hopkins, K.D., 1978).

Equation 4: Yates Correction for Continuity

$$\chi^2_{\text{Yates}} = \sum^{k} \frac{(|f_o - f_e| - 0.5)^2}{f_e}$$

Probability Value (p-value) and Level of Statistical Significance

Variables included in Models 1 – 6 are those that are significantly associated (p-value<0.05) with UHNs. Customary for health research, a null hypothesis (H_0) is created which suggests that no effect on the population of interest will occur. For example, for this research, the H_0 suggests that immigrant status is not associated with a difference in UHNs. On the other hand, the alternative hypothesis (H_A) suggests that there is an effect on the population of interests and therefore immigrant status will affect UHNs experiences.

The p-value is the probability of obtaining a pattern of data given that the H_0 is true. A large p-value suggests that there is a high probability in obtaining data results if H_0 is true and concludes that there is no effect occurs on the population when exposed to a specific characteristic (e.g. being an immigrant). As a result of a high p-value, it is suggested that we can confidently accept the H_0 as no effect occurs to the population of interest. A small p-value, on the other hand, might suggest that there is only a small chance of obtaining the pattern of data if there is no effect occurring to the population of interest, and therefore a genuine effect occurs to the population of interest. The result of a small p-value suggests the rejection of the H_0 and acceptance of the H_A.

Traditionally, a level of statistical significance of 0.05 is used to decide between the H_0 or H_A. A value equal to or less than 0.05 suggests that if it is found that the probability of obtaining a pattern of results if there was no effect on the population is less than 0.05 or 5%, then the H_0 can

be confidently rejected. On the other hand, the if probability of obtaining a pattern of results if there was no effect on the population is greater than 005 or 5%, then the H_0 could not be confidently rejected. Typically, a significance value of 0.05 is used to provide the best balance between making a Type I Error (α) with the probability of making a Type II Error (β). Normally, a Type I Error occurs when the H_0 is rejected when it is true. A Type II Error, on the other hand, occurs when H_0 is failed to be rejected although it is false.

Concordance Statistic (C-Statistic)

The concordance statistic (C-Statistic) is used to measure the goodness-of-fit for binary outcomes modelled using (multivariate) logistic regression models. The C-Statistic will be used to help determine the model that is best associated with predicting UHNs.

Ranging from 0.5 – 1 a score of 0.5 indicates that the association of an outcome might be due to chance or probability, regardless of the variables included in the model to predict that outcome. However, a score of 1 on the other hand, might suggest a strong association between variables included within a model and the outcome. While the C-Statistic can be used to determine whether variables in a model are associated with UHNs, the removal of some variables that have no association to the outcome might not necessarily change the C-Statistic value.

Akaike Information Criterion (AIC)

The Akaike Information Criterion (AIC) is an estimator concerned with the model fit and quality of a specific model. The AIC can be used to determine the model best suited to predict future values of an outcome when combining specific variables of interest, along with the model's intercept, in relation to other models. For this study, the model with the lowest AIC value will be considered the best model that can be used to predict the probability of reporting the experience of

a UHN of immigrants during 2014. A good model that can predict future outcomes is on that has a low AIC value, which indicates a better fit when compared to a model with a high AIC.

Multivariate Models

To determine the variables associated with UHNs experiences during 2014, an approach similar to that of Wu et al. (2005) was used. A series of multivariate binary logistic regression models were created used to help explain the relationship between individual factors identified in the AMB and AMP-VP with the experience of an UHN.

The Baseline Model (Model 1) examines the relationship of UHN with immigrant status, age, and gender. Subsequent models, Model 2 – Model 5 introduce different individual factors which will act as the controlled variables. These individual factors include the predisposing (Model 2), enabling (Model 3), barriers to accessing care (Model 4), and factors related to medical need (Model 5).

Model 6 combines all of the controlled individual factors to examine how these factors might affect each other and UHN experiences (Wu et al., 2005).

Models 7 and 8 only include immigrant sub-populations. Model 7 examines the effect that time since immigration has on the experience of UHN for immigrants using the variable "length of residency in Canada". Finally, Model 8 will examine how immigrants' experiences with UHNs change as their time in Canada also increases, while controlling for all individual factors and barriers to receiving care.

Variables of Interest

The main independent and dependent variables used are summarized in Table 2 and are based on the ABM and the ABM-VP. Following the model proposed by Andersen (2008), the

predictor variables are classified into the predisposing, enabling, and needs-based factors. Also included are some barriers to receiving healthcare services.

Table 2: Canadian Community Health Study Variables to be Used.

Main Outcomes
Unmet Healthcare Need
Reason for Unmet Healthcare Need
Type of Unmet Healthcare Need
Predisposing Factors
Age
Gender
Immigrant Status
Highest Level of Education
Marital Status
Region of Birth
Enabling Factors
Sense of Community Belonging
Access to Employment
Access to Regular Source of Care
Language Spoken to Doctor
Language Spoken at Home
Canadian Region
Contact with General Practitioner
Visit Dentist
Contact with Specialist
Needs-Based Factors
Presence of at least one chronic condition
Self-rated Health Status
Self-rated Stress
Barriers to Receiving Care
Household Income
Cultural/Racial Background
Knowledge of an Official Language
Residence Type
Insurance Coverage

Results

Results from the quantitative analysis of the 2014 CCHS will be presented in this section. Summary statistics related to UHN and immigrant status will be presented (Table 3), followed by a bivariate association of UHN and the variables of interest (Table 4). This section also presents results from the binary logistic regression analysis, model fit procedures, and regression analysis tables (Table 7 – Table 15).

Sample Statistics

The total number of respondents who responded to the 2014 CCHS was 63,522. However, after identifying respondents aged 18 and older, who answered questions about their immigrant status and questions concerning their experiences with UHNs during 2014, the total number of valid responses included in this analysis was 56,937.

Table 3: Characteristics of Sample by Immigrant Status.

Variable	N	% Frequency or Mean (SD) Immigrants	% Frequency or Mean (SD) Non-Immigrants	χ^2 (p-value), df
Unmet Healthcare Needs				
Yes	6710	10.67%	12.17%	23.4219 (<0.0001), 1
No	50227	89.33%	87.83%	
Age	-	48.80 (22.64)	46.90 (16.77)	-
Sex				
Male	28029	49.74%	49.05%	2.03 (0.1541), 1
Female	20908	50.26%	50.95%	
Predisposing Factors				
Highest Level of Education	-	3.66 (1.17)	3.55 (0.92)	-
Marital Status				
Single/Never Married	13882	17.66%	26.72%	527.90 (<0.0001), 2
Married/Common Law	35515	69.45%	59.91%	
Widowed/Separated/Divorced Don't Know	7540	12.89%	13.37%	
Region of Birth				
Africa	1327	9.02%	-	55128.40 (<0.0001), 5
Asia and Middle East	6448	43.83%	-	
Central America/Caribbean and Bermuda/South America	1807	12.28%	-	
Europe	4471	30.39%	-	
Oceania/Other/Other North America	659	4.49%	-	
Enabling Factors				
Sense of Community Belonging	-	2.11 (1.20)	2.22 (0.83)	-
Access to Employment (Yes)	40606	67.82%	72.53%	122.97 (<0.0001), 2
Access to Regular Source of Care (Yes)	48296	83.40%	85.32%	31.27, (<0.0001), 1
Residency: Canadian Provinces				
Ontario	21908	51.31%	34.01%	2813.24, (<0.0001), 5
Atlantic	3954	1.40%	8.88%	
Quebec	12126	14.77%	25.96%	
Prairies	10211	14.43%	19.16%	
British Columbia	7555	17.99%	11.62%	
Northern Provinces/Territories	174	0.10%	0.37%	
Contact with General Practitioner (Yes)	43466	75.75%	76.55%	9.58 (0.0083), 2
Contact with Dentist (Yes)	15068	32.54%	24.35%	403.32, (<0.0001), 2
Contact with Specialist (Yes)	18141	30.35%	32.39%	20.38, (<0.0001), 1

Table 3: Characteristics of Sample by Immigrant Status (Continued)

Variable	N	% Frequency or Mean (SD) Immigrants	% Frequency or Mean (SD) Non-Immigrants	χ^2 (p-value), df
Barriers to Accessing Care				
Ethnic Background				
Caucasian	43560	36.70%	90.37%	
Black	1434	8.07%	0.58%	
Chinese	2228	12.78%	0.82%	
East Asian	1516	9.25%	0.37%	
Middle Eastern	1101	6.83%	0.23%	24021.11, (<0.0001), 8
South Asian	2297	13.42%	0.77%	
Southeast Asian	543	2.77%	0.32%	
Other/Multiple	1958	9.63%	1.28%	
Not Stated/Don't Know	2300	0.57%	5.25%	
Household Income				
Low Income	3059	7.30%	4.70%	
Lower-Middle Income	8296	19.07%	13.00%	516.12, (<0.0001), 2
Upper-Middle Income	45583	73.63%	82.30%	
Residency: Type				
Urban Population Centre	46385	94.96%	76.76%	2392.62, (<0.0001), 1
Rural	10553	5.04%	23.24%	
Supplemental Health Insurance (Yes)	23207	51.72%	36.94%	986.87, (<0.0001), 1
Medical Need				
At least one chronic condition (Yes)	25529	43.45%	45.32%	386.27, (<0.0001), 2
Self-Rated Health Status	-	2.40 (1.35)	2.35 (0.93)	-
Self-Rated Stress	-	2.80 (1.36)	2.83 (0.93)	-
Length of Time in Canada				
Less than 5 years	1962	13.33%	-	
5 – 9 years	1976	13.43%	-	56937.00, (<0.0001), 4
10 – 14 years	1853	12.60%	-	
15 years or more	8921	60.64%	-	
N	56,937	25.84%	74.16%	

Note: Significant association between values with p-value ≤0.05. Values with degrees of freedom (d.f.) of 1 uses Yates Correction of Continuity(χ^2_{Yates}).

As shown in Table 3, 74.16% of the respondents included in the analysis identified as Canadian-born adults, while 25.84% identified as immigrants. The unadjusted analysis reveals

that in 2014, immigrant status and UHN experiences were significantly associated ($\chi^2_{\text{Yates}} = 23.42$, p-value<0.0001).

The average age of Canadian-born adults who responded to the 2014 CCHS was 47 years old, while the average age of immigrants was 49 years old. Immigrants were on average better educated than Canadian-born adults and more immigrants than Canadian-born identified as being married.

Canadian-born adults felt better connected to their community than immigrants and had more access to regular sources of care, employment, and specialist service use than immigrants. However, immigrants reported more use of dental services and also were more likely than Canadian-born adults to have access to supplemental health insurance. The presence of at least one or more chronic conditions was less common among immigrants and immigrants were more likely than Canadian-born adults to report better self-rated health status. These findings are expected given the expectations of immigrants who are chosen for migration to Canada (e.g. lack of chronic conditions).

In 2014, a majority of Canadian immigrants resided in either Ontario or British Columbia, whereas a majority of respondents who identified as Canadian-born adults resided in Ontario or Quebec. Residency in an urban population centre was more common among immigrants than Canadian-born adults and the opposite is true for rural population centres, where the number of immigrants was four times lower than the number of Canadian-born adults, in 2014.

Finally, when considering the ethnic background of the respondents, more than 90% of Canadian-born adults identified as Caucasian. The ethnic background of immigrants is more diverse, on the other hand. Among immigrants, 36% identified as Caucasian, while approximately

45% identified as belonging to ethnicities originating from Asia or the Middle East. Only 8% of immigrants identified as Black.

Table 4: Characteristics of Sample and Bivariate Association with Unmet Healthcare Needs.

Variable	N	% Frequency or Mean (SD) with UHN	% Frequency or Mean (SD) without UHN	χ^2 (p-value), df
Immigrant Status				
Immigrant	14712	23.40%	26.16%	23.42 (<0.0001), 1
Canadian-Born Adult	42225	76.60%	73.84%	
Age	-	44.52 (17.08)	47.77 (17.84)	-
Age Squared	-	6.56 (1.29)	6.78 (1.32)	-
Sex				
Male	28029	44.27%	49.89%	74.63, (<0.0001), 1
Female	28908	55.73%	50.11%	
Predisposing Factors				
Highest Level of Education	-	3.59 (0.978)	3.58 (0.965)	-
Marital Status				
Single/Never Married	13882	29.15%	23.74%	124.86 (<0.0001), 2
Married/Common Law	35515	56.25%	63.19%	
Widowed/Separated/Divorced Don't Know	7540	14.60%	13.06%	
Region of Birth				
Africa	1354	3.75%	2.20%	129.12 (<0.0001), 5
Asia and Middle East	6538	8.63%	11.86%	
Central America/Caribbean and Bermuda/South America	1840	3.31%	3.22%	
Europe	4597	7.11%	8.20%	
Oceania/Other/Other North America	745	1.28%	1.31%	
Enabling Factors				
Sense of Community Belonging	-	2.39 (1.01)	2.17 (0.882)	-
Access to Employment (Yes)	40606	11.82%	88.18%	83.42 (<0.0001), 2
Access to Regular Source of Care (Yes)	48295	75.59%	86.06%	502.59 (<0.0001), 1
Residency: Canadian Provinces				
Ontario	21908	35.67%	38.85%	194.26 (<0.0001), 5
Atlantic	3954.	5.68%	7.11%	
Quebec	13136	29.06%	22.27%	
Prairies	10211	15.04%	18.32%	
British Columbia	7555	14.14%	13.15%	
Northern Provinces/Territories	174	0.42%	0.29%	
Contact with General Practitioner (Yes)	43466	80.96%	75.73%	88.59 (<0.0001), 2
Contact with Dentist (Yes)	15068	21.35%	27.15%	102.7164 (<0.0001), 2
Contact with Specialist (Yes)	18141	45.31%	30.07%	632.51 <0.0001), 1

Table 5: Characteristics of Sample and Bivariate Association with Unmet Healthcare Needs (Continued)

Variable	N	% Frequency or Mean (SD) with UHN	% Frequency or Mean (SD) without UHN	χ^2 (p-value), df
Barriers to Accessing Care				
Ethnic Background				
Caucasian	43560	75.52%	76.64%	
Black	1434	3.30%	2.41%	
Chinese	2228	3.27%	4.00%	
East Asian	1516	1.23%	2.85%	
Middle Eastern	1101	2.92%	1.80%	206.0017 (<0.0001), 8
South Asian	22979	3.10%	4.16%	
Southeast Asian	543	0.84%	0.97%	
Other/Multiple	1958	4.07%	3.36%	
Not Stated/Don't Know	2300	5.76%	3.81%	
Household Income				
Low Income	3058	9.22%	4.86%	
Lower-Middle Income	8296	17.01%	14.24%	278.64 (<0.0001), 2
Upper-Middle Income	45583	73.77%	80.90%	
Residency: Type				
Urban Population Centre	46385	82.81%	81.29%	9.02 (0.0027), 1
Rural	10552.	17.19%	18.71%	
Supplemental Health Insurance (Yes)	23206	37.6%	41.18%	31.29 (<0.0001), 1
Medical Need				
At least one chronic condition (Yes)	25529	48.47%	43.36%	318.59 (<0.001), 2
Self-Rated Health Status	-	2.83 (1.14)	2.303 (0.97)	-
Self-Rated Stress	-	3.20 (1.10)	2.77 (0.98)	-
Length of Time In Canada				
Less than 5 years	1962	3.38%	3.45%	
5 – 9 years	1976	3.54%	3.46%	33.73 (<0.0001), 4
10 – 14 years	1853	3.19%	3.26%	
15 years or more	8921	13.29%	15.99%	
N	56,937	11.78%	88.22%	23.42, <0.0001, 1

Note: Significant association between values with p-value ≤0.05. Values with degrees of freedom (d.f.) of 1 uses Yates Correction of Continuity(χ^2_{Yates}).

Bivariate associations between UHNs and independent individual factors are presented in Table 4. The purpose of this table is to determine the variables that were significantly associated

with UHN experiences in 2014. The average level of education among those who experienced UHNs in 2014 and those who did not experience UHNs was similar. Those who experienced UHNs in 2014 were less likely to have access to employment, access to regular sources of care, contact with dentists, or have supplemental health insurance. Surprisingly, however, those who did experience UHNs reported better feelings of community connectedness and also used general practitioner services more than those who did not experience UHNs.

As presented in Table 4, a higher percentage of individuals reporting at least one or more chronic conditions also reported having an UHN. Surprisingly, individuals who have UHN experiences report higher self-rated health status than those without UHN. On the other hand, those who reported no UHN also reported higher self-rated stress than those reporting an UHN.

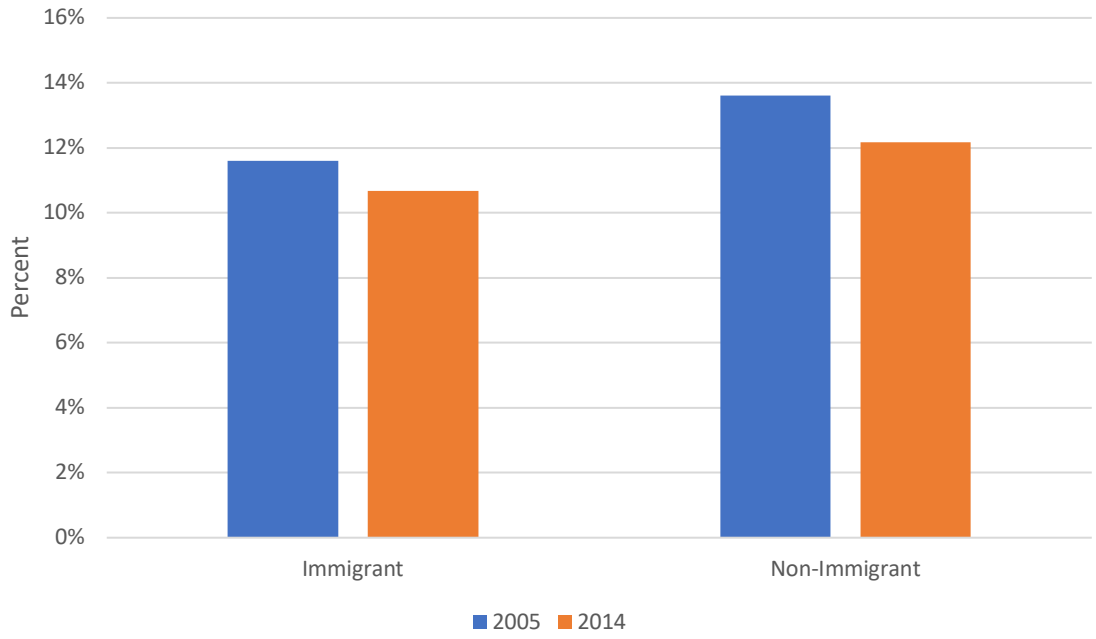
Similar to the results in Table 3, Table 4's results indicate that in Ontario and Quebec the percentage reporting UHN was double that =in British Columbia and the Prairies, and 6 times greater than the UHN experienced by those living in the Atlantic provinces during 2014.

Unmet Healthcare Needs

Among the 56,937 respondents, 50,224 (88.22%) did not experience UHNs in 2014, while 6,173 (11.78%) did experience UHNs. After adjusting for age, gender, and immigrant status, the risk of experiencing UHNs was 11.90% lower for immigrants than for Canadian-born adults (OR=0.881, p=0.0484), as indicated in Model 1—The Baseline Model. After considering the effect of all individual variables and their impact on UHN (Model 6), immigrants' UHNs risk remains 9.50% lower than Canadian-born adults' risk (OR=0.905, p=0.8310). However, immigrant status remained statistically insignificant (p-value>0.05) after adjusting for all individual variables in Model 6.

Overall, more Canadian-born adults (12.17%) experienced UHNs during 2014 than did immigrants (10.67%) (Figure 5). These findings are consistent with those of Wu et al. (2005) and the descriptive statistics published by Statistics Canada (2014), indicating that immigrant status might be a protective factor for experiencing UHNs.

Figure 4: Percent Reporting Having an Unmet Healthcare Need, by Immigrant Status, 2014 Canadian Community Health Survey

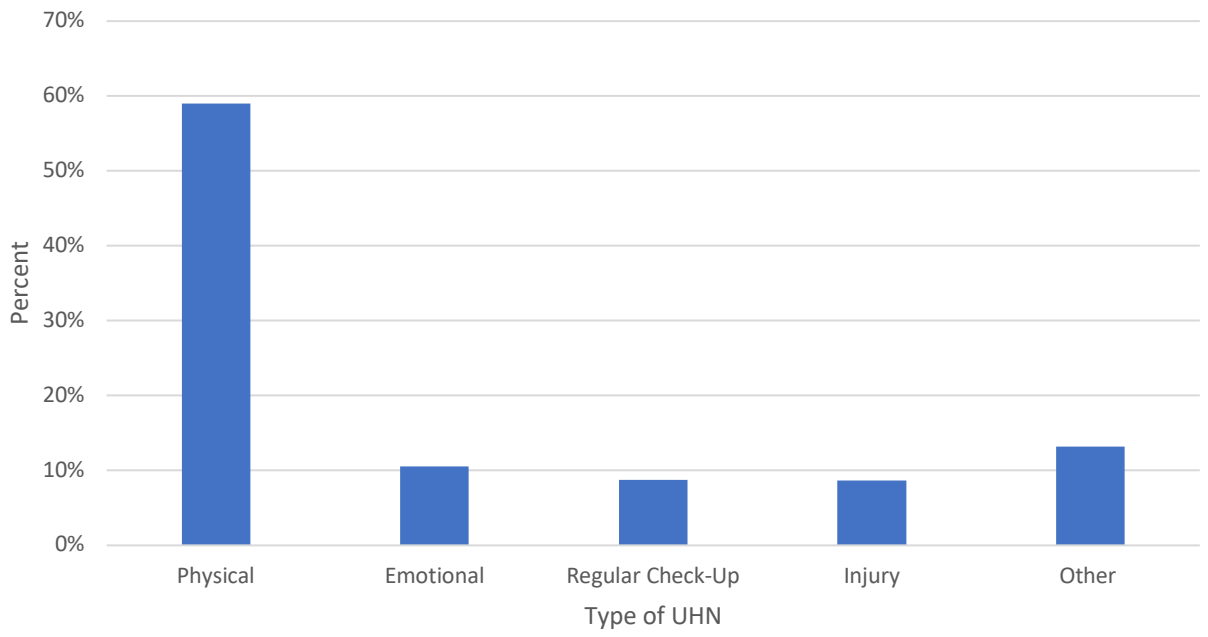


Source: Wu et al. (2005); author's calculation.

Type of Unmet Healthcare Need

The most common types of UHNs experienced by respondents during 2014 was also investigated in this analysis. Types of UHNs were categorized as regular check-up, physical, injury, emotional, and others. Overall, the most common type of UHN experienced by both immigrants and Canadian-born adults were those related to physical healthcare needs (58.95%). This was followed by UHN for other health problems (13.18%) and UHNs for emotional problems (10.52%).

Figure 5: Percent Reporting Having an Unmet Healthcare Need, by Type of Need, 2014 Canadian Community Health Survey



As shown in Figure 6, the unadjusted results show that 10 % of immigrants who reported UHNs indicated that they were related to regular check-ups compared to the 8.34% of Canadian-born adults. However, immigrants were 22.3% less likely to report these types of UHNs than Canadian-born adults, which might contribute to less UHN experiences by immigrants.

Finally, the regression output for the type of UHNs indicates that more Canadian-born adults reported UHNs related to emotional health problems (12.03%) or an injury (9.44%) than did immigrants (5.58% and 5.94%) in 2014. Although fewer immigrants reported UHNs related to an emotional health problem, the probability that immigrants would report UHNs related to emotional problems was 13.5% greater when compared to Canadian-born adults. On the other hand, immigrants were 20% less likely than Canadian-born adults to report UHNs related to an injury.

Figure 6: Percent Reporting Unmet Healthcare Need, By Type of Need and Immigrant Status, 2014 Canadian Community Health Survey

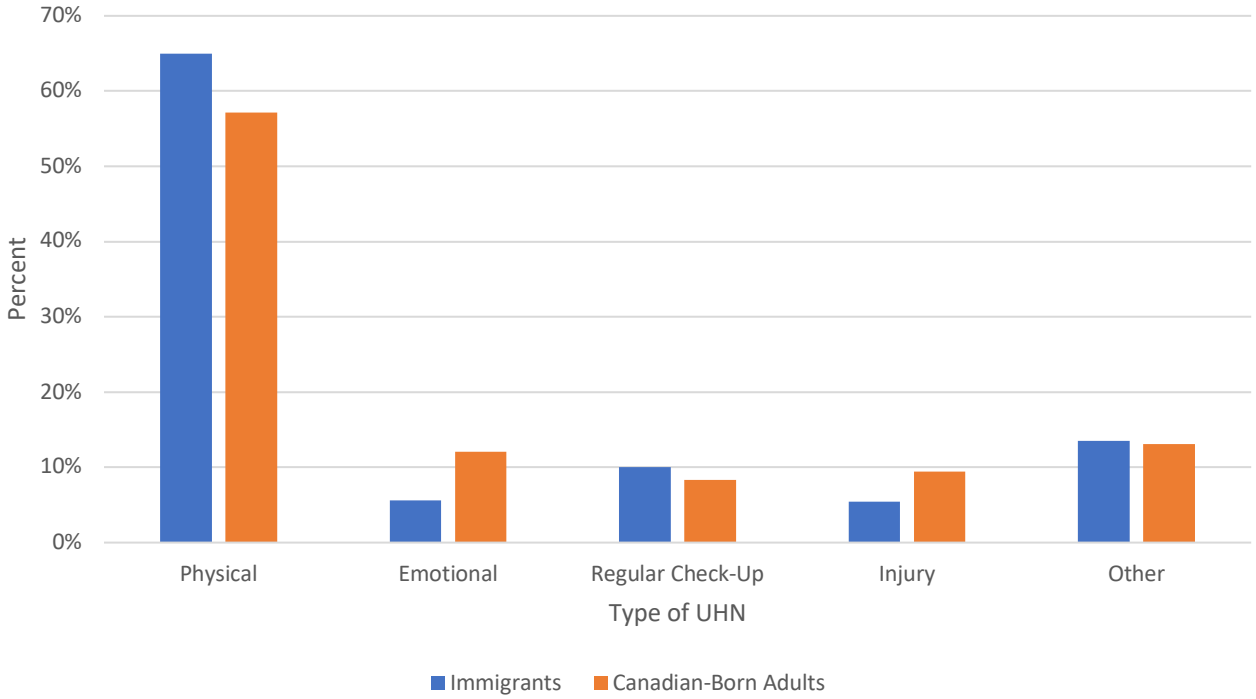
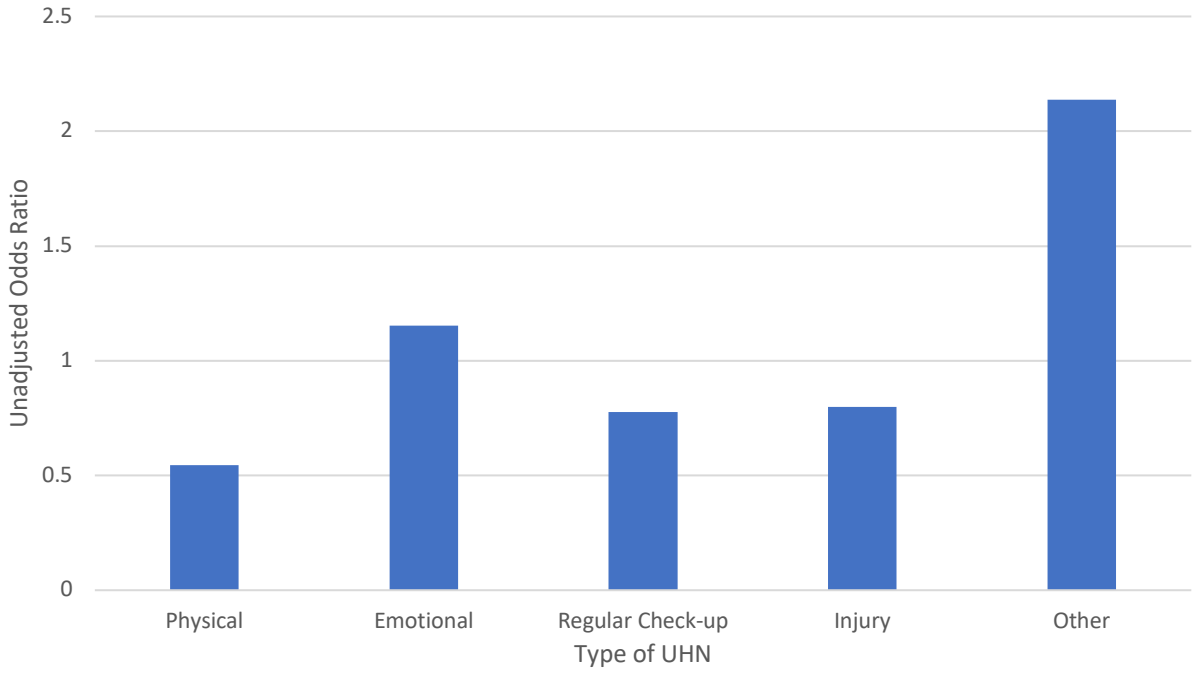


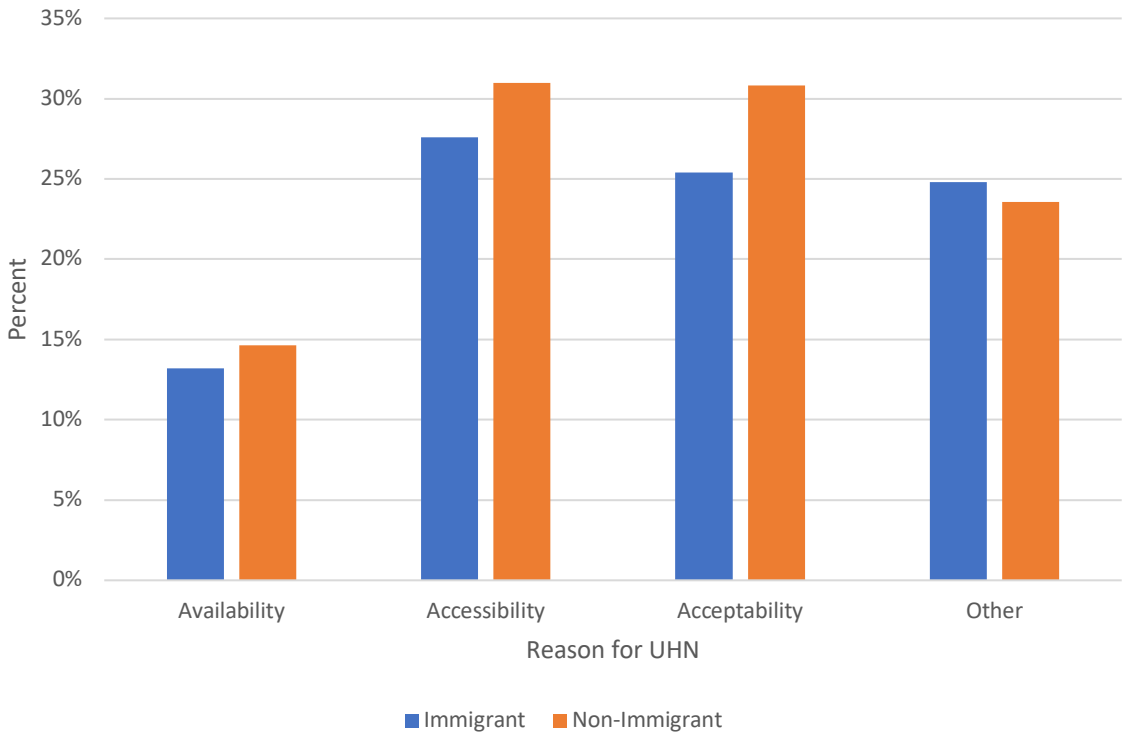
Figure 7: Unadjusted Odds of Reporting Type of Unmet Healthcare Needs, Immigrants, 2014 Canadian Community Health Survey



Reason for Unmet Healthcare Need

The most common reasons associated with experiences of UHNs in 2014 are presented in Table 5. Approximately 31.66% of respondents who experienced UHNs reported these experiences due to the acceptability of healthcare services, while 30.19% reported UHN experiences because of the accessibility of healthcare services. At the same time, 14.30% of respondents who experienced UHNs in 2014 indicated this experience was due to problems related to the availability of healthcare services while 23.85% of respondents indicated "other" problems.

Figure 8: Percent Reporting Reason for Unmet Healthcare Need, by Immigrant Status, 2014 Canadian Community Health Survey



Multivariable Models

Factors Related to UHN Differences

To determine the differences in experiencing an UHN between immigrants and Canadian-born adults, as well as the effect that individual factors have on these differences, a set of binary multivariate logistic regression models were created. Model 1–The Baseline Model, adjusts for immigrant status, age, and gender. Subsequent models (Models 2 – Model 5) introduce individual factors (i.e. predisposing, enabling, and medical needs factors, and barriers to accessing healthcare services). The purpose of this is to look at the effect of these individual factors on UHNs risk. Model 6 controls for all individual factors included in Models 1 – 5.

Model 7 and Model 8 are immigrant specific and examine how immigrants' risk of experiencing UHNs might change as their time in Canada increases. Model 7 adjusts for immigrants' length of time in Canada, age, and sex. Model 8, however, takes into account the effect of all individual factors, sex, age, and immigrants' length of time in Canada.

The factors that were significantly associated with UHN during 2000/01 and their associated odds ratio values are outlined in Table 6. According to the study by Wu et al. (2005), variables that were significantly associated with UHNs risk in 2000/01 include immigrant status, age, gender, highest level of education, social support, community belonging, marital status, low-income, visible minority status, rural residency, the presence of a chronic condition, self-rated health status, and self-rated stress (Wu et al., 2005).

Table 6: Odds Ratios of Unmet Health Need on Immigrant Status and Selected Predictors: Canada, 2001

Independent Variable	Model 6	95% CI	
Immigrant (1= yes)	0.879***	-0.820	0.938
Predisposing Characteristics			
Age	0.984***	0.977	0.990
Age Square	0.990*	0.990	0.990
Female (1 = yes)	1.204***	1.167	1.240
Education	1.065***	1.058	1.073
Enabling Characteristics			
Social Support	0.988***	0.987	0.990
Community belonging	0.952***	0.938	0.965
Marital Status			
Separated/divorced	1.118***	1.062	1.175
Widowed	1.015	0.934	1.096
Never married/single	0.967	0.917	1.017
Married/cohabiting (reference)			
Barriers to Health Care			
Low income (1 = yes)	1.146***	1.095	1.197
Visible minority (1 = yes)	0.905**	0.864	0.946
Rural residence (1 = yes)	0.975	0.906	1.044
Medical Need			
Chronic condition (1 = yes)	1.919***	1.874	1.964
Health	0.660	0.642	0.678
Stress	1.348	1.330	1.366
-LogL		42686	
d.f.		12	

*p<0.05 **p<0.01 ***p<0.001 (two-tailed test).

Source: Wu et al. (2005)

Table 7: Logistic Regression Model Predicting UHN –Baseline Model (Model 1).

	Model 1				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Immigrant Status (Ref=No)	0.881	0.777	0.999	-0.1265	0.0484
Age	0.990	0.987	0.992	-0.0105	<.0001
Sex (Ref=Male)	1.268	1.137	1.414	0.2376	<.0001
Concordance Statistic	0.578				
AIC	40998.190				
N	56,937				

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

Model 1–The Baseline Model (Table 7), focuses on the differences in experiencing UHNs after adjusting for only immigrant status, age, and sex. The adjusted logistic regression models indicate that in 2014, immigrants were less likely than Canadian-born adults to experience an UHN (OR=0.881) with a 11.90% lower risk.

The variables included in Model 1 are significantly associated (p-value<0.05) with UHNs in 2014, suggesting Model 1 can be used to explain differences in UHN experiences between immigrants and Canadian-born adults when only considering age and sex. For every one-year increase in age, the risk of experiencing UHNs decreased by a factor of approximately -0.13 (OR=0.990, p-value=0.0484). Model 1 also suggests that females were 26.8% more likely than males to experience UHNs in 2014 (OR=1.268, p-value<0.0001).

Table 8: Logistic Regression Model Predicting UHN–Predisposing Factors Model (Model 2).

	Model 2				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Controlled					
Immigrant Status (Ref=No)	0.899	0.390	2.075	-0.1064	0.8028
Age	0.989	0.986	0.992	-0.0107	<.0001
Sex (Ref=Male)	1.244	1.115	1.389	0.2187	0.0001
Predisposing Factors					
Highest Level of Education (Ref=Post-Secondary Graduation)					
Some Post-Secondary	1.337	1.044	1.711	0.2902	0.0213
Secondary School Graduate	0.939	0.798	1.106	-0.0627	0.4501
Less Than Secondary School Graduation	0.979	0.809	1.184	-0.0214	0.8247
Not Stated	0.810	0.612	1.071	-0.2112	0.1383
Language Spoken at Home (Ref=At Least 1 Official Language)	1.036	0.863	1.244	0.0355	0.7023
Marital Status (Ref=Single/Never Married/Don't Know)					
Married/Common Law	0.886	0.777	1.011	-0.1210	0.0713
Widowed/Separated/Divorced	1.187	0.986	1.430	0.1718	0.0700
Region of Birth (Ref=Canada)					
Africa	1.739	0.717	4.219	0.5533	0.2206
Asia	0.755	0.308	1.847	-0.2816	0.5368
Central America/Caribbean and Bermuda/South America	1.074	0.443	2.608	0.0717	0.8738
Europe	1.035	0.441	2.427	0.0340	0.9375
Oceania/Other/Other North America	1.056	0.452	2.466	0.0544	0.8998
Concordance Statistic	0.584				
AIC	40822.969				
N	56,937				

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

The Predisposing Factors Model (Model 2) adjusts for individual predisposing factors such as highest level of education, language spoken at home, marital status, and region of birth, as well as immigrant status, age, and sex. The adjusted odds ratios from Model 2 suggests that age and sex are significantly associated (p-value<0.05) with UHN experiences; each yearly increase in age is associated with a 1.10% lower risk of experiencing UHNs (OR=0.989, p-value<0.0001). Females'

risk for experiencing an UHN was higher than males' risk (OR=1.224, p-value=0.0001). In Model 2 immigrant status was not significantly associated (p-value>0.05) with UHN after adjusting for individual predisposing factors.

Aside from age and sex, predisposing factors that were significantly associated with UHN risk in 2014 was respondents' highest level of educational attainment. When compared to those who "completed post-secondary education", respondents who indicated "at least some post-secondary" education were 33.7% more likely to experience UHNs (OR=1.337, p-value=0.0213), suggesting that completing higher education might reduce UHNs risk.

Since a majority of the individual predisposing factors included in Model 2 are not significantly associated with UHN (p>0.05), they cannot be used to explain the differences in UHN experiences between immigrants and Canadian-born adults.

Table 9: Logistic Regression Model Predicting UHN–Enabling Factors Model (Model 3).

	Model 3				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Controlled					
Immigrant Status (Ref=No)	0.876	0.747	1.028	-0.1320	0.1053
Age	0.990	0.987	0.993	-0.0100	<.0001
Sex (Ref=Male)	1.206	1.077	1.350	-0.1320	0.0012
Enabling Factors					
Community Belonging (Ref=Very Strong)					
Somewhat Strong	0.843	0.721	0.987	-0.1702	0.0341
Somewhat Weak	1.270	1.074	1.501	0.2389	0.052
Very Weak	1.806	1.468	2.221	0.5909	<.0001
Don't Know/Refusal/Not Stated	1.097	0.844	1.427	0.0929	0.4871
Access to Employment (Ref=Yes)	1.143	1.010	1.293	0.1334	0.0348
Access to Regular Source of Care (Ref=Yes)	1.870	1.224	2.858	0.6260	0.0039
Language Spoken to Doctor (Ref=English or French)	1.226	0.828	1.814	0.2036	0.3078
Language Spoken at Home (Ref=At Least 1 Official Language)	0.957	0.797	1.150	-0.0437	0.6398
Canadian Region (Ref=Ontario)					
Atlantic	0.681	0.557	0.834	-0.3836	0.0002
Quebec	0.887	0.725	1.087	-0.194	0.2474
Prairies	0.626	0.512	0.765	-0.4685	<.0001
British Columbia	0.847	0.683	1.051	-0.1658	0.1315
Northern Provinces/Territories	1.043	0.798	1.364	0.049	0.7589
Contact General Practitioner (Ref=No)	1.686	1.455	1.954	0.5225	<.0001
Contact Dentist (Ref=No)	0.762	0.265	2.192	-0.2718	0.6136
Contact Specialist (Ref=Yes)	0.520	0.467	0.578	-0.6543	<.0001
Concordance Statistic	0.671				
AIC	39103.390				
N	56,937				
Model Intercept	-1.7693				

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

Model 3–The Enabling Factors Model (Table 9) includes individual enabling factors such as community belonging, access to employment, access to regular sources of care, language

spoken to doctor, language spoken at home, Canadian region of residence, contact with general practitioners, contact with dentists, and contact with specialists.

After adjusting for individual enabling factors, Model 3 finds that age and sex are both significantly associated (p-value<0.05) with experiences of UHNs in 2014. For every year increase in age, the probability that immigrants will experience UHNs decreases by a factor of 0.13 when compared to Canadian-born adults (OR=0.990, p-value<0.0001). Similar to prior models, females' risk of experiencing UHNs was higher than males' risk (OR=1.206, p-value=0.0012).

Of the individual enabling variables included in Model 3, those that were significantly associated with UHNs in 2014 included respondents' sense of community belonging, access to regular sources of care, contact with a general practitioner, contact with specialist services, and Canadian region of residence. Respondents who indicated "somewhat strong" feelings of community belonging had a 16% lower risk of experiencing an UHN than those who reported "very strong" feelings of community connectedness (OR=0.843, p-value=0.0341). Those who reported a "very weak" sense of community belonging, on the other hand, were 8.06% more likely to experience an UHN than someone who had reported "very strong" feelings of community connectedness (OR=1.806, p-value=0.0348). Access to a regular source of care increased respondents' probability of experiencing UHNs by 8.70% (OR=1.807, p-value=0.0039). Increased UHN experiences were also true for those who had access to a general practitioner (OR=1.686, p-value<0.0001) while access to specialist services a lower risk of experiencing UHNs (OR=0.520, p-value<0.0001).

In terms of respondents' geographic residence, those who indicated living in an Atlantic region during 2014 had lower odds (OR=0.681, p-value=0.0002) of reporting UHNs than those

who reported living in Ontario. This finding is the same for those who lived in the Prairies (i.e. Saskatchewan and Manitoba) and Alberta (OR=0.626, p-value<0.0001).

Table 10: Logistic Regression Model Predicting UHN–Barriers to Accessing Care Model (Model 4).

	Model 4				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Controlled					
Immigrant Status (Ref=No)	0.942	0.792	1.078	-0.0787	<.0001
Age	0.989	0.987	0.992	-0.0108	<.0001
Gender (Ref=Male)	1.253	1.121	1.399	0.2252	0.3158
Barriers to Accessing Care					
Racial Background (Ref=Caucasian)					
Black	1.261	0.842	1.887	0.2316	0.2600
Chinese	0.768	0.504	1.170	-0.2641	0.2184
East Asian	0.413	0.253	0.673	-0.8853	0.0004
Middle Eastern	1.407	0.938	2.112	0.3415	0.0990
South Asian	0.694	0.488	0.987	-0.3652	0.0420
Southeast Asian	0.828	0.419	1.638	-0.1886	0.5873
Other/Multiple	1.109	0.818	1.503	0.1036	0.5034
Not Stated/Don't Know	1.308	1.090	1l569	0.2685	0.0039
Household Income (Ref=Lower-Middle Income)					
Low Income	1.419	1.125	1.790	0.3498	0.0032
Upper-Middle Income	0.737	0.635	0.855	-0.3052	<.0001
Knowledge of an Official Language (Ref=At least 1 Official Language)	1.130	0.615	2.074	0.1221	0.6933
Residence Type (Ref=Urban Population Centre)	0.910	0.805	1.030	-0.0939	0.1362
Access to Supplemental Health Insurance (Ref=Yes)	1.146	1.024	1.281	0.1360	0.0172
Concordance Statistic	0.597				
AIC	40568.794				
N	56,937				

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

Model 4–Barriers to Accessing Care (Table 10) adjusts for age, sex, and individual barriers to accessing care. These barriers include the respondents' racial background, household income, knowledge of an official language, residence type (e.g. urban or rural city centre), and if they have access to supplemental health insurance.

The adjusted model indicates that immigrant status and age are both significantly associated (p-value<0.05) with experiencing UHNs in 2014. After holding all other variables constant, immigrants were 6.8% more likely than Canadian-born adults to experience UHNs in 2014 (OR=0.942, p-value<0.0001). For every one-year increase in age, however, immigrants' risk of experiencing UHNs decreased by 1.1%, when compared to Canadian-born adults (OR=0.989, p-value<0.0001).

After adjusting for barriers to accessing healthcare services, being a part of some racial groups (East Asians or South Asians) was significantly associated with lower UHN experiences when compared to those who identified as Caucasian (OR=0.413, p-value=0.0004 and OR=0.694, p-value=0.0420, respectively). Similarly, being a part of a low or upper-middle income household had a significant association with UHN experiences in 2014. Those a part of low-income households had a 42% increased risk (OR=1.419, p-value=0.0032) of experiencing an UHNs, while those a part of upper-middle income households had a 26.3% decreased risk (OR=0.737, p-value=0.0039) for experiencing UHNs in 2014 when compared to those in middle-income households. Individuals who had access to supplemental health insurance had a 14.6% increased risk of experiencing UHNs than those who did not have access to supplemental health insurance (OR=1.146, p-value=0.0172).

Table 11: Logistic Regression Model Predicting UHN–Medical Need Model (Model 5).

	Model 5				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Controlled					
Immigrant Status (Ref=No)	0.888	0.783	1.006	-0.1191	0.0618
Age	0.981	0.977	0.985	-0.0189	<.0001
Sex (Ref=Male)	1.269	1.136	1.417	0.2383	<.0001
Medical Need					
Presence of At Least One Chronic Condition (Ref=Yes)	0.783	0.667	0.919	-0.2446	0.0029
Self-Rated Health Status (Ref=Fair)					
Excellent	0.223	0.181	0.276	-1.4984	<.0001
Very Good	0.337	0.286	0.397	-.0884	<.0001
Good	0.527	0.448	0.620	-0.6404	<.0001
Poor/Don't Know/Refusal	1.376	1.083	1.748	0.3192	0.0090
Self-Rated Stress (Ref=A Bit Stressed)					
Extremely Stressful	3.143	2.527	3.909	1.1452	<.0001
Quite a bit Stressful	0.663	1.470	1.880	0.5083	<.0001
Not Very Stressful	0.896	0.780	1.030	-0.1097	0.1218
Not at all Stressful	0.807	0.652	1.000	-0.2139	0.0505
Not Stated/Don't Know	1.917	0.380	9.672	0.6505	0.4302
Concordance Statistic	0.693				
AIC	38338.202				
N	56,937				

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

Model 5–Medical Needs (Table 11) adjusts for individual variables related to respondents' medical needs such as the presence of at least one or more chronic conditions, self-rated health status, and self-rated stress levels. The adjusted models indicate that all variables included in Model 5 were significantly associated (p-value<0.05) with UHN experiences in 2014, except immigrant status (p-value>0.05).

Furthermore, the adjusted odds ratios from Model 5 suggest that after holding other variables constant, a one-year increase in age was associated with a 1.9% decrease in UHNs risk (OR=0,981, p-value<0.0001). The probability of reporting an UHN experience is increased by

26.9% when considering the effect that sex has on UHN experiences and females were more likely than males to report UHN during 2014 (OR=1.269, p-value<0.0001).

The probability of experiencing an UHN by those with one or more chronic conditions was decreased by 21.7% (OR=0.783, p-value=0.0029) when compared to those without a chronic condition. Similarly, those who reported either “excellent”, “very good”, or “good” health status were expected to experience fewer UHNs experiences (OR=0.223, OR=0337, and OR=0,5270, p-value<0.0001). When looking at self-rated stress, on the other hand, those who reported “quite a bit of stress” compared to those who were “a bit stressed” were on average 33.7% less likely to report UHN experiences (OR=0.663, p-value<0.0001). Those who reported self-rated stress levels as “extremely stressful”, however, were three times more likely to experience UHNs than those who were “a bit stressed” (OR=3.143, p-value<0.0001).

Model 5 (Table 11) makes clear that although immigrants reported less experiences of UHN, the relationship between immigrant status and UHNs is not significantly associated after adjusting for individual medical needs variables.

Table 12: Logistic Regression Model Predicting UHN–Combined Model (Model 6).

	Model 6				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Controlled					
Immigrant Status (Ref=No)	0.905	0.360	2.273	-0.1001	0.8310
Age	0.987	0.981	0.992	-0.0136	<.0001
Sex (Ref=Male)	1.239	1.101	1.394	0.2139	0.0004
Predisposing Factors					
Highest Level of Education (Ref=Post-Secondary Graduation)					
Some Post-Secondary	1.192	0.926	1.533	0.1753	0.1724
Secondary School Graduate	0.807	0.685	0.950	-0.2147	0.0101
Less Than Secondary School Graduation	0.705	0.578	0.860	-0.3492	0.0006
Not Stated	0.633	0.484	0.828	-0.4575	0.0009
Language Spoken at Home (Ref=At Least 1 Official Language)	0.987	0.808	1.206	-0.0127	0.9009
Marital Status (Ref=Single/Never Married/Don't Know)					
Married/Common Law	0.958	0.831	1.103	-0.0433	0.5474
Widowed/Separated/Divorced/	1.119	0.930	1.347	0.1125	0.2341
Region of Birth (Ref=Canada)					
Africa	1.413	0.531	3.763	0.3459	0.4881
Asia	0.765	0.288	2.031	-0.2674	0.5606
Central America/Caribbean and Bermuda/South America	0.905	0.337	2.431	-0.0993	0.8434
Europe	0.963	0.379	2.446	-0.0380	0.9363
Oceania/Other/Other North America	1.142	0.463	2.817	0.1324	0.7736
Enabling Factors					
Community Belonging (Ref=Very Strong)					
Somewhat Strong	0.815	0.696	0.955	-0.2044	0.0115
Somewhat Weak	1.098	0.926	1.302	0.0932	0.2828
Very Weak	1.280	1.032	1.587	0.2465	0.0250
Don't Know/Refusal/Not Stated	0.790	0.586	1.063	-0.2362	0.1195
Access to Employment (Ref=Yes)	0.931	0.817	1.061	-0.0718	0.2808
Access to Regular Source of Care (Ref=Yes)	1.634	1.026	2.605	0.4913	0.0388
Language Spoken to Doctor (Ref=English or French)	1.389	0.901	2.143	0.3287	0.1368
Language Spoken at Home (Ref=At Least 1 Official Language)	0.987	0.080	1.206	-0.0127	0.9009

Table 12: Logistic Regression Model Predicting UHN–Combined Model (Model 6) (Continued).

	Model 6				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Canadian Region (Ref=Ontario)					
Atlantic	0.688	0.532	0.889	-0.3744	0.0043
Quebec	0.925	0.689	1.241	-0.0784	0.6008
Prairies	0.657	0.485	0.890	-0.4202	0.0068
British Columbia	0.904	0.656	1.244	-0.1014	0.5339
Northern Provinces/Territories	0.857	0.621	1.184	-0.1538	0.3501
Contact General Practitioner (Ref=No)	1.485	1.271	1.735	0.3955	<.0001
Contact Dentist (Ref=No)	0.740	0.267	2.049	-0.3014	0.5613
Contact Specialist (Ref=Yes)	0.638	0.570	0.715	-0.4488	<.0001
Barriers to Accessing Care					
Cultural and Racial Background (Ref=Caucasian)					
Black	1.202	0.781	1.850	0.1840	0.4022
Chinese	0.877	0.561	1.369	-0.1317	0.5620
East Asian	0.637	0.346	1.175	-0.4503	0.1489
Middle Eastern	1.389	0.862	2.238	0.3283	0.1772
South Asian	0.827	0.531	1.287	-0.1904	0.3983
Southeast Asian	1.108	0.508	2.417	0.1029	0.7954
Other/Multiple	1.241	0.901	1.709	0.2157	0.1864
Not Stated/Don't Know	1.262	1.016	1.567	0.2326	0.0351
Household Income (Ref=Lower-Middle Income)					
Low Income	1.289	1.005	1.653	0.2535	0.0459
Upper-Middle Income	0.951	0.818	1.105	-0.0506	0.5080
Knowledge of an Official Language (Ref=At least 1 Official Language)	1.115	0.593	2.096	0.1091	0.7342
Residence Type (Ref=Urban Population Centre)	0.995	0.877	1.130	-0.00457	0.9436
Access to Supplemental Health Insurance (Ref=Yes)	1.069	0.854	1.339	0.0670	0.5590
Medical Need					
Presence of At Least One Chronic Condition (Ref=Yes)	0.787	0.665	0.931	-0.2394	0.053
Self-Rated Health Status (Ref=Fair)					
Excellent	0.263	0.212	0.327	-.3341	<.0001
Very Good	0.383	0.323	0.455	-0.9597	<.0001
Good	0.567	0.478	0.672	-0.5680	<.0001
Poor/Don't Know/Refusal	1.304	1.020	1.667	0.2655	0.0341

Table 12: Logistic Regression Model Predicting UHN–Combined Model (Model 6) (Continued).

	Model 6				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Self-Rated Stress (Ref=A Bit Stressed)					
Extremely Stressful	2.980	2.372	3.745	.0920	<.0001
Quite a bit Stressful	1.564	1.376	1.778	0.4473	<.0001
Not Very Stressful	0.909	0.790	1.046	-0.0958	0.1806
Not at all Stressful	0.811	0.653	1.007	-0.2097	0.0582
Not Stated/Don't Know	2.147	0.421	10.939	0.7640	0.3571
Concordance Statistic	0.728				
AIC	36948.405				
N	56,937				

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

Model 6–The Combined Model (Table 12) adjusts for immigrant status, age, sex, and all individual factors (e.g. predisposing, enabling, barriers to accessing care, and medical need). The purpose of this model was to determine the effect of these factors on UHN experiences. The adjusted results from Model 6 suggests that after combining all individual factors in one model, those that were significantly associated (p-value<0.05) with UHNs in 2014 are age, sex, highest level of education, community belonging, access to regular sources of care, Canadian region of residence, household income, self-rated health status, and self-rated stress levels.

After keeping all other variables constant, a one-year increase in age was associated with lower UHNs experiences (OR=0.987, p-value<0.0001). Similar to other models, after looking at the effect of sex and UHN experiences, females' risk remained higher than males' risk for experiencing UHNs (OR=1.239, p-value=0.0004).

In Model 6, an individual predisposing factor that was significantly associated with UHN experiences (p-value≤0.05) was the highest level of education. Compared to those who completed post-secondary graduation, those who completed secondary school or less had a lower probability of experiencing UHNs (OR=0.807, p-value=0.0101; OR=0.705, p-value=0.0006). On the other

hand, those who reported some post-secondary education had a 19.20% higher risk of experiencing UHNs in 2014, although this category was not statistically significant.

The enabling factors included in Model 6 that were significantly associated (p-value ≤0.05) with UHNs experiences during 2014 included community belonging, access to regular sources of care, Canadian region of residence, contact with a general practitioner, and use of specialist services. Compared with those who reported a "very good" sense of community belonging, those who had a "somewhat strong" sense of community belonging had a lower odds of reporting UHNs (OR=0.815, p-value=0.0115), while those who reported "very weak" feelings of community belonging had higher odds of experiencing UHNs (OR=1.280, p-value=0.0250).

An association between residency in some Canadian regions and UHN experience was also seen in Model 6. When compared to those living in Ontario, those who lived in Atlantic regions or the Prairies and Alberta were less likely to report UHN experiences (OR=0.688, p-value=0.0043; OR=0657, p-value=0.0068) and the association between Canadian region of residence and UHN experiences was significant (P-value≤0.05). Although the adjusted results indicated that residency in Québec, British Columbia, and Northern Provinces and Territories are associated with fewer UHN experiences, residency in these regions was not significantly associated with UHNs experiences (p-value>005). Other enabling factors significantly associated with experiencing UHNs included access to regular sources of care (OR=1.634, p-value=0.0388) and access to a general practitioner (OR=1.485, p-value<0.0001). No contact with a specialist was associated with a 36.2% decreased risk of experiencing an UHN (OR=0.638, p-value<0.0001).

Of the barriers to accessing healthcare services that were associated with UHN experiences, household income was the only significant barrier that could help explain UHN experiences in

2014. After holding other variables constant, those in low-income households had a 28.9% increased risk of experiencing UHNs (OR=1.289, p-value=0.0459).

The only medical-related factors associated with UHN experiences in Model 6 were self-rated health status and self-rated stress levels. When compared to individuals who rated their health status as "fair", those who reported either "excellent", "very good", or "good" self-rated health had a lower risk of experiencing UHNs. At the same time, respondents who suggested a "poor" self-rated health status or indicated "don't know" or refused to answer, had a 3.04% increased risk of experiencing an UHN during 2014 (OR=1.304, p-value=0.0341). Other measures of self-rated health status were not significantly associated with UHN experiences during 2014.

According to the results from Models 1 – 6, the best model to be used for predicting UHN experiences during 2014 is Model 6—The Combined Model. The C-Statistic for this model was the highest of all models and the AIC statistic was the lowest (C-Statistic=0.728, AIC=36948.405). Variables in Model 6 that were significantly associated with UHN during 2014 were similar to those that were significantly associated with UHN in 2000/01 as indicated by the Wu et al. (2005) study (Table 13). Although similar, the effect of these factors on UHN experiences was slightly different from the effect they had on UHNs experiences in 2000/01 (Wu et al. 2005).

Table 13: Statistically Significant Variables Associated with Unmet Healthcare Needs: 2000/01

Independent Variable	Odds Ratio	95% Confidence Interval
Immigrant (1=Yes)	0.879***	(0.820,0.938)
Predisposing Factors		
Age	0.984***	(0.977,0.990)
Female	1.204***	(1.167,1.240)
Education	1.065***	(1.058,1.073)
Enabling Resources		
Social Support	0.988***	(0.987,0.990)
Community Belonging	0.952***	(0.938,0.965)
Marital Status (Ref=Married)		
Separated/Divorced	1.118***	(1.062,1.175)
Widowed	1.015	(0.934,1.096)
Never Married/Single	0.967	(0.917,1.017)
Barrier to Health Care		
Low income (1=yes)	1.146***	(1.095,1.197)
Visible minority (1=yes)	0.905**	(0.864,0.946)
Rural residence (1=yes)	0.975	(0.906,1.044)
Medical Need		
Chronic condition (1=yes)	1.919***	(1.874,1.964)
Health	0.660***	(0.642,0.678)
Stress	1.348***	(1.330,1.366)

*p<0.05 **p<0.01 ***p<0.001 (two-tailed test)

Source: Wu et al. (2005)

Immigrant's Length of Residency in Canada

Table 14: Logistic Regression Model Predicting UHN, Immigrants–Immigrant Length of Time in Canada (Model 7).

	Model 7			
	Odds Ratio	95% Confidence Limit	Estimate	Pr > |t|
Controlled				
Age	0.981	0.960 1.002	-0.0195	0.0748
Sex (Ref=Male)	1.633	0.950 2.809	0.4907	0.0760
Length of Residence in Canada				
Years in Canada (Ref=Less than 5 Years)				
5 – 9 Years	1.214	0.080 18.385	0.1943	0.8883
10 – 14 Years	2.045	0.128 32.647	0.7153	0.6122
15 Years or More	1.839	0.130 26.016	0.6039	0.6516
Concordance Statistic	0.590			
AIC	1320.599			
N	2,275			

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

Model 7—Immigrant Length of Time in Canada (Table 14) was used to examine the differences in UHN experiences of immigrants after adjusting for age, sex, and their length of residency in Canada. The adjusted odds ratios results from Table 14 indicate no significant association between length of residence in Canada and UHN experiences in 2014 (p-value>0.05). However, the odds ratios show a pattern that was expected, given the previous literature. Compared to recent immigrants (e.g. those living in Canada for 5 years or less), all other immigrants had a higher risk of experiencing UHNs in 2014. For example, immigrants living in Canada between 5 – 9 years had a 21.4% higher risk of experiencing UHNs, while immigrants living in Canada for 15 years or more had 83.9% increased risk of reporting UHNs after adjusting for age, sex, and length of residency. Immigrants living in Canada between 10 – 14 years, however, had 2 times higher risk of experiencing UHNs compared to recent immigrants. Although not

significant, these results suggest that as immigrants' length of residency in Canada increases, the protective factors that might have initially contributed to their lower risk of unmet needs might begin to disappear.

Table 15: Logistic Regression Model Predicting UHN, Immigrants– Immigrant Length of Time in Canada and Population-Based Factors (Model 8).

	Model 8				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Controlled					
Age	0.976	0.941	1.013	0.2106	0.1992
Sex (Ref=Male)	1.524	0.801	2.900	-0.0238	0.2007
Predisposing Factors					
Highest Level of Education (Ref=Post-Secondary Graduation)					
Some Post-Secondary	1.006	0.066	15.373	0.4730	0.7144
Secondary School Graduate	0.888	0.128	6.150	0.3486	0.7115
Less Than Secondary School Graduation	X0.483	0.092	2.534	-0.2603	0.7547
Not Stated	0.224	0.003	18.000	-1.0288	0.5721
Language Spoken at Home (Ref=At Least 1 Official Language)	0.813	0.415	1.591	-0.1036	0.5447
Marital Status (Ref=Single/Never Married/Don't Know)					
Married/Common Law	1.003	0.333	3.021	-0.1806	0.5032
Widowed/Separated/Divorced/	1.730	0.447	6.703	0.3644	0.3054
Region of Birth (Ref=Europe)					
Africa	0.876	0.113	6.774	0.1171	0.8693
Asia	0.399	0.112	1.425	-0.6698	0.1359
Central America/Caribbean and Bermuda/South America	0.399	0.087	1.830	-0.6703	0.2234
Oceania/Other/Other North America	2.063	0.464	9.169	0.9736	0.1745
Enabling Factors					
Community Belonging (Ref=Very Strong)					
Somewhat Strong	0.844	0.281	2.531	-0.4459	0.1215
Somewhat Weak	2.270	0.793	6.498	0.5436	0.0407
Very Weak	1.576	0.360	6.902	0.1787	0.7024
Access to Employment (Ref=Yes)	0.629	0.296	1.333	-0.2321	0.2257
Language Spoken to Doctor (Ref=English or French)	1.446	0.414	5.046	0.1844	0.5624
Language Spoken at Home (Ref=At Least 1 Official Language)	0.813	0.415	1.591	0.1036	0.5447
Contact General Practitioner (Ref=No)	0.888	0.270	2.924	-0.0595	0.8447
Contact Specialist (Ref=Yes)	0.293	0.150	0.571	-0.6142	0.0003

Table 15: Logistic Regression Model Predicting UHN, Immigrants– Immigrant Length of Time in Canada, Population-Based Factors (Model 8) (Continued).

	Model 8				
	Odds Ratio	95% Confidence Limit		Estimate	Pr > |t|
Barriers to Accessing Care					
Cultural and Racial Background (Ref=Caucasian)					
Black	2.358	0.425	13.073	-0.1449	0.8409
Chinese	3.639	0.695	19.056	0.2892	0.6636
East Asian	1.225	0.005	298.515	-0.7994	0.7384
Middle Eastern	3.060	0.428	21.895	0.1158	0.8821
South Asian	1.563	0.363	6.729	-0.5557	0.3242
Southeast Asian	10.143	1.764	58.318	1.3142	0.0569
Other/Multiple	5.965	1.435	24.797	0.7834	0.2117
Household Income (Ref=Low-Middle Income)					
Low Income	0.077	0.010	0.572	-1.5466	0.177
Upper-Middle Income	0.620	0.251	1.534	0.1844	0.5624
Knowledge of an Official Language (Ref=Yes)	2.730	0.079	93.993	0.5021	0.5774
Residence Type (Ref=Urban Population Centre)	2.079	0.785	5.504	0.3659	0.1404
Medical Need					
Presence of At Least One Chronic Condition (Ref=Yes)					
No	0.553	0.230	1.329	-0.4753	0.1221
Not Stated	1.271	0.330	4.902	0.3576	0.4062
Self-Rated Health Status (Ref=Fair)					
Excellent	0.036	0.010	0.129	-1.8253	<0.0001
Very Good	0.190	0.078	0.462	-0.1713	0.5590
Good	0.237	0.099	0.567	0.0472	0.8521
Poor/Don't Know/Refusal	0.358	0.056	2.304	0.4312	0.5162
Self-Rated Stress (Ref=A Bit Stressed)					
Extremely Stressful	2.769	0.869	8.823	0.6773	0.1465
Quite a bit Stressful	1.260	0.586	2.710	-0.1097	0.7258
Not Very Stressful	1.299	0.571	2.955	-0.0792	0.8084
Not at all Stressful	1.214	0.226	6.521	-0.1474	0.8253
Length of Residence in Canada					
Years in Canada (Ref=Less than 5 Years)					
5 – 9 Years	0.864	0.040	18.860	-0.1412	0.7928
10 – 14 Years	1.089	0.046	25.958	0.0900	0.8749
15 Years or More	1.042	0.051	21.465	0.0462	0.9225
Concordance Statistic	0.744				
AIC	1088.727				
N	2,275				

Notes: bolded values are statistically significant at p≤0.05. Bootstrapped estimates are shown.

Model 8—Immigrant Length of Time in Canada and Population-Based Factors (Table 15), adjusts for immigrants' length of residence in Canada and all individual population-based factors.

The adjusted logistic regression results suggest that reporting "somewhat weak" feelings of community belonging (OR=2.270, p-value=0.0407), "no contact" with a specialist (OR=0.293, p-value=0.0003), and "excellent" self-rated health status (OR=0.036, p-value<0.0001) were significantly associated with UHN in 2014. Remaining variables in the model were not significantly associated with UHN experiences in 2014 for immigrants (p-value>0.05).

After controlling for individual factors, patterns of UHN experiences in Model 8 are different from those in Model 7, after including immigrants' length of residence in Canada, where the inclusion of immigrants' length of time in Canada has some effect on their UHN experiences. Although length of residence in Canada and UHN remained unassociated (p-value>0.05) in Model 8, immigrants who lived in Canada between 5 – 9 years had a 13.9% lower risk of experiencing UHN (OR=0.864) than recent immigrants. Immigrants who lived in Canada between 10 – 14 years had a 8.40% increased risk of experiencing UHNs (OR=1.084) than recent immigrants in 2014 while immigrants living in Canada for 15 years or more had a 4.20% increased risk of experiencing UHNs than recent immigrants in 2014 (OR=1.042).

Best Model of UHN

The odds ratios of variables that were significantly associated with UHNs experiences in 2014 from Models 1 – 8 are presented in Table 16. Also included in are the C-statistic and the AIC for each model.

To determine the differences in experiencing UHNs in 2014 between immigrants and Canadian-born adults, several multivariate binary logistic regression models were created that included immigrant status, age, sex, and various individual population-based factors. Results from these adjusted models indicated that of the models, Model 6 is the best model to be used for making predictions on UHN experiences in 2014 due to the high C-Statistic value and low AIC.

To explain how immigrants' length of residence might affect their UHN experiences, models 7 and 8 were created, which adjusts for immigrants' length of residence, age, sex, and individual population-based factors. Results from these models indicate that Model 8 is the best model that can be used to explain differences in UHN experiences when considering immigrants' length of residence in Canada (C-Statistic=1088.727, AIC=0.744).

Table 166: Significant Predictors of UHN in 2014: Model 1 – Model 8.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	*Model 7	*Model 8
Controlled								
Immigrant Status (Ref=No)	0.881	-	-	0.942	-	-	-	-
Age	0.990	0.989	0.990	0.989	0.981	0.987	-	-
Gender (Ref=Female)	1.267	1.244	1.206	-	1.269	1.239	-	-
Predisposing Factors								
Highest Level of Education								
Some Post-Secondary	-	1.337	-	-	-	-	-	-
Secondary School Graduate	-	-	-	-	-	0.807	-	-
Less Than Secondary School Graduation	-	-	-	-	-	0.705	-	-
Not Stated	-	-	-	-	-	0.633	-	-
Enabling Factors								
Community Belonging (Ref=Very Strong)								
Somewhat Strong	-	-	0.843	-	-	0.815	-	-
Somewhat Weak	-	-	-	-	-	-	-	0.5436
Very Weak	-	-	1.806	-	-	1.280	-	-
Access to Employment (Ref=Yes)	-	-	1.143	-	-	-	-	-
Access to Regular Source of Care (Ref=Yes)	-	-	1.870	-	-	1.634	-	-
Canadian Region (Ref=Ontario)								
Atlantic	-	-	0.681	-	-	0.688	-	-
Prairies	-	-	0.626	-	-	0.657	-	-
Contact General Practitioner (Ref=No)	-	-	1.686	-	-	1.485	-	-
Contact Specialist (Ref=Yes)	-	-	0.520	-	-	0.638	-	-0.6142
Barriers to Accessing Care								
Cultural and Racial Background (Ref=Caucasian)								
East Asian	-	-	-	0.413	-	-	-	-
South Asian	-	-	-	0.694	-	-	-	-
Other/Multiple	-	-	-	-	-	-	-	-
Not Stated/Don’t Know	-	-	-	1.308	-	1.262	-	-

Table 16: Significant Predictors of UHN in 2014: Model 1 – Model 8.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	*Model 7	*Model 8
Household Income (Ref=Lower-Middle Income)								
Low Income	-	-	-	1.419	-	1.289	-	-1.5466
Upper-Middle Income	-	-	-	0.737	-	-	-	-
Access to Supplemental Health Insurance (Ref=Yes)	-	-	-	1.146	-	-	-	-
Medical Need								
Presence of At Least One Chronic Condition (Ref=Yes)	-	-	-	-	0.783	-	-	-
Self-Rated Health Status (Ref=Fair)								
Excellent	-	-	-	-	0.223	0.263	-	-1.8253
Very Good	-	-	-	-	0.337	0.383	-	-
Good	-	-	-	-	0.527	0.567	-	-
Poor/Don't Know/Refusal	-	-	-	-	1.376	1.304	-	-
Self-Rated Stress (Ref=A Bit Stressed)								
Extremely Stressful	-	-	-	-	3.143	2.980	-	-
Quite a bit Stressful	-	-	-	-	0.663	1.564	-	-
Not Very Stressful	-	-	-	-	0.896	-	-	-
Not at all Stressful	-	-	-	-	0.807	-	-	-
Not Stated/Don't Know	-	-	-	-	1.917	-	-	-
Model Intercept	-1.6210	-1.5562	-1.7693	-14581	-0.4590	-0.6552	-2.2865	-0.5215
-2LogLikelihood	40990.190	40790.969	39057.390	40532.794	38308.202	36830.405	1308.599	998.727
Concordance Statistic	0.578	0.584	0.671	0.597	0.693	0.728	0.590	0.744
Akaike Information Criterion	40998.190	40822.969	39103.390	40568.794	38338.202	36948.405	1320.599	1088.727
Sample Size								

Notes: Values reported are statistically significant at $p \leq 0.05$. Bootstrapped estimates are reported
*Immigrant only model

Discussion

Using data from the 2014 CCHS, the primary aim of this study was to determine how experiences of UHNs between immigrants and Canadian-born adults might have changed since 2000/01. A secondary aim of this research was to determine the effect of various individual factors, on UHN experiences for these groups. The final aim of this research was to determine how immigrants' experiences of UHNs might change after adjusting their length of residence in Canada along with other individual population-based factors.

Although the total number of people who experienced UHNs in 2014 was lower than the number of people who experienced UHNs in 2000/01, The Baseline Model (Model 1) shows that immigrants' risk for experiencing UHNs remained lower than Canadian-born adults' risk (OR=0.881, p-value=0.0484). The decline in the number of respondents who reported UHN experiences in 2014 might suggest that although some barriers might remain in place that can affect individuals' access to healthcare services and their risk of experiencing UHNs, the degree to which these barriers continue to affect access to healthcare services and UHNs has changed since 2000/01. After controlling for additional individual factors (Model 6), results from the multivariate logistic regression analysis concluded that immigrants' risk of experiencing UHNs remained lower than Canadian-born adults' risk, however, the association between immigrant status and UHNs becomes insignificant (OR=0.905, p-value=0.8310).

A secondary analysis found that variables that were significantly associated (p-value≤0.05) with UHN experiences in 2014 were similar to those identified by Wu et al. (2005) to be significantly associated with UHN experiences in 2000/01 and include age, sex, highest level of education, community belonging, access to regular sources of care or specialized services, Canadian region of residence, household income, and self-rated health status and stress levels.

Finally, results from this study show that UHN experiences and immigrants' length of residence in Canada were not significantly associated (p-value>0.05).

Have the Unmet Healthcare Needs of Immigrants and Canadian-born Adults Changed Since 2000/01?

A descriptive analysis of the 2014 CCHS indicated that the number of Canadians who experienced UHNs in 2014 declined from the number of Canadians who reported UHN experiences in 2000/01. Approximately 12.50% of respondents of the 2000/01 CCHS indicated they experienced a UHN in 2000/01 (Hou & Chen, 2002; Wu et al. 2005). When remeasured in 2014, a 1.00% decrease was found, and an unadjusted analysis done by Statistics Canada (2016b) concluded that approximately 11.40% of those who responded to the CCHS experienced UHNs in 2014 (Statistics Canada, 2016b). Results from this study find that an estimated 11.78% of Canadians experienced UHNs in 2014. Overall, adjusted logistic regression models concluded that the risk of experiencing UHNs was greater for Canadian-born adults than immigrants in 2014, results identical to both studies completed by Wu et al. (2005) and Statistics Canada (2016b).

After controlling for age and sex, only, Model 1—The Baseline Model shows that immigrants had a 11.90% lower risk of experiencing UHNs than Canadian-born adults in 2014. These results were expected since earlier research (Ali et al. 2004, Statistics Canada, 2016b, Qusenel-Valée et al. 2011, and Wu et al. 2005) produced similar findings. After adjusting for additional individual factors (Model 6), the probability that immigrants would experience UHNs remained 9.50% lower when compared to Canadian-born adults (OR=0.905, p-value=0.8310). The finding that immigrants were less likely to experience UHNs than Canadian-born adults in 2014 is not surprising given that immigrants are accepted for migration to Canada based on characteristics often associated with favourable health outcomes.

According to Laroche (2000), a number of changes to polices regarding immigrants' requirements prior to entering the country shifted the inflow of Canada's immigrants. These changes were accompanied by an influx of immigrants who migrated to Canada from less traditional source countries, those located in Asia and the Middle East, Africa, and South and Central America, rather than traditional countries located in Europe (Laroche, 2000). The Immigration Act asserted a need to screen all immigrants prior to migration and this was due to the belief that some immigrants might cause an excessive demand on Canada's healthcare system; these immigrants were excluded from migration (Lu & Ng, 2019). The modernization of the Immigration and Refugee Protection Act in 2002 exempted some immigrant categories, such as refugees and some who are a part of the family class immigrants, from medical screening (Lu & Ng, 2019). As a result of these changes, differences in the way information is collected from immigrants and the way they are screen might have occurred. For example, between 2011 and 2017, a majority of immigrants who migrated to Canada arrived as skilled workers under the economic class of migrants (Statistics Canada, 2017). These immigrants were selected for migration based on favourable characteristics, determined during an intense screening process. Remaining immigrants who migrated to Canada between 2011 and 2017, migrated as refugees or as family class migrants for family reunification purposes. These remaining immigrants, however, might not have been subject to intense screening (Laroche, 2000; Lu & Ng, 2019; Statistics Canada, 2017). As a result, a majority of immigrants migrating to Canada as skilled workers are therefore might pose less of a risk for Canada's healthcare system and therefore might not experience UHNs to the same degree as those migrating to Canada as family class immigrants or refugees.

Predictors of UHN Experiences in 2014

The second aim of this study was to determine the effect of various individual factors on UHN experiences. Model 1–The Baseline Model– controlled for age and sex. Subsequent models (Model 2 – Model 6) introduced individual population-based factors (e.g. predisposing, enabling, medical needs factors, and barriers towards accessing healthcare services). To determine the model that was best able to predict future UHN experiences, the C-Statistic and AIC of all models were compared.

Overall the results from this study showed that among all models, Model 6—The Combined Model, which adjusts for immigrant status, age, sex, and all individual factors was the best model for making predictions about UHN experiences in 2014 (C-Statistic=0.728, AIC=36948.405). Although immigrant status was not significantly associated with UHN experiences in this model, odds ratios from this Model 6 suggested that 11 variables included in the model were statistically significant (p-value$\leq$0.05) and could be used to predict UHN experiences in 2014. The results from this study might indicate importance in examining how each of these 11 factors can contribute to UHN experiences for all Canadians.

Predisposing Factors

Predisposing factors that were significantly associated with predicting UHN experiences in 2014 include the age, sex, and highest level of education of the respondent.

Sex and Gender

Overall, females' risk of experiencing UHNs in 2014 was higher than males' risk for experiencing UHN (OR=1.239). More females (55.73%) than males (44.27%) indicated that they experienced UHNs during 2014 and these results are similar to those recorded by Statistics Canada (2016b).

The findings that females' risk of experiencing UHNs is greater than males is not surprising given that females are a part of a group identified as vulnerable for increased experiences of UHNs (Sanmartin et al. 2002). The idea that females are expected to experience more UHNs than males might be a result, in part, of gender-based roles. As Bryant et al. (2009) explain, often, women who work full-time outside of the home carry both work-related responsibilities and the responsibility to provide unpaid care to their families (Bryant et al., 2009; Pederson, Raphael, and Johnson, 2010; Turcotte, 2014). This care may take the form of looking after children, a spouse and/or ageing parents. These roles, and the time they demand may hinder females' ability to seek care for themselves, which might also help explain why working women are more likely to report "poorer" health status than males (Bryant et al. 2009, Bertakis et al. 2000). At the same time, women who are not employed might also expected to fulfill gender-based roles that could impact their ability to seek and use healthcare services and increase their risk for reporting "poorer" health status when compared to males, who are and are not working. In short, the unique barriers that all women experience towards accessing healthcare services might stem largely from their roles as a primary caregiver and the time required to carry out this role (Bryant et al. 2009).

However, given that women are usually the primary caregivers, the finding that they experience more UHN than males might, nevertheless, be anticipated to be offset by the increased knowledge about the healthcare system that females can gain as they navigate it (Pedersen et al. 2010). Pedersen et al. (2010) suggest that it is possible that some women are more likely to be recipients of home care services than men and are also more likely to be employed as formal caregivers thereby providing them with further opportunities to increase their healthcare system knowledge. As a result, it might be expected that whatever limited access to healthcare services females may face, lack of knowledge might not to be a primary explanation. Rather, the

explanation for more UHN experiences is more likely to be related to insufficient time for them to access healthcare services related to their own healthcare needs.

Furthermore, differences in UHN experiences of males and females might be explained by some gender or sex-based roles that might influence access and use of healthcare services. To begin with, some health research has found that, women living in the United States typically use a significantly higher number of healthcare resources than males (e.g. primary care services, emergency treatment, speciality care, and diagnostic services) (Bertakis, Azari, Helms, Callahan, & Robbins, 2000). At the same time, other health research found that the total healthcare expenditures for residents living in Manitoba, Canada, was higher for females ($1,164) than males ($918) and a high proportion of healthcare expenditures (22%) were related to sex-characteristics (e.g. biological reproductive characteristics) (Bertakis et al. 2000; Mustard, C.A., Kaufert, P., Kozryskyi, A., & Mayer, T., 1998). Given that females are frequent users of the healthcare system, reporting more UHN experiences than males might be surprising. However, increased reports of UHN by females might be due to the increased awareness of their healthcare needs as well as an increased awareness about services that are potentially available to them.

Secondly, differences in UHN experiences between males and females might be related to gender-based health beliefs. According to Bertakis et al (2000), women have a greater willingness and ability to take care of themselves when facing precarious health outcomes and have a greater propensity to seek out preventive healthcare services than males. This might suggest that women take increased precautions to prevent the onset of precarious health outcomes. Furthermore, seeking preventive measures to offset unpredictable health outcomes might be the result of an increased awareness that if faced with precarious health outcomes, they might not be able to readily meet these needs, increasing their risk of further ill health.

An important factor that should be considered when examining the effect of gender and sex on UHN experiences is the overlap that gender and sex have with other social determinants of health. The impact of sex and gender on other social determinants of health vary in nature. When individuals access healthcare services, intersections of their identity become linked to healthcare concerns and might influence the degree to which they have access to and use healthcare services (Bryant et al. 2009). The increased disadvantage of females towards meeting their healthcare needs might be intensified by factors that also disadvantage females (the type of employment, access to supplemental health insurance, race, or income). For example, women are less likely to be employed in full-time work and are also less likely to be eligible for unemployment benefits or be employed in lower-paying occupations, while females who are employed are more likely than males to be eligible for unemployment benefits (Bryant et al. 2009; McGibbon et al.2009). As a consequence of this overlap, women might be limited in terms of accessing supplemental healthcare services (dental or diagnostic specialist services) that promote favourable health outcomes and fewer UHN experiences.

Gender, race, and immigrant status also intersect, which might contribute to different experiences of UHN for some women, particularly those who are immigrants. For example, McGibbon (2009) explains that when compared to non-immigrant women, immigrant women of colour might face more barriers towards accessing healthcare services. Additionally, women with disabilities are also twice as likely to be unemployed, affecting their income, access to supplementary healthcare services, and more experiences with UHNs, when compared to women who are not disabled.

Age

The effect of age on UHN experiences (OR=0.987) was similar to the results by Wu et al. (2005) (OR=0.984, p-value≤0.001), suggesting the effect of age on UHN experiences has not substantially changed since 2000/01.

A possible explanation for the variation of UHN experiences with age might be the exposure to life-course events that may contribute to increased access to healthcare services or better knowledge about the healthcare system, favourable health outcomes, and less UHN experiences. Some life-course events that were positively associated with less experiences of UHNs include marriage, the completion of post-secondary education, starting full-time employment, and periods of financial stability (Marshall, 2011; Mirowsky and Ross, 1992). Together, these events can help explain the variation in UHN experiences when considering age.

Furthermore, individuals' health behaviours might sometimes begin to get better with age. Some of these health behaviours might include drinking and smoking in moderation, avoiding the use of recreational drugs, increased use of general practitioner, specialist, or preventative services, and improved education about available healthcare services and community connections (Mirowsky and Ross, 1992). Practising better health behaviours might, therefore, be reflected in fewer UHN experiences.

Education

Education has been identified as a social determinant of health that has the potential to affect health outcomes and UHN experiences. In this study, education was significantly associated with UHNs in 2014, a finding that is not surprising given that education sometimes affects other social determinants of health (Adams, 2002; Armstrong, 2009; WHO, 2019). Education can impact access to healthcare services and sometimes influences individuals' understanding of their

healthcare needs and how their health behaviours might impact their experiences with UHNs (Adams, 2002; Armstrong, 2009).

Those who report higher levels of educational attainment are more likely to report better health outcomes by way of increased access to resources that contribute to these better health outcomes (occupation, income, secure housing). Furthermore, higher educational attainment might also be associated with an increased awareness of symptoms and behaviours related to precarious health outcomes and might be able to use services before these symptoms become worse (Adams, 2002; Armstrong, 2009). While an awareness of symptoms related to precarious health might sometimes be expected to contribute to more UHN experiences, an increased understanding of these symptoms might be accompanied by pro-health behaviours, such as the use of preventative health services, a reduction in smoking and drinking, improved eating habits, increased exercise, and more use of preventative healthcare services (Adams, 2002; Armstrong, 2009). As a result, experiencing UHNs by those with higher educational attainment might be reduced as they can recognize and deal with symptoms related to ill health before they become serious.

Enabling Factors

The enabling factors identified significantly associated (p-value≤0.05) with UHN experiences in 2014 include respondents' sense of community belonging, Canadian region of residence and residency in a rural or urban city centre, and access to regular sources of care or specialist services. These factors were consistent with those found by Wu et al. (2005) to be significantly associated with UHN experiences in 2000/01.

Community belonging

Literature examining the quality of social relationships among community members and the quality of their health outcomes advocates that community belonging and engagement are

positively associated with UHN experiences. Positive relationships among community members can positively affect health outcomes as these relationships might promote knowledge about healthcare services within a community and spread information about how to access these services. Furthermore, communication and positive social relationships among community members might also facilitate discussion about health symptoms and is important in some diverse immigrant communities where immigrants might feel stigmatized or marginalized.

The quality of social relationships and a series of networks among community members can sometimes reflect the level of interaction that community members have with the healthcare system (Bryant et al. 2009). Increased communication among community members and various aspects of the healthcare system (healthcare providers), commonly make these members more knowledgeable about healthcare services available to them. Greater information sharing among community members, therefore, acts as a support system for some community members who might be facing precarious health outcomes or UHNs. Furthermore, increased knowledge about available healthcare services might allow individuals facing UHNs to schedule and attend medical appointments more frequently and without difficulty (Bryant et al. 2009). Increased communication and knowledge about services available to community members and sometimes supplement their understanding of health symptoms they might be facing and how their health behaviours contribute to these symptoms. Increasing knowledge of these symptoms and behaviours through community workshops, for example, can educate members about their perceived and subjective health and will also act as a support system through community leadership, connectedness, and unity (Im and Rosenberg, 2007).

Better self-reported health status is also common among those who report a higher quality connectedness within their community (Palis, Marchand, and Oviedo-Joekes, 2018). This finding

is particularly important for some immigrants since increased interactions among members of immigrant dense communities might allow immigrants to speak about their health in terms of their cultural understanding. This might enable immigrants to seek and use healthcare services more frequently.

Canadian region of residence and type of residence

Region of residence in Canada and whether individuals were living in rural areas or urban centres affected their experiences with UHNs in 2014. Typically, the influence that geographic factors have on UHN experiences are due to how health systems are governed in those regions. Furthermore, the reasons for not receiving care and differences in health-seeking behaviours become different depending on the region individuals live in and whether they live in a rural or urban city centre (Allin, 2008; Sibley and Glazier, 2008; Sibley and Weiner, 2011).

First, differences in UHN experiences when concerning geographic factors might be the result of the 13 decentralized healthcare governance systems within Canada. Although Canada's universal healthcare system is influenced by the federal government and must follow guiding principles from the Canada Health Act, enactment of healthcare policies and services remain the responsibility of provincial and territorial governments (Allin, 2008). Differences in the way that healthcare systems are governed (planning, funding, and delivery of healthcare services) might lead to various degrees of inequity and access to healthcare services by residents.

Secondly, UHN experiences reported by Canadians varied across Canada and the reasons for reporting UHNs also varied. The variation in UHNs ranged from 7.8% in Prince Edward Island to 13.3% in Manitoba (Sibley and Glazier, 2009). Problems related to the availability of healthcare services were reported more often by those living in Quebec, Newfoundland and Labrador, and Manitoba, while those living in British Columbia, Saskatchewan, and Manitoba experienced

UHNs because of the acceptability of healthcare services (Sibley and Glazier, 2009). Finally, respondents living in British Columbia and Alberta experienced UHNs because of problems related to the accessibility of healthcare services (Sibley and Glazier, 2009). As a result of not being able to access healthcare services due to the availability or accessibility of healthcare services, experiencing UHNs would be expected. Those who reported reasons related to acceptability of healthcare services might be able to meet their healthcare needs but choose not to for personal reasons.

Finally, differences in the experiences of UHNs among those who live in rural or urban city centres might be due to the differences in health-seeking behaviours among these individuals (Sibley and Weiner, 2011). After adjusting for factors related to access to healthcare service use and UHNs, results from Sibley and Weiner (2011) indicate that reporting UHN experiences along the rural-urban continuum remained to be true. That is, those living in urban areas were more likely than those living in rural areas to report less UHN experiences. The differences along the rural-urban continuum might be related to a respondent's level of knowledge about their healthcare problems or their ability to access healthcare services. For example, knowledge of healthcare needs and access to services can be closely linked to whether an individual uses drop-in clinics (Sibley and Weiner, 2011). Popular among those living in urban city centres, drop-in clinics are a convenient resource for individuals to meet their healthcare needs. However, those using use drop-in clinics are less likely to have established regular sources of care and as a result might be unaware of healthcare needs until they become a serious problem (Sibley and Weiner, 2011).

Access to Regular Source of Care (e.g. family and general practitioners) and Specialized Care

Access to regular sources of care (e.g. family or general practitioners) or the use of specialized services were found to be significantly associated with UHN experiences. Exposure to

regular sources of care might sometimes be a protective factor that can keep individuals in good health (Levesque et al. 2008; Shi and Stevens, 2008). Accessing regular sources of care allows individuals to speak about their healthcare problems with healthcare providers. Speaking about health problems with practitioners not only informs the healthcare practitioner about healthcare needs but also allows healthcare practitioners to inform patients resources available to them that will allow them to meet their needs (Levesque et al. 2008; Sanmartin and Ross, 2006).

Having access to regular sources of care might not always result in healthcare needs being met, however. Although regular sources of care might inform individuals of their healthcare needs and with potential resources that will allow them to meet their needs, access to a regular source of care does not guarantee that patients will be able to access the necessary healthcare services, when needed. Being placed on a waiting list can potentially influence ways in which patients answer questions about UHN experiences (Sanmartin and Ross, 2006).

It is important to recognize that for some, the absence of a regular source of care might result in individuals remaining uninformed about their healthcare needs, therefore creating a false-positive record of UHN experiences. While this does contribute to reduced reports of UHN experiences, individuals reporting these false-positive reports might be faced with further precarious health outcomes in the future and potentially more UHNs.

Medical Needs Factors

Self-rated health status and stress levels were significantly associated with UHN in 2014. Those who reported "good" health status or better had a 43.30% - 73.70% decreased risk of experiencing UHNs. On the other hand, reporting greater levels of stress was associated with an increased risk experiencing UHNs. Respondents who viewed their lives as "extremely stressful" were almost three times more likely to experience an UHN than respondents who felt that their lives were just "a bit stressful".

Self-Rated Health Status and Stress Levels

Often, self-rated health status and self-rated stress levels can be used to predict whether individuals will experience UHNs. Frequent users of the healthcare system (those with a precarious health outcome or those suffering from chronic conditions) might constantly be reminded of the negative effects associated with their health condition, therefore contributing to the belief that they are constantly experiencing UHNs.

It could be true, however, that sometimes, reporting UHN experiences could be due to the increased communication that individuals have with healthcare practitioners. For example, Levesque et al. (2008) explain that for some, reporting the experience of a UHN might be due to increased exposure to healthcare professionals rather than because of the presence of the condition. Those with regular access to healthcare services might constantly be reminded about their healthcare symptoms that need to be addressed. This might create the assumption that the healthcare needs of patients are not being addressed and might also contribute to reporting poorer health status and increased feelings of stress.

The overlap between immigrant status, self-rated health status and self-rated stress levels can potentially be related to the process of immigration. New immigrants to Canada often report

"good" or better health status at the time of arrival. Data collected from immigrants are usually by those migrating as economic immigrants, leaving out a large number of immigrants who migrate to Canada as refugees or for family reunification purposes.

At the same time, the cross-sectional nature of the CCHS might limit the information that can help explain the relationship between self-rated health status or self-rated stress levels and UHN experiences. Since the data collected in the CCHS are cross-sectional, the understanding of the long-term effects of acculturation and stress related to the migration process is limited.

Barriers to Accessing Healthcare

Socioeconomic status can sometimes act as a barrier that contributes to UHN experiences. Respondents belonging to low-income households in 2014 had a 28.9% higher risk of experiencing UHNs compared to members of lower-middle or upper-income households. Although income can affect UHN experiences in many ways, negative effects of income on UHN experiences are usually intensified when considering the overlap between income and other social determinants of health, such as type of employment, age, or sex (Bryant et al. 2009; Wolfson et al. 1999). Furthermore, it is important to understand that the distribution of income within society might also mirror the health outcomes of that society and UHN experiences via some social problems tightly associated with the unequal distribution of income (Wilkinson, 2005).

Socioeconomic Status and Income

Socioeconomic status can sometimes reflect whether individuals can access healthcare services and meet their healthcare needs. Sometimes, the impact of some social determinants of health alongside socioeconomic status can add to health outcomes (Bryant et al. 2009; Wolfson et al. 1999). For example, those belonging to low socioeconomic households might be employed in precarious employment that offers low wages and no supplemental health insurances. As a result,

these individuals in low socioeconomic households might not have the means to access healthcare services to ensure their healthcare needs are met and might, therefore, experience increased UHNs.

Although earning a high income and being a part of a high income household is often associated with less UHN experiences and better health outcomes, some health research explains that the positive relationship between high income and less UHN experiences might not always be true and that income should not always be used to make predictions about UHN experiences (Mackenback et al. 2004; Rowlingson, K., 2011). Increases in income usually expose individuals to more resources that will allow them to address their healthcare problems, high income does not necessarily guarantee that individuals will be able to use these services. According to Mackenback et al. (2004) and Rowlingson (2011), the relationship between high income and good health is curvilinear. That is, individuals with higher incomes might not always be able to access healthcare services faster than those a part of low-income households. Placement on waiting-lists, for example, might contribute to the idea that their UHN experiences are being unmet, contributing to increased reporting of UHNs.

Distribution of Income within a Community

Social problems that contribute to precarious health outcomes and potential UHNs are usually characteristic for communities where there is an unequal distribution of income (Pickett and Wilkinson, 2015). Some social problems common to these communities include high rates of drug use or teenage pregnancy, high murder rates, or reduced access to education (Wilkinson, 2005). The presence of these social problems can potentially contribute to high mortality rates and precarious health outcomes, and potentially more UHNs than communities where these problems are not present.

Immigrants' UHN and Length of Residence in Canada

Immigrants' length of residence in Canada was found to be unassociated with their UHN experiences in 2014. However, although insignificant, the point estimates of the odds of having a UHN changed with time in Canada, a finding what is which are consistent with the literature, specifically that which describes the presence of a healthy immigrant effect among immigrants living in Canada (McDonald & Kennedy, 2004; Lu and Mg, 2019; Gee et al. 2004).

When compared to recent immigrants, those who have lived in Canada between 10 – 14 years had the highest risk of experiencing UHNs, while immigrants living in Canada between 5 – 9 years had the lowest-risk of UHN experiences during 2014. This change in UHN experience risk might be associated with increased acculturation into the host society and immigrants' improved ability to navigate Canada's healthcare systems. As immigrants become acculturated, it is expected that they will begin to practice behaviours common within the host society; this might contribute to the loss of protective factors unique to immigrants. Moreover, during this period of acculturation, reasons related to reporting the experience of UHNs by immigrants become vague and generalized (Wu et al. 2005).

While immigrants' length of residence in Canada and their UHN experiences are not significantly associated, experiences of UHNs might differ depending on the class of migration immigrants arrive to Canada under. For example, economic immigrants might migrate to Canada with health characteristics associated with a lower risk of experiencing UHNs. As their length of time in Canada increases, immigrants' experiences with UHNs might increase, however, it is expected that they will have access to resources that will allow them to meet these needs. On the other hand, other immigrant groups such as refugees or family class migrants' experiences with UHNs might be different from those of economic class migrants. Refugees and family class

migrants likely arrive in Canada with less expectations than economic migrants and are subject to different medical screening procedures. While the UHN experiences of family class migrants and refugees might increase, in a similar matter to economic migrants, their experiences might be different as they might not be able to access the same services to meet healthcare needs that economic migrants can access. Unfortunately, the cross-sectional nature of the CCHS limits the understanding of how immigrant class affects and UHNs when also considering immigrants' length of residence in Canada.

As immigrants' length of residence in Canada increases, it could be expected that advancement in their ability to navigate Canada's healthcare system occurs. Increased knowledge about Canada's healthcare system and how to access healthcare services can sometimes contribute to feelings that their UHN are being unmet since they become aware of the many services available to them. At the same time, a decrease in UHNs, on the other hand, by immigrants who have lived in Canada for 15 years or more might be due to the idea that they have accumulated enough information about their healthcare symptoms and how to access services to ensure that their healthcare needs remain met. A result of increased information about healthcare services available to immigrants and how they can access these services, is a reduction in the number of UHN experiences reported by immigrants who have lived in Canada for 15 years or more.

Policy Implications and Practice

Fortunately, the differences in UHN experiences between immigrants and Canadian-born adults has not changed since 2000/01 when remeasured in 2014. From a healthcare policy perspective, the findings from this study might suggest an importance in widening the availability of healthcare services to Canadians, regardless of immigrant status. The lack of change in UHN experiences reported by Canadians might suggest that changes within Canada's healthcare system, specifically those related to the access to or the communication of healthcare services, should be done to help further reduce the number of people who experience UHNs. Changes to Canada's healthcare system can be achieved through healthcare system restructuring, specifically the revision of healthcare policies that are aimed at increasing awareness of available healthcare services, reducing current wait-times, and increasing communication among community members and healthcare practitioners about the services that are available to them.

Availability of Healthcare Services

This research suggests that although immigrants and Canadian-born adults might be exposed to healthcare services to help address their healthcare needs, access to these healthcare services is not always available. This finding is true for both immigrants and Canadian-born adults. While health system restructuring has occurred to help increase access to healthcare services, some of these restricting attempts have resulted in long-wait times that might contribute to UHN experiences. Health system restructuring aimed at reducing current wait-times should be implemented so that Canadians can have increased access to services to help with their healthcare needs. As a result, the negative health outcomes associated with prolonged waiting periods might also be reduced in addition to reporting UHN experiences.

To further help eliminate long-wait times and experiences of UHNs, community awareness programs should be made available to Canadians. Communication among community members and healthcare practitioners by the way of community awareness programs can potentially increase knowledge about the healthcare system and services available to Canadians. Furthermore, these programs can potentially facilitate discussion among community members about their healthcare symptoms and can provide support for seeking healthcare services (Cutler et al. 2015). The increase in knowledge about services available to community members can help with wait-time reduction and decrease the lack of available services reported by some, that contributes to UHN experiences as the increased communication might members about alternative services that can be used to meet healthcare needs. Finally, the implementation of community awareness programs and increased communication among members might potentially increase members' understanding about factors associated to their health outcomes (e.g. decisions about diet and exercise), potentially reducing precarious health outcomes and the need to use healthcare services (Cutler et al. 2015).

Conclusion, Limitations, and Strengths

Conclusions

The primary aim of this study was to examine the differences in UHN experiences of Canadian-born adults and immigrants, and to determine how these experiences might have changed since 2000/01. A secondary aim of this research was to establish the individual factors significantly associated (p-value≤0.05) with UHN experiences during 2014. The last aim of this study was to determine how immigrants' length of residence was related to their UHN experiences.

As a whole, this study confirms that the differences in UHN experiences between immigrants and Canadian-born adults remain unchanged from prior studies (Wu et al. 2005 Statistics Canada, 2016b). The finding that immigrants report less UHN experiences is consistent with health literature that identify immigrants as reporters of higher self-rated health status and those that identify the presence of a healthy immigrant effect.

While immigrant status was not significantly associated with UHN experiences in 2014, results from the adjusted multivariate binary logistic regression models indicate that factors most reasonable for predicting UHN experiences in 2014 are those contained in Model 6—The Combined Model. As a result, Model 6—The Combined Model, is the best model for making predictions about UHN experiences when compared to other models (Model 2 – 5).

Immigrants' length of residence in Canada was found to be independent of their UHN experiences in 2014. Although not significantly associated, results from this study do show that as the duration of time in Canada increases, immigrants' predicted risk of experiencing UHNs increased, suggesting that immigrants might lose their protective health characteristics approximately 10 years after arrival into Canada. UHN risk is the highest for immigrants living in Canada between 10 – 15 years and is the lowest for immigrants living in Canada between 5 – 9 years; the risk of experiencing an UHN for immigrants who have lived in Canada for 15 years or

more is higher than the risk of immigrants living in Canada between 5 – 9 years, but lower than those living in Canada between 10 – 14 years. The patterns association with immigrants' UHN experiences after their arrival might be due to the effects of acculturation and behaviours customary to the host society that are eventually practised by immigrants. At the same time, immigrants' knowledge about the healthcare system might increase and their expectations of the system might change. Advanced education about the healthcare system and new expectations about the healthcare system might contribute to the variation in UHN experiences by immigrants as their length of residence in Canada increases.

It is important to understand that the process of immigration might influence data collected about immigrant health. A majority of immigrants who migrate to Canada arrive as economic immigrants. It is therefore expected that these immigrants will arrive with good health status and characteristics best suited for good health outcomes, as their admission into Canada is based on favourable health characteristics. On the other hand, remaining immigrants arriving to Canada for family reunification purposes or as refugees might not be subject to an intense screening process and their health problems at the time of arrival might not be considered at the same level as economic migrants. Since the Canadian Community Health Survey does not collect information about immigrant class, differences in their UHN experiences are unavailable.

This research also shows the importance of considering how many social determinants of health might act together to influence access to healthcare services and UHN experiences. For example, immigrant status, gender, and race might act together with employment and socioeconomic status to influence the availability and access to healthcare services for some individuals. Together the overlap of these social determinants of health might contribute to UHN experiences.

Limitations

The first limitation of this study is the cross-sectional nature of the CCHS and the inability to determine the causal association between immigrant status and UHN. This occurs because the information collected by respondents was done at one period. This limitation may impact the study since confirmable trends over time could not be created. Generalizations about factors that potentially impacted UHN experiences in 2014 could be inferred from this data. Future studies should make use of longitudinal datasets that can help establish long-term trends and examine how factors that affect UHNs change over time.

Two questions used from the CCHS focused on the respondents' UHN experiences and their self-rated health status. The use of these questions potentially acts as a second limitation given that the perception of UHN experiences and self-rated health status can differ between immigrants and Canadian-born adults, as well as across cultures. Key factors that may contribute to these differences include individuals' understanding of their health, immigrant-specific factors such as level of health literacy upon arrival to Canada, and the immigration process. For these reasons, it is important to understand health and illness from the context of the respondents' life (i.e., their racial background and cultural ideas, and how these may influence their responses to these questions, and/or their past experiences with healthcare systems). Additionally, the interpretation of questions used in the CCHS might be limiting as they look at the inability to receive healthcare services or access healthcare services. Recall bias might be present as some individuals might not be able to recall their inability to access healthcare services within the last 12 months of when they needed them. Finally, questions used in the CCHS might also act as a limitation as questions in the CCHS are understood from the Western/European context. As a

result, a different understanding of healthcare needs might be clouded when looked as though another cultural lens.

The lack of information on immigrant class can be considered the third limitation of this study. Immigrant class has the potential to impact the results since all immigrant classes were grouped in the CCHS. This results in the assumption that all immigrant needs are similar and that their access to services once in Canada is also similar. Since it is not possible to determine immigrant class in this dataset, we are unable to make the association between immigrant class and the types of services that are needed or are being unmet. Furthermore, grouping all immigrants into one category is potentially perplexing since immigrants experience different barriers upon their arrival, and to different degrees. For example, individuals migrating to Canada as refugees might have more medical needs than individuals migrating to Canada as skilled workers. The diversity of immigrants to Canada is very wide. Immigrants to Canada include a wide range of people; both very rich and very poor, people with a wide range of occupational, education, and family background, and very different levels of need, expectations, and facility navigating through the healthcare system. Future studies should provide more investigation into barriers of healthcare use for particular groups of immigrants that are not easily identifying in the data (e.g. recent refugees).

A fourth limitation of this study is the use of questions related to "unmet healthcare need" as a proxy to measure the efficiency of the healthcare system and how well the healthcare system is meeting the needs of its users. Gibson and Clair (2018) say that there should be no expectation that individuals with different healthcare needs should fail to obtain healthcare services at the same rate as the general population. The expectation that individuals should not fail to meet their healthcare needs is also created due to the fact that Canada's healthcare system is universal and all

services that are medically necessary are covered for Canadians. The reporting behaviours of individuals will vary based on several variables such as socioeconomic status, education, and a person's expectations of the healthcare system. As a result, self-assessed UHN questions are vulnerable to misinterpretation or different interpretation by social location. Therefore, future studies of self-assessed UHN should be coupled with studies that use externally validated metrics for UHN (e.g., Ambulatory Care Sensitive Conditions) rather than questions related to a person's self-assessed UHN alone (Gibson and Clair, 2018). Such an approach would mitigate reporting biases between self-reported UHN and the associated biases of some variables of interest.

The fifth limitation of this study is related to the total number of respondents that answered questions about their immigrant status and UHN experiences during 2014. The number of Canadian-born adults that responded to questions in the CCHS was three times greater than the number of immigrants who responded. Similarly, the number of females who responded to questions about UHNs experiences was greater than the number of males who responded for both immigrants and Canadian-born adults. Although good enough to make inferences about the general population, there might be some over-representation for Canadian-born adults and their UHN experiences and this is similar for the representation of females who experienced UHNs in 2014. At the same time, the under-representation of the actual number of immigrants who migrated to Canada as well as their actual experiences with UHNs after their arrival could be present in this study. Immigrants who responded to questions about their UHNs in the 2014 CCHS might be those who were considered the primary applicant for their immigration application. Their responses to the question in the CCHS might not reflect the UHN experiences of others who might have travelled with them (elder parents, spouses, children, or other accompanying family members). As

a result, there is a risk that the UHNs of all immigrants who were eligible to answer might not have been recorded, therefore removing some valid UHNs cases in the study.

Strengths of Study

There are many strengths of this study, all of which can contribute to future research that focuses on immigrant health, the experience of UHN, and research related to public health and health policies. Primarily, these strengths relate to this study's design; however, some strengths relate to study methods and the inclusion criteria for the theoretical methods.

One strength of this study is how the binary logistic regression models were created and compared. Since Models 1 to 5 focus on each category of the individual population-based factors, this study was able to determine the effect that each group of individual factors had on UHN experiences when isolated. Model 6 was then implemented to determine the effects that these individual population-based factors had on UHN when in one model. That Model 6 was shown to be the best model to report UHN experiences makes sense since population-based factors cannot be isolated given the feedback loops displayed in the ABM and ABM-VP; each of the population-based factors acts upon the others to influence health outcomes.

Overall, this research has the potential to impact future studies that explore the quality of Canada's healthcare system and the delivery of services. This study assesses Canada's healthcare system by measuring respondents' UHN experiences and the factors that contribute to these experiences. Moreover, its results indicate the factors that should be included in future models that assess UHN for Canadians, in particular, those related to medical need.

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