Three Essays on Health and Health Behaviours of Immigrants

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Abstract

This thesis focuses on the comparison between immigrants and non-immigrants with respect to various health-related behaviours perspective/viewpoints. Specifically, this thesis comprises three essays. First, I investigate any differences in the factors for utilizing general practitioners (GP) and specialists (SP) between immigrants and non-immigrants in Canada. Second, I examine the causal effects of language proficiency on the health and health behaviours of immigrants to Canada. Finally, I investigate whether there are any differences in the claiming patterns of the Medical Expense Tax Credit (METC) and/or Medical Expense Supplement (MES) for immigrants compared to non-immigrants in Canada.

Chapter 1 investigates any differences in healthcare utilization patterns between immigrants and non-immigrants. We implement a two-part model, where the first part applies logistic regressions to assess factors associated with visiting a physician, and the second applies zero-truncated negative binomial regression models to capture the frequency of using healthcare services, conditional on having at least one visit. Our results show that the patterns of healthcare utilization are different for immigrants compared to non-immigrants; differences are also observed by gender and age. More specifically, prescription drug insurance coverage and chronic conditions play opposing roles for male and female immigrants compared to their non-immigrants counterparts. Moreover, the

number of years since migration is an important factor in increasing the probability of any general practitioner (GP) and specialist (SP) visit for all immigrants.

Chapter 2 is to my knowledge, the first research on the causal effects of language proficiency on health outcomes and healthcare utilization of immigrants in Canada. My finding contradicts the idea that immigrants with poor language facilities are less likely to have a regular doctor. I find that good self-reported health is positively associated with language proficiency. However, I find no statistically significant causal effect of language proficiency on reporting 'good mental health'. In addition, I find strong evidence that the utilization of hospital and mental health care services are positively associated with being English-language proficient even after controlling for many possible sets of factors.

Chapter 3 contributes by supporting existing literature, but with a completely different dimension: the medical tax perspective. I am unaware of any previous research that directly compares the claim patterns of the Medical Expense Tax Credit (METC) and/or refundable Medical Expense Supplement (MES) for immigrants with those of non-immigrants in Canada. My results show that there are differences in the proportions of tax filers who claimed the METC and/or MES, and the amounts of a claim for the METC and/or MES for immigrants compared to non-immigrants; differences are also observed by age, years since migration (YSM), province and immigration categories. In both couples and single families, a lower proportion of immigrant tax filers claimed gross immediate family medical expenses (GME), potential METC claims, and METC refunds compared to

non-immigrants. In the case of single families, a higher proportion of non-immigrant tax filers claimed MES compared to their immigrant counterparts.

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Declaration of Academic Achievement

The material in this dissertation consists of my own research. I conducted all the empirical analysis, as well as writing of the manuscripts from 2016 to 2021.

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Introduction

Canada is one of the major immigrant-receiving countries in the world. As immigrants account for about 21.9% of the population in Canada (Statistics Canada, the census, 2016), their health is an important consideration for both immigration and health care policy. To develop effective policies, it is important to understand why, how, and to what extent the health and health-related behaviours of immigrants differ from non-immigrants in Canada. Economic theories offer insight into these issues. For example, according to the theoretical framework of the behavioural model, health care utilization is highly related to societal and individual determinants (R. Andersen & Newman, 1973; R. M. Andersen, 1995). Immigrants have become increasingly diverse and in particular, most recent immigrants are from Asia, the Middle East, Latin America, the Caribbean and Africa with different societal and individual characteristics. One particular difference considered in the dissertation is language. In 2016, since 72.5% of immigrants reported a mother tongue other than English or French (Chavez, 2019), language barriers might be another reason why health status and health-related behaviours might be different for immigrants compared to non-immigrants.

This thesis focuses on the comparison between immigrants and non-immigrants with respect to various health-related behaviours perspective/viewpoints. Specifically, this thesis comprises three essays. First, I investigate any differences in the factors for utilizing general practitioners (GP) and specialists (SP) between immigrants and non-immigrants in Canada. Second, I examine the causal effects of language proficiency on the health and

health behaviours of immigrants to Canada. Finally, I investigate whether there are any differences in the claiming patterns of the Medical Expense Tax Credit (METC) and/or Medical Expense Supplement (MES) for immigrants compared to non-immigrants in Canada.

The first chapter of my thesis titled "Does the Pattern of Healthcare Utilization by Immigrants Differ Compared to Non-immigrants in Canada?" contributes to an understudied, but important area using the Canadian Community Health Survey (CCHS) linked with administrative data from the Ontario Health Insurance Plan (OHIP). I implement a two-part model, where the first part applies logistic regressions to assess the factors causing a visit to a physician, and the second applies zero-truncated negative binomial regression models to explain the frequency of using healthcare services, conditional on having at least one visit. I find that the patterns of healthcare utilization are different for immigrants compared to non-immigrants; differences are also observed by gender and age. More specifically, having insurance for prescription drugs and having chronic conditions can play opposing roles for male and female immigrants compared to non-immigrants. I find that the number of years since migration is an important factor in increasing the probability of any GP and SP visit for all immigrants. Male-immigrants whose mother tongue is English or French are likely to have more GP and SP visits than non-immigrants. On the other hand, for female-immigrants with a mother tongue other than English or French, the probability of visiting any SP is significantly lower. These results have important implications, as identifying the issues of healthcare utilization is key for

understanding how the Canadian healthcare system contributes to the inequality of health outcomes.

The second chapter of my thesis, "The Effects of Language Proficiency on the Health and Health Behaviors of Immigrants", is to my knowledge, the first research on the causal effects of language proficiency on health outcomes and healthcare utilization of immigrants in Canada. Previous epidemiological literature has provided evidence on the negative association between Limited English Proficiency (LEP) and health outcomes, but not many studies have explored the causal impacts that underlie this association. Because, individuals who have better language skills may have better health outcomes for other reasons unobserved by researchers, the reported relationship may suffer from a potential endogeneity bias. In this paper, using data from the Canadian Community Health Survey (CCHS) from 2003 to 2014 (except for Quebec), I apply the instrumental variable (IV) approach by using various parametric and semi-parametric econometric models to identify the causal effects of language proficiency on health outcomes and healthcare utilization of immigrants. My first instrument is the interaction between an indicator for early arrival (age at arrival is less than or equal to 9 years old) and an indicator for a country of origin where the dominant language is not English. The second instrument is the interaction between an indicator of an early arrival and linguistic distance from English. My finding contradicts the idea that immigrants with poor language facilities are less likely to have a regular doctor. I find that good self-reported health is positively associated with language proficiency. However, I find no statistically significant causal effect of language proficiency on reporting 'good mental health'. In addition, I find strong evidence that the

utilization of hospital and mental health care services are positively associated with being English-language proficient even after controlling for many possible sets of factors. This is consistent with other studies (Brar et al., 2009; Latif, 2010; Latif & Miles, 2012; Sun et al., 2010), where a language barrier is associated with lower use of preventative health care services by various ethnic communities.

The final chapter of my thesis "Is There Any Difference in the Medical Expenses Tax Credit Patterns for Immigrants Compared to Non-immigrants in Canada?" contributes by supporting existing literature, but with a completely different dimension: the medical tax perspective. There is a small number of studies that focus on health-related tax measures (Emery, 2016; Smart & Stabile, 2005). I am unaware of any previous research that directly compares the claim patterns of the Medical Expense Tax Credit (METC) and/or refundable Medical Expense Supplement (MES) for immigrants with those of non-immigrants in Canada. In this paper, I implement an empirical strategy using data from the Longitudinal Administrative Database (LAD) from 2004 to 2013. I implement a two-part model, where the first part models that claiming of any METC and/or MES, and the second part addresses the claim amounts, conditional on having any positive claim. My results show that there are differences in the proportions of tax filers who claimed the METC and/or MES, and the amounts of a claim for the METC and/or MES for immigrants compared to non-immigrants; differences are also observed by age, years since migration (YSM), province and immigration categories. In both couples and single families, a lower proportion of immigrant tax filers claimed gross immediate family medical expenses (GME), potential METC claims, and METC refunds compared to non-immigrants. In the

case of single families, a higher proportion of non-immigrant tax filers claimed MES compared to their immigrant counterparts.

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Chapter One

Does the Pattern of Healthcare Utilization by Immigrants Differ Compared to Non-immigrants in Canada?

1.1 Introduction

Canada has a higher immigration rate than most OECD countries, and health and healthcare utilization of the large immigrant population raise important considerations for both immigration and healthcare policy. In Canada, healthcare is organized provincially and to receive federal funding must meet the standards of the Canada Health Act that include: public administration, comprehensiveness, universality, portability, and accessibility.[1] Despite the publicly funded provision of healthcare in Canada, immigrants face challenges not common for non-immigrants. The most common issues were found to be: communication, information, culture, socio-economic status, healthcare system structure, and knowledge (Ahmed et al., 2016; Kalich, Heinemann, & Ghahari, 2016). Notably, people use healthcare services not only for preventing and curing health problems but also for promoting the maintenance of health and well-being or obtaining information about their health status and diagnosis. Even though immigration is a major source of population

[1] Government of Canada. Canada's health care system 2016 [Available from: https://www.canada.ca/en/health-canada/services/canada-health-caresystem.

growth in Canada, very few studies have explicitly focused on immigrants' healthcare utilization patterns compared to non-immigrants using data other than self-reports. In particular, we are unaware of any study that separately focuses on the factors related to both incidences of a physician visit and the number of physician visits for immigrants compared to non-immigrants in Canada using reliable administrative billing data.

There are three reasons why healthcare utilization patterns might be different for immigrants and non-immigrants in Canada. The first reason pertains to language barriers. In earlier years, most immigrants to Canada came from the USA, the UK, and a few European countries. In 1967 Canadian immigration legislation was liberalized to encourage immigration from non-English speaking countries (Setia et al., 2011). According to Statistics Canada (2007), 70% of recent immigrants reported a mother tongue other than English or French. Consequently, immigrants, especially those who are new, may face language barriers in accessing healthcare services.

The second reason why healthcare utilization patterns may differ for immigrants relates to the level of income, health, and environment of the source country. There is a substantial increase in the number of immigrants coming from Asia, Africa, and the Middle East, mostly from low- and middle-income countries, with these continents making up 72.6% of the total recent immigrant population (Statistics Canada, 2004, 2012). Immigrants from low- or middle-income countries may differ from those from high-income countries on many dimensions, such as source country culture, healthcare system and nutrition standards. Also, in some of these countries, inequality and the relatively poor treatment of females are a common phenomenon (UNDP Report, 1994).

Lastly, while self-selection processes and Canadian immigration policy ensure that, at the time of arrival, immigrants are on average healthier than the Canadian-born population, many researchers suggest that this health advantage does not persist over time (for example, Lu & Ng,

2019; Maio, 2010; Setia, Quesnel-Vallee, Abrahamowicz, Tousignant, & Lynch, 2011; Subedi & Rosenberg, 2014). This is another reason why healthcare utilization patterns may differ for immigrants compared to non-immigrants. However, this declining time trend in relative immigrant health status is found, with a few exceptions, mostly in studies using self-reported health status. An important caveat is that as time in Canada increases, immigrants may adopt Canadian social norms and their standard regarding what constitutes "good" and "excellent" health evolve. This implies that their reported health may decline with time in Canada even though nominally objective measures of health status stays constant. Alternatively, consistently measured health status may decline for immigrants more quickly than for the Canadian born as a result of various factors identified in the literature, and including: the loss of social status and social networks, cultural barriers, adoption of Canadian behaviors, and poor working conditions (Asanin & Wilson, 2008; Deri, 2005; Devillanova, 2008; Gee, Walsemann, & Takeuchi, 2010; Liu, Xue, Yu, & Wang, 2016; Pippins, Alegría, & Haas, 2007; Shi, Lebrun, & Tsai, 2009).

Although a large number of studies have examined the health status of immigrants, to date only a small number of studies have specifically examined healthcare utilization by immigrants in Canada. Most of the available studies use data from the National Population Health Survey (NPHS) (for example, Latif & Miles, 2012; Newbold, 2009; Setia et al., 2011) and the Canadian Community Health Survey (CCHS) (for example, Laporte, Nauenberg, & Shen, 2008), where healthcare utilization is assessed using self-reports of healthcare utilization. However, several factors affect the accuracy of self-reported healthcare use including sample population, cognitive abilities, recall time frame, type of utilization, utilization frequency, questionnaire design, mode of data collection, and memory aids and probes (Bhandari & Wagner, 2006). Additionally, survey measures are almost universally quite limited. For example, they sometimes indicate whether there has been a physician visit in some limited time period, but do not indicate the number of visits. In contrast, our study is based on a dataset that links the Canadian Community Health Survey (CCHS) from 2004/5 with

administrative billing data from the Ontario Health Insurance Plan (OHIP). This combination avoids the measurement error associated with self-reporting, and also provides much more extensive data on utilization than that found in the survey data. In addition, there are several other advantages to the current study, which focuses on two simple but related questions. First, what are the important factors determining having had at least one physician visit as well as determining the number of visits conditional on having at least one visit? Second, is there any difference in the utilization patterns between general practitioners (GP) and specialists (SP)?

To answer the first question, we implement a two-part model, where the first part applies logistic regressions to assess the factors instigating a physician visit and the second part applies zero-truncated negative binomial regression models to capture the frequency of physician visits, conditional on having at least one visit. The effect of 'age at immigration' is also examined.

The second question is asked because in Canada GPs are in a gate-keeping role in authorizing access to specialty care, hospital care, and diagnostic tests. Making an appointment with a GP is almost entirely a patient's discretion (assuming a GP accepts the patient). GPs refer patients to SPs. GPs choose an SP after considering a variety of factors, for example, the SP's medical skill, their previous experience with the SP, office location, quality of communication between them, and patients' preferences. This implies that the patient drives the demand for a GP visit, while the demand for an SP visit is at least partly, and likely primarily, driven by the GP (Asada & Kephart, 2007).

1.2 Literature Review

1.2.1 Previous Research on Healthcare Utilization in Canada

Analyses of the factors predicting healthcare utilization in Canada have received considerable attention. With very few exceptions, studies attempt to explain the relationships between socioeconomic status, health status, and the utilization of physicians' services. For example, research shows that the likelihood of an individual visiting a primary care physician at least once a year depends on income. Canadians with lower incomes are more frequent users of primary care physicians (Dunlop, Coyte, & McIsaac, 2000). On the other hand, lower-income is found to be associated with less contact with GPs, but among those who had contact, people with lower income and lower levels of education are more frequent users of GPs (Asada & Kephart, 2007). Another study also reports that those with lower socioeconomic status, former daily smokers, the physically inactive, current non-drinkers and the obese are more likely to be high-cost users of healthcare (Rosella et al., 2014).

1.2.2 Previous Research on Healthcare Utilization Comparison between Immigrants and Non-immigrants in Canada

Only a few studies have looked at the factors determining utilization patterns and the difference in healthcare utilization of immigrants compared to non-immigrants in Canada. Some studies (for example, Deri, 2005; McDonald & Kennedy, 2004) indicate a significant lower-utilization of HC services by immigrants compared to non-immigrants in Canada. Using data from the Canadian National Population Health Survey, the study by Latif & Miles (2012) compares the number of visits to GPs by Canadian-born elderly people to that of elderly immigrants. It suggests that there is no significant difference between elderly immigrants and non-immigrants in their use of using GP services.

A study by Latif (2010) examined the factors responsible for the gap in Pap test utilization rates between recent immigrants and other Canadians using data from the Canadian National Population Health Survey (1998–1999). The results suggest that the variables representing race,

language, having a regular physician, insurance status and income level are the main correlational factors with the utilization gap, which gradually narrows with years since migration. The results of a study by Sun et al. (2010) found that screening mammography rates are persistently lower in Asian immigrant women aged 50-69 compared to non-immigrant women in Canada. In this case, language is found to be a barrier. The authors suggest incorporating culturally and linguistically sensitive education programs about the risk of breast cancer in outreach to this population group.

The study by Gee, Kobayashi, & Prus (2004) shows that age at immigration affects the health of mid-to-later life immigrants compared to non-immigrants. They find the healthy immigrant effect applies only to later mid-life immigrants (ie., those who immigrated less than 10 years ago, aged 45 to 64); but in the case of older immigrants (65 years and over) the scenario is reversed, and recent immigrants have poorer health than Canadian born persons. Age at migration is clearly an important factor for the study of immigrant health and healthcare utilization.

1.2.3 Healthcare Utilization Comparison between Immigrants and Non-immigrants Outside of Canada

Outside of Canada, there is a range of studies that compare healthcare utilization patterns between immigrants and non-immigrants. Of course, care needs to be used in international comparisons given differences in both immigration patterns and national health care systems. Using data from the 1998 Medical Expenditure Panel Survey linked to the 1996-1997 National Health Interview Survey, Mohanty et al. (2005) find that per capita healthcare expenditure is substantially lower for immigrants compared to non-immigrants in the USA. A systematic search of ‘immigrants and healthcare’ resulting in 1559 articles suggests that immigrants incur lower costs than U.S. born citizens, with the exception of emergency department expenditures for immigrant children (Derose, Bahney, & Lurie, 2009).

For Spain, using data from the 2003 and 2006 Spanish National Health surveys, Hernández-Quevedo and Jiménez-Rubio (2009) investigate inequalities in health and healthcare utilization for immigrants compared to the Spanish population. The differences between immigrants and native-born individuals are small for visits to a GP, but immigrants have a lower probability of visiting an SP, which implies they face barriers to SP services or that they are healthier. Another study, based on data from the 2006 to 2007 National Health Survey, shows that there is no statistically significant difference between immigrants and native-born individuals in the pattern of utilization of physician services and rates of hospitalization (Bustillo & Antón, 2009). However, papers find evidence that immigrants have comparatively lower access to SPs, but have a higher frequency of visits for emergency services than the Spanish population (Bustillo & Antón, 2009; Rué et al., 2008). A study by Rué et al., (2008) demonstrates that immigrants from lower-income countries utilize more emergency services, which might indicate that such groups have more accidents that require emergency services, have different preferences or face barriers to non-emergency healthcare services in host countries and use emergency services as a substitute. Moreover, a study by García Gómez & López Nicolás (2006) shows that the difference in utilization decrease with the number of years that immigrants' stay in the host country. The study concludes that the immigrant population has limited knowledge about the functioning of healthcare systems in host countries, which might be the reason for differences in their healthcare utilization pattern.

A study based on the Survey of Health, Aging and Retirement in Europe (SHARE, 2004) for 11 European countries shows that on average, immigrants who are aged above 50 use more healthcare services compared to members of the native-born population with the same characteristics (Solé-Auró, Guillen, & Crimmins, 2009). The result suggests that immigrants have a 6% to 27% higher probability of visiting the doctor or being hospitalized compared to the native-

born population. The study concludes that 'cultural reasons' might be responsible for the more intensive use of healthcare services by elderly immigrants.

1.3 Sources of Data and Descriptive Statistics

1.3.1. Data

The data for this study comes from individual-level information from the CCHS cycle 3.1 (2004/2005), linked with administrative billing data from the OHIP 2004/2005. The CCHS 3.1 Ontario Share File only includes the 87% of Ontario resident respondents who permitted their survey responses to be linked with administrative datasets. Survey weights are employed to (partly) account for the limited linkage, as well as survey non-response and other issues.

The CCHS is a cross-sectional survey of Canadians 12 years and older residing in a private dwelling. In this study, respondents aged 12-17 are excluded because our targeted sample is only the adult population of Ontario respondents. CCHS 3.1 excludes full-time members of the Canadian Armed Forces, as well as individuals living on Reserves or Crown lands and in certain remote regions. The survey collects information on respondents' personal characteristics, self-reported health status, health factors, demographic, socioeconomic characteristics, and healthcare utilization.[2]

All permanent residents of Ontario, except personnel of the Canadian Forces and Royal Canadian Mounted Police, and prisoners of federal jails, are covered by a single-payer public insurance system referred to as OHIP. The advantage of using the OHIP dataset is that it provides

[2] This information is found in Statistics Canada user guides, which are not publicly available.

detailed information on all claims made by GPs and SPs, as well as the diagnostic and laboratory tests conducted outside of hospitals. Moreover, it provides information on patients' age, gender, cost and dates of services received, and associated healthcare utilization characteristics. Because the data set linked OHIP records with the CCHS share file, our sample also includes persons who receive no OHIP services in that year.

Our outcomes of interest are the number of GP and SP visits. The use of GP/SP is defined as contact with a GP/SP in the past year. Family physicians are the 'gatekeepers' and play a key role in providing both services and also access to other healthcare services (such as drugs, diagnostics and SPs services). We consider the use of GPs and SPs in terms of both incidences of use (use or non-use) and the number of occurrences (frequency of visits).

The main independent variables of interest that are specifically relevant to the immigrant population are years-since-migration (YSM), language proficiency and the income level of the source country. Language proficiency is defined as the mother tongue being English or French. The categorizations for the income level of the source country are low, medium, high and unknown using the World Bank's classification of countries based on gross national income (GNI) per capita in the year the immigrant came to Canada. For example, in 1980, China was categorized as low-income, whereas it became a middle-income country after 1986. Of course, what really matters is what the immigrant was exposed to before immigration, especially at early age, which appears to be critical for health.

Other independent (or sometimes endogenous) variables are added to the model to capture the potential confounding effects of socio-demographic, health and behavioral characteristics on healthcare utilization for immigrants and non-immigrants. Previous work on factors predicting health and immigrant's health guides the selection of the explanatory variables for the study (Aday & Andersen, 1981; Andersen & Newman, 1973; Chen, Smith, & Mustard, 2010; Lebrun, 2012;

McDonald & Kennedy, 2004; Newbold, 2009; Rosella et al., 2014). Aday and Anderson's foundational framework for potential access to care is a very useful tool for selecting covariates; it organizes them into three broad categories: predisposing factors, enabling factors and need-based factors. Pre-disposing factors include the following demographic factors: age, gender, marital status, and race/ethnicity. Enabling factors are determined by the availability of individual and community-level resources which include access to physician services, education, health insurance coverage and living in an urban area (Aday & Andersen, 1981; Lebrun, 2012). Educational attainment is categorized as less than high school, high school graduate, some post-secondary/diploma, bachelor/above, and missing education; having supplementary medical insurance categories are: no insurance, insurance provided by the government, insurance provided by the employer, and purchased insurance (privately).

Including self-rated health, defined categorically as poor, fair, good, very good, and excellent, addresses need-based factors for healthcare utilization, as does having a chronic condition (CC).[3] We consider all types of chronic conditions; this study categorizes chronic conditions as: a person suffering from 0, 1, 2, 3, and 4 or more chronic conditions. Moreover, to define lifestyle, other variables are incorporated, such as: smoking status (smoker/ non-smoker) and drinking status (alcohol-drinker/ non-drinker). Also, Body Mass Index (BMI) is used as an independent variable; four broad BMI categories are included: underweight or normal, over-weight, obese and pregnant.

However, while the study considers a large set of independent variables or regressors, all of them are not truly "independent". Here, age, years since migration, mother tongue, and income

[3] Chronic conditions included are: (a) Associated with an elevated risk of mortality high blood pressure, chronic bronchitis or emphysema, diabetes, heart disease, cancer, suffered from the effects of a stroke, etc. (b) Possibly associated with an elevated risk of mortality: asthma, Alzheimer disease, other dementia or other psychiatric conditions (c) Not associated with elevated risk mortality: food allergies, allergies other than food allergies, arthritis or rheumatism, back problems excluding arthritis, migraine headaches, sinusitis, epilepsy, stomach or intestinal ulcers, urinary incontinence, cataracts, glaucoma, and other long-term conditions (Kaplan et al., 2007).

level of the source country are "true" exogenous variables. The remaining variables, for example, level of education, having supplementary health insurance, receiving social assistance, chronic conditions, and BMI are endogenous variables because the values of these variables are determined by other variables. In the regression models, when we use any control variable that is not "true exogenous", it is possible that the control is poor. For example, although BMI is a strong predictor of both health status and use of physician services, BMI dummies might be poor controls to use in regressions to capture the causal effects of health status on the use of physician services.

1.3.2. Descriptive Analysis

Table 1.1 provides the weighted sample (column) percentages and means for each of the dependent and explanatory variables used within the study for four subgroups: immigrant males, non-immigrant males, immigrant females, and non-immigrant females. For each gender, adjacent to the immigrant and non-immigrant columns is a column of p-values from two-sided t-tests with the null hypothesis that the relevant immigrant and non-immigrant portions/means are equal.

A significantly higher percentage of male immigrants had at least one GP and SP visit compared to non-immigrants. For males, among those who visit physicians at least once, non-immigrants are more likely to have a small number of visits, and immigrants are more likely to have a large number of visits. For females, the same story applies to GPs, but not for SPs. Specifically, in the case of SP visits, a significantly higher percentage of female immigrants do not use any SP services; female immigrants are less likely to have a large number of SP visits than non-immigrants, except in the case of "6 to 10 visits".

On average, immigrants are significantly older than non-immigrants, with proportionately fewer immigrants under age 30 and more over age 55. A larger proportion of immigrants (both males and females) report having achieved a bachelor's or higher degree compared to non-immigrants, and immigrants are more likely to be married compared to non-immigrants. Among

the immigrants, overall only 29% report a mother tongue as either English or French.

Turning next to health-related outcomes that we use as regressors, it is important to note that a larger proportion of immigrants do not have any supplementary health insurance compared to non-immigrants. Also, the distribution of the number of chronic conditions (CCs) in Table 1.1, shows that immigrants make up a comparatively small proportion of the sample population with CCs, with a significantly smaller proportion indicating that they are suffering from more than 4 CCs (for both males and females) compared to non-immigrants.

[Table 1.1 here]

[Chart 1.1 here]

Chart 1.1 shows the proportion of self-reported poor or fair health for immigrants and non-immigrants. In the younger age group (up to age 44), comparatively few immigrants report poor or fair SRH compared to non-immigrants. After the age of 44, the scenario is sometimes the opposite: a higher percentage of immigrants indicate their SRH as being poor or fair compared to their counterparts. The chart can be regarded as supporting the "Healthy Immigrant Effect".

[Chart 1.2 here]

Chart 1.2 shows a combination of the aging and cohort effect. We see that a lower percentage of new immigrants (females, males and all) report their self-rated health as poor or fair. However, the percentage increases with the increase in the number of years in Canada. When comparing male and female immigrants, males consistently report comparatively better health than females. It is important to note that those with greater years since migration are average, older than those with lower years since migration.

[Chart 1.3 here]

[Chart 1.4 here]

Charts 1.3 and 1.4 illustrate the distribution of the differences between immigrants and non-immigrants in the utilization of GP services by gender and age group. It can be seen that both male and female prime-aged (18 to 65) immigrants have a higher proportion of reporting more than 6 GP visits, compared to their counterparts. On the other hand, for older immigrants (66+), the distributions are dissimilar for males and females. Similarly, the graphs in Chart 4 illustrates the distribution of the differences between immigrants and non-immigrants in the utilization of SP services by gender and age group. For the prime-aged immigrants, this distribution is almost opposite for males and females. However, for the older respondents, who are frequent users, male immigrants have higher utilization than their counterparts, whereas females do not.

1.4 Methodology

The two-part model is commonly used in health economics studies (Lahiri & Xing, 2004; Mullahy, 1986; Sarma & Simpson, 2006). The two-part model is a good fit for our case because it can distinguish a positive-versus-zero use of physician services, from the subsequent frequency or volume of uses. We conduct separate analyses for GP and SP visits. For each case, we use a two-part model.

In the two-part model, a binary choice model is fit for the probability of observing a positive-versus-zero outcome. Then, conditional on a positive outcome, a suitable regression model is fit for the number of visits (Belotti, Deb, Manning, & Norton, 2015). In the first stage, logistic regressions are performed to assess the factors associated with having at least one physician visit in the past 12 months. Then, in the second stage, we estimate a count data model to analyze the factors associated with the number of physician visits in the past 12 months, conditional on having had at least one visit. In this stage, for example, ‘the number of GP visits’ is a strictly positive dependent variable. In such cases, performing a zero truncated Poisson regression is an option, but that model

assumes that the mean and variance are equal and that every count is independent of the others. However, the variance of healthcare utilization data might exceed the mean. In our context, the zero-truncated negative binomial model is more suitable because this model relaxes the independence assumption and allows for over-dispersion (Asada & Kephart, 2007).

In this study, all the analyses are weighted with probability weights to adjust for the unequal probability of selection. All the reported standard errors are robust standard errors and all odds ratios are estimated using maximum likelihood estimation. For the zero-truncated negative binomial regression model, the overdispersion parameter is reported (Czepiel, 2002).

The model of interest is:

$$P_i(Y = y_i|X_i) = IM_i'\beta_{IM} + X_i'\beta_X + (X_i * IM_i)'\beta_{X*IM} + \varepsilon_i \quad (1)$$

where the dependent variable y_i is the number of GP or SP visits in the last 12 months, and X_i is the vector of explanatory variables of the study. The study considers two different sets of equations with two different combinations of explanatory variables. In the first vector of explanatory variables, we only consider exogenous variables: YSM, mother tongue, and income of the source country. The second set considers both exogenous and endogenous variables: YSM, mother tongue, the income of the source country education, supplementary health insurance, social assistance, chronic conditions, smoker, alcohol user, BMI, urban, self-rated health and cultural/ethnicity. Here, IM_i indicates whether or not the individual is an immigrant and $(X_i * IM_i)$ denotes the interaction between each explanatory variable and the respondent's immigration status. In this context, β_{X*IM} is the coefficient underlying the odds ratios for the interaction effects for being an immigrant, compared to the corresponding non-immigrants.

The binomial logistic model can be shown as:

$$P_i\ (Y = y_i^*|\ X_i) = \frac{1}{1+exp^{(IM_i'\beta_{IM}+X_i'\beta_X+(X_i*IM_i)'\beta_{X*IM}+\varepsilon_i)}} \quad (2)$$

$$\text{Where } \; y_i^* = 1 \; if \; visit \; to \; any \; physicia \; in \; last \; 12 \; months$$

$$= 0 \; if \; no \; physician \; visit \; in \; last \; 12 \; months$$

The density function of the zero-truncated negative binomial (ZTNB) can be shown as:

$$P_i\,(Y = y_i^* | y_i^* > 0, X_i) = \frac{P(Y = y_i^* | X_i)}{P(y_i > 0)}$$

$$= \frac{\exp(-\mu_i)\mu_i^{y_i}}{[1-\exp(-\mu_i)]y_i!} \qquad (3)$$

Where $\mu_i = exp(IM_i'\beta_{IM} + X_i'\beta_X + (X_i * IM_i)'\beta_{X*IM} + \varepsilon_i)$

When ZTNB, $y_i^* = 1, 2, 3, 4 \ldots 21+$, number of physician visits in last 12 months

We apply two-parts model for using GP and SP separately, and the analyses are performed separately for each gender and two age categories: age18-65 and age 66+. Also, we apply a two-part-model according to gender and age at migration (AAM), where AAM is divided into three categories: AAM 0-12, AAM 13-35, AAM 36+. These analyses use the full set of explanatory variables of the study.

1.5 Analytical Results

1.5.1 GP Visits: Two-part Model

1.5.1.1 First Part

We separately examine factors associated with any GP visit and factors associated with the number of GP visits conditional on having at least 1 visit, by using logistic regressions and ZTNB model analysis, as shown in Tables 2 and 3, respectively. The results are presented in two different sets of equations with two different combinations of regressors: the first set considers only exogenous variables and is labeled as “Set A”, where the second set considers both exogenous and endogenous variables and is labeled as “set B”.

According to part 1, both male and female prime-aged (18-65) immigrants are less likely to have any GP visit compared to non-immigrant counterparts when only exogenous variables are

controlled, as shown in columns 1 and 3 under "set A" of Table 1.2. YSM is a highly statistically significant factor for increasing the probability of any GP visit for all prime-aged immigrants both when we control only exogenous variables and when we control both exogenous and endogenous variables. Overall, odds ratios for YSM are relatively higher when we control only exogenous variables. For example, for prime-aged (18-65) males, an increase in one year of YSM increases the probability of having at least 1 GP visit by 5.5% when we control only exogenous variables, otherwise, it is 6.8%. Interestingly, prime-aged male immigrants from low-income countries have a higher probability of having at least 1 GP visit compared to those from rich countries and non-immigrants, irrespective of the set of controls. The scenario is opposite for older female immigrants from low-income countries when controlling only the exogenous variables.

[Table 1.2 here]

Turning to the endogenous variables that are used as regressors in the second set (Set B) of equations, education, especially having some post-secondary education/diploma, high school graduation and bachelor's or higher degree, is significant for decreasing the probability of having any GP visit for prime-aged (18-65) male immigrants compared to non-immigrants with the same level of education. By contrast, these factors play just an opposite role for older (66+) male immigrants compared to their counterparts. However, the odds ratios for older female immigrants with a bachelor's or higher degree of having any GP visits are significantly higher (8.701) than the odds ratios of their non-immigrant counterparts.

The interaction effect of being a smoker is also a significant and increasing factor for using at least 1 GP service for older male immigrants. In contrast, being an alcohol drinker reduces the probability of using any GP for prime-aged female immigrants compared to their counterparts.

1.5.1.2 Second Part

In part 2, when we control only exogenous variables, we do not find any statistically significant coefficients on any of our immigrant variables in the estimated number of visits (conditional on having at least one visit) equation.

[Table 1.3 here]

According to part 2, when both exogenous and endogenous variables are controlled, prime-aged female immigrants have a 53.1% higher probability of increasing the number of GP visits, conditional on having at least one visit, as compared to non-immigrant counterparts. Having supplementary medical insurance is an important factor influencing the number of GP visits for immigrants, but plays the opposite role for prime-aged males and females. For example, with having an employer or private insurance, the odds of visiting a GP are 1.271 and 0.848 times that of the corresponding odds for a male and female non-immigrant, respectively.

Moreover, conditional on having at least 1 GP visit, being obese and/or being pregnant are significant factors associated with fewer GP visits for prime-aged female immigrants compared to same-aged female non-immigrants. On the other hand, results shown in column 6 of Table 1.3 implies that having a chronic condition is a statistically significant factor for having fewer GP visits for older male immigrants, as compared to their non-immigrants counterpart.

1.5.2 SP visits: Two-part model

1.5.2.1 First Part:

Following the GP visits, the estimated results with factors of having any SP visit (part1), and factors associated with the number of SP visits conditional on having at least one SP visit (part 2), are reported in Tables 4 and 5, respectively.

[Table 1.4 here]

According to part 1 where only exogenous variables are controlled in the regressions, as shown in Table 1.4, both prime-aged male and female immigrants are less likely to have any SP visit compared to their non-immigrant counterparts. These results are statistically significant.

In both sets of regressions, with controlling only exogenous variables and with controlling both exogenous and endogenous variables, YSM is highly significant for increasing the probability of having at least one SP visit for both prime-aged male and female immigrants. It implies that the probability of using any SP service is higher as the number of years in Canada increases. In addition, older female immigrants from middle-income countries have a significantly lower probability of using any SP service compared to those from rich countries, in both sets of regressors. However, the scenario is just the opposite for prime-aged female immigrants from middle-income countries who are more likely to have at least one SP visit, when both endogenous and exogenous variables are controlled in the regressions.

Regarding the probability of having at least 1 SP visit, the second set of equations (set B) in Table 1.4 shows that most of the odds ratios of statistically significant interaction terms are lower than 1.00. This implies that overall immigrants have a lower probability of having at least 1 SP visit compared to the non-immigrants. For example, pregnant immigrants have a significantly lower probability of visiting an SP, while the odds ratios of the interaction effect are only 0.303. The variable interacting immigrant with poor/fair SRH is statistically significant and has an odds ratios of 2.399, which implies that prime-aged male immigrants who report poor/fair SRH, have a 2.399 times higher probability of visiting an SP compared to prime-aged non-immigrant males. However, living in an urban area is highly associated with a higher probability of visiting any SP (around 7.134 times higher) for older male immigrants.

1.5.2.2 Second Part:

Regarding the number of SP visits conditional on having at least one SP visit, the empirical evidence from Table 1.5 indicates that the differences in the utilization of SP between immigrants and non-immigrants are insufficient to draw any result. However, YSM increases the probability of having a higher number of SP visits for prime-aged male immigrants, when only exogenous variables are controlled. On the other hand, YSM is associated with a fewer number of SP visits for prime-aged female immigrants conditional on having at least one SP visit irrespective of the sets of regressors.

[Table 1.5 here]

However, both older female immigrants who have government-provided supplementary health insurance and older unmarried male immigrants are associated with fewer SP visits compared to the corresponding non-immigrant counterparts. On the other hand, having chronic conditions is associated with a higher number of SP visits, for older female immigrants.

1.5.3 GP Visits: Two-part Model (Stratification by Age at Migration)

To conduct analysis and comparison, Age at Migration (AAM) is divided into three categories: AAM0-12, AAM13-35, and AAM 36+. Results for the childhood immigrants whose AAM is between the ages of 0 to 12 years old (AAM 0-12) and later life immigrants who came to Canada after the age of 36 (AAM 36+) are presented in Table 1.6 (part 1) and Table 1.7 (part 2), respectively.

1.5.3.1 Part 1

YSM is significantly and positively related to a higher probability of using at least 1 GP service for both male and female later life immigrants both when controlling only exogenous variables (set A) and also when controlling both exogenous and endogenous variables (set B). For example, when only exogenous variables are controlled for in set A, childhood male immigrants from low-income countries have a 1.794 times higher estimated probability of having any GP visit

as compared to those from high-income countries.

[Table 1.6 here]

Apart from "true" exogenous variables, among the childhood female immigrants, having two CCs and/or being a smoker make them less likely to visit a GP compared to non-immigrant females, as shown in Table 6. On the other hand, later female immigrants with pregnancy indicate a significantly lower probability of visiting any GP and also exhibit a significantly lower frequency of using GP services compared to female non-immigrants. Interestingly, for later life male immigrants having any post-secondary/diploma education is associated with decreasing the probability of visiting any GP.

1.5.3.2 Part 2

According to part 2, conditional on having at least one GP visit, childhood female immigrants are less likely to have a large number of visits, as shown in Table 1.7. In this case, the odds ratios vary across the two sets of regressors. However, childhood female immigrants who report a mother tongue other than English or French are associated with fewer GP visits, as compared to immigrants who report their mother tongue as either English or French. With controlling only exogenous variables, Column 4 of Table 1.7 reports that later life female immigrants from low-income countries are more likely to have a higher number of GP visits (conditional on having at least one GP visit), as compared to immigrants from high-income countries. On the other hand when both exogenous and endogenous variables are controlled, conditional on having at least one GP visit, later life female immigrants are less likely to have a large number of visits. For female childhood and later life immigrants, age is associated with a 1.1 or 1.026 times increase in the number of GP visits, as compared to their non-immigrants counterparts, as shown in columns 7 and 8 of Table 1.7.

[Table 1.7 here]

Turning to the endogenous regressors, conditional on having at least one GP visit, having more education (particularly high school graduation or a bachelor's or higher degree) and incidence of chronic conditions are significant factors for increasing the number of GP visits for females who came to Canada as children. All the female immigrants, irrespective of their AAM, tend to have fewer GP visits when obese and/or receiving social assistance. Interestingly, having insurance provided by an employer or purchased privately is associated with a higher number of GP visits for male later life immigrants, while it is associated with fewer visits for later life female immigrants. In contrast, male childhood immigrants who are non-married and/or smokers tend to have more GP visits, conditional on having at least one GP visit.

1.5.4 SP Visits: Two-part Model (Stratification by Age at Migration)

1.5.4.1 Part 1

The estimated results on factors of visiting any SP (part 1), and factors associated with the number of SP visits conditional on having at least one SP visit (part 2), are reported in Tables 1.8 and 1.9, respectively.

Later life female immigrants are less likely to have any SP visits compared to non-immigrant females when only exogenous variables are controlled, as shown in column 4 of Table 1.8. Irrespective of the set of regressors, just as in the results on using any GP service, YSM is also significant and positively related to a higher probability of using any SP service for both male and female later immigrants. In addition, with both sets of controls (set A and set B), childhood female immigrants from medium-income countries are more likely to have any SP visit, as compared to immigrants from high-income countries.

[Table 1.8]

With respect to the endogenous variables, as shown in Table 1.8, receiving social assistance

and/or pregnancy reduces the probability of having at least 1 SP visit for female childhood immigrants and female later life immigrants respectively, as compared to their corresponding counterparts. However, male later life immigrants exhibit a higher probability of contracting an SP when they are alcohol drinkers but exhibit a lower probability of visiting an SP when they have some post-secondary education or a diploma.

1.5.4.2 Part 2

According to the part 2 results of Table 1.9, conditional on having at least one SP visit, irrespective of the set of controls, childhood female immigrants are less likely to have a large number of SP visits. Also, an increase in age by one year has statistically significantly 1.142 or 1.152 times higher effects on the number of SP visits for childhood female immigrants, as compared to non-immigrant counterparts, as shown in columns 3 and 7 of Table 1.9. These two odds ratios for the interaction terms of age are obtained by using the two sets of regressors. However, the respective quadratic odds ratios for the interaction terms of age are less than 1.00, which implies a diminishing effect of age on having a larger number of SP visits, as compared to their non-immigrants counterparts. Conversely, when only exogenous variables are controlled in the regressions, later life male immigrants with a mother tongue other than English or French are less likely to have a larger number of SP visits. Also, female childhood immigrants from a medium-income country exhibit a higher frequency of using SP services conditional on having at least one SP visit. These two statistically significant results disappear when both exogenous and endogenous variables are controlled.

[Table 1.9]

With respect to the endogenous variables, as shown in “set B” of Table 1.9, conditional on having at least one SP visit, having 4 or more chronic conditions is associated with a higher number of SP visits for childhood female immigrants. On the other hand, female later immigrants, who are

alcohol drinkers and/or obese, have a higher number of SP visits. However, for childhood male immigrants, all levels of education tend to increase the frequency of using SP services compared to their non-immigrant counterparts, whereas having supplementary medical insurance, provided by the employer or purchased privately, is associated with fewer SP visits.

1.6 Discussion

While many studies have explored the factors of healthcare utilization, very few studies have compared factors determining healthcare utilization patterns for immigrants compared to non-immigrants. This paper contributes to this understudied, but important area using the Canadian Community Health Survey (CCHS) linked with administrative billing data from Ontario Health Insurance Plan (OHIP).

An important feature of this study is the use of a broad range of explanatory variables: predisposing factors, enabling factors and need-based factors as well as immigrant relevant factors, and the incorporation of interactions between particular indicators with immigration status. Another important contribution of this study is descriptive statistics of the distribution of GP and SP uses by immigrants compared to non-immigrants. The study finds that among people aged 18 to 44, comparatively fewer immigrants report poor or fair SRH: the scenario is opposite for people aged over 44, which supports the “Healthy Immigrant Effect”.

The study explicitly recognizes the differences in factors causing any use versus the intensity of use of GPs and SPs, across gender, age categories, and age at migration (AAM) categories. Our results highlight some interesting findings: for example, having more education decreases the probability of using any GP services for prime-aged male immigrants compared to their non-immigrants counterpart, while it plays the opposite role for both male and female senior immigrants.

Concerning AAM, our results underline that later life male immigrants (AAM 36+), with post-secondary education or a diploma, are less likely to visit any GP or SP. In contrast, conditional on having at least one GP visit, education (high school graduation, Bachelor's and higher level) increases the frequency of using GP services for female childhood immigrants (AAM 0-12). Similarly, having such education significantly increases the number of SP visits for male childhood immigrants, as expected.

The findings in our analysis show that years since migration (YSM) is an important factor associated with healthcare utilization. YSM increases the probability of visiting any GP or SP for both male and female prime-aged (18-65) immigrants. Canadian migrant literature establishes a strong relationship between duration since migration (as a proxy of acculturation) and health status decline. The increase in probability of visiting any GP and SP with the increase in YSM for both males and females in our findings apparently supports the existing migration literature. Also, we find that YSM significantly increases the probability of using any physician services for both male and female later life (AAM 36+) immigrants. The study by García Gómez & López Nicolás (2006) shows that differences in utilization decrease with the number of years immigrants' stay in the host country. In our study, a statistically significant positive relationship between YSM and the probability of having any physician visit is found only in the case of later life immigrants, not in the case of childhood immigrants. This is one factor behind the decline over time in the differences in healthcare utilization.

Our results also reveal that prime-aged male immigrants whose mother tongue is either English or French have a higher probability of using any GP and SP services compared to non-immigrants. On the other hand, for female immigrants with a mother tongue other than English or French, the probability of using any SP services is significantly lower than for non-immigrant counterparts. This could mean that those female immigrants with a mother tongue other than English face some barriers in obtaining services.

Our results reveal some differences in the healthcare utilization patterns between immigrants and non-immigrants, also between males and females. For example, having employer-provided health insurance increases the frequency of using GP services for later life (AAM 36+) male immigrants, while it plays opposing roles for later life female immigrants. Also, among those who visit physicians at least once, immigrants are more likely to have a large number of visits compared to their non-immigrants counterparts. For males, this story applies to both the case of GPs and SPs. On the other hand, for females, the story applies in the case of GPs, but not for SPs.

The results of the paper also indicate gender difference exists in factors, for example, education, insurance, and obesity, which determine immigrants' healthcare utilization behaviours. In all the analyses, pregnant immigrants have a lower frequency of physician visits compared to pregnant non-immigrants. Our results are conceptually consistent with a study by Sun et al., (2010) that finds that screening test rates are persistently lower in Asian immigrant women compared to non-immigrant women in Canada. These results have important implications, as identifying the issues of healthcare utilization is key for understanding how the Canadian healthcare system contributes to the inequality of health outcomes.

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Table 1.1: Descriptive Statistics (Sample means and proportions of key variable)

	Male			Female		
	Immigrant	Non-immigrant	*P-value*	Immigrant	Non-immigrant	*P-value*
GP visit						
At least 1	78.3	74.5	*0.008*	87.6	88.4	*0.506*
Number of GP visits						
1 visit	12.3	16.7	*0*	8.9	11.8	*0.001*
2 visits	11.7	13.4	*0.129*	9	11.4	*0.005*
3 visits	11.9	10.1	*0.138*	8.9	10.5	*0.072*
4 visits	8.2	7.9	*0.685*	9.1	9.6	*0.523*
5 visits	6.2	5.9	*0.762*	8	9	*0.237*
6 to 10	17.7	13	*0*	27.5	22.4	*0*
11 to 20	8	5.8	*0.008*	12.7	10.3	*0.032*
21 + visits	2.4	1.8	*0.175*	3.6	3.2	*0.524*
SP visit						
At least 1	70.9	67.1	*0.016*	83.8	86.2	*0.051*
Number of SP visit						
1 visit	12.2	14.1	*0.096*	8.8	10.8	*0.032*
2 visits	8.2	9.4	*0.209*	6.9	8.4	*0.064*
3 visits	8.1	7.2	*0.371*	6.2	8.6	*0.002*
4 visits	6.6	5.8	*0.341*	5.5	6.9	*0.033*
5 visits	5.4	4.1	*0.096*	7.6	6.8	*0.263*
6 to 10	15.6	11.9	*0.001*	22.8	19.4	*0.008*
11 to 20	9.6	9.6	*0.967*	16.4	17	*0.603*
21 +visits	5.2	4.9	*0.68*	9.7	8.5	*0.167*
Age group						
Age18-24	9	16.3	*0*	8.4	14.7	*0*
Age25-30	5.9	10.9	*0*	8.9	10.3	*0.118*
Age31-34	6.9	7	*0.902*	7.5	7.2	*0.643*
Age35-40	12.9	12.4	*0.669*	14.1	11.7	*0.025*
Age41-44	10.3	10.7	*0.736*	8.4	9.1	*0.511*
Age45-50	12.6	12	*0.62*	12.6	12.1	*0.705*
Age51-54	6.9	6.4	*0.641*	7	6.5	*0.583*
Age55-60	11.5	8.3	*0.003*	9.5	8.5	*0.2*
Age61-65	8.2	5.4	*0.008*	6.9	5.4	*0.208*
Age66+	15.9	10.7	*0*	16.6	14.7	*0.007*
Education						
Less than High school	5.1	5.4	*0.688*	7.5	6.7	*0.226*
High school	8.4	10.2	*0.029*	8.7	10.6	*0.017*
Post-sec/Diploma	35.3	44.1	*0*	36	45	*0*
Bachelor & above	43.3	31	*0*	39.4	31.9	*0*
Missing	7.8	9.3	*0.166*	8.4	5.8	*0.009*
Mother tongue of Immigrants						
English/French	28.95	NA		28.61	NA	*0.512*
Other	71.05	NA		71.39	NA	*0.512*
Years Since Migration						
YSM 0-5	14.5	NA		16.3	NA	*0.211*
YSM 6-18	33.4	NA		32.5	NA	*0.975*
YSM 19+	52.1	NA		51.2	NA	*0.415*
Marital Status						
Married	77.8	62.8	*0*	68.2	60.1	*0*
Supplementary Health Insurance						

	Male			Female		
	Immigrant	Non-immigrant	*P-value*	Immigrant	Non-immigrant	*P-value*
No insurance	28.6	23.1	*0*	32.6	20.8	*0*
Govt. insurance	9.7	9.5	*0.743*	13.8	13.1	*0.441*
Employer/private	61.7	67.5	*0*	53.6	66.1	*0*
Social Assistance						
Recipient	2.5	3.4	*0.683*	3.2	4.3	*0.221*
Number of Chronic Conditions						
No CC	33.7	29.9	*0*	26.9	21.4	*0*
1 CC	26.6	27.9	*0.238*	21.9	24.4	*0.694*
2 CC	17.3	19.5	*0.015*	19.7	19.6	*0.016*
3 CC	11.5	10.6	*0.662*	12.8	13.8	*0.016*
4+ CC	10.9	12.1	*0.005*	18.7	20.9	*0.001*
Smoking						
Smoker	69.5	75.7	*0*	44.1	65.2	*0*
Drinking alcohol						
Drinker	92.3	97.8	*0*	84	95.8	*0*
Body Mass Index						
Normal/underweight	41.7	38.3	*0.015*	54.7	51.3	*0.028*
Over weight	45	41.3	*0.022*	29.4	28.1	*0.417*
Obese	13.3	20.4	*0*	14	18.8	*0*
Pregnant				1.9	1.8	*0.362*
Urban/Rural						
Urban	87.4	77.2	*0*	88.7	78.6	*0*
Self-rated Health (SRH)						
Poor	3.02	2.49	*0.278*	4.39	2.67	*0.004*
Fair	6.93	7.83	*0.223*	9.26	8.15	*0.193*
Good	30.39	27.25	*0.041*	32.72	24.99	*0*
Very good	34.37	40.72	*0*	32.91	41.39	*0*
Excellent	25.28	21.71	*0.022*	20.72	22.79	*0.117*
Cultural/ethnicity origin						
White	78.3	96.6	*0*	79.7	96.8	*0*
Income of source country						
Low	18.2	NA		15	NA	*0.14*
Medium	14.5	NA		17.9	NA	*0.03*
High	31.2	NA		30	NA	*0.841*
Unknown	36.1	NA		37.1	NA	*0.392*
Born in Canada	0	100		0	100	*0.362*
Age (Mean)	47.9	43	*0*	47.3	44.8	*0*
Std. Dev.	16.2	16.5		17	17.6	
YSM (Mean)	24.4	NA		24.2	NA	*0.571*
Std. Dev.	17			17.6		
N (weighted)	2667	10633		3173	12665	

Source: Author's calculations based on the Canadian Community Health Survey (CCHS) from 2004/5 with administrative data from the Ontario Health Insurance Plan (OHIP).

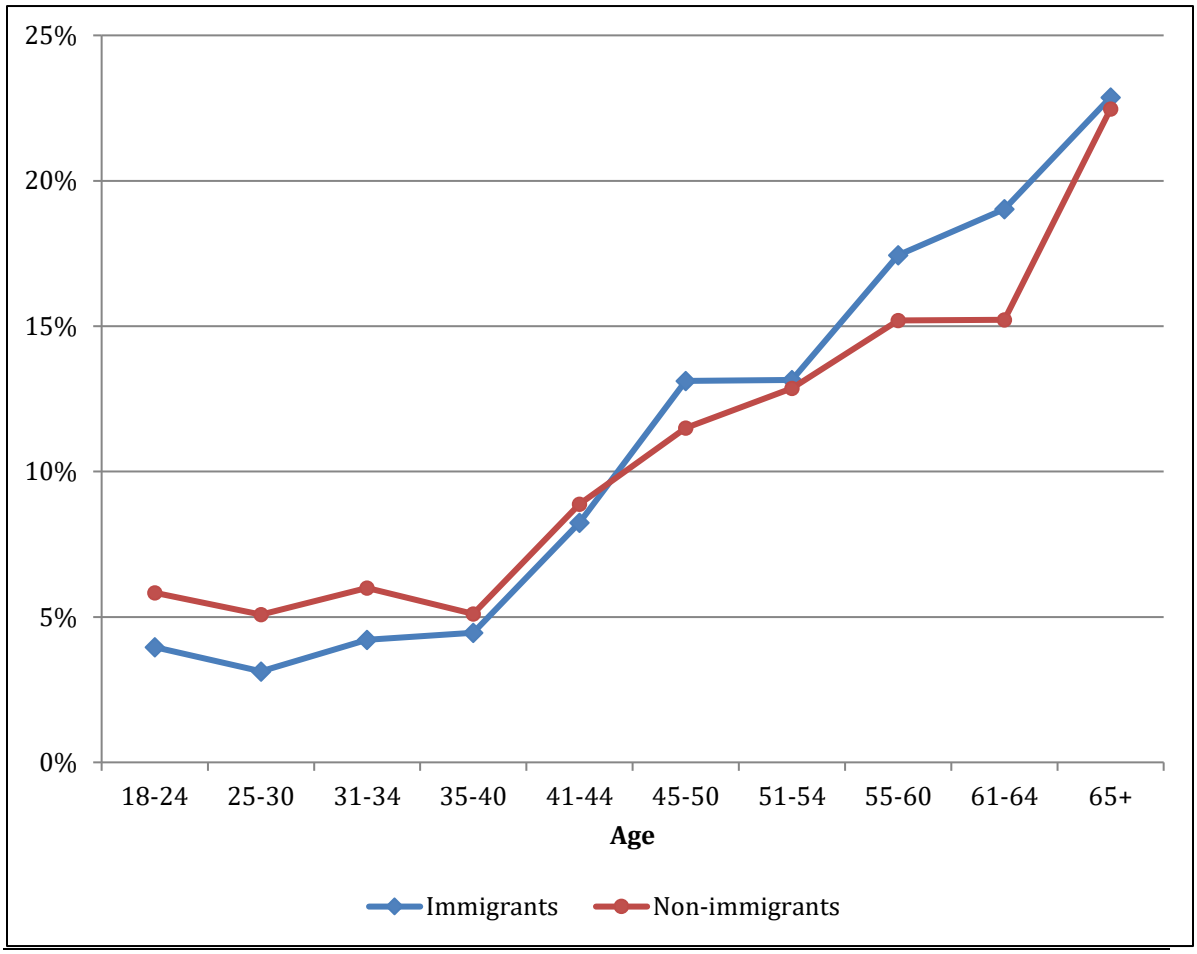


Chart 1.1: Self-reported poor or fair health by immigrants and non-immigrants, between 2004 and 2005 (all adults)

Note: Author's calculations based on the Canadian Community Health Survey (CCHS) from 2004/5 with administrative data from the Ontario Health Insurance Plan (OHIP).

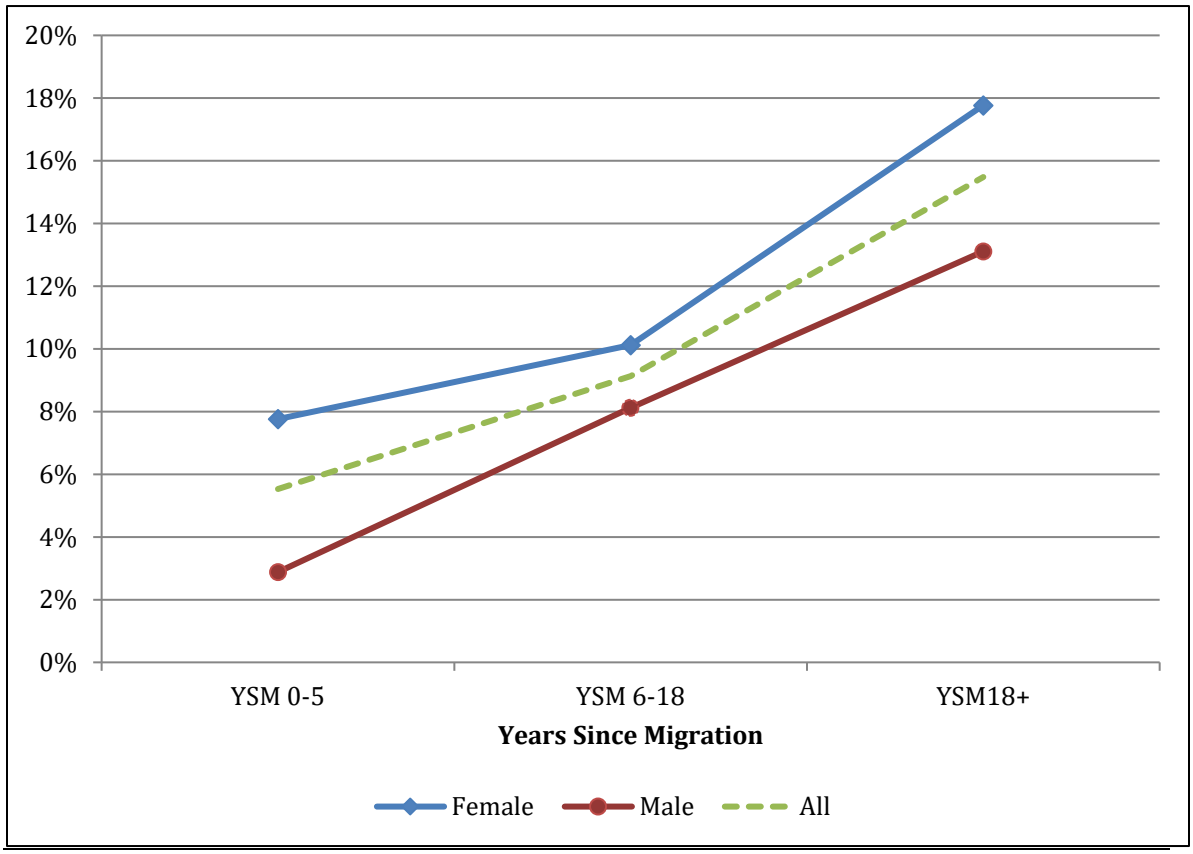
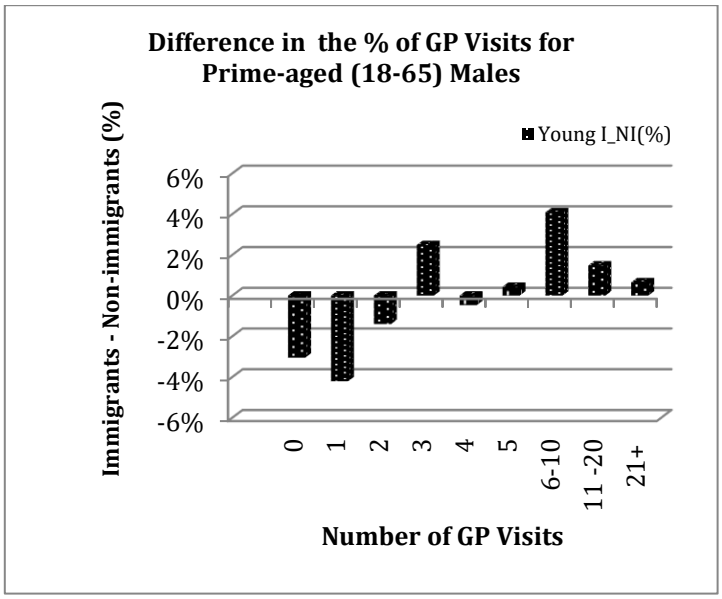
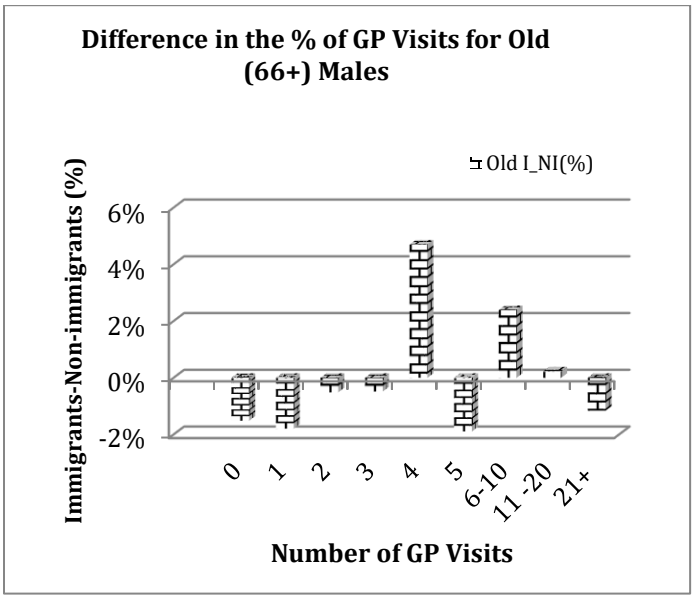
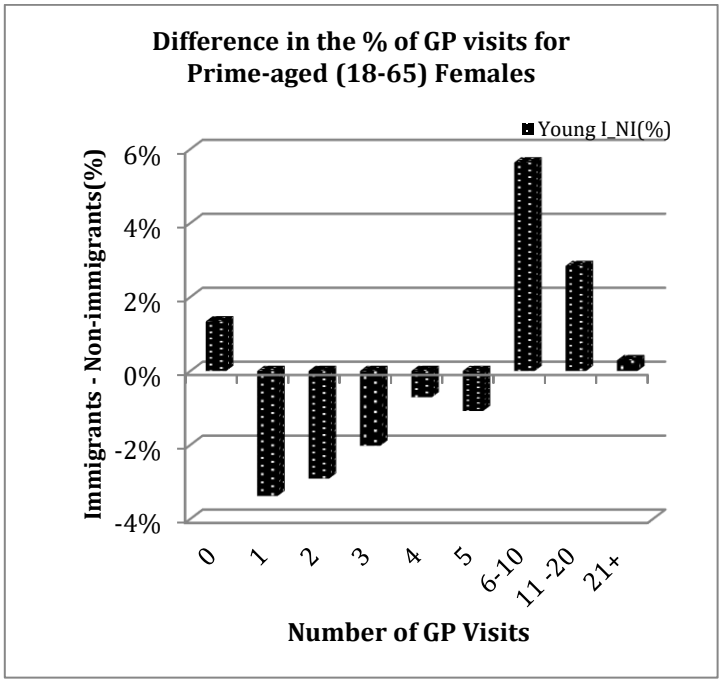


Chart 1.2: Self-reported poor or fair health by years since migration between 2004 to 2005 (immigrants)

Note: Author's calculations based on the Canadian Community Health Survey (CCHS) from 2004/5 with administrative data from the Ontario Health Insurance Plan (OHIP).







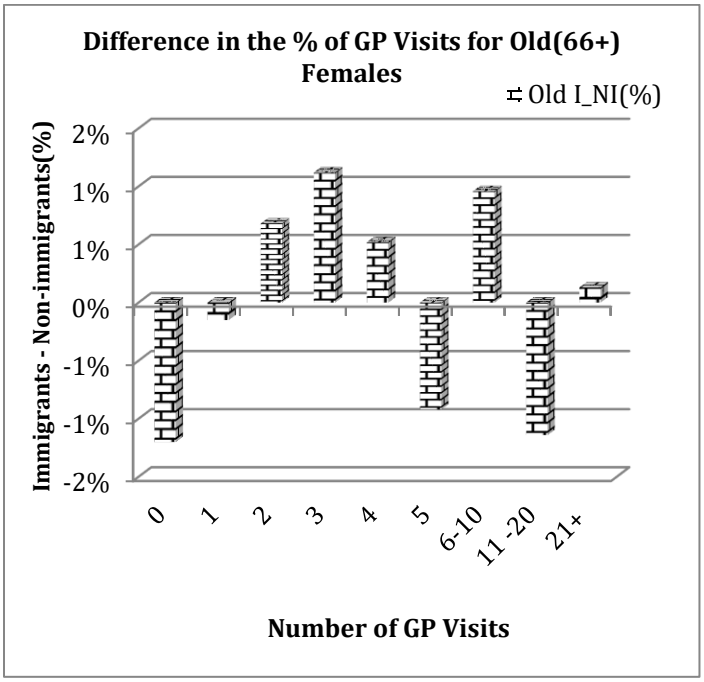
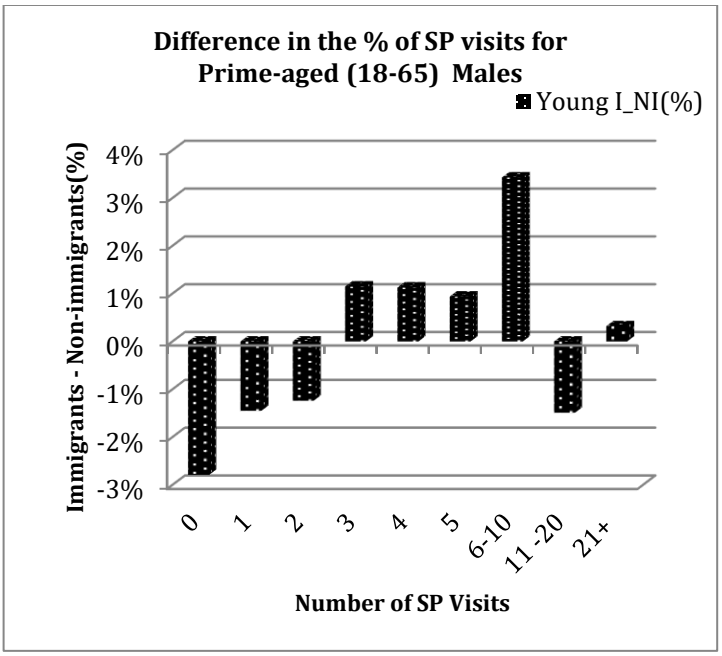
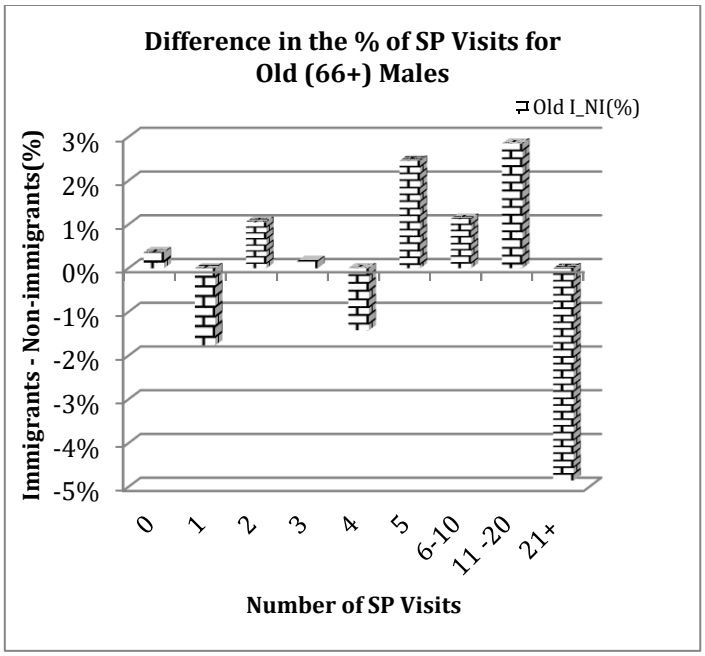
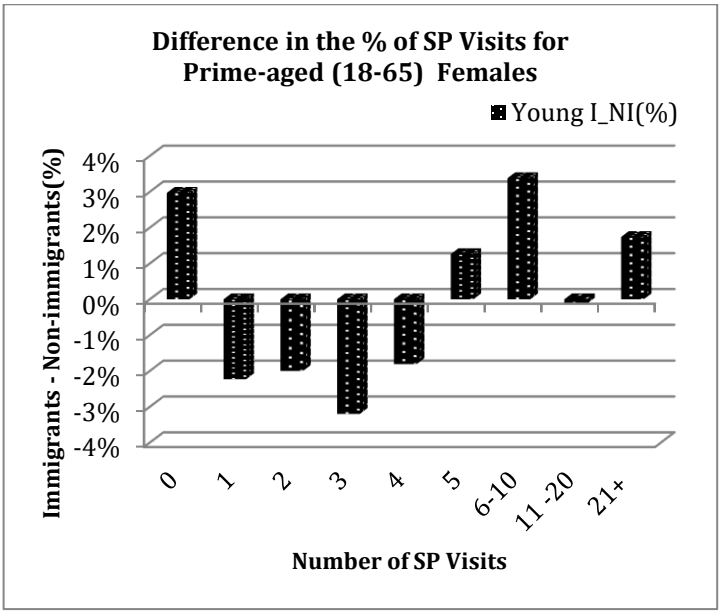


Chart 1.3: Difference in the utilization of GP services between immigrants and non-immigrants by gender and age

Note: Author's calculations based on the Canadian Community Health Survey (CCHS) from 2004/5 with administrative data from the Ontario Health Insurance Plan (OHIP).







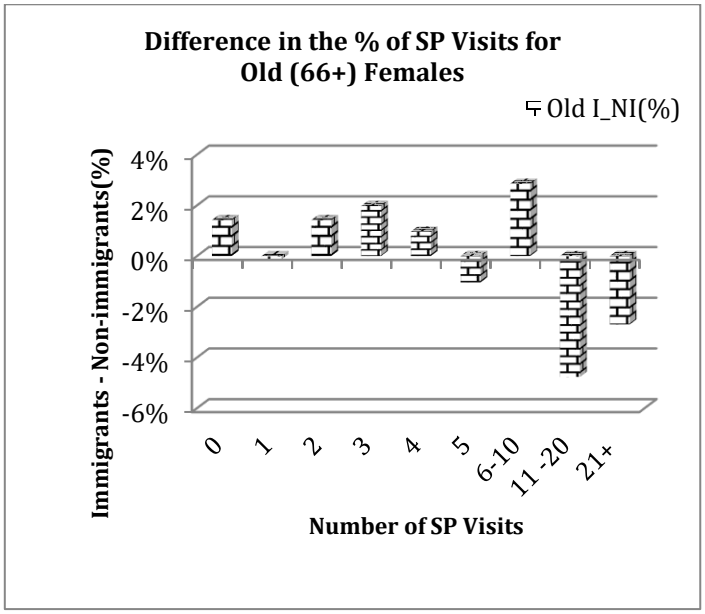


Chart 1.4: Difference in the utilization of SP services between immigrants and non-immigrants by gender and age

Table 1.2: Results of part 1 of two-part model for any GP Visit

	Set A				Set B			
	Male		Female		Male		Female	
GP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.417**	3.195	0.229***	1.243	2.863	0.322	1.333	0.451
	(0.118)	(5.027)	(0.0996)	(1.548)	(2.016)	(0.629)	(1.291)	(0.706)
Years Since Migration								
YSM	1.068**	0.887	1.147***	1.020	1.055**	0.900	1.142***	1.031
	(0.021)	(0.079)	(0.026)	(0.050)	(0.022)	(0.084)	(0.024)	(0.048)
YSM^2	0.999*	1.002	0.998***	1.000	0.999*	1.002	0.997***	1.000
	(0.0004)	(0.0012)	(0.000)	(0.000)	(0.0004)	(0.0013)	(0.0004)	(0.0005)
Mother Tongue (#English/French)								
I*Other MT	0.955	1.233	1.107	0.920	1.093	1.375	1.052	1.393
	(0.178)	(0.456)	(0.247)	(0.430)	(0.203)	(0.544)	(0.238)	(0.677)
Income of Source Country (#High-income)								
Low	1.938*	2.073	1.512	0.303*	1.937*	3.972	1.608	0.313
	(0.568)	(1.413)	(0.852)	(0.174)	(0.598)	(2.949)	(1.001)	(0.198)
Medium	1.162	4.559	1.304	0.283	1.075	6.354	1.618	0.335
	(0.336)	(4.330)	(0.418)	(0.253)	(0.332)	(6.259)	(0.604)	(0.291)
Unknown/other	1.413	2.007	1.140	0.847	1.303	2.146	1.219	0.727
	(0.330)	(0.942)	(0.308)	(0.503)	(0.312)	(1.116)	(0.330)	(0.440)
Education (#Less than high school)								
High school					1.194	0.655	1.590*	0.893
					(0.225)	(0.237)	(0.370)	(0.358)
I*High school					0.261**	10.57**	1.149	2.922
					(0.128)	(8.858)	(0.711)	(2.315)
Post-se/Diploma					1.356	0.725	1.489	1.084
					(0.231)	(0.199)	(0.304)	(0.314)
I*Post-se/Diploma					0.159***	2.555	0.723	1.633
					(0.0708)	(1.473)	(0.391)	(0.933)
Bachelor & above					1.058	0.613	1.662*	0.870
					(0.189)	(0.223)	(0.358)	(0.324)
I*Bachelor & above					0.308**	4.238*	0.608	8.701*
					(0.136)	(3.081)	(0.336)	(8.374)
Missing					1.267	0.531	0.962	1.286
					(0.264)	(0.302)	(0.319)	(0.749)
I*Missing					0.203**	2.321	1.441	22.21
					(0.106)	(2.333)	(0.954)	(36.57)
Smoking (#Non-smoker)								
Smoker					0.909	0.351*	1.038	0.921
					(0.0775)	(0.146)	(0.117)	(0.245)
I*Smoker					1.007	7.717***	0.733	0.981
					(0.200)	(4.438)	(0.185)	(0.519)
Drinking Alcohol (#Non-drinker)								
Drinker					1.235	2.384	1.369	0.651
					(0.333)	(1.516)	(0.398)	(0.256)
I*Drinker					0.731	0.391	0.421*	2.954
					(0.282)	(0.389)	(0.186)	(1.695)
Body Mass Index (#Underweight/normal)								
Over weight					1.087	0.893	1.245	0.685
					(0.0889)	(0.227)	(0.140)	(0.195)

	Set A				Set B			
	Male		Female		Male		Female	
GP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
I*Over weight					1.048	1.262	1.391	1.049
					(0.209)	(0.615)	(0.386)	(0.576)
Obese					1.046	0.892	1.016	1.026
					(0.110)	(0.278)	(0.171)	(0.340)
I*Obese					1.156	0.784	1.576	0.379
					(0.406)	(0.512)	(0.564)	(0.253)
Pregnant					1	1	3.421***	1
					(.)	(.)	(1.049)	(.)
I*Pregnant					1	1	0.295*	1
					(.)	(.)	(0.165)	(.)
N	10745	2555	12040	3771	10745	2555	12040	3771

Note. Part1 applies a logistic regression model. The dependent variable 'GP visit' is binary: a positive versus zero use. ***p<0.001, **p<0.01, *p<0.05. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.1).

Table 1.3: Results of part 2 of two-part model for the number of GP visits

	Set A				Set B			
	Male		Female		Male		Female	
Number of GP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.949	0.830	0.973	1.179	1.900	1.945	1.531*	1.282
	(0.160)	(0.251)	(0.108)	(0.245)	(0.671)	(0.779)	(0.319)	(0.371)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.415***	1.137*	1.280***	1.050
					(0.104)	(0.0585)	(0.0897)	(0.0432)
I*Govt insurance					0.964	0.980	0.884	0.863
					(0.152)	(0.0934)	(0.120)	(0.0735)
Employer/private					1.046	1.050	1.134**	1.138**
					(0.0550)	(0.0570)	(0.0437)	(0.0522)
I*Employer/private					1.271*	1.083	0.848*	0.866
					(0.129)	(0.117)	(0.0617)	(0.0852)
Social Assistance (#Not recipient)								
Recipient					1.141	1.535	1.078	1.173
					(0.105)	(0.468)	(0.0741)	(0.251)
I*Recipient					0.822	0.776	0.671*	1.630
					(0.173)	(0.271)	(0.106)	(0.475)
Number of Chronic Conditions (#No CC)								
1 CC					1.443***	1.368**	1.204***	1.215
					(0.0786)	(0.165)	(0.0566)	(0.128)
I*1 CC					1.064	0.608*	0.851	1.417
					(0.115)	(0.133)	(0.0716)	(0.305)
2 CC					1.748***	1.773***	1.391***	1.517***
					(0.0999)	(0.212)	(0.0698)	(0.159)
I*2 CC					0.997	0.537**	0.942	1.039
					(0.126)	(0.116)	(0.0898)	(0.208)
3 CC					2.133***	1.895***	1.485***	1.749***
					(0.162)	(0.229)	(0.0805)	(0.185)
I*3 CC					1.032	0.537**	0.861	0.888
					(0.163)	(0.116)	(0.0878)	(0.179)
4 CC					2.784***	2.058***	1.752***	1.880***
					(0.187)	(0.236)	(0.0895)	(0.187)
I*4 CC					0.725	0.626*	0.978	1.081
					(0.120)	(0.134)	(0.0924)	(0.211)
Body Mass Index (#Under weight/normal)								
Over weight					1.127**	0.944	1.127**	0.942
					(0.0493)	(0.0462)	(0.0464)	(0.0386)
I*Over weight					1.092	1.034	0.917	1.070
					(0.0987)	(0.0956)	(0.0686)	(0.0905)
Obese					1.255***	0.967	1.255***	1.004
					(0.0700)	(0.0581)	(0.0505)	(0.0462)
I*Obese					0.824	1.168	0.772**	1.027
					(0.124)	(0.158)	(0.0660)	(0.0968)
Pregnant					1	1	1.468***	1
					(.)	(.)	(0.0974)	(.)
I*Pregnant					1	1	0.615**	1
					(.)	(.)	(0.110)	(.)
N	7884	2341	10553	3595	7884	2341	10553	3595

Note. Part 2 applies a zero truncated negative binomial regression model. The dependent variable is 'number of GP visits' conditional on a positive outcome. ***p<0.001, **p<0.01, *p<0.05. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.2).

Table 1.4: Results of part 1 of two-part model for any SP Visit

	Panel A				Panel B			
	Male		Female		Male		Female	
SP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.401***	0.605	0.184***	0.682	0.841	0.0302	0.252	0.206
	(0.109)	(0.876)	(0.0556)	(0.722)	(0.598)	(0.0564)	(0.182)	(0.407)
Years Since Migration								
YSM	1.066***	0.988	1.121***	1.019	1.055**	0.980	1.117***	1.020
	(0.0188)	(0.0721)	(0.0245)	(0.0469)	(0.0195)	(0.0694)	(0.0242)	(0.0582)
YSM2	0.999	1.000	0.998***	1.000	0.999	1.001	0.998***	1.000
	(0.00033)	(0.0009)	(0.00039)	(0.00056)	(0.00035)	(0.00087)	(0.00038)	(0.00063)
Income of Source Country (#High-income)								
Low	1.228	2.139	1.398	0.417	1.134	3.211	1.784	0.384
	(0.301)	(1.450)	(0.375)	(0.241)	(0.303)	(2.519)	(0.555)	(0.222)
Medium	1.417	0.558	1.277	0.211*	1.132	0.478	1.810*	0.200*
	(0.379)	(0.390)	(0.376)	(0.152)	(0.340)	(0.350)	(0.535)	(0.162)
Unknown/other	1.164	1.459	1.141	0.819	1.076	1.588	1.373	0.661
	(0.225)	(0.635)	(0.245)	(0.489)	(0.221)	(0.793)	(0.289)	(0.370)
Body Mass Index (#Underweight/normal)								
Over weight					0.975	1.146	1.132	1.463
					(0.0752)	(0.312)	(0.127)	(0.470)
I*Over weight					1.042	1.768	0.961	2.328
					(0.191)	(0.986)	(0.226)	(1.748)
Obese					1.008	1.159	1.028	1.778
					(0.0980)	(0.426)	(0.154)	(0.779)
I*Obese					0.749	1.647	1.290	0.272
					(0.237)	(1.252)	(0.422)	(0.202)
Pregnant					1	1	4.643***	1
					(.)	(.)	(1.965)	(.)
I*Pregnant					1	1	0.303*	1
					(.)	(.)	(0.184)	(.)
Rural/Urban								
Urban					0.974	0.937	1.255*	0.996
					(0.0809)	(0.259)	(0.136)	(0.337)
I*Urban					0.707	7.134***	0.662	1.297
					(0.219)	(3.914)	(0.190)	(0.969)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.501**	2.266*	0.806	1.490
					(0.216)	(0.757)	(0.180)	(0.524)
I*Poor/fair					2.399*	1.548	1.362	1.076
					(0.924)	(1.239)	(0.558)	(0.805)
N					10745	2555	12040	3753

Note. Part1 applies a logistic regression model. The dependent variable 'SP visit' is binary: a positive versus zero use. ***p<0.001, **p<0.01, *p<0.05. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.3).

Table 1.5: Results of part 2 of two-part model for the number of SP visits

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.805	0.745	1.138	0.765	0.921	0.966	1.439	0.702
	(0.144)	(0.181)	(0.126)	(0.185)	(0.343)	(0.388)	(0.345)	(0.229)
Years Since Migration								
YSM	1.027*	1.009	0.980**	1.012	1.011	1.006	0.978**	1.012
	(0.012)	(0.009)	(0.007)	(0.009)	(0.011)	(0.011)	(0.007)	(0.008)
YSM^2	1.000	1.000	1.001***	1.000	1.000	1.000	1.000***	1.000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0001)
Mother Tongue (#English/French)								
I*Other MT	0.841	0.885	0.956	0.940	0.932	0.887	0.931	0.968
	(0.093)	(0.067)	(0.064)	(0.062)	(0.087)	(0.062)	(0.060)	(0.066)
Income of Source Country (#High-income)								
Low	0.988	1.003	1.210	0.801	0.990	1.122	1.201	0.789
	(0.148)	(0.182)	(0.122)	(0.134)	(0.148)	(0.183)	(0.132)	(0.126)
Medium	0.750	0.950	1.162	1.088	0.651**	1.042	1.182	1.010
	(0.127)	(0.120)	(0.107)	(0.135)	(0.0989)	(0.132)	(0.108)	(0.149)
Unknown/other	0.961	1.126	1.091	0.966	0.849	1.165	1.096	0.909
	(0.106)	(0.0967)	(0.0831)	(0.0801)	(0.0878)	(0.101)	(0.0795)	(0.0715)
Marital Status (#Married)								
Non-married					0.858**	0.988	0.825***	1.024
					(0.0430)	(0.0508)	(0.0287)	(0.0357)
I*Non-married					1.003	0.824*	1.028	1.048
					(0.119)	(0.0794)	(0.0853)	(0.0772)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.189*	0.932	1.166*	1.004
					(0.0938)	(0.0475)	(0.0870)	(0.0409)
I*Govt insurance					1.250	1.064	1.041	0.820*
					(0.220)	(0.0990)	(0.145)	(0.0681)
Employer/private					1.027	1.025	1.139**	1.106*
					(0.0629)	(0.0526)	(0.0453)	(0.0484)
I*Employer/private					1.171	0.949	0.864	0.883
					(0.134)	(0.0919)	(0.0672)	(0.0841)
Number of Chronic Conditions (#No CC)								
1 CC					1.257***	1.083	1.184***	0.897
					(0.0826)	(0.144)	(0.0580)	(0.0875)
I*1 CC					1.134	1.243	0.897	2.312***
					(0.144)	(0.250)	(0.0837)	(0.449)
2 CC					1.595***	1.321*	1.364***	1.195*
					(0.109)	(0.169)	(0.0677)	(0.105)
I*2 CC					1.208	1.030	0.925	1.457*
					(0.166)	(0.198)	(0.0910)	(0.268)
3 CC					2.028***	1.445**	1.471***	1.350***
					(0.156)	(0.186)	(0.0823)	(0.121)
I*3 CC					0.843	0.901	0.894	1.385
					(0.129)	(0.179)	(0.101)	(0.261)
4 CC					2.192***	1.702***	1.638***	1.579***
					(0.174)	(0.210)	(0.0874)	(0.134)
I*4 CC					0.926	1.107	1.086	1.415*
					(0.141)	(0.209)	(0.111)	(0.246)
N					6975	2376	10187	3640

Note. Part 2 applies a zero truncated negative binomial regression model. The dependent variable is 'number of GP visits' conditional on a positive outcome. ***$p<0.001$, **$p<0.01$, *$p<0.05$. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.4).

Table 1.6: Results of part 1 of Two-part Model for GP visit (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	1.702	0.476	20.53	0.184	3.971	1.803	12.79	0.520
	(2.558)	(0.371)	(42.16)	(0.192)	(6.997)	(1.907)	(29.75)	(0.726)
Years Since Migration								
YSM	1.033	1.041*	1.266*	1.049*	1.049	1.041*	1.211	1.044*
	(0.130)	(0.021)	(0.132)	(0.020)	(0.113)	(0.020)	(0.134)	(0.019)
YSM^2	1.000	0.999*	0.996**	0.999***	0.999	0.999*	0.996**	0.999***
	(0.0018)	(0.0004)	(0.0014)	(0.0003)	(0.0016)	(0.0004)	(0.0014)	(0.0003)
Income of Source Country (#High-income)								
Low	0.596	1.794*	0.691	1.417	0.555	1.874	0.736	1.349
	(0.352)	(0.530)	(0.785)	(0.795)	(0.341)	(0.621)	(0.710)	(0.894)
Medium	2.728	1.148	2.145	1.243	3.409	1.123	2.409	1.316
	(1.781)	(0.339)	(1.182)	(0.386)	(2.171)	(0.349)	(1.325)	(0.474)
Unknown/other	1.162	1.292	2.091	1.376	1.090	1.236	2.100	1.405
	(0.487)	(0.308)	(0.903)	(0.362)	(0.489)	(0.303)	(0.828)	(0.375)
Education (#Less than high school)								
High school					1.126	1.126	1.371	1.371
					(0.187)	(0.187)	(0.276)	(0.276)
I*High school					0.526	0.601	1.483	0.963
					(0.387)	(0.281)	(1.207)	(0.487)
Post-se/Diploma					1.291	1.291	1.308	1.308
					(0.192)	(0.192)	(0.229)	(0.229)
I*Post-se/Diploma					0.361	0.307**	1.364	0.590
					(0.237)	(0.125)	(1.018)	(0.272)
Bachelor & above					1.009	1.009	1.449*	1.449*
					(0.162)	(0.162)	(0.270)	(0.270)
I*Bachelor & above					0.977	0.609	0.969	0.555
					(0.685)	(0.253)	(0.757)	(0.272)
Missing					1.192	1.192	0.807	0.807
					(0.228)	(0.228)	(0.242)	(0.242)
I*Missing					0.752	0.460	15.03*	2.339
					(0.652)	(0.232)	(16.88)	(1.459)
Number of Chronic Conditions (#No CC)								
1 CC					1.660***	1.660***	1.609***	1.609***
					(0.142)	(0.142)	(0.196)	(0.196)
I*1 CC					0.805	0.895	0.594	0.868
					(0.293)	(0.185)	(0.239)	(0.251)
2 CC					2.817***	2.817***	2.812***	2.812***
					(0.294)	(0.294)	(0.354)	(0.354)
I*2 CC					0.504	0.619	0.301*	0.687
					(0.248)	(0.184)	(0.150)	(0.205)
3 CC					3.366***	3.366***	3.776***	3.776***
					(0.534)	(0.534)	(0.614)	(0.614)
I*3 CC					2.603	0.771	0.895	0.782
					(1.750)	(0.334)	(0.533)	(0.287)
4 CC					4.127***	4.127***	4.732***	4.732***
					(0.779)	(0.779)	(0.963)	(0.963)
I*4 CC					0.568	1.178	0.688	0.448
					(0.462)	(0.641)	(0.554)	(0.228)
Smoking (#Non-smoker)								
Smoker					0.884	0.884	1.078	1.078

	Panel A				Panel B			
	Male		Female		Male		Female	
GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
					(0.0745)	(0.0745)	(0.116)	(0.116)
I*Smoker					1.416	1.164	0.485*	0.756
					(0.451)	(0.227)	(0.163)	(0.181)
Body Mass Index (#Under weight/normal)								
Over weight					1.082	1.082	1.236*	1.236*
					(0.0864)	(0.0864)	(0.131)	(0.131)
I*Over weight					0.865	1.009	0.626	0.870
					(0.322)	(0.206)	(0.252)	(0.230)
Obese					1.042	1.042	1.081	1.081
					(0.107)	(0.107)	(0.173)	(0.173)
I*Obese					2.822	1.223	1.108	0.965
					(1.640)	(0.411)	(0.618)	(0.357)
Pregnant					1	1	2.995***	2.995***
					(.)	(.)	(0.923)	(0.923)
I*Pregnant					1	1	1	0.276*
					(.)	(.)	(.)	(0.151)
N	11300	12954	13467	15459	11300	12954	13455	15459

Note. Part 1 applies a logistic regression model where the dependent variable 'GP visit' is binary: a positive versus zero use. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***p<0.001, **p<0.01, *p<0.05. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.5).

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Table 1.7: Results of part 2 of the Two-part Model for the number of GP visits (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	1.280	0.856	0.372*	0.855	0.665	1.489	0.235**	0.833
	(0.605)	(0.274)	(0.163)	(0.227)	(0.446)	(0.608)	(0.117)	(0.251)
Age								
Age	1.020***	1.020***	0.989**	0.989**	1.014*	1.014*	0.981***	0.981***
	(0.006)	(0.006)	(0.004)	(0.004)	(0.006)	(0.006)	(0.004)	(0.004)
I*Age	0.976	1.015	1.077	1.009	0.983	1.008	1.100**	1.025*
	(0.047)	(0.014)	(0.043)	(0.012)	(0.048)	(0.015)	(0.036)	(0.012)
Age^2	1.000	1.000	1.000***	1.000***	1.000	1.000	1.000***	1.000***
	(0.00005)	(0.00005)	(0.00004)	(0.00004)	(0.00005)	(0.00005)	(0.00004)	(0.00004)
I*Age^2	1.000	1.000	0.999*	1.000	1.000	1.000	0.999**	1.000*
	(0.00048)	(0.00013)	(0.00038)	(0.00011)	(0.00047)	(0.00014)	(0.00032)	(0.0001)
Mother Tongue (#English/French)								
I*Other MT	0.737*	0.922	1.022	0.995	0.819	0.970	1.058	0.971
	(0.0903)	(0.0663)	(0.119)	(0.0618)	(0.0854)	(0.0631)	(0.110)	(0.0530)
Income of Source Country (#High-income)								
Low	0.972	1.285	1.001	1.244*	1.054	1.218	0.976	1.163
	(0.261)	(0.182)	(0.262)	(0.135)	(0.282)	(0.162)	(0.223)	(0.114)
Medium	0.774	0.811	1.192	1.149	0.782	0.732**	1.211	1.060
	(0.198)	(0.093)	(0.188)	(0.109)	(0.183)	(0.081)	(0.172)	(0.087)
Unknown/other	1.033	1.022	1.072	1.076	1.003	0.964	1.029	1.045
	(0.140)	(0.078)	(0.128)	(0.086)	(0.127)	(0.074)	(0.113)	(0.067)
Education (#Less than high school)								
High school					0.985	0.985	0.899*	0.899*
					(0.058)	(0.058)	(0.039)	(0.038)
I*High school					1.437	0.752	1.575*	1.152
					(0.419)	(0.164)	(0.280)	(0.129)
Post-se/Diploma					1.012	1.012	0.917**	0.917**
					(0.051)	(0.051)	(0.031)	(0.030)
I*Post-se/Diploma					1.543	0.777	1.213	1.059
					(0.346)	(0.153)	(0.203)	(0.101)
Bachelor & above					1.049	1.049	0.845***	0.845***
					(0.059)	(0.059)	(0.035)	(0.035)
I*Bachelor & above					1.552	0.638*	1.518*	1.095
					(0.367)	(0.133)	(0.278)	(0.115)
Missing					0.996	0.997	0.944	0.945
					(0.082)	(0.082)	(0.067)	(0.067)
I*Missing					1.053	0.566*	1.309	1.248
					(0.299)	(0.126)	(0.280)	(0.196)
Marital Status (#Married)								
Non-married					1.080	1.079	1.019	1.019
					(0.043)	(0.043)	(0.033)	(0.032)
I*Non-married					1.478*	0.964	0.905	1.056
					(0.241)	(0.098)	(0.094)	(0.069)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.208***	1.207***	1.183***	1.182***
					(0.057)	(0.057)	(0.055)	(0.054)
I*Govt insurance					1.192	0.992	0.944	0.848
					(0.266)	(0.101)	(0.163)	(0.081)
Employer/private					1.023	1.023	1.135***	1.134***
					(0.045)	(0.045)	(0.037)	(0.037)
I*Employer/priva					1.034	1.227*	0.793	0.826**
					(0.160)	(0.112)	(0.097)	(0.056)
Social Assistance (#Not recipient)								
Recipient					1.289**	1.288**	1.143*	1.143*

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
					(0.114)	(0.113)	(0.067)	(0.067)
I*Recipient					0.659	0.747	0.566*	0.695*
					(0.229)	(0.152)	(0.164)	(0.111)
Number of Chronic Conditions (#No CC)								
1 CC					1.390***	1.389***	1.211***	1.211***
					(0.069)	(0.069)	(0.056)	(0.055)
I*1 CC					0.968	0.986	1.063	0.876
					(0.144)	(0.105)	(0.145)	(0.0737)
2 CC					1.661***	1.658***	1.420***	1.418***
					(0.086)	(0.086)	(0.068)	(0.067)
I*2 CC					1.244	0.872	1.252	0.947
					(0.246)	(0.103)	(0.207)	(0.085)
3 CC					1.927***	1.923***	1.558***	1.555***
					(0.127)	(0.126)	(0.079)	(0.079)
I*3 CC					0.930	0.822	1.474*	0.835
					(0.210)	(0.118)	(0.239)	(0.080)
4 CC					2.283***	2.278***	1.783***	1.779***
					(0.128)	(0.127)	(0.086)	(0.085)
I*4 CC					0.948	0.766	1.436*	1.000
					(0.196)	(0.105)	(0.207)	(0.089)
Smoking (#Non-smoker)								
Smoker					0.968	0.968	1.009	1.009
					(0.039)	(0.039)	(0.028)	(0.028)
I*Smoker					1.431**	1.002	1.031	0.964
					(0.185)	(0.086)	(0.098)	(0.057)
Body Mass Index (#Under weight/normal)								
Over weight					1.059	1.059	1.105**	1.105**
					(0.039)	(0.039)	(0.038)	(0.038)
I*Over weight					1.063	1.101	1.064	0.890
					(0.148)	(0.087)	(0.128)	(0.059)
Obese					1.164**	1.163**	1.232***	1.231***
					(0.058)	(0.058)	(0.043)	(0.043)
I*Obese					1.037	0.931	0.750*	0.750***
					(0.164)	(0.108)	(0.105)	(0.061)
Pregnant					1	1	1.420***	1.418***
					(.)	(.)	(0.095)	(0.095)
I*Pregnant					1	1	0.740	0.632*
					(.)	(.)	(0.215)	(0.116)
N	8604	9952	12034	13804	8604	9952	12034	13804

Note. Part 2 applies zero truncated negative binomial regression model where the dependent variable is 'number of GP visit' conditional on positive outcome. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***p<0.001, **$p<0.01$, *$p<0.05$. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.6).

Table 1.8: Results of part 1 of Two-part Model for SP visit (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	0.794	0.513	0.343	0.142*	1.658	1.457	0.100	0.226
	(0.994)	(0.371)	(0.430)	(0.112)	(2.698)	(1.461)	(0.159)	(0.250)
Years Since Migration								
YSM	0.978	1.047*	1.150	1.057***	0.995	1.048*	1.061	1.054**
	(0.096)	(0.019)	(0.095)	(0.017)	(0.085)	(0.019)	(0.092)	(0.019)
YSM^2	1.001	0.999	0.998	0.999**	1.001	0.999*	0.998	0.999**
	(0.0013)	(0.0003)	(0.0013)	(0.0003)	(0.0012)	(0.0003)	(0.0011)	(0.0003)
Income of Source Country (#High-income)								
Low	0.694	0.988	2.368	1.542	0.579	0.953	3.354	1.806
	(0.360)	(0.245)	(1.445)	(0.415)	(0.350)	(0.265)	(2.289)	(0.56)
Medium	0.702	1.253	4.067**	1.285	0.729	1.036	6.220**	1.660
	(0.307)	(0.360)	(2.134)	(0.393)	(0.328)	(0.320)	(3.665)	(0.489)
Unknown/other	1.169	1.029	1.889	1.304	0.972	0.967	2.262*	1.521
	(0.364)	(0.209)	(0.697)	(0.287)	(0.318)	(0.198)	(0.733)	(0.328)
Education (#Less than high school)								
High school					1.338	1.338	1.014	1.014
					(0.210)	(0.210)	(0.204)	(0.204)
I*High school					0.325	0.476	1.445	1.480
					(0.259)	(0.227)	(0.942)	(0.727)
Post-se/Diploma					1.577**	1.577**	1.343	1.343
					(0.222)	(0.222)	(0.226)	(0.226)
I*Post-se/Diploma					0.492	0.348*	1.662	1.036
					(0.352)	(0.149)	(0.969)	(0.478)
Bachelor & above					1.584**	1.584**	1.831***	1.831***
					(0.239)	(0.239)	(0.336)	(0.336)
I*Bachelor & above					0.814	0.527	1.600	0.741
					(0.605)	(0.233)	(0.998)	(0.346)
Missing					1.641**	1.641**	0.923	0.923
					(0.301)	(0.301)	(0.254)	(0.254)
I*Missing					0.213	0.247**	5.676*	2.636
					(0.184)	(0.129)	(4.545)	(1.509)
Social Assistance (#Not recipient)								
Recipient					1.255	1.255	1.185	1.185
					(0.293)	(0.293)	(0.296)	(0.296)
I*Recipient					3.902	0.997	0.163**	0.798
					(3.392)	(0.523)	(0.114)	(0.446)
Drinking Alcohol (#Non-drinker)								
Drinker					0.889	0.889	1.101	1.101
					(0.226)	(0.226)	(0.299)	(0.299)
I*Drinker					1.052	2.393*	2.191	0.752
					(0.678)	(0.884)	(1.265)	(0.294)
Body Mass Index (#Under weight/normal)								
Over weight					0.922	0.922	1.133	1.133
					(0.0711)	(0.0711)	(0.122)	(0.122)
I*Over weight					1.044	1.033	0.567	0.720
					(0.329)	(0.192)	(0.202)	(0.170)
Obese					0.930	0.930	1.047	1.047
					(0.0906)	(0.0906)	(0.149)	(0.149)
I*Obese					1.763	1.056	1.149	0.797
					(0.873)	(0.320)	(0.548)	(0.259)
Pregnant					1	1	4.910***	4.910***
					(.)	(.)	(2.076)	(2.076)
I*Pregnant					1	1	0.272	0.259*
					(.)	(.)	(0.263)	(0.154)
N	11300	12954	13467	15459	11300	12954	13467	15459

Note. Part 1 applies logistic regression model where the dependent variable 'SP visit' is binary: a positive versus zero use. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***p<0.001, **$p<0.01$, *$p<0.05$. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.7).

Table 1.9: Results of part 2 of Two-part Model for the number of SP visit (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	1.030	1.081	0.221*	0.792	0.526	1.437	0.308*	1.011
	(0.704)	(0.491)	(0.132)	(0.228)	(0.422)	(0.675)	(0.180)	(0.342)
Age								
Age	1.037***	1.037***	1.017***	1.017***	1.035***	1.035***	1.006	1.006
	(0.006)	(0.006)	(0.004)	(0.004)	(0.006)	(0.006)	(0.004)	(0.004)
I*Age	1.041	1.006	1.142**	1.018	0.965	0.991	1.152***	1.024
	(0.084)	(0.019)	(0.057)	(0.013)	(0.059)	(0.018)	(0.046)	(0.014)
Age^2	1.000*	1.000*	1.000	1.000	1.000**	1.000**	1.000	1.000
	(0.00006)	(0.00005)	(0.00004)	(0.00004)	(0.00006)	(0.00005)	(0.00004)	(0.00004)
I*Age^2	1.000	1.000	0.999**	1.000	1.000	1.000	0.999***	1.000*
	(0.00078)	(0.00016)	(0.00046)	(0.00011)	(0.00059)	(0.00016)	(0.00037)	(0.00012)
Years Since Migration								
YSM	0.954	0.991	0.928*	0.987	1.026	0.988	0.912**	0.985*
	(0.0659)	(0.00988)	(0.0343)	(0.00724)	(0.0445)	(0.00920)	(0.0288)	(0.00717)
YSM2	1.000	1.000	1.001*	1.000*	1.000	1.000	1.001**	1.000**
	(0.00075)	(0.00012)	(0.00039)	(0.00009)	(0.00049)	(0.00011)	(0.00033)	(0.00009)
Mother Tongue (#English/French)								
I*Other MT	0.825	0.847*	0.957	0.992	0.920	0.909	1.026	0.970
	(0.116)	(0.0689)	(0.109)	(0.0565)	(0.111)	(0.0662)	(0.111)	(0.0546)
Income of Source Country (#High-income)								
Low	0.891	0.932	1.029	1.172	0.749	1.086	1.043	1.214
	(0.404)	(0.129)	(0.215)	(0.119)	(0.257)	(0.150)	(0.222)	(0.130)
Medium	0.826	0.703**	1.073	1.176	0.824	0.699**	1.078	1.217*
	(0.172)	(0.0906)	(0.211)	(0.108)	(0.179)	(0.0919)	(0.188)	(0.107)
Unknown/other	0.922	0.968	0.879	1.036	0.871	0.915	0.898	1.067
	(0.156)	(0.0859)	(0.111)	(0.0694)	(0.124)	(0.0784)	(0.105)	(0.0673)
Education (#Less than high school)								
High school					1.191*	1.189*	0.912*	0.912*
					(0.0813)	(0.0803)	(0.0397)	(0.0396)
I*High school					2.264*	0.710	1.493	1.047
					(0.935)	(0.128)	(0.323)	(0.120)
Post-se/Diploma					1.164**	1.162**	0.960	0.960
					(0.0661)	(0.0653)	(0.0327)	(0.0326)
I*Post-se/Diploma					2.098**	0.931	1.200	1.084
					(0.599)	(0.134)	(0.221)	(0.102)
Bachelor & above					1.181**	1.179**	0.996	0.997
					(0.0759)	(0.0750)	(0.0414)	(0.0413)
I*Bachelor & above					2.137**	0.979	1.208	0.994
					(0.622)	(0.150)	(0.236)	(0.105)
Missing					1.210*	1.208*	0.890	0.891
					(0.108)	(0.107)	(0.0669)	(0.0667)
I*Missing					1.745	0.817	0.904	1.110
					(0.698)	(0.158)	(0.243)	(0.174)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.026	1.025	1.085	1.085
					(0.0519)	(0.0513)	(0.0477)	(0.0475)
I*Govt insurance					0.917	1.195	0.953	0.941
					(0.217)	(0.121)	(0.154)	(0.0826)
Employer/private					1.007	1.007	1.119***	1.119***
					(0.0474)	(0.0469)	(0.0372)	(0.0371)
I*Employer/priva					0.702*	1.103	1.004	0.877
					(0.122)	(0.105)	(0.138)	(0.0632)
Number of Chronic Conditions (#No CC)								

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
1 CC					1.194**	1.192**	1.148**	1.148**
					(0.0700)	(0.0693)	(0.0526)	(0.0524)
I*1 CC					1.053	1.225	1.091	0.979
					(0.192)	(0.138)	(0.166)	(0.0908)
2 CC					1.483***	1.479***	1.323***	1.322***
					(0.0909)	(0.0899)	(0.0600)	(0.0598)
I*2 CC					1.152	1.179	1.044	0.962
					(0.223)	(0.144)	(0.162)	(0.0909)
3 CC					1.741***	1.732***	1.422***	1.421***
					(0.114)	(0.112)	(0.0697)	(0.0695)
I*3 CC					0.843	0.840	1.071	0.914
					(0.181)	(0.111)	(0.189)	(0.0936)
4 CC					1.895***	1.886***	1.595***	1.593***
					(0.122)	(0.120)	(0.0745)	(0.0742)
I*4 CC					1.000	1.034	1.424*	1.136
					(0.213)	(0.129)	(0.212)	(0.104)
Drinking Alcohol (#Non-drinker)								
Drinker					1.102	1.102	1.114	1.113
					(0.155)	(0.153)	(0.0716)	(0.0713)
I*Drinker					1.315	0.966	0.706	0.789*
					(0.399)	(0.196)	(0.154)	(0.0839)
Body Mass Index (#Under weight/normal)								
Over weight					0.967	0.968	1.056	1.056
					(0.0419)	(0.0415)	(0.0332)	(0.0331)
I*Over weight					1.061	1.100	1.067	0.951
					(0.155)	(0.0967)	(0.144)	(0.0645)
Obese					1.049	1.049	1.026	1.026
					(0.0555)	(0.0549)	(0.0356)	(0.0355)
I*Obese					0.820	1.043	0.734	0.830*
					(0.146)	(0.107)	(0.117)	(0.0771)
Pregnant					1	1	1.583***	1.581***
					(.)	(.)	(0.102)	(0.102)
I*Pregnant					1	1	0.741	0.746
					(.)	(.)	(0.147)	(0.130)
N	7835	9098	11763	13486	7835	9098	11763	13486

Note. Part 2 applies zero truncated negative binomial regression model where the dependent variable is 'number of SP visit' conditional on positive outcome. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***$p<0.001$, **$p<0.01$, *$p<0.05$. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity. This table only includes selective important results; please see the appendix for a complete table (Table A1.8).

Appendix 1

Table A1.1: Results of part 1 of two-part model for any GP Visit (Full table)

	Panel A				Panel B			
	Male		Female		Male		Female	
GP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.417**	3.195	0.229***	1.243	2.863	0.322	1.333	0.451
	(0.118)	(5.027)	(0.0996)	(1.548)	(2.016)	(0.629)	(1.291)	(0.706)
Years Since Migration								
YSM	1.068**	0.887	1.147***	1.020	1.055**	0.900	1.142***	1.031
	(0.0218)	(0.0792)	(0.0256)	(0.0503)	(0.0218)	(0.0836)	(0.0238)	(0.0481)
YSM^2	0.999*	1.002	0.998***	1.000	0.999*	1.002	0.997***	1.000
	(0.00041)	(0.00125)	(0.0004)	(0.0005)	(0.00042)	(0.00127)	(0.00038)	(0.00046)
Mother Tongue (#English/French)								
I*Other MT	0.955	1.233	1.107	0.920	1.093	1.375	1.052	1.393
	(0.178)	(0.456)	(0.247)	(0.430)	(0.203)	(0.544)	(0.238)	(0.677)
Income of Source Country (#High-income)								
Low	1.938*	2.073	1.512	0.303*	1.937*	3.972	1.608	0.313
	(0.568)	(1.413)	(0.852)	(0.174)	(0.598)	(2.949)	(1.001)	(0.198)
Medium	1.162	4.559	1.304	0.283	1.075	6.354	1.618	0.335
	(0.336)	(4.330)	(0.418)	(0.253)	(0.332)	(6.259)	(0.604)	(0.291)
unknown/other	1.413	2.007	1.140	0.847	1.303	2.146	1.219	0.727
	(0.330)	(0.942)	(0.308)	(0.503)	(0.312)	(1.116)	(0.330)	(0.440)
Education (#Less than high school)								
High school					1.194	0.655	1.590*	0.893
					(0.225)	(0.237)	(0.370)	(0.358)
I*High school					0.261**	10.57**	1.149	2.922
					(0.128)	(8.858)	(0.711)	(2.315)
Post-se/Diploma					1.356	0.725	1.489	1.084
					(0.231)	(0.199)	(0.304)	(0.314)
I*Post-se/Diploma					0.159***	2.555	0.723	1.633
					(0.0708)	(1.473)	(0.391)	(0.933)
Bachelor & above					1.058	0.613	1.662*	0.870
					(0.189)	(0.223)	(0.358)	(0.324)
I*Bachelor & above					0.308**	4.238*	0.608	8.701*
					(0.136)	(3.081)	(0.336)	(8.374)
Missing					1.267	0.531	0.962	1.286
					(0.264)	(0.302)	(0.319)	(0.749)
I*Missing					0.203**	2.321	1.441	22.21
					(0.106)	(2.333)	(0.954)	(36.57)
Marital Status (#Married)								
Non-married					0.851*	0.756	1.015	0.704
					(0.0655)	(0.179)	(0.108)	(0.176)
I*Non-married					0.933	0.591	0.899	1.220
					(0.205)	(0.274)	(0.218)	(0.592)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.175	1.321	1.082	1.234
					(0.191)	(0.374)	(0.316)	(0.349)
I*Govt insurance					1.773	1.178	1.185	1.300
					(0.797)	(0.589)	(0.576)	(0.687)
Employer/private					1.263**	1.339	1.244	1.121
					(0.108)	(0.397)	(0.150)	(0.311)
I*Employer/priva					1.312	0.596	1.274	2.046
					(0.264)	(0.327)	(0.308)	(1.208)
Social Assistance (#Not recipient)								
Recipient					1.561*	0.579	2.696***	1
					(0.332)	(0.683)	(0.771)	(.)
I*Recipient					2.830	0.267	0.373	1

	Panel A				Panel B			
	Male		Female		Male		Female	
GP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
					(1.716)	(0.435)	(0.216)	(.)
Number of Chronic Conditions (#No CC)								
1 CC					1.667***	1.799	1.570***	2.168*
					(0.144)	(0.654)	(0.196)	(0.852)
I*1 CC					1.011	0.629	0.995	0.155*
					(0.213)	(0.381)	(0.293)	(0.139)
2 CC					2.946***	2.059*	2.650***	4.794***
					(0.314)	(0.682)	(0.353)	(1.634)
I*2 CC					0.791	0.841	0.790	0.290
					(0.235)	(0.519)	(0.234)	(0.247)
3 CC					3.537***	3.241**	3.234***	10.49***
					(0.591)	(1.186)	(0.550)	(3.833)
I*3 CC					0.939	1.486	0.799	0.218
					(0.425)	(1.106)	(0.340)	(0.203)
4 CC					4.745***	3.365**	3.856***	11.20***
					(0.990)	(1.514)	(0.840)	(4.088)
I*4 CC					1.271	1.560	0.635	0.351
					(0.809)	(1.308)	(0.350)	(0.364)
Smoking (#Non-smoker)								
Smoker					0.909	0.351*	1.038	0.921
					(0.0775)	(0.146)	(0.117)	(0.245)
I*Smoker					1.007	7.717***	0.733	0.981
					(0.200)	(4.438)	(0.185)	(0.519)
Drinking Alcohol (#Non-drinker)								
Drinker					1.235	2.384	1.369	0.651
					(0.333)	(1.516)	(0.398)	(0.256)
I*Drinker					0.731	0.391	0.421*	2.954
					(0.282)	(0.389)	(0.186)	(1.695)
Body Mass Index (#Underweight/normal)								
Over weight					1.087	0.893	1.245	0.685
					(0.0889)	(0.227)	(0.140)	(0.195)
I*Over weight					1.048	1.262	1.391	1.049
					(0.209)	(0.615)	(0.386)	(0.576)
Obese					1.046	0.892	1.016	1.026
					(0.110)	(0.278)	(0.171)	(0.340)
I*Obese					1.156	0.784	1.576	0.379
					(0.406)	(0.512)	(0.564)	(0.253)
Pregnant					1	1	3.421***	1
					(.)	(.)	(1.049)	(.)
I*Pregnant					1	1	0.295*	1
					(.)	(.)	(0.165)	(.)
Rural/Urban								
Urban					0.942	1.301	1.223	1.247
					(0.0819)	(0.315)	(0.144)	(0.375)
I*Urban					1.056	2.505	0.706	0.812
					(0.325)	(1.392)	(0.224)	(0.582)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.571**	1.278	1.339	1.436
					(0.242)	(0.409)	(0.303)	(0.448)
I*Poor/fair					1.340	1.829	1.759	1.532
					(0.536)	(1.225)	(0.832)	(1.118)
Cultural/ethnicity Origin (White)								
Non-White					1.140	1.428	0.611	4.629
					(0.225)	(1.681)	(0.168)	(5.039)
I*Non-White					0.594	0.387	0.890	0.318
					(0.161)	(0.546)	(0.336)	(0.398)
N	10745	2555	12040	3771	10745	2555	12040	3771

Note. Part1 applies a logistic regression model. The dependent variable 'GP visit' is binary: a positive versus zero use. ***p<0.001, **p<0.01, *p<0.05. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B"

considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Table A1.2: Results of part 2 of two-part model for the number of GP Visits (Full table)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of GP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.949	0.830	0.973	1.179	1.900	1.945	1.531*	1.282
	(0.160)	(0.251)	(0.108)	(0.245)	(0.671)	(0.779)	(0.319)	(0.371)
Years Since Migration								
YSM	1.016	1.010	1.004	0.991	1.002	1.002	0.995	0.988
	(0.0107)	(0.0122)	(0.00734)	(0.00809)	(0.00910)	(0.0106)	(0.00664)	(0.00701)
YSM^2	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000*
	(0.00017)	(0.00012)	(0.00013)	(0.00008)	(0.00015)	(0.0001)	(0.00012)	(0.00007)
Mother Tongue (#English/French)								
I*Other MT	0.920	0.927	1.005	0.936	0.998	0.891	0.970	0.961
	(0.0864)	(0.0711)	(0.0747)	(0.0668)	(0.0826)	(0.0632)	(0.0607)	(0.0726)
Income of Source Country (#High-income)								
Low	1.331	1.199	1.241	0.890	1.149	1.255	1.123	0.940
	(0.199)	(0.168)	(0.145)	(0.123)	(0.144)	(0.182)	(0.117)	(0.154)
Medium	0.906	0.796	1.139	0.932	0.781	0.816	1.038	0.867
	(0.124)	(0.120)	(0.118)	(0.140)	(0.101)	(0.115)	(0.0896)	(0.126)
Unknown/other	1.034	1.047	1.093	1.043	0.951	1.008	1.029	1.014
	(0.0996)	(0.109)	(0.104)	(0.0849)	(0.0791)	(0.0949)	(0.0762)	(0.0789)
Education (#Less than high school)								
High school					0.911	0.995	0.873*	0.957
					(0.0754)	(0.0751)	(0.0527)	(0.0493)
I*High school					0.731	0.891	1.094	0.997
					(0.223)	(0.123)	(0.169)	(0.109)
Post-se/Diploma					0.898	1.021	0.921	0.875**
					(0.0636)	(0.0612)	(0.0429)	(0.0365)
I*Post-se/Diploma					0.787	0.919	0.964	1.077
					(0.224)	(0.0939)	(0.125)	(0.0983)
Bachelor & above					0.944	0.925	0.837***	0.884
					(0.0721)	(0.0728)	(0.0440)	(0.0651)
I*Bachelor & above					0.612	0.828	1.022	1.005
					(0.174)	(0.130)	(0.139)	(0.130)
Missing					0.856	0.922	0.969	0.865
					(0.0878)	(0.109)	(0.0817)	(0.0868)
I*Missing					0.533*	0.932	1.142	0.903
					(0.170)	(0.178)	(0.213)	(0.162)
Marital Status (#Married)								
Non-married					0.945	0.993	1.057	1.097*
					(0.0394)	(0.0536)	(0.0357)	(0.0412)
I*Non-married					0.892	0.823	1.045	0.906
					(0.0933)	(0.0840)	(0.0724)	(0.0685)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.415***	1.137*	1.280***	1.050
					(0.104)	(0.0585)	(0.0897)	(0.0432)
I*Govt insurance					0.964	0.980	0.884	0.863
					(0.152)	(0.0934)	(0.120)	(0.0735)
Employer/private					1.046	1.050	1.134**	1.138**
					(0.0550)	(0.0570)	(0.0437)	(0.0522)
I*Employer/private					1.271*	1.083	0.848*	0.866
					(0.129)	(0.117)	(0.0617)	(0.0852)
Social Assistance (#Not recipient)								
Recipient					1.141	1.535	1.078	1.173
					(0.105)	(0.468)	(0.0741)	(0.251)
I*Recipient					0.822	0.776	0.671*	1.630
					(0.173)	(0.271)	(0.106)	(0.475)
Number of Chronic Conditions (#No CC)								
1 CC					1.443***	1.368**	1.204***	1.215
					(0.0786)	(0.165)	(0.0566)	(0.128)
I*1 CC					1.064	0.608*	0.851	1.417
					(0.115)	(0.133)	(0.0716)	(0.305)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of GP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
2 CC					1.748***	1.773***	1.391***	1.517***
					(0.0999)	(0.212)	(0.0698)	(0.159)
I*2 CC					0.997	0.537**	0.942	1.039
					(0.126)	(0.116)	(0.0898)	(0.208)
3 CC					2.133***	1.895***	1.485***	1.749***
					(0.162)	(0.229)	(0.0805)	(0.185)
I*3 CC					1.032	0.537**	0.861	0.888
					(0.163)	(0.116)	(0.0878)	(0.179)
4 CC					2.784***	2.058***	1.752***	1.880***
					(0.187)	(0.236)	(0.0895)	(0.187)
I*4 CC					0.725	0.626*	0.978	1.081
					(0.120)	(0.134)	(0.0924)	(0.211)
Smoking (#Non-smoker)								
Smoker					1.004	0.987	1.002	0.993
					(0.0458)	(0.0635)	(0.0326)	(0.0352)
I*Smoker					0.816*	1.180	0.918	1.104
					(0.0759)	(0.138)	(0.0603)	(0.0852)
Drinking Alcohol (#Non-drinker)								
Drinker					0.956	1.073	0.999	0.995
					(0.147)	(0.136)	(0.0946)	(0.0598)
I*Drinker					0.954	0.814	0.895	0.962
					(0.190)	(0.183)	(0.105)	(0.114)
Body Mass Index (#Underweight/normal)								
Over weight					1.127**	0.944	1.127**	0.942
					(0.0493)	(0.0462)	(0.0464)	(0.0386)
I*Over weight					1.092	1.034	0.917	1.070
					(0.0987)	(0.0956)	(0.0686)	(0.0905)
Obese					1.255***	0.967	1.255***	1.004
					(0.0700)	(0.0581)	(0.0505)	(0.0462)
I*Obese					0.824	1.168	0.772**	1.027
					(0.124)	(0.158)	(0.0660)	(0.0968)
Pregnant					1	1	1.468***	1
					(.)	(.)	(0.0974)	(.)
I*Pregnant					1	1	0.615**	1
					(.)	(.)	(0.110)	(.)
Rural/Urban								
Urban					1.104*	1.137*	1.011	0.962
					(0.0493)	(0.0584)	(0.0364)	(0.0403)
I*Urban					0.962	1.094	1.166	1.076
					(0.121)	(0.103)	(0.101)	(0.109)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.392***	1.298***	1.391***	1.304***
					(0.0893)	(0.0632)	(0.0656)	(0.0594)
I*Poor/fair					1.068	0.922	0.997	0.957
					(0.135)	(0.0829)	(0.0864)	(0.0884)
Cultural/ethnicity Origin (White)								
Non-White					0.955	0.893	1.009	1.234*
					(0.0980)	(0.193)	(0.0843)	(0.120)
I*Non-White					1.145	1.074	1.099	0.835
					(0.153)	(0.285)	(0.116)	(0.144)
N	7884	2341	10553	3595	7884	2341	10553	3595

Note. Part 2 applies a zero truncated negative binomial regression model. The dependent variable is 'number of GP visits' conditional on a positive outcome. ***$p<0.001$, **$p<0.01$, *$p<0.05$. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Table A1.3: Results of part 1 of two-part model for any SP Visit (Full table)

	Panel A				Panel B			
	Male		Female		Male		Female	
SP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.401***	0.605	0.184***	0.682	0.841	0.0302	0.252	0.206
	(0.109)	(0.876)	(0.0556)	(0.722)	(0.598)	(0.0564)	(0.182)	(0.407)
Years Since Migration								
YSM	1.066***	0.988	1.121***	1.019	1.055**	0.980	1.117***	1.020
	(0.0188)	(0.0721)	(0.0245)	(0.0469)	(0.0195)	(0.0694)	(0.0242)	(0.0582)
YSM2	0.999	1.000	0.998***	1.000	0.999	1.001	0.998***	1.000
	(0.00033)	(0.0009)	(0.00039)	(0.00056)	(0.00035)	(0.00087)	(0.00038)	(0.00063)
Mother Tongue (#English/French)								
I*Other MT	0.942	1.003	1.267	0.723	1.095	0.950	1.235	0.979
	(0.153)	(0.372)	(0.246)	(0.314)	(0.191)	(0.407)	(0.239)	(0.418)
Income of Source Country (#High-income)								
Low	1.228	2.139	1.398	0.417	1.134	3.211	1.784	0.384
	(0.301)	(1.450)	(0.375)	(0.241)	(0.303)	(2.519)	(0.555)	(0.222)
Medium	1.417	0.558	1.277	0.211*	1.132	0.478	1.810*	0.200*
	(0.379)	(0.390)	(0.376)	(0.152)	(0.340)	(0.350)	(0.535)	(0.162)
Unknown/other	1.164	1.459	1.141	0.819	1.076	1.588	1.373	0.661
	(0.225)	(0.635)	(0.245)	(0.489)	(0.221)	(0.793)	(0.289)	(0.370)
Education (#Less than high school)								
High school					1.141	0.889	0.863	0.998
					(0.193)	(0.358)	(0.203)	(0.444)
I*High school					0.504	1.580	2.337	1.215
					(0.247)	(1.320)	(1.257)	(1.036)
Post-se/Diploma					1.228	1.126	1.078	1.943*
					(0.188)	(0.343)	(0.219)	(0.610)
I*Post-se/Diploma					0.437	1.980	1.941	0.872
					(0.197)	(1.222)	(0.952)	(0.542)
Bachelor & above					1.214	2.301	1.476	2.132
					(0.196)	(1.035)	(0.316)	(1.149)
I*Bachelor & above					0.600	0.704	1.175	1.527
					(0.272)	(0.534)	(0.575)	(1.533)
Missing					1.204	1.172	0.730	1.664
					(0.232)	(0.804)	(0.224)	(1.093)
I*Missing					0.305*	0.484	3.640*	
					(0.162)	(0.505)	(2.118)	
Marital Status (#Married)								
Non-married					0.641***	0.497**	0.877	0.331***
					(0.0471)	(0.129)	(0.0852)	(0.100)
I*Non-married					0.901	1.379	0.794	1.970
					(0.185)	(0.653)	(0.177)	(1.018)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.656**	1.413	1.276	0.985
					(0.260)	(0.409)	(0.335)	(0.317)
I*Govt insurance					1.310	0.960	0.811	1.062
					(0.498)	(0.468)	(0.374)	(0.616)
Employer/private					1.342***	2.039*	1.278*	1.630
					(0.110)	(0.681)	(0.141)	(0.544)
I*Employer/private					1.069	1.118	1.186	1.131
					(0.211)	(0.676)	(0.284)	(0.871)
Social Assistance (#Not recipient)								
Recipient					1.171	0.674	1.122	0.168*
					(0.273)	(0.974)	(0.294)	(0.140)
I*Recipient					0.879	0.227	0.890	
					(0.466)	(0.430)	(0.478)	
Number of Chronic Conditions (#No CC)								
1 CC					1.647***	3.095**	1.624***	2.529*
					(0.134)	(1.090)	(0.194)	(1.109)

	Panel A				Panel B			
	Male		Female		Male		Female	
SP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
I*1 CC					0.986	0.411	1.413	0.733
					(0.192)	(0.250)	(0.350)	(0.599)
2 CC					2.787***	3.908***	2.477***	4.917***
					(0.276)	(1.314)	(0.323)	(2.029)
I*2 CC					0.905	0.321*	0.929	0.770
					(0.262)	(0.185)	(0.329)	(0.617)
3 CC					3.134***	7.648***	3.145***	10.87***
					(0.473)	(3.336)	(0.520)	(4.879)
I*3 CC					1.393	1.475	0.919	2.837
					(0.663)	(1.227)	(0.377)	(2.760)
4 CC					5.689***	30.27***	6.859***	10.61***
					(1.107)	(13.64)	(1.301)	(5.433)
I*4 CC					1.196	0.250	0.950	3.871
					(0.796)	(0.212)	(0.452)	(3.646)
Smoking (#Non-smoker)								
Smoker					0.876	0.655	1.060	0.885
					(0.0712)	(0.235)	(0.111)	(0.255)
I*Smoker					0.912	1.696	0.981	2.419
					(0.177)	(1.114)	(0.217)	(1.412)
Drinking Alcohol (#Non-drinker)								
Drinker					0.856	1.345	1.047	1.051
					(0.221)	(0.780)	(0.320)	(0.462)
I*Drinker					1.766	4.003	0.726	0.777
					(0.636)	(3.353)	(0.297)	(0.605)
Body Mass Index (#Underweight/normal)								
Over weight					0.975	1.146	1.132	1.463
					(0.0752)	(0.312)	(0.127)	(0.470)
I*Over weight					1.042	1.768	0.961	2.328
					(0.191)	(0.986)	(0.226)	(1.748)
Obese					1.008	1.159	1.028	1.778
					(0.0980)	(0.426)	(0.154)	(0.779)
I*Obese					0.749	1.647	1.290	0.272
					(0.237)	(1.252)	(0.422)	(0.202)
Pregnant					1	1	4.643***	1
					(.)	(.)	(1.965)	(.)
I*Pregnant					1	1	0.303*	1
					(.)	(.)	(0.184)	(.)
Rural/Urban								
Urban					0.974	0.937	1.255*	0.996
					(0.0809)	(0.259)	(0.136)	(0.337)
I*Urban					0.707	7.134***	0.662	1.297
					(0.219)	(3.914)	(0.190)	(0.969)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.501**	2.266*	0.806	1.490
					(0.216)	(0.757)	(0.180)	(0.524)
I*Poor/fair					2.399*	1.548	1.362	1.076
					(0.924)	(1.239)	(0.558)	(0.805)
Cultural/ethnicity Origin (White)								
Non-White					1.195	2.661	0.471**	2.348
					(0.227)	(4.547)	(0.116)	(2.579)
I*Non-White					0.904	1.192	1.293	0.435
					(0.238)	(2.190)	(0.426)	(0.570)
N					10745	2555	12040	3753

Note. Part1 applies a logistic regression model. The dependent variable 'SP visit' is binary: a positive versus zero use. ***p<0.001, **p<0.01, *p<0.05. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Table A1.4: Results of part 2 of two-part model for the number of SP Visits (Full table)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
Immigrant	0.805	0.745	1.138	0.765	0.921	0.966	1.439	0.702
	(0.144)	(0.181)	(0.126)	(0.185)	(0.343)	(0.388)	(0.345)	(0.229)
Years Since Migration								
YSM	1.027*	1.009	0.980**	1.012	1.011	1.006	0.978**	1.012
	(0.0118)	(0.00970)	(0.00707)	(0.00952)	(0.0111)	(0.0108)	(0.00722)	(0.00841)
YSM2	1.000	1.000	1.001***	1.000	1.000	1.000	1.000***	1.000
	(0.00019)	(0.0001)	(0.00013)	(0.00009)	(0.00018)	(0.00011)	(0.00013)	(0.00009)
Mother Tongue (#English/French)								
I*Other MT	0.841	0.885	0.956	0.940	0.932	0.887	0.931	0.968
	(0.0931)	(0.0672)	(0.0643)	(0.0617)	(0.0866)	(0.0623)	(0.0601)	(0.0655)
Income of Source Country (#High-income)								
Low	0.988	1.003	1.210	0.801	0.990	1.122	1.201	0.789
	(0.148)	(0.182)	(0.122)	(0.134)	(0.148)	(0.183)	(0.132)	(0.126)
Medium	0.750	0.950	1.162	1.088	0.651**	1.042	1.182	1.010
	(0.127)	(0.120)	(0.107)	(0.135)	(0.0989)	(0.132)	(0.108)	(0.149)
Unknown/other	0.961	1.126	1.091	0.966	0.849	1.165	1.096	0.909
	(0.106)	(0.0967)	(0.0831)	(0.0801)	(0.0878)	(0.101)	(0.0795)	(0.0715)
Education (#Less than high school)								
High school					1.234*	1.099	0.813**	1.041
					(0.119)	(0.0850)	(0.0548)	(0.0499)
I*High school					0.664	1.034	1.179	0.964
					(0.174)	(0.152)	(0.190)	(0.106)
Post-se/Diploma					1.145	1.026	0.865**	0.998
					(0.0928)	(0.0631)	(0.0464)	(0.0382)
I*Post-se/Diploma					1.000	1.078	1.180	0.999
					(0.225)	(0.124)	(0.157)	(0.0867)
Bachelor & above					1.149	1.058	0.892	1.104
					(0.101)	(0.0859)	(0.0532)	(0.0607)
I*Bachelor & above					1.009	1.107	1.058	1.014
					(0.222)	(0.176)	(0.148)	(0.114)
Missing					1.123	1.046	0.782**	0.992
					(0.131)	(0.114)	(0.0723)	(0.121)
I*Missing					1.017	1.075	1.249	0.906
					(0.283)	(0.185)	(0.244)	(0.168)
Marital Status (#Married)								
Non-married					0.858**	0.988	0.825***	1.024
					(0.0430)	(0.0508)	(0.0287)	(0.0357)
I*Non-married					1.003	0.824*	1.028	1.048
					(0.119)	(0.0794)	(0.0853)	(0.0772)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.189*	0.932	1.166*	1.004
					(0.0938)	(0.0475)	(0.0870)	(0.0409)
I*Govt insurance					1.250	1.064	1.041	0.820*
					(0.220)	(0.0990)	(0.145)	(0.0681)
Employer/private					1.027	1.025	1.139**	1.106*
					(0.0629)	(0.0526)	(0.0453)	(0.0484)
I*Employer/private					1.171	0.949	0.864	0.883
					(0.134)	(0.0919)	(0.0672)	(0.0841)
Social Assistance (#Not recipient)								
Recipient					0.992	1.419	1.084	1.075
					(0.0965)	(0.424)	(0.0754)	(0.208)
I*Recipient					0.983	0.386	0.876	1.415
					(0.208)	(0.237)	(0.190)	(0.392)
Number of Chronic Conditions (#No CC)								
1 CC					1.257***	1.083	1.184***	0.897
					(0.0826)	(0.144)	(0.0580)	(0.0875)
I*1 CC					1.134	1.243	0.897	2.312***

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+	Age18-65	Age66+
					(0.144)	(0.250)	(0.0837)	(0.449)
2 CC					1.595***	1.321*	1.364***	1.195*
					(0.109)	(0.169)	(0.0677)	(0.105)
I*2 CC					1.208	1.030	0.925	1.457*
					(0.166)	(0.198)	(0.0910)	(0.268)
3 CC					2.028***	1.445**	1.471***	1.350***
					(0.156)	(0.186)	(0.0823)	(0.121)
I*3 CC					0.843	0.901	0.894	1.385
					(0.129)	(0.179)	(0.101)	(0.261)
4 CC					2.192***	1.702***	1.638***	1.579***
					(0.174)	(0.210)	(0.0874)	(0.134)
I*4 CC					0.926	1.107	1.086	1.415*
					(0.141)	(0.209)	(0.111)	(0.246)
Smoking (#Non-smoker)								
Smoker					1.007	0.972	0.923*	1.009
					(0.0545)	(0.0565)	(0.0316)	(0.0334)
I*Smoker					1.111	1.190	1.070	1.045
					(0.115)	(0.130)	(0.0764)	(0.0764)
Drinking Alcohol (#Non-drinker)								
Drinker					1.162	1.221	1.104	1.074
					(0.213)	(0.153)	(0.109)	(0.0589)
I*Drinker					0.815	0.727	0.818	0.935
					(0.192)	(0.163)	(0.107)	(0.110)
Body Mass Index (#Underweight/normal)								
Over weight					1.013	1.018	1.104**	0.935
					(0.0532)	(0.0500)	(0.0418)	(0.0353)
I*Over weight					1.107	0.889	0.961	0.951
					(0.120)	(0.0795)	(0.0721)	(0.0754)
Obese					1.140*	1.026	1.050	0.974
					(0.0701)	(0.0664)	(0.0426)	(0.0419)
I*Obese					0.951	1.077	0.836	1.109
					(0.119)	(0.133)	(0.0866)	(0.101)
Pregnant					1	1	1.487***	1
					(.)	(.)	(0.0967)	(.)
I*Pregnant					1	1	0.795	1
					(.)	(.)	(0.137)	(.)
Rural/Urban								
Urban					1.012	1.136*	1.078	1.115*
					(0.0535)	(0.0589)	(0.0420)	(0.0498)
I*Urban					1.088	1.003	1.083	0.823
					(0.149)	(0.111)	(0.110)	(0.0876)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.576***	1.318***	1.347***	1.148***
					(0.107)	(0.0612)	(0.0632)	(0.0406)
I*Poor/fair					1.190	0.887	0.959	1.092
					(0.160)	(0.0800)	(0.0915)	(0.0886)
Cultural/ethnicity Origin (White)								
Non-White					0.843	1.015	0.956	0.898
					(0.109)	(0.201)	(0.0790)	(0.158)
I*Non-White					1.111	0.807	0.984	1.163
					(0.186)	(0.199)	(0.110)	(0.271)
N					6975	2376	10187	3640

Note. Part 2 applies a zero truncated negative binomial regression model. The dependent variable is 'number of SP visits' conditional on a positive outcome. ***$p<0.001$, **$p<0.01$, *$p<0.05$. Odds ratios are reported. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Table A1.5: Results of part 1 of Two-part Model for any GP visit (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	1.702	0.476	20.53	0.184	3.971	1.803	12.79	0.520
	(2.558)	(0.371)	(42.16)	(0.192)	(6.997)	(1.907)	(29.75)	(0.726)
Age								
Age	0.964**	0.964**	0.955**	0.955**	0.944***	0.944***	0.918***	0.918***
	(0.0115)	(0.0115)	(0.0161)	(0.0161)	(0.0121)	(0.0121)	(0.0177)	(0.0177)
I*Age	0.963	1.006	0.697*	1.025	0.929	0.987	0.753	1.052
	(0.157)	(0.0383)	(0.103)	(0.0437)	(0.131)	(0.0409)	(0.110)	(0.0470)
Age^2	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***
	(0.00013)	(0.00013)	(0.00017)	(0.00017)	(0.00014)	(0.00014)	(0.00021)	(0.00021)
I*Age^2	1.000	1.000	1.005**	1.000	1.001	1.000	1.005**	1.000
	(0.00192)	(0.0004)	(0.00176)	(0.00052)	(0.00168)	(0.00043)	(0.00168)	(0.00052)
Years Since Migration								
YSM	1.033	1.041*	1.266*	1.049*	1.049	1.041*	1.211	1.044*
	(0.130)	(0.0208)	(0.132)	(0.0200)	(0.113)	(0.0201)	(0.134)	(0.0190)
YSM^2	1.000	0.999*	0.996**	0.999***	0.999	0.999*	0.996**	0.999***
	(0.00179)	(0.00035)	(0.0014)	(0.00028)	(0.00160)	(0.00035)	(0.00142)	(0.00028)
Mother Tongue (#English/French)								
I*Other MT	1.019	0.990	0.582	1.056	1.203	1.084	0.588	0.985
	(0.339)	(0.186)	(0.214)	(0.233)	(0.368)	(0.203)	(0.199)	(0.222)
Income of Source Country (#High-income)								
Low	0.596	1.794*	0.691	1.417	0.555	1.874	0.736	1.349
	(0.352)	(0.530)	(0.785)	(0.795)	(0.341)	(0.621)	(0.710)	(0.894)
Medium	2.728	1.148	2.145	1.243	3.409	1.123	2.409	1.316
	(1.781)	(0.339)	(1.182)	(0.386)	(2.171)	(0.349)	(1.325)	(0.474)
Unknown/other	1.162	1.292	2.091	1.376	1.090	1.236	2.100	1.405
	(0.487)	(0.308)	(0.903)	(0.362)	(0.489)	(0.303)	(0.828)	(0.375)
Education (#Less than high school)								
High school					1.126	1.126	1.371	1.371
					(0.187)	(0.187)	(0.276)	(0.276)
I*High school					0.526	0.601	1.483	0.963
					(0.387)	(0.281)	(1.207)	(0.487)
Post-se/Diploma					1.291	1.291	1.308	1.308
					(0.192)	(0.192)	(0.229)	(0.229)
I*Post-se/Diploma					0.361	0.307**	1.364	0.590
					(0.237)	(0.125)	(1.018)	(0.272)
Bachelor & above					1.009	1.009	1.449*	1.449*
					(0.162)	(0.162)	(0.270)	(0.270)
I*Bachelor & above					0.977	0.609	0.969	0.555
					(0.685)	(0.253)	(0.757)	(0.272)
Missing					1.192	1.192	0.807	0.807
					(0.228)	(0.228)	(0.242)	(0.242)
I*Missing					0.752	0.460	15.03*	2.339
					(0.652)	(0.232)	(16.88)	(1.459)
Marital Status (#Married)								
Non-married					0.840*	0.840*	0.792*	0.792*
					(0.0640)	(0.0640)	(0.0828)	(0.0828)
I*Non-married					0.931	0.874	0.953	1.000
					(0.323)	(0.198)	(0.344)	(0.242)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.157	1.157	1.173	1.173
					(0.164)	(0.164)	(0.277)	(0.277)
I*Govt insurance					4.273	1.431	0.697	1.249
					(3.360)	(0.521)	(0.598)	(0.527)
Employer/private					1.268**	1.268**	1.271*	1.271*
					(0.105)	(0.105)	(0.146)	(0.146)
I*Employer/priva					1.058	1.312	0.959	1.176

	Panel A				Panel B			
	Male		Female		Male		Female	
GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
					(0.375)	(0.269)	(0.370)	(0.274)
Social Assistance (#Not recipient)								
Recipient					1.588*	1.588*	2.628***	2.628***
					(0.327)	(0.327)	(0.728)	(0.728)
I*Recipient					4.461	3.147	1.232	0.462
					(5.701)	(1.898)	(1.789)	(0.293)
Number of Chronic Conditions (#No CC)								
1 CC					1.660***	1.660***	1.609***	1.609***
					(0.142)	(0.142)	(0.196)	(0.196)
I*1 CC					0.805	0.895	0.594	0.868
					(0.293)	(0.185)	(0.239)	(0.251)
2 CC					2.817***	2.817***	2.812***	2.812***
					(0.294)	(0.294)	(0.354)	(0.354)
I*2 CC					0.504	0.619	0.301*	0.687
					(0.248)	(0.184)	(0.150)	(0.205)
3 CC					3.366***	3.366***	3.776***	3.776***
					(0.534)	(0.534)	(0.614)	(0.614)
I*3 CC					2.603	0.771	0.895	0.782
					(1.750)	(0.334)	(0.533)	(0.287)
4 CC					4.127***	4.127***	4.732***	4.732***
					(0.779)	(0.779)	(0.963)	(0.963)
I*4 CC					0.568	1.178	0.688	0.448
					(0.462)	(0.641)	(0.554)	(0.228)
Smoking (#Non-smoker)								
Smoker					0.884	0.884	1.078	1.078
					(0.0745)	(0.0745)	(0.116)	(0.116)
I*Smoker					1.416	1.164	0.485*	0.756
					(0.451)	(0.227)	(0.163)	(0.181)
Drinking Alcohol (#Non-drinker)								
Drinker					1.323	1.323	1.279	1.279
					(0.332)	(0.332)	(0.323)	(0.323)
I*Drinker					0.749	0.663	1.161	0.539
					(0.487)	(0.257)	(0.777)	(0.228)
Body Mass Index (#Underweight/normal)								
Over weight					1.082	1.082	1.236*	1.236*
					(0.0864)	(0.0864)	(0.131)	(0.131)
I*Over weight					0.865	1.009	0.626	0.870
					(0.322)	(0.206)	(0.252)	(0.230)
Obese					1.042	1.042	1.081	1.081
					(0.107)	(0.107)	(0.173)	(0.173)
I*Obese					2.822	1.223	1.108	0.965
					(1.640)	(0.411)	(0.618)	(0.357)
Pregnant					1	1	2.995***	2.995***
					(.)	(.)	(0.923)	(0.923)
I*Pregnant					1	1	1	0.276*
					(.)	(.)	(.)	(0.151)
Rural/Urban								
Urban					0.964	0.964	1.223	1.223
					(0.0807)	(0.0807)	(0.135)	(0.135)
I*Urban					1.366	1.301	0.937	0.842
					(0.654)	(0.359)	(0.408)	(0.244)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.511**	1.511**	1.339	1.339
					(0.214)	(0.214)	(0.266)	(0.266)
I*Poor/fair					0.873	1.116	1.883	1.546
					(0.559)	(0.430)	(1.903)	(0.648)
Cultural/ethnicity Origin (White)								
Non-White					1.154	1.154	0.584*	0.584*
					(0.223)	(0.223)	(0.160)	(0.160)
I*Non-White					0.982	0.664	1.124	1.217

	Panel A				Panel B			
	Male		Female		Male		Female	
GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
					(0.475)	(0.188)	(0.631)	(0.479)
N	11300	12954	13467	15459	11300	12954	13455	15459

Note. Part 1 applies logistic regression model where the dependent variable 'GP visit' is binary: a positive versus zero use. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***p<0.001, **$p<0.01$, *$p<0.05$. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Table A1.6: Results of part 2 of Two-part Model for the number of GP visits (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	1.280	0.856	0.372*	0.855	0.665	1.489	0.235**	0.833
	(0.605)	(0.274)	(0.163)	(0.227)	(0.446)	(0.608)	(0.117)	(0.251)
Age								
Age	1.020***	1.020***	0.989**	0.989**	1.014*	1.014*	0.981***	0.981***
	(0.00554)	(0.00550)	(0.00378)	(0.00375)	(0.00570)	(0.00568)	(0.00419)	(0.00417)
I*Age	0.976	1.015	1.077	1.009	0.983	1.008	1.100**	1.025*
	(0.0468)	(0.0138)	(0.0426)	(0.0120)	(0.0479)	(0.0147)	(0.0362)	(0.0117)
Age^2	1.000	1.000	1.000***	1.000***	1.000	1.000	1.000***	1.000***
	(0.00005)	(0.00005)	(0.00004)	(0.00004)	(0.00005)	(0.00005)	(0.00004)	(0.00004)
I*Age^2	1.000	1.000	0.999*	1.000	1.000	1.000	0.999**	1.000*
	(0.00048)	(0.00013)	(0.00038)	(0.00011)	(0.00047)	(0.00014)	(0.00032)	(0.0001)
Years Since Migration								
YSM	1.035	0.999	0.962	1.000	1.033	0.994	0.939*	0.992
	(0.0402)	(0.00790)	(0.0294)	(0.00573)	(0.0397)	(0.00716)	(0.0232)	(0.00568)
YSM^2	1.000	1.000	1.001*	1.000	1.000	1.000	1.001**	1.000
	(0.00043)	(0.00009)	(0.00033)	(0.00007)	(0.00043)	(0.00009)	(0.00027)	(0.00007)
Mother Tongue (#English/French)								
I*Other MT	0.737*	0.922	1.022	0.995	0.819	0.970	1.058	0.971
	(0.0903)	(0.0663)	(0.119)	(0.0618)	(0.0854)	(0.0631)	(0.110)	(0.0530)
Income of Source Country (#High-income)								
Low	0.972	1.285	1.001	1.244*	1.054	1.218	0.976	1.163
	(0.261)	(0.182)	(0.262)	(0.135)	(0.282)	(0.162)	(0.223)	(0.114)
Medium	0.774	0.811	1.192	1.149	0.782	0.732**	1.211	1.060
	(0.198)	(0.0932)	(0.188)	(0.109)	(0.183)	(0.0806)	(0.172)	(0.0865)
Unknown/other	1.033	1.022	1.072	1.076	1.003	0.964	1.029	1.045
	(0.140)	(0.0778)	(0.128)	(0.0859)	(0.127)	(0.0740)	(0.113)	(0.0673)
Education (#Less than high school)								
High school					0.985	0.985	0.899*	0.899*
					(0.0582)	(0.0580)	(0.0385)	(0.0384)
I*High school					1.437	0.752	1.575*	1.152
					(0.419)	(0.164)	(0.280)	(0.129)
Post-se/Diploma					1.012	1.012	0.917**	0.917**
					(0.0505)	(0.0503)	(0.0305)	(0.0304)
I*Post-se/Diploma					1.543	0.777	1.213	1.059
					(0.346)	(0.153)	(0.203)	(0.101)
Bachelor & above					1.049	1.049	0.845***	0.845***
					(0.0591)	(0.0589)	(0.0354)	(0.0353)
I*Bachelor & above					1.552	0.638*	1.518*	1.095
					(0.367)	(0.133)	(0.278)	(0.115)
Missing					0.996	0.997	0.944	0.945
					(0.0818)	(0.0816)	(0.0672)	(0.0669)
I*Missing					1.053	0.566*	1.309	1.248
					(0.299)	(0.126)	(0.280)	(0.196)
Marital Status (#Married)								
Non-married					1.080	1.079	1.019	1.019
					(0.0428)	(0.0425)	(0.0325)	(0.0324)
I*Non-married					1.478*	0.964	0.905	1.056
					(0.241)	(0.0981)	(0.0943)	(0.0690)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.208***	1.207***	1.183***	1.182***
					(0.0571)	(0.0568)	(0.0546)	(0.0542)
I*Govt insurance					1.192	0.992	0.944	0.848
					(0.266)	(0.101)	(0.163)	(0.0811)
Employer/private					1.023	1.023	1.135***	1.134***
					(0.0447)	(0.0445)	(0.0374)	(0.0372)
I*Employer/priva					1.034	1.227*	0.793	0.826**

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
					(0.160)	(0.112)	(0.0972)	(0.0555)
Social Assistance (#Not recipient)								
Recipient					1.289**	1.288**	1.143*	1.143*
					(0.114)	(0.113)	(0.0674)	(0.0671)
I*Recipient					0.659	0.747	0.566*	0.695*
					(0.229)	(0.152)	(0.164)	(0.111)
Number of Chronic Conditions (#No CC)								
1 CC					1.390***	1.389***	1.211***	1.211***
					(0.0698)	(0.0695)	(0.0556)	(0.0553)
I*1 CC					0.968	0.986	1.063	0.876
					(0.144)	(0.105)	(0.145)	(0.0737)
2 CC					1.661***	1.658***	1.420***	1.418***
					(0.0860)	(0.0857)	(0.0675)	(0.0671)
I*2 CC					1.244	0.872	1.252	0.947
					(0.246)	(0.103)	(0.207)	(0.0853)
3 CC					1.927***	1.923***	1.558***	1.555***
					(0.127)	(0.126)	(0.0791)	(0.0787)
I*3 CC					0.930	0.822	1.474*	0.835
					(0.210)	(0.118)	(0.239)	(0.0796)
4 CC					2.283***	2.278***	1.783***	1.779***
					(0.128)	(0.127)	(0.0860)	(0.0854)
I*4 CC					0.948	0.766	1.436*	1.000
					(0.196)	(0.105)	(0.207)	(0.0888)
Smoking (#Non-smoker)								
Smoker					0.968	0.968	1.009	1.009
					(0.0387)	(0.0385)	(0.0282)	(0.0281)
I*Smoker					1.431**	1.002	1.031	0.964
					(0.185)	(0.0858)	(0.0977)	(0.0566)
Drinking Alcohol (#Non-drinker)								
Drinker					0.965	0.966	1.011	1.011
					(0.116)	(0.116)	(0.0612)	(0.0609)
I*Drinker					0.835	0.953	1.227	0.904
					(0.254)	(0.177)	(0.216)	(0.0840)
Body Mass Index (#Under weight/normal)								
Over weight					1.059	1.059	1.105**	1.105**
					(0.0391)	(0.0389)	(0.0380)	(0.0378)
I*Over weight					1.063	1.101	1.064	0.890
					(0.148)	(0.0874)	(0.128)	(0.0593)
Obese					1.164**	1.163**	1.232***	1.231***
					(0.0580)	(0.0577)	(0.0430)	(0.0427)
I*Obese					1.037	0.931	0.750*	0.750***
					(0.164)	(0.108)	(0.105)	(0.0610)
Pregnant					1	1	1.420***	1.418***
					(.)	(.)	(0.0951)	(0.0946)
I*Pregnant					1	1	0.740	0.632*
					(.)	(.)	(0.215)	(0.116)
Rural/Urban								
Urban					1.118**	1.118**	1.005	1.005
					(0.0429)	(0.0427)	(0.0312)	(0.0310)
I*Urban					0.771	0.971	1.145	1.161
					(0.131)	(0.0959)	(0.136)	(0.0911)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.338***	1.337***	1.369***	1.368***
					(0.0629)	(0.0626)	(0.0502)	(0.0499)
I*Poor/fair					1.023	1.067	0.917	0.930
					(0.160)	(0.101)	(0.101)	(0.0757)
Cultural/ethnicity Origin (White)								
Non-White					1.032	1.032	1.016	1.016
					(0.0997)	(0.0993)	(0.0777)	(0.0774)
I*Non-White					1.192	1.124	1.054	1.110
					(0.226)	(0.146)	(0.181)	(0.113)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of GP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
N	8604	9952	12034	13804	8604	9952	12034	13804

Note. Part 2 applies zero truncated negative binomial regression model where the dependent variable is 'number of GP visit' conditional on positive outcome. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***p<0.001, **$p<0.01$, *$p<0.05$. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Table A1.7: Results of part 1 of Two-part Model for any SP visit (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	0.794	0.513	0.343	0.142*	1.658	1.457	0.100	0.226
	(0.994)	(0.371)	(0.430)	(0.112)	(2.698)	(1.461)	(0.159)	(0.250)
Age								
Age	0.979	0.979	0.977	0.977	0.966**	0.966**	0.941***	0.941***
	(0.0119)	(0.0119)	(0.0148)	(0.0148)	(0.0126)	(0.0126)	(0.0157)	(0.0157)
I*Age	1.067	1.010	0.889	1.031	1.017	0.973	0.994	1.037
	(0.138)	(0.0349)	(0.104)	(0.0382)	(0.123)	(0.0362)	(0.120)	(0.0448)
Age^2	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***
	(0.00014)	(0.00014)	(0.00016)	(0.00016)	(0.00015)	(0.00015)	(0.00018)	(0.00018)
I*Age^2	0.999	1.000	1.002	1.000	0.999	1.000	1.001	1.000
	(0.00146)	(0.00036)	(0.00154)	(0.00042)	(0.00136)	(0.00039)	(0.00132)	(0.00048)
Years Since Migration								
YSM	0.978	1.047*	1.150	1.057***	0.995	1.048*	1.061	1.054**
	(0.0962)	(0.0190)	(0.0950)	(0.0172)	(0.0895)	(0.0192)	(0.0917)	(0.0185)
YSM^2	1.001	0.999	0.998	0.999**	1.001	0.999*	0.998	0.999**
	(0.00132)	(0.00029)	(0.00132)	(0.00028)	(0.00121)	(0.00029)	(0.00111)	(0.00029)
Mother Tongue (#English/French)								
I*Other MT	0.988	1.005	1.392	1.180	1.392	1.140	1.458	1.156
	(0.271)	(0.172)	(0.494)	(0.225)	(0.429)	(0.203)	(0.448)	(0.224)
Income of Source Country (#High-income)								
Low	0.694	0.988	2.368	1.542	0.579	0.953	3.354	1.806
	(0.360)	(0.245)	(1.445)	(0.415)	(0.350)	(0.265)	(2.289)	(0.560)
Medium	0.702	1.253	4.067**	1.285	0.729	1.036	6.220**	1.660
	(0.307)	(0.360)	(2.134)	(0.393)	(0.328)	(0.320)	(3.665)	(0.489)
Unknown/other	1.169	1.029	1.889	1.304	0.972	0.967	2.262*	1.521
	(0.364)	(0.209)	(0.697)	(0.287)	(0.318)	(0.198)	(0.733)	(0.328)
Education (#Less than high school)								
High school					1.338	1.338	1.014	1.014
					(0.210)	(0.210)	(0.204)	(0.204)
I*High school					0.325	0.476	1.445	1.480
					(0.259)	(0.227)	(0.942)	(0.727)
Post-se/Diploma					1.577**	1.577**	1.343	1.343
					(0.222)	(0.222)	(0.226)	(0.226)
I*Post-se/Diploma					0.492	0.348*	1.662	1.036
					(0.352)	(0.149)	(0.969)	(0.478)
Bachelor & above					1.584**	1.584**	1.831***	1.831***
					(0.239)	(0.239)	(0.336)	(0.336)
I*Bachelor & above					0.814	0.527	1.600	0.741
					(0.605)	(0.233)	(0.998)	(0.346)
Missing					1.641**	1.641**	0.923	0.923
					(0.301)	(0.301)	(0.254)	(0.254)
I*Missing					0.213	0.247**	5.676*	2.636
					(0.184)	(0.129)	(4.545)	(1.509)
Marital Status (#Married)								
Non-married					0.830*	0.830*	0.814*	0.814*
					(0.0621)	(0.0621)	(0.0799)	(0.0799)
I*Non-married					0.815	0.768	0.824	0.823
					(0.256)	(0.161)	(0.299)	(0.210)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.401*	1.401*	1.201	1.201
					(0.200)	(0.200)	(0.264)	(0.264)
I*Govt insurance					1.923	1.118	1.261	0.984
					(1.165)	(0.379)	(0.811)	(0.404)
Employer/private					1.341***	1.341***	1.280*	1.280*
					(0.109)	(0.109)	(0.137)	(0.137)

	Panel A				Panel B			
	Male		Female		Male		Female	
SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
I*Employer/private					1.143	1.114	0.800	1.178
					(0.400)	(0.224)	(0.283)	(0.278)
Social Assistance (#Not recipient)								
Recipient					1.255	1.255	1.185	1.185
					(0.293)	(0.293)	(0.296)	(0.296)
I*Recipient					3.902	0.997	0.163**	0.798
					(3.392)	(0.523)	(0.114)	(0.446)
Number of Chronic Conditions (#No CC)								
1 CC					1.600***	1.600***	1.609***	1.609***
					(0.131)	(0.131)	(0.189)	(0.189)
I*1 CC					1.153	0.828	0.675	1.331
					(0.391)	(0.164)	(0.251)	(0.318)
2 CC					2.550***	2.550***	2.425***	2.425***
					(0.251)	(0.251)	(0.310)	(0.310)
I*2 CC					1.402	0.721	0.665	0.876
					(0.641)	(0.203)	(0.277)	(0.307)
3 CC					2.730***	2.730***	3.180***	3.180***
					(0.407)	(0.407)	(0.516)	(0.516)
I*3 CC					1.438	1.137	0.886	1.059
					(0.852)	(0.540)	(0.477)	(0.435)
4 CC					4.917***	4.917***	6.406***	6.406***
					(0.927)	(0.927)	(1.175)	(1.175)
I*4 CC					0.531	1.021	3.469	1.139
					(0.440)	(0.600)	(3.311)	(0.563)
Smoking (#Nonsmoker)								
Smoker					0.815*	0.815*	1.054	1.054
					(0.0672)	(0.0672)	(0.107)	(0.107)
I*Smoker					1.137	1.067	0.764	1.182
					(0.349)	(0.212)	(0.244)	(0.243)
Drinking Alcohol (#Non-drinker)								
Drinker					0.889	0.889	1.101	1.101
					(0.226)	(0.226)	(0.299)	(0.299)
I*Drinker					1.052	2.393*	2.191	0.752
					(0.678)	(0.884)	(1.265)	(0.294)
Body Mass Index (#Under weight/normal)								
Over weight					0.922	0.922	1.133	1.133
					(0.0711)	(0.0711)	(0.122)	(0.122)
I*Over weight					1.044	1.033	0.567	0.720
					(0.329)	(0.192)	(0.202)	(0.170)
Obese					0.930	0.930	1.047	1.047
					(0.0906)	(0.0906)	(0.149)	(0.149)
I*Obese					1.763	1.056	1.149	0.797
					(0.873)	(0.320)	(0.548)	(0.259)
Pregnant					1	1	4.910***	4.910***
					(.)	(.)	(2.076)	(2.076)
I*Pregnant					1	1	0.272	0.259*
					(.)	(.)	(0.263)	(0.154)
Rural/Urban								
Urban					0.997	0.997	1.244*	1.244*
					(0.0827)	(0.0827)	(0.130)	(0.130)
I*Urban					1.125	0.932	0.824	0.748
					(0.506)	(0.255)	(0.367)	(0.216)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.487**	1.487**	0.827	0.827
					(0.207)	(0.207)	(0.174)	(0.174)
I*Poor/fair					1.426	1.882	1.135	1.062
					(0.918)	(0.730)	(0.622)	(0.432)
Cultural/ethnicity Origin (White)								
Non-White					1.329	1.329	0.500**	0.500**
					(0.249)	(0.249)	(0.121)	(0.121)
I*Non-White					1.411	0.933	0.882	1.553
					(0.658)	(0.254)	(0.409)	(0.521)

	Panel A				Panel B			
	Male		Female		Male		Female	
SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
N	11300	12954	13467	15459	11300	12954	13467	15459

Note. Part 1 applies logistic regression model where the dependent variable 'SP visit' is binary: a positive versus zero use. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***p<0.001, **$p<0.01$, *$p<0.05$. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Table A1.8: Results of part 2 of Two-part Model for the number of SP visits (Stratification by Age at Migration)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
Immigrant	1.030	1.081	0.221*	0.792	0.526	1.437	0.308*	1.011
	(0.704)	(0.491)	(0.132)	(0.228)	(0.422)	(0.675)	(0.180)	(0.342)
Age								
Age	1.037***	1.037***	1.017***	1.017***	1.035***	1.035***	1.006	1.006
	(0.00622)	(0.00615)	(0.00405)	(0.00403)	(0.0063)	(0.00623)	(0.00447)	(0.00446)
I*Age	1.041	1.006	1.142**	1.018	0.965	0.991	1.152***	1.024
	(0.0835)	(0.0189)	(0.0569)	(0.0130)	(0.0586)	(0.0179)	(0.0457)	(0.0137)
Age^2	1.000*	1.000*	1.000	1.000	1.000**	1.000**	1.000	1.000
	(0.00006)	(0.00005)	(0.00004)	(0.00004)	(0.00006)	(0.00005)	(0.00004)	(0.00004)
I*Age^2	1.000	1.000	0.999**	1.000	1.000	1.000	0.999***	1.000*
	(0.00078)	(0.00016)	(0.00046)	(0.00011)	(0.00059)	(0.00016)	(0.00037)	(0.00012)
Years Since Migration								
YSM	0.954	0.991	0.928*	0.987	1.026	0.988	0.912**	0.985*
	(0.0659)	(0.00988)	(0.0343)	(0.00724)	(0.0445)	(0.00920)	(0.0288)	(0.00717)
YSM2	1.000	1.000	1.001*	1.000*	1.000	1.000	1.001**	1.000**
	(0.00075)	(0.00012)	(0.00039)	(0.00009)	(0.00049)	(0.00011)	(0.00033)	(0.000087)
Mother Tongue (#English/French)								
I*Other MT	0.825	0.847*	0.957	0.992	0.920	0.909	1.026	0.970
	(0.116)	(0.0689)	(0.109)	(0.0565)	(0.111)	(0.0662)	(0.111)	(0.0546)
Income of Source Country (#High-income)								
Low	0.891	0.932	1.029	1.172	0.749	1.086	1.043	1.214
	(0.404)	(0.129)	(0.215)	(0.119)	(0.257)	(0.150)	(0.222)	(0.130)
Medium	0.826	0.703**	1.073	1.176	0.824	0.699**	1.078	1.217*
	(0.172)	(0.0906)	(0.211)	(0.108)	(0.179)	(0.0919)	(0.188)	(0.107)
unknown/other	0.922	0.968	0.879	1.036	0.871	0.915	0.898	1.067
	(0.156)	(0.0859)	(0.111)	(0.0694)	(0.124)	(0.0784)	(0.105)	(0.0673)
Education (#Less than high school)								
High school					1.191*	1.189*	0.912*	0.912*
					(0.0813)	(0.0803)	(0.0397)	(0.0396)
I*High school					2.264*	0.710	1.493	1.047
					(0.935)	(0.128)	(0.323)	(0.120)
Post-se/Diploma					1.164**	1.162**	0.960	0.960
					(0.0661)	(0.0653)	(0.0327)	(0.0326)
I*Post-se/Diploma					2.098**	0.931	1.200	1.084
					(0.599)	(0.134)	(0.221)	(0.102)
Bachelor & above					1.181**	1.179**	0.996	0.997
					(0.0759)	(0.0750)	(0.0414)	(0.0413)
I*Bachelor & above					2.137**	0.979	1.208	0.994
					(0.622)	(0.150)	(0.236)	(0.105)
Missing					1.210*	1.208*	0.890	0.891
					(0.108)	(0.107)	(0.0669)	(0.0667)
I*Missing					1.745	0.817	0.904	1.110
					(0.698)	(0.158)	(0.243)	(0.174)
Marital Status (#Married)								
Non-married					1.066	1.065	0.892***	0.892***
					(0.0446)	(0.0441)	(0.0263)	(0.0262)
I*Non-married					1.046	0.902	1.014	0.998
					(0.198)	(0.0940)	(0.125)	(0.0719)
Supplementary Health Insurance (#No insurance)								
Govt insurance					1.026	1.025	1.085	1.085
					(0.0519)	(0.0513)	(0.0477)	(0.0475)
I*Govt insurance					0.917	1.195	0.953	0.941
					(0.217)	(0.121)	(0.154)	(0.0826)
Employer/private					1.007	1.007	1.119***	1.119***
					(0.0474)	(0.0469)	(0.0372)	(0.0371)
I*Employer/priva					0.702*	1.103	1.004	0.877

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
					(0.122)	(0.105)	(0.138)	(0.0632)
Social Assistance (#Not recipient)								
Recipient					1.089	1.089	1.137*	1.137*
					(0.0921)	(0.0911)	(0.0672)	(0.0670)
I*Recipient					0.977	0.936	1.306	0.875
					(0.310)	(0.187)	(0.325)	(0.178)
Number of Chronic Conditions (#No CC)								
1 CC					1.194**	1.192**	1.148**	1.148**
					(0.0700)	(0.0693)	(0.0526)	(0.0524)
I*1 CC					1.053	1.225	1.091	0.979
					(0.192)	(0.138)	(0.166)	(0.0908)
2 CC					1.483***	1.479***	1.323***	1.322***
					(0.0909)	(0.0899)	(0.0600)	(0.0598)
I*2 CC					1.152	1.179	1.044	0.962
					(0.223)	(0.144)	(0.162)	(0.0909)
3 CC					1.741***	1.732***	1.422***	1.421***
					(0.114)	(0.112)	(0.0697)	(0.0695)
I*3 CC					0.843	0.840	1.071	0.914
					(0.181)	(0.111)	(0.189)	(0.0936)
4 CC					1.895***	1.886***	1.595***	1.593***
					(0.122)	(0.120)	(0.0745)	(0.0742)
I*4 CC					1.000	1.034	1.424*	1.136
					(0.213)	(0.129)	(0.212)	(0.104)
Smoking (#Non-smoker)								
Smoker					0.953	0.954	0.931*	0.931*
					(0.0440)	(0.0436)	(0.0264)	(0.0263)
I*Smoker					1.250	1.128	1.009	1.096
					(0.164)	(0.101)	(0.101)	(0.0666)
Drinking Alcohol (#Non-drinker)								
Drinker					1.102	1.102	1.114	1.113
					(0.155)	(0.153)	(0.0716)	(0.0713)
I*Drinker					1.315	0.966	0.706	0.789*
					(0.399)	(0.196)	(0.154)	(0.0839)
Body Mass Index (#Under weight/normal)								
Over weight					0.967	0.968	1.056	1.056
					(0.0419)	(0.0415)	(0.0332)	(0.0331)
I*Over weight					1.061	1.100	1.067	0.951
					(0.155)	(0.0967)	(0.144)	(0.0645)
Obese					1.049	1.049	1.026	1.026
					(0.0555)	(0.0549)	(0.0356)	(0.0355)
I*Obese					0.820	1.043	0.734	0.830*
					(0.146)	(0.107)	(0.117)	(0.0771)
Pregnant					1	1	1.583***	1.581***
					(.)	(.)	(0.102)	(0.102)
I*Pregnant					1	1	0.741	0.746
					(.)	(.)	(0.147)	(0.130)
Rural/Urban								
Urban					1.044	1.044	1.083*	1.083*
					(0.0456)	(0.0452)	(0.0362)	(0.0361)
I*Urban					1.068	1.058	0.972	0.996
					(0.180)	(0.116)	(0.124)	(0.0851)
Self-reported Health (#Good/very good/excellent)								
Poor/fair					1.435***	1.431***	1.289***	1.288***
					(0.0666)	(0.0658)	(0.0445)	(0.0443)
I*Poor/fair					1.163	1.011	1.058	0.931
					(0.204)	(0.106)	(0.169)	(0.0767)
Cultural/ethnicity Origin (#White)								
Non-White					0.936	0.937	0.976	0.976
					(0.107)	(0.106)	(0.0757)	(0.0755)
I*Non-White					1.217	0.952	0.746	0.906
					(0.297)	(0.144)	(0.142)	(0.0996)

	Panel A				Panel B			
	Male		Female		Male		Female	
Number of SP visit	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+	AAM 0-12	AAM 36+
N	7835	9098	11763	13486	7835	9098	11763	13486

Note. Part 2 applies zero truncated negative binomial regression model where the dependent variable is 'number of SP visit' conditional on positive outcome. AAM0-12, age at migration is zero to 12 years old; AAM 36+, age at migration is after 36 years old. ***p<0.001, **p<0.01, *p<0.05. "Set A" only considers exogenous variables: YSM, mother tongue, and income of the source country. "Set B" considers both exogenous and endogenous variables: YSM, mother tongue, and income of the source country, education, supplementary health insurance, social assistance, chronic conditions, smoker, and alcohol user, BMI, urban, self-rated health and cultural/ethnicity.

Chapter Two

The Effects of Language Proficiency on the Health and Health Behaviors of Immigrants

2.1 Introduction

Canada is one of the major immigrant-receiving countries and has one of the highest immigration rates in the world. Most recent immigrants come from countries where the dominant language is not one of the official languages of the host country (English or French). As a result, one of the major challenges confronting policymakers today is the large number of individuals who have limited language-proficiency in the official language of Canada. In Canada, data from the 2016 Census reveal that about 47.2% of the immigrant population speaks a language at home other than English or French and about 6.8% report not speaking either official language at all.

An extensive literature in economics examines the impact of language skills and language-proficiency on labor market performance and social assimilation indicators such as marriage, fertility, and residential location decisions (Bleakley & Chin, 2004, 2008, 2010; Chiswick & Houseworth, 2011). However, the parallel question of how language proficiency impacts health and health behaviours is largely unexplored. Previous studies on the health effects of language skills mostly come from the clinical sciences. Such studies exclusively rely on multivariate regression models and compare the health outcomes of those who are language-proficient to those who are not, where language proficiency is treated as an exogenous variable. But, individuals who have better

language skills may have better health outcomes for other reasons unobserved by the researchers. The objective of this paper is to address endogeneity and to identify the causal effects of language proficiency on health and healthcare utilization among immigrants.

Our methodology exploits the fact that younger children learn languages better due to the nature of their cognitive development. As a result, immigrants who arrive in Canada at an earlier age (less than or equal to 9 years old) will have better host country language skills. Greater language skills may enhance educational achievement and lead to better health outcomes. In order to control for these factors, we use two instruments to measure the host country language proficiency: firstly, an indicator for early arrival interacted with coming from a country where the dominant language is not English and secondly, an indicator for early arrivals interacted with a measure of the linguistic distance between the native language and English. We implement the instrumental variable approach using the traditional two-stage least square (2SLS) method and also two-stage residual inclusion (2SRI), which should result in better estimates in the case of a dichotomous endogenous treatment and outcome. We also provide the results from a bivariate probit for comparison.

Finally, we cover multiple dimensions of health, including some aspects of mental health, so that we can see a more comprehensive picture when it comes to the causal impact of language proficiency on the health and health behaviours of immigrants in Canada.

2.2Literature Review

2.2.1 Previous Research on Language Barrier/Proficiency and Healthcare Utilization

Having English proficiency is one of the potentially important factors that can set many immigrants apart from those without language proficiency. Research shows that immigrants who

have language proficiency will have better social, economic and health behaviours outcomes. For immigrants who do not speak English well, or at all, language barriers may contribute to health disparities by impeding health-related communication. In the existing literature, analyses of the association between language barriers and immigrants' health and health behaviours have received considerable attention. The literature on both the US and Canada generally finds that limited language-proficient immigrants use 'the general medical care system' less with potentially negative health effects (see for example Gee, Walsemann, & Takeuchi, 2010; Pippins, Alegría, & Haas, 2007; Schachter, Kimbro, & Gorman, 2012; Shi, Lebrun, & Tsai, 2009 for findings from US data; Brar et al., 2009; Omariba & Ng, 2011; Pottie et al., 2008; Wu, Penning, & Schimmele, 2005 for results from Canadian data; and Lebrun, 2012 for a US-Canada comparison). These results sometimes offer an explanation for the convergence of immigrants, who tend to be in better health upon arrival, to the lower health levels of natives (e.g., Fuller-Thomson et al., 2011).[4] Overall, in both countries, immigrants with limited English Proficiency (LEP) and with shorter length of stay (less than 10 years), have lower rates of access/utilization, compared to their counterparts (Lebrun, 2012).

In one part of literature, LEP is identified as one of the important barriers to accessing particular health care services by different racial/ethnic groups (for example, Asanin & Wilson, 2008; Gee, Walsemann, & Takeuchi, 2010; Pippins, Alegría, & Haas, 2007; Shi, Lebrun, & Tsai, 2009). Language barriers are one of the potentially important contributors to disparities in having screening tests, particularly cancer screening (De Alba & Sweningson, 2006; Jacobs, Karavolos, Rathouz, Ferris, & Powell, 2005; Latif, 2010). Using data from the Canadian Community Health Survey cycle 2.1 (2003), the study by Sun et al., (2010) finds that screening mammography rates

[4] The fact that immigrants tend to be healthier than natives but converge over time to the same health levels as natives is well documented both in the US (see Stephen et al., 1994; Antecol and Beddard, 2006) and in Canada (see Chen et al., 1996; Newbold and Danforth, 2003; and McDonald and Kennedy, 2004).

are persistently lower in Asian immigrant women (aged 50-69) compared to non-immigrant women in Canada. In this case, language is interpreted as a barrier.

LEP is associated with mental health care disparities, because both treatment and diagnosis of a mental health problem predominantly rely on verbal communication with mental healthcare providers, compared to other health problems for which there are objective tests. Consequently, immigrants with LEP may face more challenges accessing mental healthcare services (Sentell, Shumway, & Snowden, 2007). It has been well documented that various ethnic communities who have migrated to North America experience many serious mental health problems but consistently underutilize mental health services (Kim et al., 2011; Li & Browne, 2000; Sadavoy, Meier, & Ong, 2004; Sentell et al., 2007). The study by Li & Browne (2000) identifies LEP and a lack of understanding of the mainstream culture of the host country as the major barriers for utilizing mental health facilities.

On the other hand, few studies explore the relationship between language proficiency and self-rated health. For example, using data from a longitudinal population-based cohort survey of immigrants to Canada (2001, 2003), the study by Pottie et al., (2008) shows that there is a statistically significant association between poor language proficiency and poor self-rated health. The impact is greater for women compared to men. Correspondingly, a study by Schachter, Kimbro, & Gorman, (2012) demonstrates that across immigrant ethnic groups, being bilingual is associated with better self-rated physical and mental health, compared to being proficient only in English or a native language.

2.2.2 Previous Research on the Impact of Language Barrier/proficiency on Health and Causality

Although the literature provides evidence on the negative association between LEP and health outcomes, not many studies explore the causal mechanism that underlies this association. A

few causal routes are discussed within a Grossman model framework by Clarke & Isphording (2015). First, language proficiency facilitates access to inputs into the health status production function; an example is an access to a better job with higher earnings, implying at least some positive effects on health. Second, an increase in language skills raises the efficiency of the health status production just like an increase in technology raises the efficiency of production. Language skills improve the efficiency of health status production by getting a more efficient combination of inputs to health production. Typically, approaches to allocative efficiency assume that a person with better language skills has more information about the true nature of the health status production function. Moreover, a more favourable endowment of language proficiency would have a greater chance to improve current health. Overall, such efficiency gains because of language skills interact with the Canadian health care system resulting in better health and health behaviours (Clarke & Isphording, 2015; Grossman, 2008). For example, the study by Clarke & Isphording (2015) looks at the impacts of language deficiency on health production for Australian childhood immigrants. Following the Grossman model, their study indicates that language deficiency directly affects the health status production function and indirectly affects the accessing of health care inputs.

Several papers attempt to address the problem of endogeneity to investigate the relationship between language skills and earnings. The specification strategy of our instruments is inspired by the paper of Bleakley & Chin (2004) that relies on the well-established relationship between language acquisition and age. Bleakley & Chin (2004) use an instrumental variable (IV) strategy to explore the effect of language skills on annual wages, taking into account the endogeneity of 'English-language skills'. The study uses as the instrument "the interaction between having been arrived young (age at arrival is less than or equal to 11) and having been born in a non-English speaking country". Afterward, Clarke & Isphording (2015) derive an instrument for English deficiency, following the approach by Bleakley & Chin (2004), to show the causal mechanism of language barriers on the health status production. Clarke & Isphording (2015) set their instrument

as the interaction of age at arrival and the linguistic distance which we consider as our second instrument in this paper.

2.3 Sources of Data and Descriptive Statistics

2.3.1. Data

In this paper, we implement the empirical strategy using data from Canadian Community Health Survey (CCHS) cycles 2.1 (2003), 3.1 (2005), 2007/8, 2009/10, 2011, 2012, 2013 and 2014. Our sample does not consider CCHS cycle 1.1 (2001) because the variable named 'language spoken at home' is not available in this survey. Also, there was a change to the CCHS questionnaire after 2014 that makes later years less useful. Data collection was conducted by Statistics Canada; they maintain similar sampling design, data collection methods, and survey questionnaires across the survey cycles. The CCHS is a cross-sectional survey of Canadians 12 years and older residing in a private dwelling and excludes members of the full-time members of Canadian Armed Forces, individuals living in Reserves or Crown lands and certain remote regions. The survey collects information on respondents' personal characteristics, self-reported health status, health determinants, demographic, socioeconomic characteristics, and healthcare utilization[5]. In particular, we need the data on 'age at immigration' that is derived by using 'age at the time of the interview' and 'years lived in Canada'.

Our sample only considers the childhood immigrants, which we define as immigrants born outside Canada who arrive in Canada at an age under 18 years old. The reason behind this choice is that the language acquisition abilities and behaviours of childhood immigrants are different, compared to those migrated as an adult (Schaafsma & Sweetman, 2001). For these immigrants, age at arrival is not a choice variable, because they cannot decide to migrate; the decision is made by

[5] This information is found in Statistics Canada user guides, which are not publicly available.

their parents.[6] Then, we select only those childhood immigrants who are currently aged between 18 to 65. Furthermore, we divide our sample into three mutually exclusive language categories based on the country of birth: firstly, born in non-English speaking countries; secondly, born in a country where English is an official and also dominantly spoken language and thirdly, born in a country where English is official but not dominantly spoken language. To avoid ambiguity, we further restrict our sample to categories 1 and 2 only.[7] For example, we exclude respondents from India, Hong Kong and Philippines because in those countries English is the official language but not dominantly spoken. Furthermore, respondents from Quebec, where the dominant language is French, are excluded from the sample because it is unclear whether knowing French is more beneficial to new immigrants than knowing English in Québec. Considering these sample selection criteria, there are 11,293 observations in total across all eight CCHS waves (2003-2014) of data.

Our main outcomes of interest include three broad categories; firstly, the health status that is measured by using self-reported health (SRH) and self-perceived mental health (SPMH) because both are widely used and there is evidence of their construct validity from a large volume of previous studies. Respondents were asked "Overall, how would you rate your overall health/mental health conditions over the last 12 months?" Response options for both SRH and SPMH include five categorical variables to assess the health status: excellent, very good, good, fair and poor. We treat the responses as binary variables, such as good SRH and good SPMH respectively, where the values equal one if the respondent selects excellent, very good or good, and zero otherwise. Secondly, accessibility to healthcare is measured by having a regular medical doctor, as it is very important especially in the context of immigrant groups. Respondents were asked "do you have a regular medical doctor?" and the response options are 'yes' and 'no'. Therefore, we treat the response as a binary variable, where value equals one if the individual picks 'yes' and zero otherwise. Thirdly,

[6] According to Canada Citizenship and Immigration Services, immigrant parents can bring their unmarried children younger than 21.
[7] See Appendix Table A1, panel A, part 2 in Bleakley and Chin, 2004

the utilization of healthcare services for hospitals or mental healthcare services is assessed. Respondents were asked "in the past 12 months, have you received any healthcare services at a hospital, for any diagnostic or day surgery service, overnight stay, or as an emergency room patient?" and response options were 'yes' and 'no'. Similarly, to assess mental healthcare utilization, respondents were asked "in the past 12 months, have you seen or talked to a `health professional about your emotional or mental health?" Responses options were 'yes' and 'no'. We also treat these two utilization indicators as binary variables.

2.3.2. Descriptive Analyses

For summary statistics and further analyses, we divide our sample into two mutually exclusive language categories based on the 'language spoken at home': LP (language proficient) is defined as an immigrant who speaks English at home and NLP (non-language proficient) is defined as an immigrant who speaks a language at home other than English.

[Chart 2.1 here]

If we look at the age distribution profile of our sample, we observe that among the LPs, the percentage of aged (51-65) immigrants has been increasing year-by-year, as shown in Chart 2.1. For example, in 2003-8, among the LPs, 41% are aged (51-65), but in 2013-14 that increases to 60%. The age distribution of the NLP immigrants between the years 2003 and 2014 shows that the proportion of aged (51-65) immigrants fall from 24% in 2003-8 to 23% in 2010-12, afterward the proportion of aged (51-65) immigrants grow steadily. However, young (18-40) immigrants continue to make up the majority of NLP immigrants.

Table 2.1 provides the weighted sample percentage for each of the dependent and independent variables being used within this study, according to the immigrants with language proficiency versus non-language proficiency. LP and NLP immigrants share a largely similar profile

of dependent variables except for receiving hospital and mental health care services. A larger proportion of LP immigrants report receiving hospital and mental health care services (5.3% and 9.6%) as compared to the NLPs (3.3 and 6.8%), respectively. LP immigrants are much more likely to be married (59.9%) as compared to the NLP immigrants (44.8%). A larger proportion of LP immigrants report some post-secondary education (75.7%) as compared to the NLP immigrants (63.8%), and a smaller proportion of LP immigrants indicate that they live in urban (84.4% versus 95.3%, respectively). Concerning the country of birth, the immigrants with language proficiency mostly come from UK, USA, and Germany (35.2%, 12.8% and 10.6%, respectively). On the other hand, the majority of the NLP immigrants came from China, Italy, and Vietnam (29.3%, 15.4% and 13.3%), respectively.

[Table 2.1 here]

Also, the distribution of age-at-migration in Chart 2.2, shows that for LP immigrants, the proportions decrease gradually with the increase in age-at-migration. In contrast, the profile of age-at-migration distribution is just opposite for the NLP immigrants, the proportions increase with the increase in age-at-migration.

[Chart 2.2 here]

2.4. Methodology

In this section, we briefly explain the choice of models to match with our simple scenario: endogenous binary treatment and binary outcomes. Then we explain the empirical specifications and the relevance of our instruments for this paper.

2.4.1 Choice of Model

The first issue involves the use of an appropriate methodology and suitable estimators. In our simple scenario, following standard notations let us assume that $T \in \{0, 1\}$ is a potentially endogenous treatment, and $Y \in \{0,1\}$ is our outcome of interest. Assume that if an individual receives the treatment, and then Y_1 be the individual's potential outcome. Similarly, in the case of not receiving any treatment, Y_0 be the individual's potential outcome. Let $Z \in \{0, 1\}$ is our instrument of the treatment. Let T_1 and T_0 are the individual's chosen treatment if she receives Z=1 and Z=0, respectively. In this context, we follow the definition of an instrument by Imbens and Angrist (1994) that needs to satisfy the following conditions:

Relevance: Z is relevant for explaining variation in T, i.e. $E[T|Z = 1] \neq E[T|Z = 0]$

Exogeneity: Z has no partial effect on Y.

For each individual, we observe (Z, T, Y). Suppose we have an independent and identically distributed (iid) sample of n individuals. Usually, we focus on two commonly estimated treatment effects. These are: first, average treatment effect (ATE) of the endogenous variable over the population that can be shown as $\Delta_{ATE} = E[Y_1] - E[Y_0]$. Second, if the effect of the endogenous variable on the expected outcome differs across the population, then the instrumental variable (IV) coefficient is defined as the local average treatment effects (LATE) that can be shown as:

$$\Delta_{LATE} = \frac{E[Y|Z=1]-E[Y|Z=0]}{E[T|Z=1]-E[T|Z=0]}$$

In this paper, we apply the following approaches to estimate the causal effects of language proficiency on the health and health behaviours among immigrants.

2.4.1.1. Two-stage Least Squares

The instrumental variable methods are usually implemented in two-stage approaches where the most common and popular method is the two-stage least squares (2SLS). The first stage, predicts the endogenous variable conditional on the observed confounders and the IV. In the second stage, the association between outcome and the predicted probability of treatment is estimated, again conditioning on the observed confounders. The 2SLS approach works by minimizing the squares sum of residuals in both stages and it disregards the binary structure of the outcome and treatment variables. This estimation method was originally used in cases of continuous endogenous treatment and continuous outcome measures. In our case, the dependent variables are not continuous; therefore it is argued that the traditional two-stage least squares methods might yield inconsistent results (Basu & Coe, 2017; Blundell & Powell, 2004; Terza, Basu, & Rathouz, 2008). However, economists have continued to use the 2SLS approach, even in the case of binary treatment and binary outcome variables by assuming a linear probability model (LPM), under which this estimator would be consistent, as long as the instruments are valid (Bhattacharya, Goldman, & McCaffrey, 2006; Chiburis et al., 2012a). Another key point is that the heterogeneity of treatment effects across the population is an important factor for the specific treatment effect parameter. In particular, the 2SLS provides the ATE parameter in the absence of heterogeneous effects. At the same time, it is well–established that the 2SLS provides an average treatment effect for only the subgroup of the population, whose treatment choices were influenced by the changes in the specific instrumental variable (Basu, Coe, & Chapman, 2017; Heckman, Urzua, & Vytlacil, 2006; Imbens & Angrist, 1994). In the case of binary outcomes and binary treatments, the 2SLS method produces consistent estimators of LATE across the entire range of rarity (<5% of the sample) for either treatment or the outcome (Basu et al., 2017; Imbens & Angrist, 1994). In our context, 2SLS does not consistently estimate ATE. We use it just to compare it with other previous literature.

2.4.1.2. Two-stage Residual Inclusion (Semi-parametric)

In the two-stage residual inclusion (2SRI) approach, the residuals are estimated from the first stage, and the second stage regression run with the original endogenous variable, observed confounders and the residuals (estimated from the first stage) just like an added covariate (Basu & Coe, 2017; Terza et al., 2008). In our case, we run the probit model in the first stage and estimate generalized residuals (Gourieroux et al., 1987): $\hat{y}_i{}'(y - \hat{y}_i)/\{(1 - \hat{y}_i)\hat{y}_i\}$ and then in the second stage, we consider the same cumulative distribution function (CDF) based on a nonlinear model, as our outcomes are binary. It has been suggested that the 2SRI is the best suited for IV estimators when a first or second stage models have binary dependent variable or otherwise suitable for non-linear regression, especially when the full parametric assumptions are not wanted (Basu & Coe, 2017; Blundell & Powell, 2004; Terza et al., 2008). Under these circumstances, the 2SRI Probit-Probit approach is a good fit for our case. In theory, non-linear 2SRI estimators are designed for estimating the ATE parameter. Basu, Coe, & Chapman (2017) show that the non-linear 2SRI methods produce consistent estimates of ATE parameter with inherently non-linear dependent variables.

2.4.1.3 Bivariate-Probit (Fully-parametric)

Another choice for estimating the causal effects for our case is the bivariate-probit model. Under full parametric assumptions of normality, it can be used to model the two stages simultaneously (Heckman, 1978). In general, this approach computes the maximum-likelihood estimates, which assumes that outcome and treatment are each determined by the latent linear index models with jointly normal error terms (Bhattacharya et al., 2006).

It can be shown as:

$$T = \mathbf{1}\{\propto Z + \kappa_T + \mathcal{E}_1 > 0\}$$

$$Y = \mathbf{1}\{\gamma T + \kappa_Y + \mathcal{E}_1 > 0\}$$

Where the errors ε_1 and ε_2 are jointly normally distributed with means of 0, variance of 1 and with correlation ρ and are independent of Z.

However, the bivariate-probit models can be sensitive to heteroscedasticity and are usually more robust (than other models we consider here) when treatment probabilities approach 0 or 1. On the positive side, if the underlying distribution is specified correctly, the bivariate probit estimators are generally more efficient than linear IV (Chiburis, Das, & Lokshin, 2012; Terza et al., 2008). An additional advantage of this model is that it offers a 'score test', developed by (Murphy, 2007), that has the ability to detect whether the model is mis specified or inconsistent (Chiburis, Das, & Lokshin, 2012). In our case, we perform the 'score test' for each outcome in two ways, with bootstrapping and without bootstrapping, to obtain an impression about whether our models are specified correctly (see the appendix Table A-3). In particular, the bivariate-probit model structurally recovers the average treatment effect (ATE) parameter, if the underlying distributions are correctly specified (Basu et al., 2017).

Also, as all our outcomes of interest are binary, we also estimate the probit model and its marginal effects as a benchmark of results, when endogeneity of language proficiency is not taken into account.

2.4.2 Model Set-up

The structural model of interest can be described as:

$$Y_{ijat} = \alpha_0 + \alpha_1 LP_{ijat} + \mathrm{X}'_{ijat}\Omega + \delta_a + v_j + \mu_t + \varepsilon_{ijat} \qquad (1)$$

Where the unit of observation is individual i from country j who arrived in Canada at age a, and the information is documented in the CCHS cycle year t. Y_{ijat} is the outcome of interest, such as indicators for health status and health behaviours (such as access to and utilization of healthcare

services). LP_{ijat} is our endogenous variable which indicates whether or not the individual i is language proficient. Also, X'_{ijat} is a vector of variables including age, gender, marital status, urban and province. Finally, δ_a is a set of age-at-arrival dummies; v_j is a set of country-of-birth dummies and μ_t is a set of CCHS year dummies. For the outcome of interest, we use five indicators of health status, access and utilization of healthcare services.

If language skills or LP were randomly assigned to individuals, we could estimate the causal effect of language-proficiency using an equation similar to (1). Given the endogeneity in language acquisition, we identify the impact of LP on the health and health behaviours of immigrants, by using three different types of IV strategies (2SLS, 2SRI and bivariate-probit). Intuitively, an IV method estimates the causal effect in two steps (Imbens and Angrist, 1994; Angrist and Imbens, 1995; Angrist and Pischke, 2009). The first step extracts the part of the variation in the treatment variable that is induced by a variable external to the model (the instrument). In econometrics, this induced variation is referred to as the exogenous variation. The second step then estimates how this exogenous variation in the treatment variable is related to the variation in the outcome. Newhouse and McClellan note that "one can think of the instrumental variable as a device that achieves a pseudo-randomization" (Newhouse & McClellan, 1998).

To derive our two separate instruments, we follow the approach by Bleakley & Chin (2004). Our first instrument is the interaction between an indicator for the early arrivals (less than or equal to age 9 years old) and an indicator for a country of birth where the dominant language is not English. Likewise, our second instrument is the interaction between the same indicator for the early arrival and an indicator for the linguistic distance from English (the Levenshtein Index). To better understand, the intuition behind these instruments, consider the following example of four immigrants: who arrived from China, one at age 6 and one at age 15, and who arrived from the UK, one at age 6 and one at age 15. This identification strategy is based on comparing the difference in

health outcomes and behaviours between the two Chinese immigrants to the same difference between the two British immigrants, thus eliminating the effects of both country of origin and age at arrival (Bleakley & Chin, 2004). In general, two stage IV strategies (2SLS, 2SRI and bivariate-probit) can be shown as:

By Using Instrument 1 (IV1):

$$LP_{ijat} = \alpha_0^{FS} + \alpha_1^{FS}[AGE_{9a} \times NON\ ENG_j] + \mathrm{X}_{ijat}^{'}\Omega^{FS} + \delta_a^{FS} + v_j^{FS} + \mu_t^{FS} + \varepsilon_{ijat}^{FS}, \quad (2)$$

$$Y_{ijat} = \alpha_0^{SS} + \alpha_1^{SS}\widehat{LP}_{ijat} + \mathrm{X}_{ijat}'\Omega^{SS} + \delta_a^{SS} + v_j^{SS} + \mu_t^{SS} + \varepsilon_{ijat}^{SS} \quad (3)$$

By Using Instrument 2 (IV2):

$$LP_{ijat} = \beta_0^{LFS} + \beta_1^{LFS}[AGE_{9a} \times LD_j] + \mathrm{X}_{ijat}^{'}\Omega^{LFS} + \delta_a^{LFS} + v_j^{LFS} + \mu_t^{LFS} + \varepsilon_{ijat}^{LFS}, \quad (4)$$

$$Y_{ijat} = \beta_0^{LSS} + \beta_1^{LSS}\widehat{LP}_{ijat} + \mathrm{X}_{ijat}'\Omega^{LSS} + \delta_a^{LSS} + v_j^{LSS} + \mu_t^{LSS} + \varepsilon_{ijat}^{LSS} \quad (5)$$

where AGE_{9a} is an indicator variable for age at arrival is less than or equal to 9. LD_j is the linguistic distance that is measured based on the distance of language between English and the language spoken in the respondent's birthplace. For example, if a respondent's country of birth were UK or USA (English-speaking countries), the person's linguistic distance would be zero, which implies no language distance; for a respondent born in a non-English speaking country, the distance would be non-zero. $NON\ ENG_j$ is an indicator variable for the respondent born in a non-English speaking country. Our notation is the same as structural equation (1), except the subscripts. For example, in the case of IV1, the exponent '*FS*' is an indicator for the first-stage whereas '*SS*' indicates the second-stage. Similarly, in the case of IV2, the exponents 'LFS' and 'LSS' indicate the first-stage and the second-stage, respectively.

Equation (2) and (4) describe the first-stage equations that extract the part of the variation in language-proficiency, which is exogenous to the structural model. In equation (2), the main

endogenous variable is regressed on the first instrument ($AGE_{9a} \times NON\ ENG_j$) and the remaining control variables from the structural model. In equation (4), the endogenous variable, LP is regressed on the second instrument ($AGE_{9a} \times LD_j$) and the control variables are the same as in equation (2). Correspondingly, equation (3) and (5) represent the second stage equations relating the exogenous part of the variation in LP (i.e., the predicted values from the first-stage equations) to each health outcome. If the instrument is valid, then the coefficient of the LP from these second-stage equations (α_1^{SS}) and (β_1^{LSS}) respectively, provide consistent estimates of the causal treatment effects of interest.

In addition, we also separately analyze data into two periods: 2003-8 and 2011-14. Estimates are reported in Appendix tables A-4 to A-8. The reason is that in 2008 an economic recession began in Canada.

2.4.2.3. Validity of the Instrumental variables

There are two conditions required for a valid instrument: relevance and excludability (the excludability is implied by the exogeneity condition given by earlier when presenting the Angrist and Imbens definitions). The relevance assumption states that the instrumental variable is sufficiently correlated with the treatment indicator. Our first instrument satisfies this condition if immigrating to Canada before or equal to the age of 9 from a non-English speaking country increases the language-proficiency of immigrants, after controlling for age at arrival and country of birth effects. In the same way, the second instrument satisfies the relevance condition if immigrating to Canada during childhood (before or equal to the age 9) from a country with higher language distance, increases the probability of not being language proficient, as compared to the immigrants born in a country with no language distance. The relevance condition is easily tested using the first-stage equation, while previous econometric studies document that a good instrument explains a "sufficient" amount of variation in the variable of interest, as measured by the F-statistic. As a rule-

of-thumb, if the first-stage F-statistic is greater than 10, then the instrument is considered to be strong and relevant. We perform an F-statistics test for both of our instruments and found them substantially greater than 10 (see the appendix Table A-2).

The second assumption, "excludability" states that the instrumental variable affects the outcome variable only through its effect on the treatment variable. In other words, the instrumental variable should not have a direct impact on the outcome measure. This is equivalent in our case with the first instrument assuming that immigrants from English speaking countries can effectively capture the non-language related aspects of immigration. Therefore, they are a valid control group for immigrants from non-English speaking countries. The same reasoning applies to the second instrument almost identically, which ensures the excludability of the instrument. Additionally, if we focus on the components of both instrumental variables, we see that 'a child immigrating to Canada at less than or equal to 9 years old' is a common component for both of our instruments, which can be argued as exogenous given the parents make the decision. Another component of the first instrument is 'born in a non-English speaking country' which is also an exogenous variable. Likewise, the other component of the second instrument is 'the language distance index' that is estimated based on the language distance between English and the language spoken in the immigrant's birthplace. This implies that each component of our instrumental variables is exogenous. Therefore, the interaction of two exogenous variables should not be directly correlated with the individual's health and health behavior outcomes, which supports excludability for both of our instruments.

2.5 Results

The results are shown in five different sets of equations with five different combinations of covariates (independent variable and control variable). In each set, we use the same combination of covariates in both stages. For example, in the first set of equations, we use 'born in a non-English

speaking country' and 'arrived young' as regressors in both stages. The second set considers 'born in non-English speaking country' and a full set of age at arrival dummies as regressors. The third set considers 'arrived young' and a full set of the country of birth dummies, while the fourth set includes a full set of the country of birth and a full set of age-at-arrival dummies as covariates. The last set incorporates a full set of the country of birth and a set of age-at-arrival dummies and also marital status, urban and province[8]. A full set of CCHS year dummies are controlled in all five sets of equations. The reason behind that is there might be some time-invariant unobservable factors across the CCHS cycle years; those might be correlated with the language proficiency and the health outcomes. Moreover, age and gender are also controlled in all five sets of equations. Results by using these five sets of equations are shown in five columns accordingly, in the below tables. All the results are reported in terms of marginal effects. In our analysis, we consider CCHS year 2003, age-at-arrival 0-2 years, born in UK, male, unmarried, lives in rural and Nova Scotia, as the omitted categories.

2.5.1 Effects on SRH

In this section, we examine the effects of language proficiency on SRH using both of our instruments, separately. The probit model assumes that individual language proficiency is exogenous, which may not be true because of potential endogeneity from unobservable variables, reverse causality, or measurement errors. The results from the probit model are shown in the first row of Table 2.2, where the language proficiency is not statistically significant at all, for any of the five sets of equations. Among the probit results, the first two estimates indicate a negative association between language proficiency and the probability of reporting in good SRH. Whenever we control for a full set of the country of birth dummies (in the last three sets of equations), then

[8] In this vector of variables, we only consider exogenous variables. We do not include income and education because which are more commonly considered as endogenous variables.

the estimates become positively associated. However, the bivariate-probit estimates of ATE for the language proficiency are 0.378 and 0.369 for reporting good SRH (in column 5), which are significant at a 1% level. The estimates indicate that for immigrants with language proficiency, their average probability of reporting in being good health is 37.8 and 36.9 percentage points higher than those of immigrants without language proficiency, by using IV1 and IV2 respectively. In column 5, we control for a full set of the country of birth and a set of age-at-arrival dummies and a vector of variables including age, gender, marital status, urban and province. The estimates are shown in table 2.2, especially the bivariate-probit, indicates that language proficiency has positive effects on reporting a good SRH. We justify bivariate-probit estimates by performing Murphy's score test. According to Murphy (2007), Monte Carlo Simulations show that in the case of a small sample, the performance of the test using a bootstrapped p-value is quite good. Our estimated (see the appendix) bootstrapped p-values are often sufficiently small, however, to suggest strongly the rejection of the bivariate project estimates.

[Table 2.2 here]

2.5.2 Effects on Self-perceived Mental Health

Table 2.3 reports the estimates of the causal effect of language proficiency on reporting 'good mental health' for four different estimators. Surprisingly, in few cases, language proficiency is negatively associated with reporting being in good mental health for 2SRI estimates. In this table, estimates of 2SRI are preferred and consistent since it is designed to get the ATE, and it is not fully parametric. Overall, the results are shown in Table 2.3, provide little evidence of any direct effect of language proficiency on reporting good mental health conditions.

[Table 2.3 here]

2.5.3 Effects on Having a Regular Medical Doctor

The results for the effect of language proficiency on the probability of having a regular medical doctor are reported in Table 2.4. As shown in row (1) of Table 2.4, ignoring the endogeneity of being language proficient, simply using a probit model leads us to conclude that language proficiency has a significant negative effect on the probability of having a regular medical doctor in all the five specifications. The bivariate probit estimates negative ATE using both IVs, even though they are not statistically significant. The 2SLS estimates are not statistically significant at all. For example, the 2SLS-based LATE estimates for language proficiency, -0.143 and -0.110 by using IV1 and IV2, respectively (column 5). The interpretation of LATE always refers to the marginal group (by the proximity of the instrument). Just to make it clear, in this example, in the model predicting having a regular doctor, the LATE estimates suggest that language proficiency decreases the probability of having a regular doctor by 14.3 and 11.0 percentage points among the immigrants, whose achievement of language proficiency is captured by the respective instruments. Notably, the 2SRI estimates are negative and significant ATEs in all cases (in all columns) using both IVs. The 2SRI estimates are most consistent and preferred in this context as it is not fully parametric.

A study by Talbot et al. (2001) finds that for the Canadian population as a whole, respondents who perceived themselves in better health were more likely not to have regular doctors. In our study, even after controlling the country dummies, a possible reason for the negative association between English-language proficiency and the probability of having a regular doctor could be because of the difference between conditions for young and old children varying across countries. Conditions might be the consequence of many factors, for example, many immigrants from non-English speaking countries might be born or brought up in unhealthy environments (at least less healthy than the environments experienced by many immigrants from English-speaking

countries such as the USA and UK) and they assume that it is wise to have a regular doctor and to utilize healthcare services.

[Table 2.4 here]

2.5.4 Effects on Receiving any Hospital Care

Table 5 reports the estimated causal effects of language proficiency on the probability of utilizing any hospital care using different estimators. The results using a simple probit model are shown in row 1 of Table 2.5, which indicates that in the first two sets of equations (columns 1 & 2), language proficiency is positively and significantly associated at the 5% level when endogeneity is not taken into account.

In two-stage models, after instrumentation, most of the estimates of the causal impact of language proficiency are positive and significant. Overall, for using any hospital care, the average effects of language proficiency in the entire population and the local average effects of language proficiency in the sub-group of the population are positive and significant. In column 5 when we control for a large range of variables, the 2SLS-based LATE and the 2SRI-based ATE estimates are positive and significant. For example, the 2SLS-based LATE estimates for language proficiency is 0.084, using IV2. The interpretation of LATE refers to the subgroup of the population (by the proximity of the instrument). For example, in the model predicting the use of hospital care, the LATE estimate suggests that language proficiency increases the probability of using hospital care by 8.4 percentage point, among the immigrants who have achieved language proficiency assessed by the interaction effect of arrived in Canada young and from a non-English speaking country. Overall, the results are shown in Table 5 indicate that immigrants with language proficiency have a higher probability of utilizing any hospital care even after controlling for a large number of variables.

[Table 2.5 here]

2.5.5 Effects on the Utilization of Mental Healthcare Services

Mental health treatment and diagnosis often depend on verbal communication with the mental healthcare providers and are not based on objective tests. It is therefore plausible that mental health treatment will be positively associated with language proficiency. Table 2.6 reports the estimates of the effects of language proficiency on the utilization of mental healthcare services. Results using the probit model indicate some positive impacts of the language proficiency, on the utilization of mental health care services, as expected. In the model predicting the utilization of MH care services, the bivariate probit-based consistent ATE estimates for language proficiency are 0.415 and 0.422, using IV1 and IV2, respectively. Both reach statistical significance at a 1% level. In addition, the 2SRI estimates positive and significant ATEs in all cases (in columns 1-5) using both IVs.

[Table 2.6 here]

2.5.6 Comparing Two Time Periods

We compare our estimates for two separate periods 2003-8 and 2011-14. Table 2.7 shows only the fifth set of equations where we control for the full set of the country of birth dummies, a set of age-at-arrival dummies and age, gender, marital status, urban and province. (For complete results, see Appendix tables A-4 to A-8).

In the model, predicting having good SRH, in the year 2003-8, the bivariate-probit estimates of ATE for the language proficiency are positive and significant; the result disappears for the years 2011-14 (shown in table 2.7). In the case of reporting being in good SPMH, a comparison of two periods does not yield anything important. For the dependent variable having a regular doctor, in the period 2003-8, estimates from the probit and 2SRI model are strongly negative and significant.

The significance levels of the estimates tend to either disappear or be reduced in the years 2011-14. However, in the year 2003-8, using the probit model and all the two-stage models (bivariate probit and 2SRI), the causal effects of language proficiency on the utilization of mental health treatment are positive and significant. These strong positive associations also disappear in the next period (the year 2011-14). The models predicting the probability of using hospital care also exhibit/capture differences between the two periods (years 2003-8 and 2011-14). A change in the proportion of country of birth might be a potential reason behind the difference in causal effects between these two periods (estimates are reported in appendix graph A2.1). For example, in the period 2011-14, the proportion of immigrants from the UK, USA and Germany (the countries that immigrants with language proficiency mostly come from) grew, whereas the proportion of immigrants from Italy and Vietnam (where the majority of NLP immigrants mostly come from) fell, compared to the earlier period 2003-8.

[Table 2.7 here]

2.6 Discussion

A long-standing question in health economics is whether limited English proficiency matters to the health outcomes and their health care utilization. Of particular interest to this paper is whether NLP immigrants demonstrate any differences regarding their health outcomes and health care utilization, compared to those with language proficiency. In fact, the impact of limited English proficiency varies across outcomes. For example, our results indicate that utilization of hospital and mental health care services are positively correlated with being English-language proficient, even after controlling for many possible-confounding factors. Therefore, our findings support the results reported in the existing literature by Kim et al., (2011); Li & Browne, (2000); Sadavoy, Meier, & Ong, (2004); Lebrun, (2012).

On the other hand, we find that the poor language proficient immigrants are not less likely to have a regular doctor. In our sample, among the LPs, the share of relatively older people is higher than among the NLPs. Even though the NLPs are younger they show a higher probability of having a regular doctor. However, even when we control for age in Table 4, the 2SRI model estimates a significant negative correlation between language proficiency and having a regular doctor. As a matter of fact, chronic non-communicable diseases which include heart disease, stroke, some cancers, chronic respiratory conditions and type-2 diabetes affect all ages and nationalities, but it is important to note that a higher percentage of total chronic-disease deaths occur in low and middle-income countries (Daar et al., 2007). This could be behind the higher probability of having a regular doctor of immigrants from low and middle-income non-English speaking countries. However, it might also be possible that the non-English language proficient respondents indicate that they have a regular doctor in some cases not because they do but to give the interviewer the "response" that will please them. English-language proficient respondents may culturally be less prone to provide socially desirable responses. Surprisingly, we see that the NLP immigrants have lower utilization for other healthcare services even though they have a higher probability of having a regular doctor. This could mean that immigrants face some barriers in obtaining services, including specialist services and hospital care. Language barriers are identified by many studies (Brar et al., 2009; Latif, 2010; Latif & Miles, 2012; Sun et al., 2010) for lowering the use of preventative care, diagnostic tests and procedures by various ethnic communities. It is one of the channels through which poor language proficiency could lower the probability of utilizing hospital care and mental health care services.

The results for SRH and SPMH are not strong even though they reveal few positive and significant correlations between language proficiency and a higher probability of reporting good SRH/SPMH in the bivariate probit estimates. The results on SRH are consistent with the results reported in a few studies, such as Omariba & Ng, (2011), which conclude that reporting good SRH

is positively associated with health literacy. That study also suggests that "not having English or French as the mother tongue is a risk factor for poor health among immigrants, but that education is more important in explaining SRH among immigrants than language discordance". Also, our results on SPMH may be due to old and even young people having problems reporting any mental health problem, even though they are suffering from untreated psychiatric illnesses. It suggests that stigma may be a significant barrier to the utilization of mental health care services (Gulliver, Griffiths, & Christensen, 2010; Stewart, Jameson, & Curtin, 2015). In general, self-reported data are a matter of 'concern' about the accuracy of the researchers (Bhandari & Wagner, 2006). So the combined effect of the 'concern' about the accuracy of self-reported data and the probability of having stigma associated with reporting poor mental health may have masked the positive association between language proficiency and good SPMH.

It is important to note that all of our respondents in the sample are immigrants, whose age-at-migration in Canada was under 18 years old. The association between poor language proficiency and the lower utilization rates of health care (hospitalization and mental) services, also the association between poor language proficiency and poor self-rated health (both physical and mental health), offers a clear indication that there may be opportunities for improvement. The implications might support policies such as special initiatives for language training, linguistically and culturally sensitive healthcare services and enriched health information services for immigrants who do not speak English.

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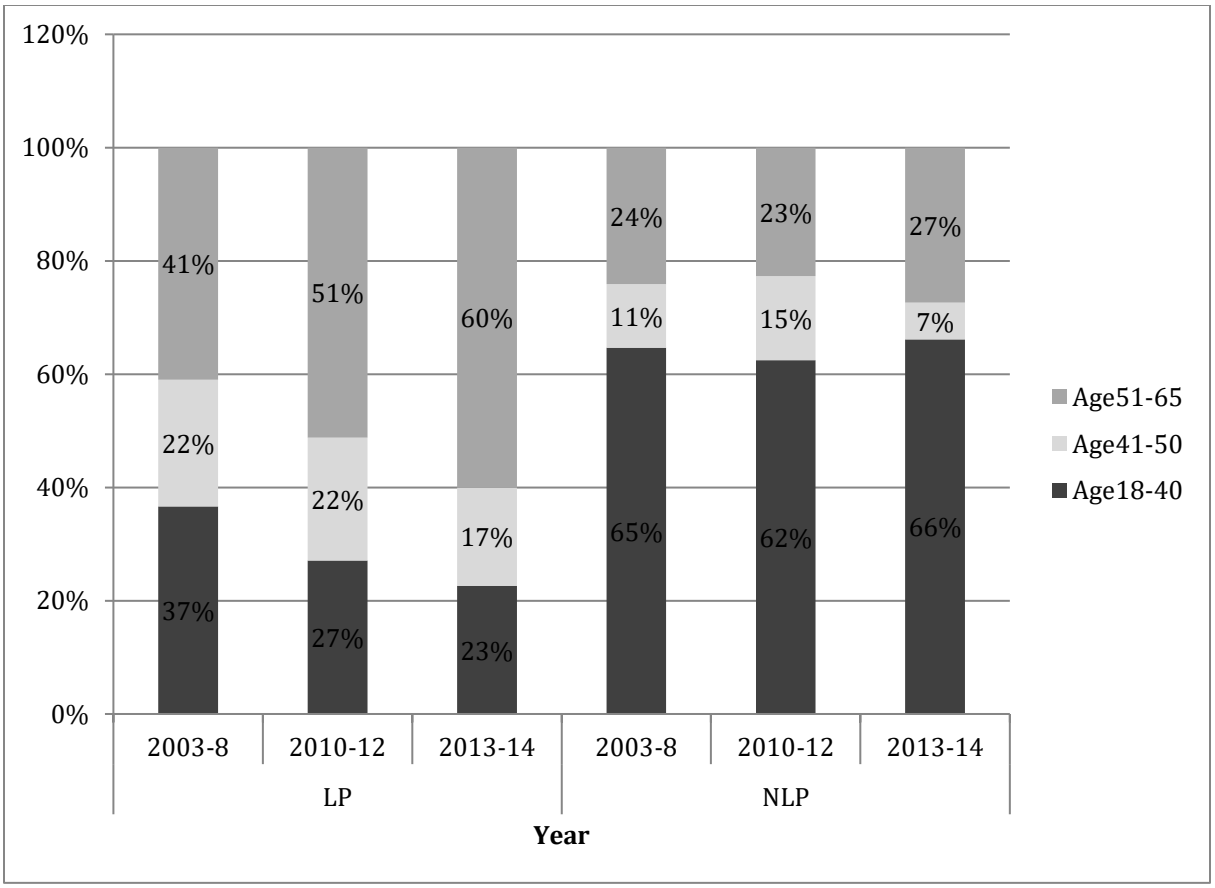

Chart 2.1: Percentage of Language Proficient and Non-language Proficient Immigrants by Age Group between 2003 and 2014

Note: Referring to Immigrants who came to Canada at age 18 or younger. Source: Authors' calculations based on the Canadian Community Health Survey (CCHS) (2003-2014).

Table 2.1. Descriptive Statistics

	LP		NLP	
	Mean/Fraction	Std. dev.	Mean/Fraction	Std. dev.
Dependent Variables:				
Good SRH	0.75	0.433	0.76	0.429
Good SPMH	0.93	0.254	0.93	0.26
Have regular doctor	0.9	0.302	0.9	0.305
Received hospital Care	0.05	0.225	0.03	0.178
Consulted for mental health	0.1	0.294	0.07	0.252
Other Variables:				
Born in English Speaking country	0.56	0.497	0	0
Age-at-arrival ≤ 9	0.71	0.454	0.35	0.478
Language distance index[1]	36.9	42.149	95.7	7.999
Age	47.1	12.786	36.4	14.997
Female	0.51	0.5	0.5	0.5
Married	0.6	0.49	0.45	0.497
Post-secondary education	0.76	0.429	0.64	0.481
Urban	0.84	0.363	0.95	0.211
Country of birth:				
China	1.53%		29.25%	
France	0.89%		1.26%	
Germany	10.56%		4.40%	
Greece	0.95%		3.18%	
Guyana	2.59%		0%	
Hungary	1.28%		1.29%	
Italy	9.41%		15.43%	
Jamaica	4.91%		0%	
Netherlands	8.51%		1.48	
Poland	3.86%		11.69	
Portugal	5.27%		12.69	
UK	35.20%		0%	
USA	12.82%		0%	
Vietnam	1.44%		13.30%	
Srilanka	0.79%		6.04%	
Province				
Ontario	60.19%		66.79%	
Manitoba	3.46%		3.84%	
Saskatchewan	1.60%		1.28%	
Alberta	11.40%		6.36%	
British Columbia	19.29%		20.78%	
Others (Nova Scotia, Newfoundland, New Brunswick, Prince Edward Island)	4.06%		0.96%	
N (Weighted)	10,129		1,164	

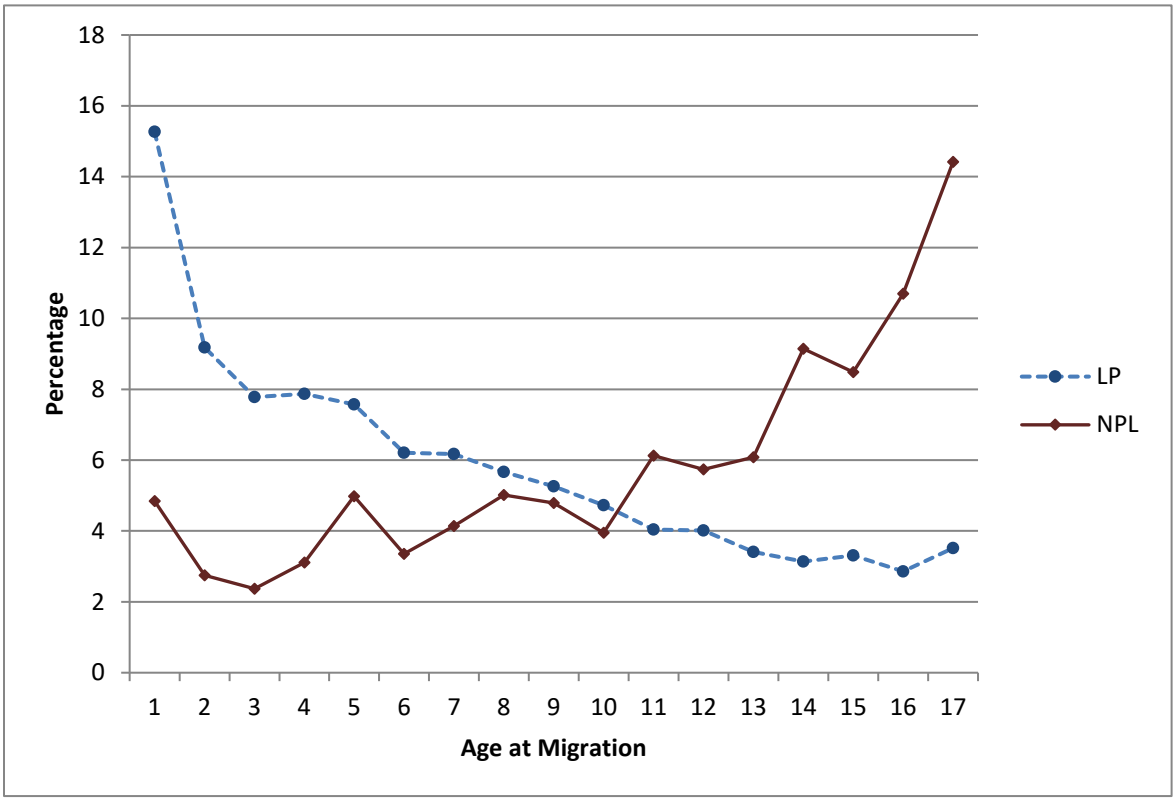

Chart 2.2: Percentage of Language Proficient and Non-language Proficient Immigrants, by Age at migration, 2003 to 2014

Notes: Referring to Immigrants who came to Canada at age 18 or younger. Source: Authors' calculations based on the Canadian Community Health Survey (CCHS) (2003-2014).

Table 2.2 Various estimates of the effect of language proficiency on reporting good SRH

	Good SRH				
Estimator	(1)	(2)	(3)	(4)	(5)
Probit	-0.022	-0.023	0.002	0.002	0.004
	(0.0168)	(0.0169)	(0.0188)	(0.0189)	(0.0191)
IV1					
Bivariate Probit:	0.085	0.048	0.386*	0.325**	0.378***
	(0.189)	(0.168)	(0.198)	(0.162)	(0.127)
2SRI	-0.040	-0.013	0.001	-0.007	-0.005
	(0.094)	(0.077)	(0.099)	(0.094)	(0.096)
2SLS	-0.005	0.002	0.106	0.125	0.118
	(0.076)	(0.094)	(0.093)	(0.128)	(0.131)
IV2					
Bivariate Probit:	0.062	0.029	0.364*	0.313*	0.369***
	(0.207)	(0.175)	(0.203)	(0.164)	(0.130)
2SRI	-0.011	-0.035	0.000	-0.006	-0.005
	(0.084)	(0.088)	(0.101)	(0.096)	(0.095)
2SLS	0.019	0.033	0.085	0.104	0.097
	(0.095)	(0.116)	(0.100)	(0.133)	(0.136)
Born in non-English country	Yes	Yes	No	No	No
Arrived young	Yes	No	Yes	No	No
Full set of age at arrival dummies	No	Yes	No	Yes	Yes
Full set of country of birth dummies	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes
N	11398	11398	11398	11398	11398

Note. SRH, self-reported health; IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***$p<0.01$, **$p<0.05$, *$p<0.10$. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table 2.3 Various estimates of the effect of language proficiency on reporting good SPMH

	Good SPMH				
Estimator	(1)	(2)	(3)	(4)	(5)
Probit	0.00374	0.00245	-0.00637	-0.00764	-0.112
	(0.0103)	(0.0103)	(0.00994)	(0.00995)	(0.0821)
IV1					
Bivariate Probit:	0.336**	0.299**	0.043	-0.038	-0.103
	(0.149)	(0.136)	(0.212)	(0.226)	(0.194)
2SRI	-0.101	-0.148	-0.174	-0.186	-0.252**
	(0.115)	(0.123)	(0.124)	(0.131)	(0.115)
2SLS	0.054	0.066	0.033	0.052	0.077
	(0.035)	(0.041)	(0.055)	(0.069)	(0.070)
IV2					
Bivariate Probit:	0.228	0.206	0.032	-0.042	-0.103
	(0.189)	(0.170)	(0.221)	(0.231)	(0.193)
2SRI	-0.234	-0.243*	-0.176	-0.197	-0.254**
	(0.148)	(0.139)	(0.122)	(0.132)	(0.114)
2SLS	0.046	0.060	0.032	0.049	0.076
	(0.044)	(0.052)	(0.058)	(0.070)	(0.071)
Born in non-English country	Yes	Yes	No	No	No
Arrived young	Yes	No	Yes	No	No
Full set of age at arrival	No	Yes	No	Yes	Yes
Full set of country of birth	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes
N	11398	11398	11398	11398	11398

Note. SPMH, self-perceived mental health; IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***p<0.01, ***p<0.05, *p<0.10.* Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table 2.4 Various estimates of the effect of language proficiency on having regular doctor

	Have Regular Doctor				
Estimator	(1)	(2)	(3)	(4)	(5)
Probit	-0.0285***	-0.0311***	-0.0352***	-0.0373***	-0.0416***
	(0.00917)	(0.00905)	(0.0100)	(0.00994)	(0.00909)
IV1					
Bivariate Probit:	-0.106	-0.171	-0.334	-0.427	-0.395
	(0.327)	(0.340)	(0.444)	(0.470)	(0.424)
2SRI	-0.361**	-0.382***	-0.409***	-0.414***	-0.438***
	(0.146)	(0.141)	(0.155)	(0.149)	(0.151)
2SLS	-0.053	-0.112	-0.079	-0.174	-0.143
	(0.082)	(0.075)	(0.130)	(0.113)	(0.108)
IV2					
Bivariate Probit:	0.080	-0.002	-0.300	-0.412	-0.377
	(0.334)	(0.367)	(0.415)	(0.453)	(0.416)
2SRI	-0.299*	-0.297*	-0.419***	-0.421***	-0.419***
	(0.161)	(0.159)	(0.157)	(0.149)	(0.148)
2SLS	-0.020	-0.091	-0.056	-0.145	-0.110
	(0.098)	(0.083)	(0.117)	(0.095)	(0.091)
Born in non-English country	Yes	Yes	No	No	No
Arrived young	Yes	No	Yes	No	No
Full set of age at arrival	No	Yes	No	Yes	Yes
Full set of country of birth	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes
N	11398	11398	11398	11398	11398

Note. IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***$p<0.01$, **$p<0.05$, *$p<0.10$. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table 2.5 Various estimates of the effect of language proficiency on the utilization of hospital services

	Use Hospital Care Services				
Estimator	(1)	(2)	(3)	(4)	(5)
Probit	0.008**	0.008**	0.088	0.076	0.088
	(0.003)	(0.003)	(0.101)	(0.102)	(0.105)
IV1					
Bivariate Probit:	0.528**	0.461*	0.637**	0.515**	0.516
	(0.262)	(0.244)	(0.317)	(0.263)	(0.346)
2SRI	0.453***	0.347**	0.250**	0.203*	0.222*
	(0.155)	(0.148)	(0.107)	(0.111)	(0.118)
2SLS	0.076***	0.065**	0.097**	0.081	0.076
	(0.028)	(0.031)	(0.048)	(0.053)	(0.048)
IV2					
Bivariate Probit:	0.632*	0.506	0.656**	0.522*	0.520
	(0.352)	(0.314)	(0.318)	(0.267)	(0.351)
2SRI	0.296**	0.281**	0.300***	0.215**	0.217*
	(0.130)	(0.131)	(0.108)	(0.108)	(0.117)
2SLS	0.093***	0.079**	0.104**	0.088*	0.084*
	(0.035)	(0.038)	(0.046)	(0.048)	(0.044)
Born in non-English country	Yes	Yes	No	No	No
Arrived young	Yes	No	Yes	No	No
Full set of age at arrival	No	Yes	No	Yes	Yes
Full set of country of birth	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes
N	11398	11398	11398	11398	11398

Note. IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***p<0.01, **p<0.05, *p<0.10. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table 2.6 Various estimates of the effect of language proficiency on the utilization of mental health care services

	Use Mental Health Care Services				
Estimator	(1)	(2)	(3)	(4)	(5)
Probit	0.019*	0.019*	0.006	0.006	0.009
	(0.010)	(0.011)	(0.012)	(0.012)	(0.011)
IV1					
Bivariate Probit:	0.260	0.280	0.025	0.105	0.415*
	(0.169)	(0.189)	(0.201)	(0.217)	(0.231)
2SRI	0.298**	0.335**	0.247*	0.255**	0.300**
	(0.134)	(0.145)	(0.134)	(0.126)	(0.136)
2SLS	0.028	0.029	0.006	0.004	-0.021
	(0.039)	(0.060)	(0.069)	(0.102)	(0.105)
IV2					
Bivariate Probit:	0.223	0.261	0.033	0.115	0.422*
	(0.242)	(0.248)	(0.244)	(0.218)	(0.232)
2SRI	0.341*	0.346**	0.244*	0.256*	0.300**
	(0.178)	(0.166)	(0.135)	(0.135)	(0.136)
2SLS	0.020	0.022	0.012	0.012	-0.013
	(0.064)	(0.089)	(0.069)	(0.100)	(0.102)
Born in non-English country	Yes	Yes	No	No	No
Arrived young	Yes	No	Yes	No	No
Full set of age at arrival	No	Yes	No	Yes	Yes
Full set of country of birth	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes
N	11398	11398	11398	11398	11398

Note. IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***$p<0.01$, **$p<0.05$, *$p<0.10$. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table 2.7 Comparison of two periods (2003-8 & 2011-14): Various estimates of the effect of language proficiency on different outcomes

	Good SRH		Good SPMH		Have Medical Doctor		Received Hospital Care		Received MH Care	
Estimator	2003-8	2011-14	2003-8	2011-14	2003-8	2011-14	2003-8	2011-14	2003-8	2011-14
Probit	-0.008	-0.021	-0.167	-0.081	-0.039***	-0.038**	0.219	-0.263	0.029*	0.017
	(0.0262)	(0.0337)	(0.106)	(0.148)	(0.0120)	(0.0159)	(0.144)	(0.387)	(0.0154)	(0.0251)
IV1										
Bivariate Probit:	0.360***	0.021	-0.480	0.456	-0.351	-0.096	-0.056	-1.662***	0.650**	0.164
	(0.121)	(0.486)	(0.469)	(0.331)	(0.658)	(0.719)	(0.471)	(0.471)	(0.278)	(0.475)
2SRI	-0.053	-0.025	-0.211	-0.336	-0.416***	-0.405*	0.352	-0.673	0.381***	0.303
	(0.074)	(0.190)	(0.135)	(0.220)	(0.145)	(0.231)	(0.253)	(0.693)	(0.081)	(0.241)
2SLS	0.266	-0.373	0.021	0.185	-0.173	-0.104	-0.034	0.022	0.080	-0.038
	(0.213)	(0.246)	(0.082)	(0.153)	(0.117)	(0.290)	(0.050)	(0.039)	(0.077)	(0.167)
IV2										
Bivariate Probit:	0.349***	0.020	-0.498	0.455	-0.328	-0.105	-0.061	-1.669***	0.652**	0.155
	(0.125)	(0.480)	(0.496)	(0.325)	(0.651)	(0.697)	(0.463)	(0.459)	(0.278)	(0.470)
2SRI	-0.049	-0.029	-0.212*	-0.329	-0.429***	-0.395*	0.327	-0.604	0.398***	0.321
	(0.072)	(0.190)	(0.127)	(0.226)	(0.144)	(0.231)	(0.264)	(0.713)	(0.077)	(0.248)
2SLS	0.237	-0.392*	0.004	0.205	-0.140	-0.062	-0.023	0.006	0.086	-0.047
	(0.216)	(0.203)	(0.076)	(0.156)	(0.116)	(0.233)	(0.046)	(0.040)	(0.075)	(0.165)
Full set of age at arrival dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full set of country of birth dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6534	2866	6534	2866	6534	2866	6534	2866	6534	2866

Note. SRH, self-reported health; SPMH, self-perceived mental health; IV1, instrumental variable 1: (age-at-arrival$\leq$9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival$\leq$9 * language distance index). The standard errors are corrected for country of birth clustering. ***p<0.01, **p<0.05, *p<0.10. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Appendix 2

Table A2.1: Countries by Language

Country of Birth	English Speaking	Non-English/French Speaking
China		
France		
Germany		
Greece		
Guyana		
Hungary		
Italy		
Netherlands/Holland		
Jamaica		
Poland		
Portugal		
UK		
USA		
Vietnam		
Srilanka		

Table A2.2: F-Test Results
Relevance of Instrument 1 (F-Test)

Outcome	Adjusted R-square	Test Results	Prob >F
SRH (Self-reported health)	0.303	Robust F (1, 11390) =162.617	0.000
SPMH (Self-perceived mental health)	0.329	Robust F (1, 11390) =131.074	0.000
Has regular medical doctor	0.303	Robust F (1, 11390) =162.617	0.000
Received hospital care	0.303	Robust F (1, 11390) =162.617	0.000
Consulted for mental health	0.303	Robust F (1, 11390) =162.617	0.000

Relevance of Instrument 2 (F-Test)

Outcome	Adjusted R-square	Test Results	Prob > F
SRH (Self-rated health)	0.3	Robust F (1, 11390) =146.782	0.000
SPMH (Self-perceived mental health)	0.329	Robust F (1, 11390) =109.882	0.000
Has regular medical doctor	0.134	Robust F (1, 11390) =146.782	0.000
Received hospital care	0.3	Robust F (1, 11390) =146.782	0.000
Consulted for mental health	0.3013	Robust F (1, 11390) =146.782	0.000

Table A2.3: Murphy's Score Test for Bivariate Probit

Score Test: Bivariate Probit (IV1)

	(1)	(2)	(3)	(4)	(5)
			SRH		
Murphy's Score Test Statistic	10.66	52.04	12.68	121.66	24.11
Bootstrapped p-value	0.019	0.001	0.001	0.001	0.009
			SPMH		
Murphy's Score Test Statistic	1.44	29.15	0.77	51.61	52.14
Bootstrapped p-value	0.727	0.001	0.672	0.001	0.001
			Regular Doctor		
Murphy's Score Test Statistic	4.83	39.66	1.45	110.18	44.33
Bootstrapped p-value	0.188	0.001	0.440	0.001	0.001
			Hospital Care		
Murphy's Score Test Statistic	0.19	36.14	0.34	108.11	52.94
Bootstrapped p-value	0.984	0.001	0.844	0.001	0.001
			Consulted for Mental Health		
Murphy's Score Test Statistic	10.18	48.46	18.11	132.46	52.14
Bootstrapped p-value	0.021	0.001	0.001	0.001	0.001

Score Test: Bivariate Probit (IV2)

	(1)	(2)	(3)	(4)	(5)
			SRH		
Murphy's Score Test Statistic	127.71	127.71	127.71	93.89	34.36
Bootstrapped p-value	0.001	0.001	0.001	0.001	0.001
			SPMH		
Murphy's Score Test Statistic	85.42	107.44	85.42	107.44	37.07
Bootstrapped p-value	0.001	0.001	0.001	0.001	0.001
			Regular Doctor		
Murphy's Score Test Statistic	94.95	22.3	94.95	22.3	46.26
Bootstrapped p-value	0.001	0.014	0.001	0.004	0.001
			Hospital Care		
Murphy's Score Test Statistic	101.63	18.26	101.63	18.26	50.03
Bootstrapped p-value	0.001	0.036	0.001	0.044	0.001
			Consulted for Mental Health		
Murphy's Score Test Statistic	112.01	33.41	112.01	33.41	18.26
Bootstrapped p-value	0.001	0.001	0.001	0.001	0.044

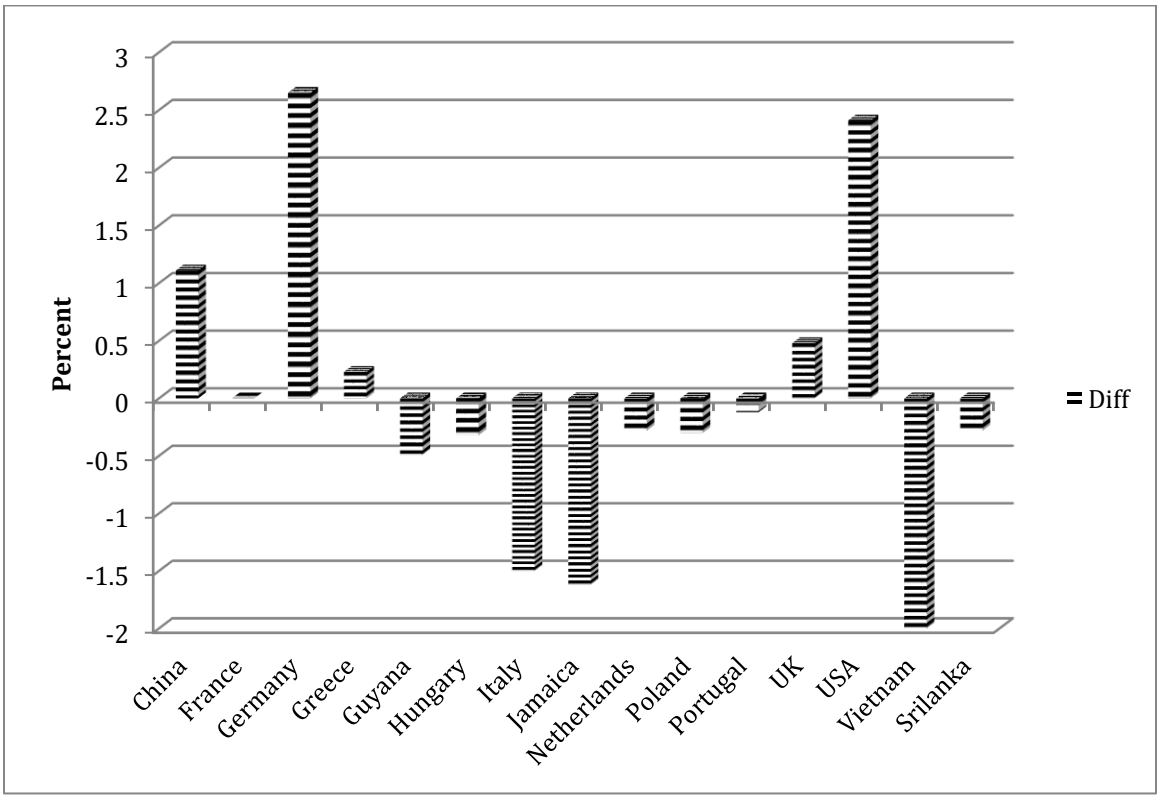

Chart A2.1: Change in percentage of immigrants' country of birth in 2011-14, compared to 2003-8

Notes: Referring to Immigrants who came to Canada at age 18 or younger. Source: Authors' calculations based on the Canadian Community Health Survey (CCHS) (2003-2014).

Table A2.4: Comparison of two periods (2003-8 & 2011-14): Various estimates of the effect of language proficiency on reporting good SRH

	Good SRH									
	Year 2003-2008					Year 2011-2014				
Estimator	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Probit	-0.029	-0.033	-0.005	-0.007	-0.008	-0.046	-0.046	-0.027	-0.027	-0.021
	(0.023)	(0.023)	(0.026)	(0.026)	(0.026)	(0.029)	(0.03)	(0.033)	(0.033)	(0.034)
IV1										
Bivariate Probit:	0.036	0.041	0.407*	0.387***	0.360***	-0.138	-0.281	-0.176	-0.525	0.021
	(0.204)	(0.177)	(0.211)	(0.144)	(0.121)	(0.417)	(0.433)	(0.558)	(0.640)	(0.486)
2SRI(ge)	-0.153**	-0.115*	-0.054	-0.048	-0.053	0.030	-0.001	-0.015	-0.043	-0.025
	(0.072)	(0.061)	(0.079)	(0.071)	(0.074)	(0.208)	(0.187)	(0.208)	(0.193)	(0.190)
2SLS	0.089	0.109	0.242	0.274	0.266	-0.289**	-0.319**	-0.300	-0.365	-0.373
	(0.119)	(0.152)	(0.162)	(0.216)	(0.213)	(0.147)	(0.159)	(0.187)	(0.244)	(0.246)
IV2										
Bivariate Probit:	-0.063	-0.031	0.389*	0.375**	0.349***	-0.153	-0.376	-0.210	-0.528	0.020
	(0.250)	(0.203)	(0.216)	(0.149)	(0.125)	(0.342)	(0.369)	(0.517)	(0.625)	(0.480)
2SRI(ge)	-0.126*	-0.098	-0.058	-0.048	-0.049	-0.007	-0.020	-0.019	-0.035	-0.029
	(0.073)	(0.071)	(0.078)	(0.077)	(0.072)	(0.191)	(0.185)	(0.210)	(0.193)	(0.190)
2SLS	0.120	0.152	0.209	0.244	0.237	-0.326**	-0.374**	-0.317**	-0.389*	-0.392*
	(0.153)	(0.188)	(0.171)	(0.220)	(0.216)	(0.152)	(0.173)	(0.154)	(0.202)	(0.203)
Full set of age at arrival dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Full set of country of birth dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes	No	No	No	No	Yes
N	6534	6534	6534	6534	6534	2866	2866	2866	2866	2866

Note. SRH, self-reported health; IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***$p<0.01$, **$p<0.05$, *$p<0.10$. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table A2.5: Comparison of two periods (2003-8 & 2011-14): Various estimates of the effect of language proficiency on reporting good SRMH

	Good SPMH									
	Year 2003-2008					Year 2011-2014				
Estimator	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Probit	0.0021	0.001	-0.011	-0.012	-0.167	0.005	0.003	-0.004	-0.006	-0.08
	(0.012)	(0.012)	(0.011)	(0.011)	(0.106)	(0.021)	(0.021)	(0.020)	(0.019)	(0.148)
IV1										
Bivariate Probit:	0.425	0.350	-0.439	-0.455	-0.480	0.247	0.237	0.549*	0.490*	0.456
	(0.269)	(0.220)	(0.402)	(0.516)	(0.469)	(0.275)	(0.265)	(0.310)	(0.276)	(0.331)
2SRI(ge)	-0.108	-0.080	-0.157	-0.158	-0.211	-0.129	-0.188	-0.202	-0.249	-0.336
	(0.110)	(0.120)	(0.126)	(0.133)	(0.135)	(0.208)	(0.211)	(0.233)	(0.242)	(0.220)
2SLS	0.038	0.031	0.002	-0.006	0.021	0.113	0.139	0.123	0.169	0.185
	(0.048)	(0.054)	(0.067)	(0.082)	(0.082)	(0.083)	(0.100)	(0.115)	(0.141)	(0.153)
IV2										
Bivariate Probit:	0.116	0.095	-0.503	-0.493	-0.498	0.195	0.161	0.545*	0.488*	0.455
	(0.307)	(0.265)	(0.467)	(0.556)	(0.496)	(0.306)	(0.302)	(0.299)	(0.273)	(0.325)
2SRI(ge)	-0.161	-0.195*	-0.159	-0.165	-0.212*	-0.295	-0.312	-0.199	-0.248	-0.329
	(0.104)	(0.116)	(0.125)	(0.130)	(0.127)	(0.239)	(0.233)	(0.234)	(0.236)	(0.226)
2SLS	0.010	0.002	-0.017	-0.025	0.004	0.131	0.164	0.145	0.192	0.205
	(0.058)	(0.065)	(0.064)	(0.078)	(0.076)	(0.096)	(0.120)	(0.115)	(0.144)	(0.156)
Full set of age at arrival dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Full set of country of birth dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes	No	No	No	No	Yes
N	6534	6534	6534	6534	6534	2866	2866	2866	2866	2866

Note. SPMH, self-perceived mental health; IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***p<0.01, **p<0.05, *p<0.10. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table A2.6: Comparison of two periods (2003-8 & 2011-14): Various estimates of the effect of language proficiency on having regular doctor

	Have Regular Doctor									
	Year 2003-2008					Year 2011-2014				
Estimator	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Probit	-0.033***	-0.035***	-0.036***	-0.037***	-0.039***	-0.015	-0.019	-0.026	-0.030	-0.038**
	(0.011)	(0.011)	(0.013)	(0.013)	(0.012)	(0.019)	(0.018)	(0.019)	(0.019)	(0.016)
IV1										
Bivariate Probit:	-0.458	-0.483	-0.559	-0.582	-0.351	0.472*	0.657*	0.146	0.273	-0.096
	(0.453)	(0.467)	(0.587)	(0.572)	(0.658)	(0.282)	(0.358)	(0.693)	(0.693)	(0.719)
2SRI(ge)	-0.351**	-0.296*	-0.499***	-0.391***	-0.416***	-0.340	-0.364*	-0.367*	-0.424*	-0.405*
	(0.172)	(0.153)	(0.147)	(0.148)	(0.145)	(0.213)	(0.218)	(0.219)	(0.237)	(0.231)
2SLS	-0.104	-0.138	-0.175	-0.222*	-0.173	0.035	-0.038	0.036	-0.083	-0.104
	(0.094)	(0.085)	(0.146)	(0.115)	(0.117)	(0.169)	(0.178)	(0.252)	(0.290)	(0.290)
IV2										
Bivariate Probit:	-0.116	-0.185	-0.511	-0.554	-0.328	0.322	0.445	0.149	0.255	-0.105
	(0.520)	(0.557)	(0.578)	(0.573)	(0.651)	(0.275)	(0.328)	(0.646)	(0.690)	(0.697)
2SRI(ge)	-0.270	-0.297*	-0.510***	-0.407***	-0.429***	-0.304	-0.321	-0.369*	-0.390*	-0.395*
	(0.178)	(0.156)	(0.144)	(0.146)	(0.144)	(0.229)	(0.237)	(0.220)	(0.222)	(0.231)
2SLS	-0.075	-0.119	-0.139	-0.187*	-0.140	0.057	-0.030	0.052	-0.055	-0.062
	(0.120)	(0.110)	(0.137)	(0.112)	(0.116)	(0.193)	(0.195)	(0.224)	(0.240)	(0.233)
Full set of age at arrival dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Full set of country of birth dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes	No	No	No	No	Yes
N	6534	6534	6534	6534	6534	2866	2866	2866	2866	2866

Note. IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***p<0.01, **$p<0.05$, *$p<0.10$. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table A2.7: Comparison of two periods (2003-8 & 2011-14): Various estimates of the effect of language proficiency on using hospital care services

	Use Hospital Care Services									
	Year 2003-2008					Year 2011-2014				
Estimator	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Probit	0.005*	0.005*	0.118	0.129	0.219	0.006	0.006	0.014	0.050	-0.263
	(0.003)	(0.003)	(0.145)	(0.146)	(0.144)	(0.005)	(0.004)	(0.233)	(0.236)	(0.387)
IV1										
Bivariate Probit:	0.097	0.124	0.057	-0.004	-0.056	0.037	0.153	-0.767	-0.190	-1.662***
	(0.285)	(0.306)	(0.323)	(0.392)	(0.471)	(1.038)	(0.874)	(1.580)	(2.091)	(0.471)
2SRI(ge)	0.339	0.332	0.213	0.248	0.352	0.674***	0.474***	0.378*	0.426	-0.673
	(0.258)	(0.215)	(0.287)	(0.242)	(0.253)	(0.253)	(0.180)	(0.200)	(0.285)	(0.693)
2SLS	-0.004	-0.012	-0.030	-0.042	-0.034	0.044	0.063	0.058	0.092	0.022
	(0.023)	(0.025)	(0.047)	(0.053)	(0.050)	(0.035)	(0.050)	(0.047)	(0.073)	(0.039)
IV2										
Bivariate Probit:	-0.083	-0.104	0.058	-0.004	-0.061	-0.898	-0.803	-0.804	-0.264	-1.67***
	(0.348)	(0.379)	(0.323)	(0.392)	(0.463)	(0.610)	(0.575)	(1.417)	(2.061)	(0.459)
2SRI(ge)	0.225	0.195	0.220	0.241	0.327	0.354	0.298	0.348	0.263	-0.604
	(0.246)	(0.229)	(0.288)	(0.240)	(0.264)	(0.240)	(0.195)	(0.229)	(0.209)	(0.713)
2SLS	-0.013	-0.023	-0.018	-0.030	-0.023	0.017	0.033	0.042	0.067	0.006
	(0.030)	(0.034)	(0.040)	(0.047)	(0.046)	(0.043)	(0.062)	(0.047)	(0.072)	(0.04)
Full set of age at arrival dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Full set of country of birth dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes	No	No	No	No	Yes
N	6534	6534	6534	6534	6534	2866	2866	2866	2866	2866

Note. IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***p<0.01, **p<0.05, *p<0.10. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Table A2.8: Comparison of two periods (2003-8 & 2011-14): Various estimates of the effect of language proficiency on using mental health care services

	Use Mental Health Care Services									
	Year 2003-2008					Year 2011-2014				
Estimator	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Probit	0.027**	0.026**	0.018	0.018	0.029*	0.027	0.028	0.014	0.015	0.017
	(0.011)	(0.012)	(0.013)	(0.013)	(0.015)	(0.023)	(0.023)	(0.026)	(0.026)	(0.025)
IV1										
Bivariate Probit:	0.432**	0.384*	0.538*	0.518*	0.650**	-0.071	0.067	-0.586*	-0.434	0.164
	(0.211)	(0.223)	(0.294)	(0.298)	(0.278)	(0.282)	(0.314)	(0.354)	(0.392)	(0.475)
2SRI(ge)	0.452***	0.424***	0.305***	0.319***	0.381***	0.321	0.341	0.293	0.343*	0.303
	(0.097)	(0.093)	(0.087)	(0.070)	(0.081)	(0.207)	(0.215)	(0.216)	(0.203)	(0.241)
2SLS	0.107***	0.079	0.154**	0.104	0.080	-0.077	0.001	-0.145	-0.042	-0.038
	(0.038)	(0.050)	(0.067)	(0.074)	(0.077)	(0.075)	(0.093)	(0.120)	(0.157)	(0.167)
IV2										
Bivariate Probit:	0.533*	0.482*	0.538*	0.530*	0.652**	-0.313	-0.192	-0.581	-0.434	0.155
	(0.290)	(0.289)	(0.326)	(0.296)	(0.278)	(0.296)	(0.325)	(0.377)	(0.392)	(0.470)
2SRI(ge)	0.401***	0.446***	0.308***	0.316***	0.398***	0.367	0.406*	0.297	0.307	0.321
	(0.074)	(0.108)	(0.087)	(0.072)	(0.077)	(0.258)	(0.241)	(0.217)	(0.217)	(0.248)
2SLS	0.127**	0.095	0.149**	0.106	0.086	-0.137	-0.052	-0.148	-0.052	-0.047
	(0.058)	(0.071)	(0.063)	(0.072)	(0.075)	(0.094)	(0.126)	(0.118)	(0.156)	(0.165)
Full set of age at arrival dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Full set of country of birth dummies	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Other controls	No	No	No	No	Yes	No	No	No	No	Yes
N	6534	6534	6534	6534	6534	2866	2866	2866	2866	2866

Note. IV1, instrumental variable 1: (age-at-arrival≤9 * born in a non-English speaking country); IV2, instrumental variable 2: (age-at-arrival≤9 * language distance index). The standard errors are corrected for country of birth clustering. ***p<0.01, **p<0.05, *p<0.10. Other controls: marital status, urban and province. Each column across all models includes the same covariates. A full set of CCHS cycle year dummies, age and gender are controlled in all columns.

Third Chapter

Is There Any Difference in the Medical Expenses Tax Credit Patterns for Immigrants Compared to Non-immigrants in Canada?

3.1 Introduction

Direct government expenditures on healthcare, mostly through Medicare, involve substantial redistribution and are funded by both the provincial and federal governments, where financing is raised by general revenue through taxation, such as personal and corporate taxes, sales taxes, and payroll levies. But these governments also operate substantial tax expenditure programs, the largest being that employer-provided healthcare/insurance costs are exempted from taxable income. Also, and of central concern to this study, the personal tax system in Canada allows tax credits for qualifying out-of-pocket healthcare expenditures and private medical insurance premiums. In fact, Canada's healthcare system is dependent on private payment for most healthcare goods and services, beyond core hospital expenses and physicians. In 2014, 27 percent of Canada's total healthcare expenditure, which is estimated at $215 billion, was privately financed, with 12 percent funded through private insurance and 15 percent paid out of pocket (Healthcare Innovation, 2015). Out-of-pocket expenditures include deductibles and copayments for publicly or privately insured healthcare goods and services, as well as direct out-of-pocket expenditures for non-publicly insured healthcare goods and services. In 2012, the largest private out-of-pocket expenditures were:

prescription drugs, long-term care and other institutions, dental care, over-the-counter drugs, vision care and personal healthcare supplies (Healthcare Innovation, 2015).

The conceptual framework for 'health services utilization' developed by Andersen & Newman (1973) argues that the societal determinants of utilization affect the individual determinants both directly, and indirectly through the health services system. Various types of individual determinants, for example, predisposing factors, enabling factors and illness level influence health services used by individuals. In this regard, the most influential societal norm which has the greatest effect on health service utilization is the way medical care is financed. The approaches of financing are related to the initiatives taken by the government or any third party with the objective to reduce the extent of financial hardship resulting from out-of-pocket medical care expenditures.

In other words, the degree of accessibility of any healthcare system is determined by the direct out-of-pocket costs for medical care to the patient. The non-refundable Medical Expense Tax Credit (METC) and refundable Medical Expense Supplement (MES) are two major health-related tax-expenditure programs that subsidize out-of-pocket current health expenditures through the personal income tax system (Emery, 2016; Government-of-Canada, 2005; Smart & Stabile, 2005). Particularly, the METC is important for two reasons: 1) it assists individuals and families who have exceptionally high medical expenses, and 2) it provides the self-employed with a tax vehicle similar to that which employed individuals obtain through employer-provided health insurance premiums and the like which are paid out of pre-tax dollars.

Tax based measures like the METC are different from other health-related benefits (Smart & Stabile, 2005). The tax subsidy under the METC is endogenous in that such expenditures are a choice and the refund amounts depend on the tax filer's personal situation. It is one of a number of non-refundable tax credits, like the donation and gifts credit, for instance, that can be forwarded to

the claims for the next five years. The METC can only be used if the taxpayer has sufficient tax to be paid. The value of any particular tax credit is conceptually problematic when considering those who pay zero taxes (i.e., for those whose tax credits exceed their taxes payable before credits). Many people have multiple sources of tax credits and, if tax credits exceed the taxes payable before credits, it is not obvious which tax credit is realized and which one is (or ones are) not realized. In addition, couples choose whether one or both members will claim credit and if they choose to make a single claim they then decide which of the two will make the claim. By contrast, the MES is a refundable tax credit that helps low-income working individuals recoup medical expenses irrespective of paying or not paying taxes.

METC depends on these two factors: (1) labour market outcomes through earnings/the income tax and (2) healthcare expenses. Economists have developed an understanding of immigrants' earning gaps and labour market outcomes, as compared to non-immigrants in Canada (Bernard, 2008; Li, 2003; Picot & Sweetman, 2005; Picot, Hou, & Coulombe, 2007; Sweetman & Warman, 2013). Research shows that comparisons of earnings between these two groups, immigrants and non-immigrants, might be misleading, in that, there is heterogeneity within the immigrant group: differences in entry cohort (Li, 2003; Picot & Sweetman, 2005; Picot et al., 2007), age at migration (Schaafsma & Sweetman, 2001), different generations (Skuterud, 2010), and immigration category, as well as overall Canadian immigration policy (Ferrer, Picot, & Riddell, 2014; Picot & Sweetman, 2011), and stocks of human and physical capital (Fitzpatrick et al., 2015; Gonzalez, 2003).

There is also extensive literature that compares immigrants and non-immigrants from a health perspective. Several studies find that for earlier immigrant cohorts there was a 'healthy immigrant effect' (HIE): just after arrival, on average, immigrants are in better health than otherwise comparable native-born Canadians. Immigrant health, however, converges to native-born levels

with time in Canada (both at the individual and the population level) (Chen et al., 1996; Newbold and Danforth, 2003; McDonald and Kennedy, 2004). Immigrants might have been initially healthier than native-born residents because of self-selection and Canadian immigration policies (Ali, McDermott, & Gravel, 2004; Constant, García-Muñoz, Neuman, & Neuman, 2015; Gushulak, 2007; Hyman, 2004; Maio, 2010). Possible reasons for the health status decline of immigrants over time are variously identified as: the loss of social status and social networks, cultural barriers, adoption of Canadian behaviors and poor working conditions (Asanin & Wilson, 2008; Deri, 2005; Devillanova, 2008; Gee, Walsemann, & Takeuchi, 2010; Leclere, Jensen, & Biddlecom, 1994; Liu, Xue, Yu, & Wang, 2016; Pippins, Alegría, & Haas, 2007; Shi, Lebrun, & Tsai, 2009). It is noteworthy, that the HIE phenomenon is not found for recent cohorts of immigrants (Sopchokchai, 2015). It means that immigrants have a different life and health experience than those are born in Canada. Considering that the METC is very relevant to both earnings and healthcare expenditures of a tax filer, this study investigates whether there is any difference in the claiming pattern of the METC (proportion of tax filers who claimed the METC and the amounts of claims) for immigrants, as compared to non-immigrants in Canada.

There are a small number of studies that focus on health-related tax measures (Emery, 2016; Smart & Stabile, 2005). Smart & Stabile (2005) examine the effects of tax measures like the METC on individual behaviour. They estimate the tax price elasticity of demand for prescription drugs, health insurance, and other eligible expenditures. Even though there are differences in the way tax subsidies are experienced by consumers, their findings suggest a moderate to large tax price elasticity. On the other hand, tax subsidies do not affect the demand for health insurance on the intensive margin. The findings of their research support the view that the income tax system can be an effective policy instrument for influencing the use of healthcare goods and services.

We are unaware of any previous research that directly compares the claim patterns of the METC and/or MES for immigrants with those of non-immigrants in Canada. There are several important strengths of this study. It is based on the Longitudinal Administrative Database (LAD) from 2004 to 2013. Our research objective is to examine any differences between immigrants and non-immigrants in Canada in the use of the METC/MES, including gross medical expenses for the filer's immediate family (spouse and children under 18 years of age), allowable medical expenses for other dependents, the maximum potential METC claim (ignoring the sufficiency of the taxes to be paid), the METC refund, and the MES amount. We investigate the tax-related variables across family types and claiming patterns, such as, by single claimant, and by couple family having one partner claiming and with both claiming. In addition, we contrast the potential METC and actual METC refund, across immigration categories and across income per capita of the source country.[9] We implement a two-part model where the first part captures the factors contributing to making any METC and/or MES claim and the second part captures the factors that affect the METC and/or MES claim amounts, conditional on making a claim. Finally, we apply both the fixed-effects model and the pooled cross-section regression model in both parts, where we rely on the fixed-effects model and the pooled cross-section in the case of time-variant and time-invariant factors, respectively.

3.2 Canadian Health-related Tax Measures

3.2.1 Medical Expense Tax Credit

Canada provides a non-refundable income tax credit for qualifying medical expenditures that serves as a supplement to the public health insurance system. There are two parts to METC: the immediate family, and non-immediate family dependents who may transfer costs above their tax

[9] The categorizations for the income level of the source country are low, medium and high using the World Bank's analytical classification of countries based on gross national income (GNI) per capita in the year the immigrant came to Canada.

liabilities. Qualifying medical expenditures can be submitted for the following persons: the taxpayer, taxpayer's spouse or common-law partner, and the taxpayer's or spouse's or common-law partner's children and dependents. Spouses may, optionally, combine their expenditures in making a claim and either spouse's expenditures for the listed set of people are all eligible for the (potentially) joint claim.

A broad list of expenditures may be claimed, including the following most common eligible medical expenses:

a) Payments to a medical doctor, dentist, nurse, or certain other medical professionals, or to a public or licensed private hospital.
b) Premiums are paid to private healthcare services plans, where those premiums are not paid by an employer.
c) Premiums are paid under the provincial or territorial drug prescription or pharmacare programs, but not premiums paid under government-sponsored medical or hospitalization plans.
d) Payments for prescription drugs, prescription eyeglasses or contact lenses, dentures, hearing aids, pacemakers, wheelchairs, crutches and other qualifying medical devices.
e) Since the 2008 budget, the cost to purchase, operate and maintain devices prescribed by a medical practitioner, including: altered auditory feedback devices for the treatment of a speech disorder; electrotherapy devices for the treatment of a medical condition or a severe mobility impairment; standing devices for standing therapy in the treatment of severe mobility impairment; and pressure pulse therapy devices for the treatment of a balance disorder.[10]

[10] Department of Finance Canada, Tax Expenditures and Evaluations 2008 https://www.fin.gc.ca/taxexp-depfisc/2008/Taxexp-depfisc08_eng.pdf

f) Eligible expenses for service animals specially trained to assist an individual who is severely affected by autism or epilepsy to cope with the individual's impairment.

Medical expenses for the taxpayer, the taxpayer's spouse or common-law partner, and dependent children under 18 are claimed on the federal tax return. Tax filers may also be entitled to provincial and territorial credits in addition to federal tax credits. Provincial and territorial governments develop their own tax laws and policies. The Canada Revenue Agency (CRA) collects for and administers provincial and territorial programs, except for the province of Quebec. The provincial medical expenses tax credit is calculated similarly to the federal one. This paper focuses only on the federal tax credit side without considering the provincial credit. Only expenses in excess of the lesser of an indexed amount for the particular year or 3% of net income can be claimed for the federal tax credit. The lowest tax rate is applied to the medical expenses to determine the amount of the tax credit. Due to the way the credit is calculated, a couple normally gets a higher credit by combining the medical expenses of both spouses on one tax return with the lowest net income, unless the income is so low that there would be insufficient tax to offset the credit. As an example, for the 2014 tax year, the system worked as follows: non-refundable tax credits were offered for eligible medical expenses that could be claimed if they exceeded the lesser of 3% of an individual's net income, or $2,171 ($2,268 for 2017 and $2,302 for 2018).[11] So, in 2014 the METC reduces payable taxes by the amount of allowable medical expenses minus the lesser of $2,171 or 3% of net income, times 15%, the lowest federal tax rate.[12]

[11] Provinces and territories offer similar credits against provincial/territorial income taxes payable for medical expenses, although the threshold amounts vary by jurisdiction.
[12] Department of Finance Canada, Tax Expenditures and Evaluations 2014
https://www.canada.ca/en/department-finance/services/publications/federal-tax-expenditures/2014.html

3.2.2 Refundable Medical Expense Supplement

A refundable medical expense supplement is available for working individuals aged 18 or older with low-incomes and high medical expenses. There is a maximum MES refund, which changes over the years, as shown in Table 3.1. As an example, the 2006 budget increased the maximum amount of the refundable medical expense supplement to $1,000, from $767 per year.[13] In order to claim the refundable MES, an indexed threshold with a maximum net family income and other conditions need to be satisfied. As an example, for the 2014 tax year, a tax filer was able to claim a credit of up to $1,152 if all the following applied:

- The tax filer had an amount for disability support deduction or medical expenses for self, spouse, or children or for other dependents of the filer's tax return, and
- The filer was a resident in Canada throughout the year.

In addition, the sum of the following two amounts had to be $3,363 or more:

- The filer's employment income and other employment income amounts received from a wage-loss replacement plan minus the amounts of pension plan deductions.
- The filer's net self-employment income (not including losses).

To be eligible for the supplement, the tax filer's combined family net income (including the spouse or common-law partner), minus any amount (reported by the tax filer or tax filer's spouse or common-law partner) of Universal Child Care Benefit and registered disability savings plan income could not be more than $48,546.[14] In addition, if the tax filer or the tax filer's spouse or common-law partner deducted an amount of universal child care benefit repayment, and/or the

[13] Department of Finance Canada, Tax Expenditures and Evaluations 2006
https://www.canada.ca/en/department-finance/services/publications/federal-tax-expenditures/2006.html
[14] Department of Finance Canada, Tax Expenditures and Evaluations 2014
https://www.canada.ca/en/department-finance/services/publications/federal-tax-expenditures/2014.html

amount for repayment of registered disability savings plan income, these amounts were added to the filer or filer's spouse or common-law partner's net income when the credit was calculated.

[Table 3.1 here]

3.3 Sources of Data and Descriptive Statistics

3.3.1. Data

We implement our empirical strategy using data from the Longitudinal Administrative Database (LAD) that incorporates data from the Longitudinal Immigration Database (IMDB). The LAD comprises a 20% sample of the annual T1 Family File (T1FF), which is a yearly cross-sectional file of all tax filers and their families. Individuals selected for the LAD are followed in order to create a longitudinal profile for each individual. The IMDB contains immigrant landing records and annual tax information for immigrants who arrived after 1980. The IMDB contains variables such as landing year, immigration category, country of birth, date of birth, mother tongue, the highest level of education, year arrived, etc. The LAD–IMDB linked database is produced by matching two databases with 20% of immigrants on the IMDB identified on the LAD (Picot et al., 2007).

The LAD covers the period 1982 to 2013. In 2004, there were significant changes in tax policy, and therefore, we use data on individuals over age 18 from 2005 to 2013. For our analysis, we first select our sample from the LAD database for the year 2004. As a result, our sample only considers the immigrants who arrived before the year 2004 and after 1982. We then link the selected individuals across the years from 2005 to 2013, to create a longitudinal profile for the individuals. We delete approximately 5% of individuals in the sample based on various checks of important variables for longitudinal consistency. We also drop observations with missing values in

immigration categories and major demographic variables. Since the tax credit is a family-based, we convert our individual-level data to tax family data. Our sample only considers one spouse from each family.

Our main outcomes of interest are claims for the METC and MES for each tax year. We consider the incidence of reporting gross medical expenses, those gross expenses exceeding the minimum threshold, and the actual tax credit (having a claim or not). Additionally, the total amounts claimed for gross medical expenditures, the maximum potential claim, and the amount of the actual tax credit are documented. Our approach is to assume that the METC is the "marginal/last" tax credit applied. The METC refund is captured as the minimum of the 'potential claim of METC' and 'Net Federal Tax Payable less the potential medical credit'. In this case, the potential claim of METC is calculated as 15% of the summation of the 'net medical expenses' and 'transfers'.

In addition, we are also interested in knowing the factors related to having 'tax room to claim the METC'. People, who have a positive potential claim of medical expenses in the tax form, but a final METC refund of zero, are defined as 'do not have sufficient room to claim'.

3.3.2. Methodology

The two-part model is commonly used in health economics (Lahiri & Xing, 2004; Mullahy, 1986; Sarma & Simpson, 2006) and is a good fit for our case because it can distinguish a positive-versus-zero claim, from the amounts claimed. We conduct analysis for the METC and MES, and not having sufficient tax room to claim the METC. For each case, we use a two-part model for not having sufficient tax room to claim the METC.

Our model can be shown as:

$$y_{it} = X'_{it}\beta + W'_i\gamma + \alpha_i + u_{it}, \quad t = 2005, 2006, \ldots\ldots\ldots, 2013 \qquad (1)$$

where the unit of observation is individual i, and the information was observed in the year t. y_{it} is the outcome of interest that denotes having the METC, MES refunds and 'not having sufficient tax room to claim the METC' in the first part, whereas y_{it} is capturing the amounts of the METC, MES refunds, conditional on having a positive outcome, in the second part. X is a vector of explanatory variables including age, years since migration, number of children, family type and province. At this point, W is a vector of time-invariant variables including immigration categories, mother tongue and a set of the income of the source country of immigrants, α_i indicates the unobserved fixed-effects.

Fixed-effects or Random Effects?

Considering the longitudinal setup of the database, the fixed-effects model is used. The fixed-effects model allows for there to be an arbitrary correlation between all fixed effect variables (but also unobserved fixed-effects) and X_{it}. On the other hand, if a key explanatory variable is constant over time, for example, the immigration category and per capita income of the source country, we cannot estimate the effect on the outcomes. As a common practice, we apply both the random effects and fixed-effects models, and then apply the Hausman test for statistically significant differences in the coefficients on the time-varying explanatory variables. As our model rejects the null hypothesis that individual effects are random, the fixed-effects are assumed to be appropriate to use.

Consider, for each individual, averaging this equation over time, it can be shown as:

$$\bar{y}_\iota = \bar{X}'_{it}\beta + W'_i\gamma + \alpha_i + \bar{u}_\iota \qquad (2)$$

If we subtract equation (2) from equation (1), then we get our main model and a set of the coefficients for the variables: age, years since migration, number of children, family types and provinces. In this case, the unobserved and observed fixed-effects cannot be identified.

$$\ddot{y}_{it} = \ddot{X}'_{it}\beta + \ddot{u}_{it} \qquad (3)$$

where $\ddot{y}_{it} = y_{it} - \overline{y}_i$ is the time-demeaned data on the outcome variables including claims for the METC, MES and 'not having sufficient tax room to claim the METC'.

$\ddot{X}_{it} = X_{it} - \overline{X}_i$ is the time demeaned data on the explanatory variables including age, years since migration, number of children, family type and province. And similarly, $\ddot{u}_{it} = u_{it} - \overline{u}_i$.

To capture the effects of time-invariant variables on the outcomes of interest, we apply simple pooled cross-section analysis. For the econometric analysis of panel data, we cannot assume that the observations are independently distributed over time. There are two distinct issues: 1) individual unobserved fixed-effects such as lifestyle or a particular health condition, for example, which do not change over time and affect METC similarly every year and 2) common annual unobserved shocks. Typically, to reflect the fact that the population may have different distributions in different time periods, both individual unobserved fixed-effects and common annual unobserved shocks, the pooled cross-section allows the intercept to differ across years by including dummy variables for all but one year. In this regard, we include a full set of dummy variables for each year where the earliest the year 2005 is considered as the base year. Our model of interest looks like:

$$y_{it} = X'_{it}\beta + Year'_{it}\delta + W'_i\gamma + \alpha_i + u_{it} \qquad (4)$$

where y_{it} is the outcome of interest capturing having the METC, MES refunds and 'not having sufficient tax room to claim the METC' in the first part, whereas y_{it} is capturing the amounts of the METC, MES refunds, conditional on having a positive outcome, in the second part. X is a vector of

explanatory variables including age, years since migration, number of children, family type and province. $Year$ is a full set of dummy variables for tax years from 2005 to 2013. W is a vector of time-invariant variables including immigration categories, mother tongue and a set of the income of the source country, and α_i indicates the unobserved fixed-effects.

We separately examine the factors of claiming or reporting any METC and MES (part 1), and the factors affecting the METC and MES claim amounts conditional on having a positive claim (part 2), by using both the fixed-effects model and pooled cross-section analysis. It is important to note that in part 1 of the two-part model, the dependent variable y_{it} in equation (3) and (4) is binary; for example, $y_{it} = 1$ if the tax filer has any claim and $y_{it} = 0$ if the tax filer does not have any claim. Also note that in part 2 of the two-part model, the dependent variable y_{it} in equation (3) and (4) is continuous because it takes the value of the claimed amounts.

3.4 Descriptive Statistics and Results

3.4.1. Descriptive statistics

For each of immigrants and non-immigrants, Table 3.2 provides the proportions of tax filers with gross immediate family medical expenses (GME), allowable medical expenses for other dependents, potential METC claims (if the tax filer has sufficient tax room), an METC refund and an MES claim. We have sub-categorized each group into three based on the type of family (single and couple) and immigration status, and then estimated the percentage who claim in each for: (1) single and had claimed (2) married or common-law couples where one partner had claimed, and (3) married or common-law couples where both partners had claimed. Table 2 shows that a smaller percentage of single immigrants reported GMEs (11.5%), as compared to single non-immigrants (19.2%). Among the immigrant couple families, only 24.5% had GMEs claimed by only one spouse, whereas the proportion is 44.7% in the case of non-immigrant couple families where one spouse

claimed GMEs. The proportion of couple families, where both partners have claims for GMEs, is very small for both immigrants and non-immigrants, only 0.4% and 0.7%, respectively.

[Table 3.2 here]

In the case of having an METC claim (as shown in Table 3.2), the percentage of non-immigrants is almost double that of immigrants. For example, among immigrant spouses, 19.5% have potential claims of the METC by one spouse, whereas among non-immigrants the proportion is almost double, at 38.2%. All tax filers with the potential to claim METC do not get the METC refund (as the METC is a non-refundable tax credit); however, a close to a similar proportion of immigrant and non-immigrant subgroups (single and claimed, 1 spouse claimed, both spouses claimed) with the potential to claim the METC, received an METC refund. For example, among both the immigrant and non-immigrant spouses having one spouse claimed, about 75% received the METC refund. Similarly, 90% of both single immigrants and single non-immigrants with potential claims actually receive the METC refund.

MES is a refundable tax credit available for low-income working individuals. A higher percentage of single non-immigrants (4%) reported MES compared to single immigrants (3.4%). On the other hand, for the couples where only one partner claimed, a higher proportion of immigrants (2.6%) claimed the MES compared to their non-immigrant counterparts (1.6%).

[Table 3.3 here]

Looking a little deeper, Table 3.3 indicates the average dollars for claiming the gross medical expenses (GME), allowable medical expenses for other dependents, potential claims of the METC, actual METC refund and the MES by the subgroups, similar to Table 3.2. The first column of Table 3 indicates the average claimed amounts by immigrants, who belonged to single families; the second

and third columns indicate the average claimed amounts by immigrant couple families where one spouse claimed and both spouses claimed, respectively. For example, single immigrants, on average, claimed $1600 for GME, whereas the claimed amount is $2200 for single non-immigrants. Overall, for all subgroups (singles, couples with one partner claimed and couples with both partners claimed) for all the variables in Table 3.3, non-immigrants claimed or received, on average, a higher amount of money as compared to their immigrant counterparts. However, on average, only single immigrants claimed more MES ($230) as compared to single non-immigrants ($180).

[Table 3.4 here]

Table 3.4 summarizes the distributions of age and province. Column 1 represents the distributions for all immigrant tax filers; columns 2 and 3 represent the distributions for immigrant tax filers who had potential METC claims and received the METC refund, respectively. If we look at the age distribution profile of our sample in columns 1 and 3 in Table 3.4, we observe that non-immigrant tax filers are significantly older as compared to immigrant tax filers. Approximately, 34.95% of non-immigrant tax filers belong to the age group 56 and over, whereas only 19.01% of immigrant tax filers belong in the same age group. On the other hand, among immigrant tax filers, approximately 57% are aged 36-55, whereas, among the non-immigrants, only 42% are in that age category. However, immigrant tax filers receiving the METC refund, make up a comparatively larger proportion of the sample population (about 61%) belonging to the age category 36-55 years. On the other hand, comparatively aged non-immigrant tax filers are the largest group receiving the METC refund (about 45%). With respect to the provinces, immigrants disproportionately live in Ontario, British Columbia, Quebec, and Alberta, which is similar to non-immigrants. It is interesting to note that in the case of having the METC refund, the majority of immigrant tax filers (42.45%) are from Ontario, whereas the majority of non-immigrant tax filers (40.58%) live in Quebec.

[Table 3.5 here]

Table 3.5 summarizes the proportions of immigrants' by per capita income of the source country and immigration categories. The proportions of immigrants are for a potential claim of METC and the METC refund, respectively. The first column of Table 3.5 reports the percentages for single immigrants who had potential claims of METC, whereas the second and third column reports the percentages for immigrant couples with one partner claimed, and both partners claimed, respectively. If we look at the distribution of per capita income of the source country, then we find that immigrant tax filers (in all subgroups) from medium-income countries make up the highest share of having a potential claim of the METC and METC refund.[15] After the medium-income countries, immigrants from high-income countries have the next highest share of having a potential claim of the METC and METC refund.

With respect to the distribution of immigration categories, among couples (couples with one partner claimed and couples with both partners claimed), a larger proportion of 'family class' immigrant tax filers report having the METC refund, after that skilled workers (principal applicant) and spouses and dependents of skilled workers, respectively. Among the single tax filers, immigrants having the METC refund mostly belong to the family class, spouses and dependents of skilled workers, refugees and skilled workers categories (34.87%, 18.69%, 18.4% and 12.72% respectively).[16] Among the refugees, government-assisted refugees who are single are most likely to receive the METC refund, as shown in Chart 3.1.

[Chart 3.1 here]

[15] The categorizations for the per capita income level of the source country are low, medium and high using the World Bank's analytical classification of countries based on gross national income (GNI) per capita, in the year the immigrant came to Canada.

[16] The category of 'refugee' includes government-assisted refugees, privately sponsored refugees, refugees landed in Canada and refugee dependents.

3.4.2. Analytical Results

3.4.2.1. The METC Refund: Two-part Model

We separately examine factors associated with claiming any METC refund and factors associated with the METC claim amounts conditional on having a positive claim by using both fixed-effects and pooled cross-section analysis, as shown in Table 3.6. All regressions use the same set of explanatory variables, as in column 1 of Table 3.6. We present coefficients estimated by using the fixed-effects model, by using this model, we eliminate the unobserved effects entirely. However, we rely on the coefficients estimated by a pooled cross-section time series analysis for the time-invariant variables, such as immigration category, mother tongue and income of the source country.

[Table 3.6 here]

According to part 1, we find using the fixed-effects model (in Table 3.6) that age and year since migration (YSM) have diminishing effects on claiming the METC, holding other factors constant; whereas, according to part 2, age has an increasing effect, but YSM has a diminishing effect on the claimed amounts of METC, conditional on having a positive claim. Columns 1 and 2 of Table 3.6, report that "number of children" is statistically significant for both increasing the probability of claiming METC and increasing the METC claimed amounts, conditional on having a positive claim. This implies that considering other things to be equal, an increase in 1 child in the family increases the probability of claiming the METC by 0.8%, and increases the METC claimed amount by 6.5%, conditional on having any positive claim.

As different family types have different claiming rates or patterns, our fixed-effects results show that a couple family has positive coefficients, while a lone-parent family has negative coefficients, in both parts 1 and part 2, when non-family is the omitted category. Results from column 1 of Table 3.6 imply that a couple family has, on average, a 2.8% higher probability of

making an METC claim, while a lone-parent family has a 5.1% lower probability of making such a claim, as compared to a non-family person. In the case of the METC claimed amounts conditional on having a positive claim, a couple family has a 25.7% higher and a lone-parent family has a 22.1% lower probability, as compared to those in the non-family category.

At the provincial and territorial levels, column 1 of Table 3.6 reports that tax filers living in Quebec, Newfoundland and Labrador, Prince Edward Island and Nova Scotia have a significantly higher probability on average (5.8%, 6.3%, 9.2%, 4.8% and 5.9%, respectively) of making a claim for the METC, as compared to tax filers who live in Ontario. However, with respect to part 2, only tax filers who live in Saskatchewan have a significantly higher METC amount than those in Ontario, conditional on having a positive claim. The estimate is an 18.1% higher amount in Saskatchewan.

In the case of time-invariant factors, we considered the coefficients estimated by using the pooled cross-section analysis. Column 3 of Table 3.6 shows that spouses and dependents of skilled workers have a higher probability of claiming the METC, whereas family class, business class and other refugees have a lower probability of making this claim, as compared to the skilled workers themselves. In contrast, family class, business class and other refugees have just the opposite tendency, having a lower probability of claiming an METC. However, column 4 of Table 6 shows that most of the immigration categories have significantly lower amounts of METC claims, as compared to skilled workers, conditional on having a positive claim of METC. Immigrants with a mother tongue of English or French indicate both a higher probability of claiming METC and higher amounts of METC claims, as compared to their immigrant counterparts. Finally, immigrants born in a low or a medium-income country have a significantly lower probability of claiming METC, and also report lower claimed amounts (conditional on having a positive METC claim), as compared to immigrants from high-income countries.

3.4.2.2. The MES Claims: Two-part Model

Table 3.7 reports comparable results for the refundable MES, again both for making any claim (part 1) and for the amounts of the claim if there is one (part 2).

[Table 3.7 here]

When all the explanatory variables are fixed, an increase in age by one year statistically significantly increases the probability of having an MES claim by 0.016 on average. However, the quadratic coefficient of age is negatively significant, which implies a diminishing effect of age on having a claim for the MES, as shown in column 1 of Table 3.7. However, conditional on having a positive claim, an increase in 1 year of age significantly increases the amounts of MES claimed by $0.50 on average. Similarly, an increase in 1 year of YSM increases the probability of having any MES by 0.007 whereas YSM shows its diminishing effect by reporting a negative coefficient for the quadratic form. The estimates imply that age and YSM have a non-linear relationship with the probability of having an MES claim, which is an inverted U shaped parabola with a maximum point. However, YSM does not statistically significantly affect the amounts of MES claimed.

The number of children is a statistically significant factor for both increasing the probability of making an MES claim, and the amounts claimed, conditional on making an MES positive claim. In the case of family, column 1 of Table 3.7 reports that a couple family and a lone-parent family have a lower probability of claiming MES as compared to a non-family person; however, family type does not have any statistically significant effect on the amounts of MES claims. Interestingly, tax filers living in Quebec indicate a significantly higher probability of making a claim for the MES, but they claim lower amounts of MES (conditional on making a positive claim), as compared to tax filers living in Ontario.

In the case of the immigration category, results obtained by using the pooled cross-sections,

shown in columns 3 and 4 of Table 3.7, indicate that on average family class, business class and refugees have a higher rate (0.4%, 0.22% and 0.4%, respectively) of claiming the MES, as compared to immigrants in the skilled workers category. On the other hand, conditional on making a positive claim, family class immigrants have statistically significantly lower amounts of MES claimed, as compared to skilled workers. Mother tongue plays an important role in the case of making an MES claim and for the amounts of MES claimed. Immigrants with a mother tongue of English or French have a 0.7% lower rate (on average) of claiming the MES but have 11.5% higher amounts of the MES claimed, compared to immigrants with a mother tongue other than English or French.

3.4.2.3. Not Having Tax Room

As the METC is a non-refundable tax credit, in order to get the refund the tax filer's 'total tax payable' amount needs to be greater than the 'potential claim of METC'. We capture the dependent variable 'no tax room' if a tax filer has positive amounts of the potential claim of METC, but the filer's estimated amount of METC refund is zero (which means zero refund). Like other dependent variables, we rely on the coefficients estimated by the fixed-effects model and the pooled cross-section model for time-variant variables and time-invariant variables, respectively. Table 3.8 reports the results of only part 1 of the two-part model, as this dependent variable is binary. Here the regressions use the same set of explanatory variables as Tables 3.6 and 3.7.

[Table 3.8 here]

An increase in one year of age decreases the probability of facing 'no tax room' for getting the METC refund by 3.3%, where the quadratic function of age is positive and statistically significant implies an increasing effect of age. The estimates indicate that age has a non-linear relationship with the probability of facing 'no tax room', that seems to be a U-shaped parabola with a minimum point. Similarly, an increase in one year of YSM decreases the probability of facing 'no tax room' on average by 12.1% with an increasing effect. More children in the family on average

increases the probability of facing insufficient tax room to claim METC. In the case of family type, on average, couple families have higher (2.1%) rates, whereas lone-parent families have lower (1.6%) rates of facing insufficient tax room to claim, as compared to the non-family person. Tax filers living in Quebec, Manitoba, and in the Atlantic regions have, on average, higher rates of facing 'no tax room', as compared to tax filers living in Ontario.

Column 2 of Table 3.8 shows the results of time-invariant variables. Surprisingly, both family class and business class immigrants, on average, have a 0.9% lower rate of facing insufficient tax room to claim METC, as compared to skilled immigrants.

3.5 Conclusion

As apprehending a particular health-related tax credit is complicated, analyzing the significant factors for the particular tax credits is not straightforward. Having potential claims for medical expenses does not guarantee that the refund of medical tax credits will be received. However, even if a tax filer receives a positive amount of refund, this does not imply that the full amount of medical credit is realized because several factors are linked with eligibility for a refund. To clarify, for example, let's consider three different tax filers who have potential claims for medical expenses, but have three different possibilities for the final METC refund outcomes. Case 1: the tax filer pays income taxes, which implies that the full value of the METC tax credit is realized. Case 2: the tax filer pays no income taxes, but 'total taxes payable before the application of tax credit' is greater than 'the value of all tax credits less the potential claim of medical credit', which implies that some fraction of the METC tax credit is realized. Case 3: the tax filer pays no income taxes, but 'total taxes payable before the application of tax credit' is less than 'the value of all tax credits less the potential claim of medical credit', which implies that none of the METC tax credit is realized. In addition, the refundable MES is only claimable conditional on having a number of

criteria satisfied, such as: the tax filer needs to have reported or claimed for medical expenses, needs to have labor earnings, total family income needs to be below a fixed threshold (as shown in Table 1), etc. However, even considering the endogeneity and the complex nature of the METC and MES, our results reveal some interesting issues.

We found that, overall, while filing taxes, a relatively higher proportion of Canadian-born families, irrespective of being single or a couple, report and claim in almost all the medical-related items, as compared to immigrant families. For example, among the non-immigrant couple families in which at least one partner had a claim, about 47% reported gross medical expenses, whereas the proportion is only 25% among their immigrant counterparts. Apart from the proportions, the average reported or claimed amounts of the medical-related items were also relatively higher for both single and couple non-immigrant families. The scenario is the opposite in the case of claiming refundable MES. Our results can be interpreted with the following caveats. Firstly, if we assume that medical expenses are need-based, an overall higher percentage and higher amount of METC claiming by the Canadian-born reflects the health advantages of immigrants relative to native-born Canadians. This finding is consistent with recent research; for example, Trovato (2019) finds that immigrants in Canada enjoy overall better health, better self-reported health and also have a mortality advantage compared to their native-born host population in Canada; Stafford, Newbold, & Ross (2010) found that immigrants are less likely to report mental health problems and depression compared to the native-born. Secondly, as the METC is based on the interaction of medical needs and income tax, sufficient income is also important for getting refunds. However, literature shows that the comparison of labour market outcomes between immigrants and non-immigrants is not straightforward because they vary with a range of factors. However, we found a marginally higher proportion of MES claiming being done by immigrant couple families, in addition to that, on average, a higher amount of MES was being claimed by single immigrants, which indirectly implies the relatively low-income profile of immigrants because refundable MES is specially designed for

low-income working tax filers with high medical expenses.

In a recent Statistics Canada research report, using the linked Canadian Community Health Survey (CCHS)-Longitudinal Immigration Database from 2007 to 2014, Lu & Ng (2019) investigate the Healthy Immigrants Effect (HIE) by immigration category. They find that results vary with immigration category with a stronger HIE observed for family-class immigrants, and then economic-class principal applicants, whereas the effect was much weaker for refugees. However, our study compares the potential claims of METC and METC refunds by immigration categories (as shown in Table 5). We see that in the case of claiming METC, overall, 'family class' is the most dominant, followed by skilled-class principal applicants, their spouses and dependents, and refugees, respectively. Our results are conceptually consistent with the study by Lu & Ng, (2019). Our results point to some concerns associated with poor health outcomes through reporting higher medical expenses and claiming larger medical credits by the 'family class' and 'skilled worker principal applicants', as compared to other immigration categories. In addition, the association between immigrants with a mother tongue English or French and their higher (in proportion and amounts) METC claiming, may indicate that there may be opportunities for improvements in communicating about tax filing and possible credits for the immigrants whose mother tongue is other than English or French. These implications might be helpful for taking important effective policy measures.

The findings in our analysis show that age and years since migration (YSM) increases the probability of claiming a medical tax credit, and increases claim amounts, as expected. Canadian migrant studies literature establishes the strong relationship between duration since migration (as a proxy of acculturation) and health status decline. For example, Pérez (2002) finds that even though immigrants have comparatively better self-reported health in general, their probability of reporting

chronic conditions increases with time lived in Canada.[17] The increase in reporting and claiming for medical tax credits with the increase in YSM in our findings apparently supports this interpretation. In the case of family types, we see that couple families have, on average, significantly higher rates and higher amounts of METC claims, whereas lone-parent families have, on average, lower rates and a lower amount of claims, as compared to non-family persons, as expected.

To the best of our knowledge, our study is the first one to compare immigrants and native-born Canadians by assessing the claiming patterns of health-related tax credits. Our research contributes support to an existing literature on immigrants and health, but with a completely different dimension: the medical costs tax credit perspective.

[17] Chronic conditions included are : (a) Associated with an elevated risk of mortality high blood pressure, chronic bronchitis or emphysema, diabetes, heart disease, cancer, suffered from the effects of a stroke, etc. (b) Possibly associated with an elevated risk of mortality: asthma, Alzheimer disease, or other dementia, etc. (c) Not associated with elevated risk mortality: food allergies, allergies other than food allergies, arthritis or rheumatism, back problems excluding arthritis, migraine headaches, sinusitis, epilepsy, stomach or intestinal ulcers, urinary incontinence, cataracts, glaucoma, and other long-term conditions (Kaplan et al., 2007).

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Table 3.1: Maximum limit of refundable MES and maximum earnings threshold for the eligibility of MES

Year	Maximum refundable MES (Value)	Change in maximum refundable MES	Minimum Earnings to be eligible for refundable MES
2005	$750	33.50%	$36,663
2006	$1,000	33.50%	$42,140
2007	$1,022	2.20%	$43,067
2008	$1,041	1.90%	$43,877
2009	$1,067	2.50%	$44,973
2010	$1,074	0.70%	$45,255
2011	$1,089	1.40%	$45,888
2012	$1,119	2.80%	$47,167
2013	$1,142	2.10%	$48,118
2014	$1,152	0.90%	$48,546
2015	$1,172	1.70%	$49,379
2016	$1,187	1.30%	$50,017
2017	$1,203	1.30%	$50,704

Source: Government of Canada. Tax and Benefit Guide 2004 to 2017. Canada Revenue Agency Government of Canada. Tax expenditures and Evaluations 2004 to 2017. Department of Finance Canada

Table 3.2: Percentage of immigrants and non-immigrants claimed, by sub-categories, Canada, tax filers, 2005 to 2013

	Immigrants (%)			Non-immigrants (%)		
	Single: Claimed	Couple: 1Claimed	Couple: Both Claimed	Single: Claimed	Couple: 1 Claimed	Couple: Both Claimed
Reported Gross Medical Expenses	11.52	24.53	0.39	19.23	44.66	0.69
Allowable ME for other dependents	0.52	1.34	0.01	0.41	0.99	0.01
Potential claim of METC	7.6	19.54	0.82	12.71	38.18	1.3
METC Refund	6.91	14.8	0.28	11.39	28.79	0.46
MES	3.36	2.55	0.02	4.06	1.55	0.01

Notes: Single families include non-family persons, separated, divorced, and widowed whereas couple families include married and common-law couples. Source: Authors' calculations based on the Longitudinal Administrative Database (2005-2013).

Table 3.3: Mean claimed amounts by immigrants and non-immigrants sub-categories. The amounts are converted to Canadian dollar values considering 2013 as the base year, Canada, tax filers, 2005 to 2013

	Immigrants (CAD$)			Non-immigrants (CAD$)		
Mean Value	Single: Claimed	Couple: 1 Claimed	Couple: Both Claimed	Single: Claimed	Couple: 1 Claimed	Couple: Both Claimed
Gross Medical Expenses	1600	2300	4100	2200	3000	6200
Allowable ME for other dependents	1300	1700	6000	1500	1900	10100
Potential claim of METC	210	290	750	280	360	1000
METC Refund	210	300	380	280	360	550
MES	230	310	920	180	340	1000

Notes: Single families include non-family persons, separated, divorced, and widowed whereas couple families include married and common-law couples.
Source: Authors' calculations based on the Longitudinal Administrative Database (2005-2013).

Table 3.4: The distribution of immigrants and non-immigrants tax filers, by age-categories and provinces, Canada, tax filers, 2005 to 2013

	Immigrants			Non-immigrants		
	All Filers	Potential Claim of METC	Received METC Refund	All Filers	Potential Claim of METC	Received METC Refund
Age:						
Age18-25	4.69	3.87	3.73	5.65	3.81	3.69
Age26-35	18.95	14.14	14.25	16.89	11.31	11.43
Age36-45	30.69	30.18	30.98	19.93	15.21	15.28
Age46-55	26.65	30.77	30.62	22.59	20.36	20.43
Age56-65	11.97	15.26	14.81	17.86	22.17	22.17
Age66-80	5.97	5.14	4.97	14.15	22.62	22.50
Age88+	1.07	0.63	0.62	2.94	4.52	4.51
Province:						
Ontario	55.58	42.45	42.45	35.48	24.65	24.65
Quebec	13.28	25.88	25.88	25.74	40.58	40.58
Manitoba	1.89	2.31	2.31	3.83	3.64	3.64
Saskatchewan	0.60	0.53	0.53	3.52	3.07	3.07
Alberta	8.99	8.93	8.93	10.53	7.65	7.65
British Columbia	18.77	18.28	18.28	11.77	9.21	9.21
Yukon/Northw/Nuna	0.10	0.07	0.07	0.30	0.06	0.06
Newfoundland	0.06	0.12	0.12	2.10	2.71	2.71
Prince Edward	0.05	0.10	0.10	0.51	0.72	0.72
Nova Scotia	0.47	0.89	0.89	3.35	4.06	4.06
New Brunswick	0.21	0.45	0.45	2.88	3.66	3.66

Notes: The age and province distribution of 'All Filers' is based on the tax filer's age in our sample. 'Potential claim of METC' and 'Received METC Refund' are based on aggregate received/claimed amounts of the two spouses/partners, however, in the case of lone-parent families or persons not in census families, aggregated amounts are individual information.
Source: Authors' calculations based on the Longitudinal Administrative Database (2005-2013).

Table 3.5: The distribution of immigrants tax filers, by the income of the source country and immigration categories, Canada, immigrant tax filers, 2005 to 2013

	Potential Claim of METC			METC Refund		
Proportion	Single: Claimed	Couple: 1Claimed	Couple: Both Claimed	Single: Claimed	Couple: 1Claimed	Couple: Both Claimed
Per capita income of the source country:						
High-income	29.24	30.33	27.19	29.00	30.29	29.57
Medium-income	62.34	65.74	70.00	62.33	65.76	66.77
Low-income	8.46	3.94	2.81	8.67	3.96	3.66
Immigration Categories:						
Family	34.52	31.22	27.19	34.87	31.14	30.97
Skilled-Principal	12.83	23.22	25.63	12.72	23.31	21.18
Skilled-Dependent	18.79	17.92	20.94	18.69	17.76	17.31
Business and Provincial	6.57	7.45	8.44	6.41	7.28	10.32
Refugees (Govt.)	7.88	5.99	4.38	7.85	6.02	4.62
Refugees (Private)	4.95	4.06	3.75	4.87	3.97	4.09
Refugees (Other)	5.56	4.11	2.50	5.68	4.42	4.84
Others	8.94	6.04	7.19	8.86	6.10	6.56

Notes: 'Potential claim of METC' and 'Received METC Refund' are based on aggregate received/claimed amounts of the two spouses/partners, however, in the case of lone-parent families or persons not in census families, aggregated amounts are individual information. Single families include non-family persons, separated, divorced, and widowed whereas couple families include married and common-law couples.

Source: Authors' calculations based on the Longitudinal Administrative Database (2005-2013).

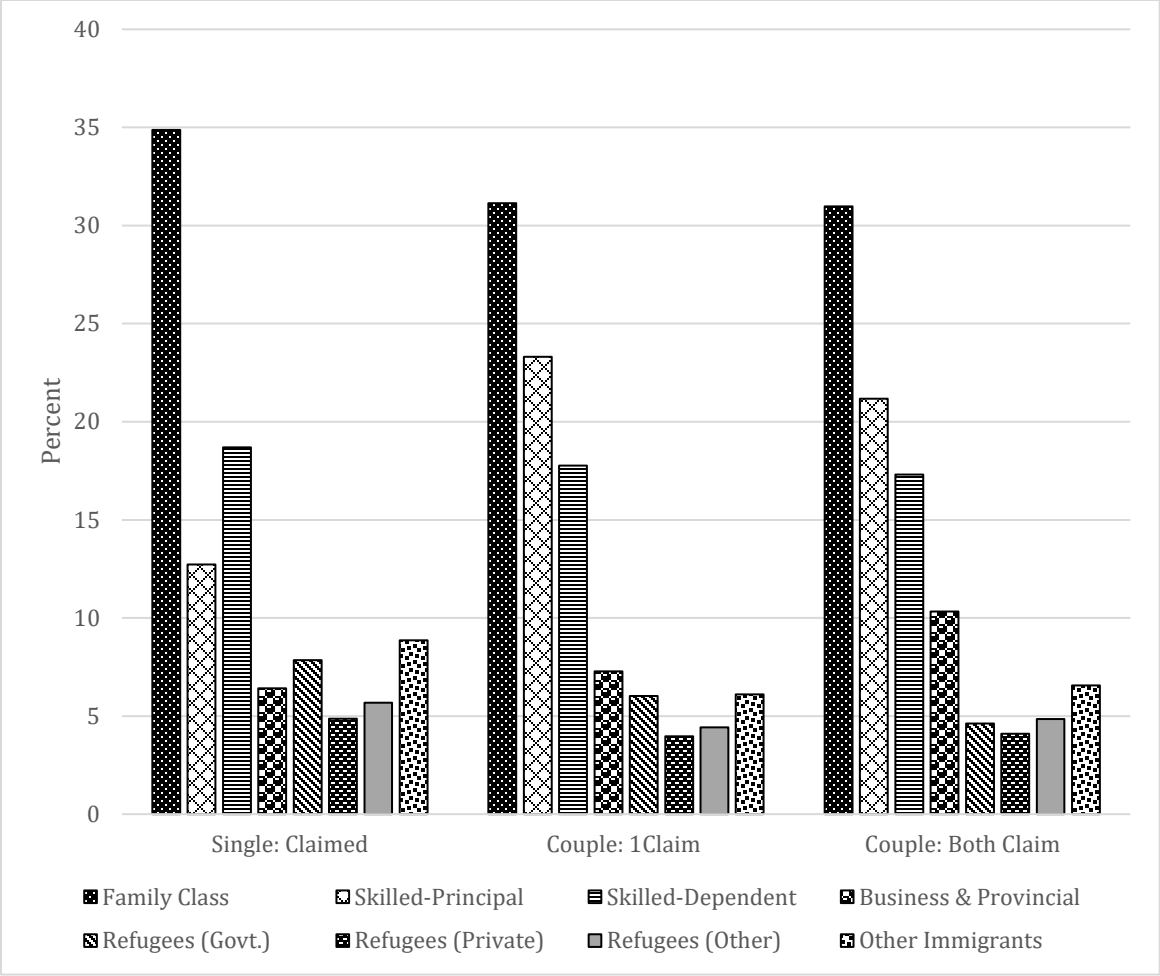

Chart 3.1: Distributions of immigration categories for the tax filers who claimed the METC refunds, Canada, immigrant tax filers, between 2005 to 2013

Table 3.6: Results of the two-part model for any claim for the METC and METC claimed amount respectively, Canada, tax filers, 2005 to 2013

		Fixed-effects		Pooling Cross-sections	
METC		**Part 1**	**Part 2**	**Part 1**	**Part 2**
Age					
	Age	0.119***	0.209***	-0.010***	0.030***
		(0.002)	(0.023)	(0.001)	(0.006)
	Age2	-0.055***	0.206***	0.054***	0.083***
		(0.002)	(0.020)	(0.001)	(0.006)
Years Since Migration					
	YSM	0.112***	0.168*	-0.023***	-0.094***
		(0.003)	(0.065)	(0.003)	(0.020)
	YSM2	-4.376***	-10.793***	0.505***	3.324***
		(0.101)	(1.849)	(0.088)	(0.693)
Total number of children					
	Number of children	0.008***	0.065***	-0.002***	0.045***
		(0.000)	(0.003)	(0.000)	(0.002)
Family Type (# non-family)					
	Couple	0.028***	0.257***	0.044***	0.447***
		(0.001)	(0.011)	(0.001)	(0.007)
	Lone-parent	-0.051***	-0.221***	-0.080***	0.250***
		(0.001)	(0.015)	(0.001)	(0.008)
Immigration Categories (#Skilled worker, Principal)					
	Family class	0.000	0.000	-0.025***	-0.136***
		(.)	(.)	(0.002)	(0.016)
	Skilled worker's spouse & dependent	0.000	0.000	0.009***	-0.033*
		(.)	(.)	(0.002)	(0.017)
	Business class	0.000	0.000	-0.018***	-0.119***
		(.)	(.)	(0.003)	(0.025)
	Provincial	0.000	0.000	0.001	-0.124
		(.)	(.)	(0.011)	(0.085)
	Refugees (Government-assisted)	0.000	0.000	0.005	-0.096***
		(.)	(.)	(0.003)	(0.025)
	Refugees (Privately sponsored)	0.000	0.000	-0.001	-0.124***
		(.)	(.)	(0.004)	(0.030)
	Other Refugees (Landed & dependent)	0.000	0.000	-0.028***	-0.161***
		(.)	(.)	(0.003)	(0.027)
	Other immigrants	0.000	0.000	-0.010**	-0.163***
		(.)	(.)	(0.003)	(0.025)
Mother Tongue					
	English or French	0.000	0.000	0.027***	0.146***

	Fixed-effects		Pooling Cross-sections	
METC	**Part 1**	**Part 2**	**Part 1**	**Part 2**
	(.)	(.)	(0.002)	(0.016)
Province (#Ontario)				
Quebec	0.058***	0.006	0.247***	0.077***
	(0.005)	(0.057)	(0.001)	(0.004)
Manitoba	0.011	0.048	0.074***	0.001
	(0.006)	(0.076)	(0.002)	(0.009)
Saskatchewan	-0.007	0.181*	0.050***	0.095***
	(0.006)	(0.075)	(0.002)	(0.010)
Alberta	-0.028***	0.093	0.020***	0.081***
	(0.003)	(0.050)	(0.001)	(0.006)
British Columbia	-0.004	0.023	0.020***	0.102***
	(0.004)	(0.051)	(0.001)	(0.006)
Yukon Northwest Nunavut	-0.049***	-0.261	-0.091***	0.081
	(0.010)	(0.141)	(0.003)	(0.067)
Newfoundland & Labrador	0.063***	0.118	0.167***	0.047***
	(0.008)	(0.078)	(0.003)	(0.010)
Prince Edward Island	0.092***	0.032	0.199***	0.005
	(0.016)	(0.132)	(0.005)	(0.019)
Nova Scotia	0.048***	-0.023	0.144***	-0.094***
	(0.006)	(0.068)	(0.002)	(0.009)
New Brunswick	0.059***	0.041	0.162***	0.039***
	(0.007)	(0.065)	(0.002)	(0.009)
Income of the Source Country (#High-income country)				
Low-income	0.000	0.000	-0.062***	-0.252***
	(.)	(.)	(0.004)	(0.027)
Medium-income	0.000	0.000	-0.053***	-0.176***
	(.)	(.)	(0.002)	(0.012)
_cons	-0.226***	2.721***	-0.028***	3.815***
	(0.005)	(0.074)	(0.003)	(0.018)
N	5131875	1309570	5131875	1309570

Note. In part 1, the dependent variable 'METC claim' is binary: a positive versus zero claims. In Part 2, the dependent variable is 'claim of the METC amounts', conditional on a positive outcome. ***p<0.001, ***p<0.01, *p<0.05.* In the case of the pooled cross-section regressions, explanatory variables also include a vector of the dummy variable for each year.

Table 3.7: Results of the two-part model for any claim for the MES and the amount of MES, respectively, Canada, tax filers, 2005 to 2013

	Fixed-effects		Pooling Cross-sections	
MES	Part 1	Part 2	Part 1	Part 2
Age				
Age	0.016***	0.500***	0.013***	0.218***
	(0.001)	(0.099)	(0.000)	(0.021)
Age2	-0.015***	-0.334**	-0.015***	-0.175***
	(0.001)	(0.102)	(0.000)	(0.023)
Years Since Migration				
YSM	0.007**	0.090	0.018***	0.014
	(0.002)	(0.165)	(0.001)	(0.038)
YSM2	-0.128*	-6.367	-0.552***	0.276
	(0.062)	(4.680)	(0.040)	(1.363)
Total number of kids				
Number of kid	0.001***	0.058***	0.001***	0.059***
	(0.000)	(0.011)	(0.000)	(0.004)
Family Type (# non-family)				
Couple	-0.022***	0.081	-0.015***	0.235***
	(0.001)	(0.045)	(0.000)	(0.012)
Lone-parent	-0.002**	-0.043	0.007***	-0.005
	(0.001)	(0.033)	(0.001)	(0.013)
Immigration Categories (# Principal Skilled worker)				
Family class	0.000	0.000	0.004***	-0.144***
	(.)	(.)	(0.001)	(0.030)
Skilled worker's spouse & dependents	0.000	0.000	0.002	-0.057
	(.)	(.)	(0.001)	(0.034)
Business class	0.000	0.000	0.022***	-0.059
	(.)	(.)	(0.002)	(0.039)
Provincial	0.000	0.000	0.009	-0.129
	(.)	(.)	(0.005)	(0.144)
Refugees (Government-assisted)	0.000	0.000	0.004*	-0.046
	(.)	(.)	(0.002)	(0.046)
Refugees (Privately sponsored)	0.000	0.000	0.004*	-0.086
	(.)	(.)	(0.002)	(0.056)
Other Refugees (Landed & dependent)	0.000	0.000	0.011***	-0.068
	(.)	(.)	(0.002)	(0.047)
Other immigrants	0.000	0.000	0.004**	-0.125**
	(.)	(.)	(0.001)	(0.047)
Mother Tongue				

	Fixed-effects		Pooling Cross-sections	
MES	Part 1	Part 2	Part 1	Part 2
English or French	0.000	0.000	-0.007***	0.115***
	(.)	(.)	(0.001)	(0.034)
Province (#Ontario)				
Quebec	0.009***	-0.427**	0.018***	-0.165***
	(0.002)	(0.152)	(0.000)	(0.011)
Manitoba	-0.000	0.493*	0.008***	-0.002
	(0.003)	(0.252)	(0.001)	(0.025)
Saskatchewan	-0.002	0.817**	0.012***	0.122***
	(0.003)	(0.262)	(0.001)	(0.025)
Alberta	-0.011***	0.090	-0.002***	0.104***
	(0.002)	(0.166)	(0.000)	(0.018)
British Columbia	-0.003*	0.317	0.003***	0.051***
	(0.002)	(0.168)	(0.000)	(0.015)
Yukon Northwest Nunavut	-0.012***	1.465***	-0.017***	0.081
	(0.003)	(0.303)	(0.001)	(0.173)
Newfoundland & Labrador	0.006*	0.184	0.010***	0.017
	(0.003)	(0.391)	(0.001)	(0.034)
Prince Edward Island	0.009	-0.606	0.014***	-0.066
	(0.006)	(0.560)	(0.002)	(0.059)
Nova Scotia	0.001	0.335	0.011***	-0.046
	(0.002)	(0.332)	(0.001)	(0.026)
New Brunswick	0.007*	0.004	0.019***	-0.066**
	(0.003)	(0.206)	(0.001)	(0.026)
Income of the Source Country (#High-income country)				
Low-income	0.000	0.000	-0.007***	-0.090
	(.)	(.)	(0.002)	(0.049)
Medium-income	0.000	0.000	-0.006***	-0.152***
	(.)	(.)	(0.001)	(0.022)
_cons	-0.003	3.146***	-0.002**	3.948***
	(0.003)	(0.251)	(0.001)	(0.048)
N	5131875	116285	5131875	116285

Note. In part 1, the dependent variable 'MES claim' is binary: a positive versus zero claims. In Part 2, the dependent variable is 'claim of the MES amounts', conditional on a positive outcome. ***p<0.001, **$p<0.01$, *$p<0.05$. In the case of the pooled cross-section regressions, explanatory variables also include a vector of the dummy variable for each year.

Table 3.8: Have Potential Claim but don't have sufficient room to claim the METC refund, Canada, tax filers, 2005 to 2013

	Part1	
No Tax Room	Fixed-effects	Pooling CS
Age		
Age	-0.033***	-0.008***
	(0.002)	(0.000)
Age2	0.118***	0.020***
	(0.002)	(0.000)
Years Since Migration		
YSM	-0.121***	0.006***
	(0.003)	(0.001)
YSM2	3.104***	-0.424***
	(0.095)	(0.036)
Total number of children		
Number of children	0.009***	0.002***
	(0.000)	(0.000)
Family Type (# non-family)		
Couple	0.021***	0.016***
	(0.001)	(0.000)
Lone-parent	-0.016***	-0.023***
	(0.001)	(0.000)
Immigration Categories (# Principal Skilled worker)		
Family class	0.000	-0.009***
	(.)	(0.001)
Skilled worker's spouse & dependent	0.000	0.001
	(.)	(0.001)
Business class	0.000	-0.009***
	(.)	(0.001)
Provincial	0.000	0.004
	(.)	(0.004)
Refugees (Government-assisted)	0.000	0.002
	(.)	(0.001)
Refugees (Privately sponsored)	0.000	0.002
	(.)	(0.001)
Other Refugees (Landed & dependent)	0.000	0.000
	(.)	(0.001)
Other immigrants	0.000	-0.002
	(.)	(0.001)
Mother Tongue		
English or French	0.000	0.010***
	(.)	(0.001)

	Part1	
No Tax Room	Fixed-effects	Pooling CS
Province (#Ontario)		
Quebec	0.027***	0.070***
	(0.004)	(0.000)
Manitoba	0.012**	0.021***
	(0.004)	(0.001)
Saskatchewan	-0.001	0.015***
	(0.004)	(0.001)
Alberta	-0.003	0.006***
	(0.002)	(0.000)
British Columbia	-0.003	0.006***
	(0.003)	(0.000)
Yukon Northwest Nunavut	-0.019**	-0.029***
	(0.006)	(0.001)
Newfoundland & Labrador	0.043***	0.047***
	(0.006)	(0.001)
Prince Edward Island	0.054***	0.060***
	(0.011)	(0.002)
Nova Scotia	0.022***	0.040***
	(0.004)	(0.001)
New Brunswick	0.023***	0.047***
	(0.005)	(0.001)
Income of the Source Country (#High-income country)		
Low-income	0.000	-0.023***
	(.)	(0.001)
Medium-income	0.000	-0.019***
	(.)	(0.001)
_cons	-0.094***	0.095***
	(0.005)	(0.001)
N	5131875	5131875

Note. The table includes only part 1 where the dependent variable 'no tax room to claim' is binary: a positive versus zero claims. ***$p<0.001$, **$p<0.01$, *$p<0.05$. In the case of the pooled cross-section regressions, explanatory variables also include a vector of the dummy variable for each year.

Conclusion

My work compares aspects of health-care access for immigrants and non-immigrants. In particular, this thesis consists of three chapters, each comparing different health-related behaviours. First, I analyze factors affecting practitioner (GP) and specialist (SP) visits. Second, I examine the causal effect of language proficiency on different self-rated health (SRH) and the use of health care services. The third, and final, the chapter investigates factors affecting the Medical Expenses Tax Credit (METC) patterns.

Chapter 1 investigates any differences in factors encouraging or hindering visits to GPs and SPs between immigrants and non-immigrants in Canada. I analyze the factors associated with a positive-versus-zero visit, and the number of GP and SP visits conditional on having had at least one visit. I find that the utilization pattern is different across immigration status, gender, and age. For example, having a bachelor's degree or above decreases the probability of using any GP services for prime-aged male immigrants compared to male non-immigrants, while it plays an opposite role for both male and female senior immigrants. I do not find any significant effect of having a bachelor's or higher degree on the number of GP visits. Also, I analyze utilization patterns of GPs and SPs based on age at migration (AAM) and gender. For example, I find that years since migration (YSM) increases the probability of visiting any GP and SP for both male and female immigrants who arrived in Canada at 36 years old or later. Also, I see that having employer-provided health insurance increases the number of GP visits for later-life male immigrants, while it has an opposite effect for female counterparts.

Chapter 2 investigates the causal effects of English language proficiency on self-rated health and use of health care services. Using CCHS data from 2003 to 2014, I find a positive

association between language proficiency and the probability of reporting being in good SRH, which is consistent with the results reported in few studies, such as, Omariba & Ng, (2011). However, there is no statistically significant association between the endogenous variable 'language proficiency' and reporting being in good mental health. Possibly, stigma is a significant barrier to utilizing and/or reporting the use of mental health care services (Gulliver et al., 2010; Stewart, Jameson, & Curtin, 2015). I find that English language proficiency has a positive causal effect on the utilization of hospital and mental health care services, which implies that immigrants face some barriers in obtaining services, including hospital care and specialists' services.

Chapter 3 compares immigrants and non-immigrants by assessing the claiming patterns of the Medical Expenses Tax Credit (METC). By using data from the Longitudinal Administrative Database (LAD) from 2004 to 2013, I find that non-immigrants, on average, report or claim higher amounts for all medical-related items (gross medical expenses, allowable expenses for other dependents, METC refund) except the refundable Medical Expense Supplement (MES) compared to immigrants. In the case of claiming METC, overall, the 'family class' has the highest rate of claims among the immigration category, followed by skilled-class principal applicants, their spouses and dependents, and refugees, respectively. My results are generally consistent with the recent study by Lu & Ng, (2019). However, I find evidence that age and years since migration (YSM) increase the probability of claiming a medical tax credit as well as increasing claim amounts, as expected. Finally, immigrants born in a low or a medium-income country have a significantly lower probability of claiming METC, and also report lower claimed amounts (conditional on having a positive METC claim) compared to immigrants from high-income countries.

This thesis provides evidence that overall, immigrants' health-related behaviors are different from their Canadian born counterparts. The association between poor language proficiency and lower utilization rates of health care (hospitalization and mental) services, as well as the

association between immigrants with a mother tongue English or French, and higher METC claims, offers an indication that there may be room for improvement. Policy measures could be implemented, for example, that supported special initiatives for language training, linguistically and culturally sensitive healthcare services, and enriched health information services for immigrants who do not speak English.

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