2011

Geo-Racial Origins, Social Inequality and Health: An Analysis of the 1996-1997 National Population Health Survey

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by

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A Thesis
Submitted to the Faculty of Graduate Studies
through the Department of Sociology, Anthropology and Criminology
in Partial Fulfillment of the Requirements for
the Degree of Master of Arts at the
University of Windsor

Windsor, Ontario, Canada

2011

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DECLARATION OF ORIGINALITY

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ABSTRACT

Although Canada is premised on values of cultural mélange, equality and social justice and despite its official commitment to multiculturalism, a large proportion of racial minorities live alternate realities. Literature suggests that Canadian society is stratified along racial and ethnic lines. The consensus within Canadian academia is that racial minorities are socially and economically disadvantaged in Canada. Evidence illustrates that socioeconomic inequalities often translate into health disparities. The relationship between ethno-racial group membership and inequality as well as that between inequality and health are widely studied. However, there is a dearth of Canadian research focusing on the relationship between ethno-racial origins and health and how this is mediated by inequality. Using public microdata from the cross-sectional household component of the 1996/97 National Population Health Survey (NPHS), this thesis investigates whether racial disparities in health exist in Canada and to what extent these disparities are a function of socioeconomic differences.

DEDICATION

This thesis is dedicated to the immigrant visible minority experience, specifically that of Errol and Malini Wijesingha who left the familiarity and comfort of their homeland to venture into the unknown so that I may have a better future.

ACKNOWLEDGEMENTS

First and foremost, I would like to sincerely thank my advisor Dr. Reza Nakhaie for his constant and invaluable guidance, motivation, humour and enthusiasm for the subject matter. Thank you for always being available to answer questions and for believing in me even in times when I doubted myself.

I would also like to thank my second reader Dr. Robert Arnold for the invaluable advice and insight regarding the methodological underpinnings of this thesis.

Thank you to Dr. Shelagh Towson for providing important feedback and the much-needed enthusiasm regarding the topic at hand.

A large amount of gratitude must be directed to Dan Edelstein at the Research Data Centre. Thank you for all your patience and time spent on helping me with my data.

I would also like to thank Dr. Muhammad Shuraydi for allowing me to be his graduate assistant. Thank you for always being kind, providing great advice and good humour during this long process. Also, thank you for believing in me and inspiring me to continue with my education.

A deep and sincere appreciation must go out to Anu and Tina for making the City of Windsor and the M.A. experience less lonely. I came to this City not knowing a single person and will be leaving having made two great friends.

I am sincerely thankful to my longtime editor friend Khalid Raheem for his input regarding all the technical aspects of writing. Every writer needs an editor, indeed.

Finally, I am forever grateful to my parents, my brother and my best friend Shanna for always pushing me to strive for my best. Christopher Lasch summarized my feelings best when he wrote, “The family is a haven in a heartless world”.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Canada is a racially and ethnically diverse society and is officially committed to multiculturalism with its pillars being social justice, civic participation and identity. Despite this stated commitment to social justice, literature suggests that Canadian society is stratified along racial and ethnic lines. The consensus in Canadian academia is that racial minorities are disadvantaged in Canada. Raphael (2010) points to racialized groups as being one segment of the population (aside from women and people with disabilities) that is "most vulnerable to material and social disadvantage" (p. 99). Past studies have demonstrated that visible minority[1] groups taken together have lower incomes in comparison to non-visible minorities (Frank, 1996; Li, 1998; Pendakur & Pendakur, 1998) and this relationship continues to exist regardless of their educational attainments (Herberg, 1990; Hou, Balakrishnan, & Jurdi, 2009; Nakhaie, 2006). Allahar and Côté (1998) argue that the securing of employment is more difficult for non-whites (as a whole) than for whites. Additionally, Wu and Schimmele (2005a) assert that being a visible minority is one of the risk factors for experiencing food insecurity.

Evidence illustrates that socioeconomic inequalities often translate into health disparities. Of course, this is not a new argument. Plato, in the 4th century B.C., discussed how living conditions affected the health of individuals (Raphael, 2010). Similarly, in 1845, Friedrich Engels commented on the conditions of the working class in England and attributed the poor health of the working class to the miserable "social and environmental

[1] In the reviewed literature, the terms "non-white" and "visible minority" will be used interchangeably. Statistics Canada defines "visible minority" according to the *Employment Equity Act* which states that visible minorities "are persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour" (Statistics Canada, n.d.).

circumstances" they had to endure (as cited in Smith, Chaturvedi, Harding, Nazroo, & Williams, 2000). Similar arguments have been made in recent times. Research in North America on mortality rates concludes that those populations with the lowest socioeconomic status tend to suffer from higher rates of mortality (Zong & Li, 1994). The Chief Public Health Officer's *2008 Report on the State of the Public Health in Canada* indicates that despite the fact that Canadians are healthier in comparison to citizens of other countries, some groups of Canadians suffer from poorer health and lower quality of life than others. This lower health status is attributed to material conditions of Canadians and the report lists such variables as income, education, employment and housing as determinants of health. Accordingly, given that racial minorities taken together have lower socioeconomic status, and given that socioeconomic status is directly related to health outcomes, it can be predicted that racial minorities suffer from poorer health than the dominant ethno-racial group. Using public microdata obtained from Statistics Canada's 1996-1997 National Population Health Survey (NPHS) Cycle 2, the following questions will be examined:

1) Is there a difference in health between whites and non-whites among the immigrant population as well as among those born in Canada?
2) To what extent can ethno-racial differences in health be accounted for by socioeconomic differences?

The relationship between ethno-racial groups and inequality as well as that between inequality and health are widely studied. However, there is a dearth of Canadian research focusing on the relationship between ethno-racial origins and health and how this is mediated by inequality (Veenstra, 2009b). The Canadian research that has focused

on health disparities between various ethnic groups indicates that ethnic variations in health of varying sizes are widespread in Canada (Veenstra, 2009a; Wu & Schimmele, 2005b). Similarly, American studies have documented marked differences in health between whites and non-whites.

Thesis Overview

In the chapters that follow, the aforementioned research questions will be examined in detail. Chapter II of this thesis discusses its theoretical orientation as well as prior literature on the relationship between social inequality, race and health. Chapter III describes the analytic process and issues surrounding the methodology. Chapter IV presents the bivariate and multivariate findings obtained from the data as well as an analysis of the results. The final chapter summarizes and discusses the results as well as the limitations and policy implications of this study.

CHAPTER II

REVIEW OF LITERATURE

Social Inequality

"Social Inequalities have been characteristic of every society and historical epoch we know about, although they have been more pronounced in some places and periods than others, and they have displayed a remarkable variety of forms" (Hunter, 1986, p. 2).

It has long been acknowledged that those who own the means of production are able to control or determine other aspects of society. For example, owners of production are more likely to occupy the higher employment, education and income strata. These upper strata have greater access to resources, rewards and privileges, which are "consequential for the lives they lead, most particularly for the rights or opportunities that they exercise and the rewards or privileges they enjoy" (Grabb, 2002, p. 2). For example, differential access to scarce resources influences material factors such as poor housing, nutrition and exposure to adverse environments, which are shown to have effects on health outcomes (Veenstra, 2009b).

Social Inequality and Health

Social inequality can affect individuals in "the most fundamental life chance of all: people's health" (Veenstra, 2009b, p. 353). Literature on the relationship between social inequality and health dates as far back as the 4th century B.C. when the philosopher Plato wrote that,

> In a state which is desirous of being saved from the greatest of all plagues – not faction, but rather distraction; there should exist among the citizens neither extreme poverty, nor, again, excessive wealth, for both are productive of great evil (as cited in Raphael, 2010, p. 13).

Likewise, in 1845, Friedrich Engels commented on the conditions of the working class in England. He attributed the poor health of the working class to the miserable "social and

environmental circumstances" they had to endure (as cited in Smith et al., 2000). Engels recognized that stress, unhealthy living conditions and the adoption of health-risk behaviours were significantly related to morbidity and mortality (Raphael, 2010).

Similar discussions have taken place in more recent times. Research in North America on mortality rates concludes that those populations with the lowest socioeconomic status tend to suffer from higher rates of mortality relative to populations with higher socioeconomic status (Zong & Li, 1994). In Canada, empirical evidence has supported the notion that health disparities are linked to socioeconomic status, specifically that lower socioeconomic status is related to poor health. (Frohlich, Ross, & Richmond, 2006; Hay, 1988; Kobayashi, Prus, & Lin, 2008; Kosteniuk & Dickinson, 2003; Pomerleau, Pederson, Østbye, Speechley, & Speechley, 1997; Raphael, 2010). In 2008, the Public Health Agency of Canada released the *Report on the State of Public Health in Canada* outlining a number of factors that affect the health outcomes of Canadians. The report found that income, employment and working conditions, food security, education, social support, healthy behaviours and access to health care were important determinants of health (2008). Nakhaie, Smylie and Arnold (2007) examined the effects of social capital and social inequality on health using the NPHS. In their analysis, they used four different measures of health: chronic health, self-assessed health, mental distress and health status and seven different measures of social inequality. The authors concluded that social inequality proves to be a very useful predictor of health.

While Canada's universal health care system might alleviate some health disparities, it is evident that disparities still continue to exist. Raphael (2004) argues that one's social and economic environment often determines whether an individual takes up

health-risk behaviours such as smoking or alcohol consumption. He further argues that "tobacco use, excessive alcohol use and carbohydrate-dense diets result from lack of material resources and are also a means of coping with such circumstances" (p. 14). Material factors such as poor housing, nutrition and exposure to adverse environments can also result in poor health outcomes (Veenstra, 2009b). Additionally, individuals with lower income, employment, and food security are more likely to experience stress due to difficulties in meeting basic necessities such as food, clothing, etc. Stress in turn leads to weaker immunity to diseases and infections (Raphael, 2010).

It is important to note that social inequality is multidimensional and each dimension of inequality has a unique relationship with health. The subsequent section will highlight the relationship between health and four of the measures of social inequality.

Education and Health

Education is important to the analysis of health because research has found that those individuals with higher education possess financial resources as well as the security necessary to support good nutrition, better employment opportunities, housing and safe working conditions, which in turn are determinants of health (Prus, 2001). For example, education affects income (Leigh, 1983; Kosteniuk & Dickinson, 2003) since well-educated people are more likely to be employed and have higher incomes and less financial insecurity (Ross & Wu, 1995). Leigh (1983) found that the indirect effects of education on health may be more important than direct effects. Education is associated with an increase in healthy lifestyle habits. Ross and Wu (1995) observed that "the well-educated are less likely to smoke, are more likely to exercise, to get health check-ups, and

to drink moderately, all of which, except check-ups, are associated with good health" (p. 719). The well-educated also possess larger social networks and, thereby, higher levels of social support, which can affect health outcomes (Cutler & Lleras-Muney, 2006).

Employment, Occupation and Health

Past research has suggested that lower-status occupations have higher levels of job strain and low levels of job control, which contribute to poor health outcomes (Smith & Frank, 2005). Studies have also found that poor employment conditions (such as exposure to harmful substances, dangerous work) lead to poor physical health via injuries and occupational diseases (Jackson, 2004). Additionally, research has showed the impact of work-related stress on health outcomes such as lower self-rated health, mental health, cardiovascular disease, or coronary heart disease (Bourbonnais, Brisson, Moisan, & Vézina, 1996; Ibrahim, Scott, Cole, Shannon, & Eyles, 2001; Kasl, 1996; Schnall, Landsbergis, & Baker, 1994). Kosteniuk and Dickinson (2003) found that in comparison to non-employed individuals, those who were employed indicated better mental and physical health. After all, employment provides people with the means (such as income and benefits) that allow them to pursue a healthy lifestyle. Unemployment is linked to material and social deprivation which then leads to mental and physical health problems such as depression, anxiety and higher suicide rates (Raphael, 2010).

Income Inequality and Health

Hay (1994) comments that prior studies conducted in Canada seem to identify income as the most important element of socioeconomic status that affects health. Income directly affects the quality of housing, experiences of food security and overall living conditions, which are social determinants of health (Raphael, 2010). Income is a basic

determinant of poverty status and there is ample evidence suggesting that poverty is related to health status (Hay, 1994; Lynch, Davey-Smith, Kaplan, & House, 2000; Wilkins, Adams, & Branckner, 1989). In looking at the effects of poverty on the health of the Canadian population, Raphael (2002) indicates that regardless of the measure used to assess health, those living in poverty also suffer from poor health. Moreover, lower-income households are five times more likely to describe their self-rated health as being fair or poor in comparison to more affluent households.

More broadly speaking, Kosteniuk and Dickinson (2003) emphasized the effect of income on health by stating that income "translates into buying power, lessens the burden of social comparison that may lead through stress to illness, and broadens and secures one's circle of friends, thereby increasing one's social support" (p. 264). Income is also associated with health-related behaviours such as the quality of one's diet, levels of physical activity and leisure, as well as tobacco and alcohol use (Raphael, 2010). Frohlich et al. (2006) assert that chronic conditions including diabetes, infectious diseases and lung cancer are higher in lower income households than in high-income households.

Food Security and Health

The Ministry of Agriculture and Agri-Food (1998) takes its definition of food security from the 1996 World Food Summit where it was stated that "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (p. 9). Existing literature on the relationship between household food insecurity and health indicates that food insecurity is associated with poor physical, social and mental health (Kirkpatrick & Tarasuk, 2008; McLeod & Veall, 2006; Olson, 1999; Vozoris &

Tarasuk, 2003; Stuff et al., 2004). McLeod and Veall (2006) found that the causal link between food insecurity and health works both ways. For example, those individuals with health problems can be faced with loss of employment, which would then lead to lower income and thereby to food insecurity. Those households that demonstrate evidence of food insecurity consume fewer vegetables, fruits, dairy products and fibre, which leads to deficiency in essential nutrients (Kirkpatrick & Tarasuk, 2008). Food insecurity is also linked to obesity and a wide variety of chronic conditions such as iron deficiency anemia, hypoglycemia, diabetes, heart disease, cancer, high blood pressure, food allergies and cardiovascular diseases (Che & Chen, 2001; Olson, 1999; Stuff et al., 2004; Vozoris & Tarasuk, 2003). Empirical evidence has shown that among social status predictors, food insecurity may be the most significant indicator of health (Nakhaie et al., 2007; Nakhaie & Arnold, 2010).

Not only does socioeconomic status affect health, it is also distributed unequally among ethno-racial groups. Before discussing the relationship between racial groups and health, I will problematize the concept of race, then show its relationship with inequality and with health.

Race as a Social Construction

The notion of race seems to permeate every aspect of our lives. Race is a perennial issue and therefore it is important to contextualize it in order to better grasp its effects on health. The classifications of people into particular "races" have historically been based on phenotypes and genotypes (Satzewich, 1998). Categorizing people based on genotypes attributes "race" to genetic differences between people. Many scientific findings now conclude that there is no single gene that is common to a particular race and

that there are more intra-group than inter-group differences in terms of genetic variation (Haney López, 2000). Additionally, past evidence of genetically based racial differences has now been attributed to scientific mistakes. Classifying race by phenotypes refers to the characterizing of people based on superficial physical characteristics such as skin colour, eye shape/colour, hair texture and/or nose structure. Scientists explain human physical variation through geographical distance and differing social environments asserting that through time, people who lived far apart ended up having differing physical appearances (Cooper, 1986; Fish, 2002; Goodman, 2000). Fish (2002) indicates that the main reasons for these differences in appearance by geography are due to mutation, natural selection and genetic drift and that these differences have "adaptive value" (p. 115). For example, Fish explains that the people of South America and Africa came to have darker skin to survive against the sun. Many scientists and researchers have now concluded that race as a biological concept has no basis in science (Corcos, 1997; Fish, 2002; Li, 1999; Small, 1998; Davis, 1997; Williams, Lavizzo-Mourey, & Warren, 1994).

What is important to note is the arbitrary nature of what physical characteristics get deemed as "racial" distinctions and which do not. It should also be noted how, throughout history, these arbitrary classifications came to be defined and redefined on the basis of economic, religious, political and social reasons (Davis, 1997; Goodman, 2000; Veenstra, 2009a; Zheng, Noh, Kaspar, & Schimmele, 2003). Allahar and Côté (1998) show how under the apartheid system in South Africa, Japanese people were defined as "honorary whites" while Chinese people were not (p. 70). Fish (2002) shows how racial classifications change depending on the country one resides in. For example, South Asians are considered "black" in England while this is not the case in North America.

Such findings further refute the notion that racial differences are biological in nature. Race is thus referred to by Fish as a myth.

Race maybe a myth but as a social construction, it is "real" in the sense that it results in material and social consequences for racialized groups (Li, 1998; Miles & Torres, 2000; Veenstra, 2009a; Zheng et al., 2003). Li (1998) asserts that one consequence that Canadians are affected by is the hierarchy in races, which makes certain racial groups more desirable than others. Zheng et al. (2003) write, "…race is not merely an illusion or ideological counterfeit either: race shapes societies and the individuals within them in powerful ways" (p. 427).

Race and Social Inequality

Racial minorities have long been disadvantaged in Canada. Empirical evidence has shown that in general, non-whites in Canada suffer from lower socioeconomic status in comparison to whites (Allahar & Côté, 1998; Frank, 1996; Galabuzi, 2006; Herberg, 1990; Hou & Balakrishnan, 1996). The following section will highlight the relationship between race and four specific measures of social inequality.

Race and Education

Empirical data in Canada on the relationship between race and education illustrate that, on average, visible minorities tend to possess higher education levels than their non-visible minority counterparts (Frank, 1996; Herberg, 1990; Hou & Balakrishnan, 1996; Nakhaie, 2006). This relationship is evident for Canadian-born as well as foreign-born visible minorities. The exception to these findings are Blacks (Driedger, 2003; Hou & Balakrishnan, 1996; Nakhaie, 2006), ethnic Vietnamese, Aboriginals (Nakhaie, 2006) and ethnic Filipinos (Hou & Balakrishnan, 1996). Frank (1996) found that 18 percent of

the visible minority population had a university degree in comparison to 11 percent of those people who were white. Hou and Balakrishnan's (1996) findings demonstrate that Canadian-born visible minorities (with the exception of blacks) attained similar or higher levels of education than the Charter groups (British and French) as well as the total population average. Hou et al. (2009) duplicated Hou and Balakrishnan's 1991 study to assess if the findings regarding educational attainment were relevant a decade later. The authors noted similar results; visible minorities, Canadian-born and foreign-born (with the exception of Filipinos and blacks) still had much higher education levels than the French, British and total Canadian population.

Li (2001) found that immigrants in general were more likely to possess a university degree than Canadian-born persons. A possible reason is that immigrants migrating under the point system need to have certain educational qualifications in order to be eligible for entrance into Canada. However, Li asserts that foreign degrees more adversely affect immigrants who are visible minorities in comparison to whites (2001). For whites, a large proportion of the disparities in net income between native-born Canadian degree-holders and immigrant foreign degree-holders is a result of immigrant status. For visible minorities, approximately half of the income disparities between native-born Canadian degree-holders and immigrant foreign degree-holders can be attributed to foreign credentials. Anisef, Sweet and Frempong (2003) conclude that regardless of the field of study, the earnings of visible minority immigrants do not correspond with the level of education they possess.

Race and Occupation

Allahar and Côté (1998) argue that the securing of employment is more difficult for non-whites (as a whole) than for whites. The authors write, "Recent human rights cases suggest that entrenched prejudices and discriminatory practices hinder the promotion of visible minorities to managerial positions in the federal civil service" (p. 66). Hou and Balakrishnan (1996) found that in comparison to the Charter groups, the proportion of visible minorities working in occupations that were managerial or professional was much smaller. This was the case even after controlling for education. Using data from 2001, Hou et al. (2009) observed that South Asians were 40 percent less likely to hold positions in management compared to people of British origin, after controlling for socio-demographic factors and education. They found that Filipinos, the lowest-ranking group, had a one in four chance of possessing a managerial job. Interestingly, visible minorities had a higher odds ratio of possessing a professional job than a managerial one. Hou et al. (2009) explain this by stating that: "Because of their higher educational levels and training, visible minorities are better able to get into professional occupations, but have less success with managerial occupations" (p. 265). Karen Kelly (1991) observed that despite having a university degree, racial minorities were less likely to be employed in managerial as well as professional occupations and were often concentrated in "lower-paying clerical, service and manual labour jobs" (as cited in Galabuzi, 2001, p. 53).

Boyd and Vickers (2009) observed that 7 in 10 recent immigrants (i.e. who have arrived since 1981) are visible minorities. Studies have shown that foreign-trained professional immigrants who are visible minorities, upon migrating to Canada, experience "downward social mobility" (Basran & Zong, 1998, p. 8). Basran and Zong

(1998) found that several of the foreign-trained professionals were not working in their field of expertise. Of the 404 foreign-trained professionals from India, Taiwan, Hong Kong and mainland China who were interviewed, 88% reported to having professional jobs (i.e. engineers, doctors, teachers and others) in their home country. In Canada, only 18.8% of this group were working as professionals. Bauder (2003) found that the devaluing of South Asian and former Yugoslavian immigrants' credentials made high level positions in the Canadian labour market almost unattainable. Li (2001) indicates that, "in general, immigrant credentials adversely affect the earnings of visible minority women and men more than white women and men" (p. 33). It seems that "employment discrimination against racial minorities with identifiable linguistic characteristics and racial features" is a barrier for the occupational attainment of non-whites (Li, 1998, p. 127).

Race and Income Inequality

As a group, visible minorities have lower incomes in comparison to non-visible minorities (Frank, 1996; Li, 1998; Pendakur & Pendakur, 1998) and this relationship continues to exist regardless of their educational attainments (Herberg, 1990; Hou et al., 2009; Nakhaie, 2006). Galabuzi (2001) observed that in 1998, racial minorities earned 30% less in comparison to whites. Nakhaie (2006) concluded that visible minority groups earned much less than those respondents claiming British ancestry and this gap was higher among immigrants. Evidence illustrates that Canadians of British origin no longer hold economic advantages in comparison with Canadians of European origin (Driedger, 2003; Gee & Prus, 2000). For example, Hou and Balakrishnan (1996) found that after controlling for the variation in educational and occupational attainment, Italians, Poles

and Portuguese are no longer inferior to the Charter groups regarding earnings. This was not the case with visible minority groups, who did not receive the same returns to income with improved educational and occupational achievements. Pendakur and Pendakur (1998) demonstrated that Canadian-born visible minority men earned significantly less income relative to Canadian-born white men with a difference of 8.2 percent. However, this relationship was not found for Canadian-born visible minority women.

In terms of immigrants, Kazemipur and Halli (2001) found that visible minority immigrants were over-represented amongst the poor in Canada and this was especially the case for those who resided in larger cities. Li (1998) asserts that visible minority immigrants possessed the lowest average income (in 1991) in contrast with foreign-born and native-born white Canadians. Galabuzi (2001) observed that the earning gap between white immigrants and non-white immigrants was 28% in 1991-1995. Pendakur and Pendakur's (1998) findings revealed that immigrant white men earned similar incomes to Canadian-born white men. However, immigrant visible minority men earned 15.8 percent less than Canadian-born white men. Similar results were found for immigrant visible minority women who experienced an earning difference of 9.1 percent when compared to Canadian-born white women. Even when foreign education was controlled for, the gaps in earnings still remained large (16.2 percent for men and 7.8 percent for women). Nakhaie (2006) observed that, "the general tendency was for visible minority immigrants, and somewhat less for European immigrants, to receive a lower return on their education" when compared to British immigrants (p. 37).

Again, systematic discrimination and structural barriers are cited as likely explanations as to the lower income attainment of visible minorities (Herberg, 1990; Hou

& Balakrishnan, 1996; Hou et al., 2009). This is referred to as the "discrimination thesis" which points to the racial discrimination and prejudice that visible minorities experience, and the way that such mistreatment limits their access to resources (e.g., job opportunities and/or educational opportunities) (Hou & Balakrishnan, 1996, p. 308). Nakhaie (2006) indicates that for immigrants, the discrimination faced could be more about ethno-racial markers rather than skin colour (e.g., foreign accent and/or language).

Race and Food Insecurity

Wu and Schimmele (2005a) assert that the issue of food insecurity was not well understood in Canada until the mid 1990s due to the lack of nationally representative data. Far less research is conducted in the area of race and food insufficiency. Rainville and Brink (2001) revealed that the proportion of food insecurity was higher for recent immigrants in comparison to the total population. Che and Chen (2001) using the 1998-1999 NPHS, demonstrated that recent immigrants reported a slightly higher chance (11 percent) than Canadian-born persons (13 percent) of experiencing at least one encounter with food insecurity. However, when other factors were controlled for, the odds of an immigrant's living with food insecurity were lower than for those who were Canadian-born. Wu and Schimmele (2005a) assert that being a visible minority is one of the risk factors for food insecurity. Among ethno-racial minorities, Aboriginals suffer the highest rates of food insecurity relative to the total Canadian population (Che & Chen, 2001; Power, 2008; Willows, 2005).

There is a vast amount of Canadian research on the relationship between race and social inequality. The research summarized above indicates that generally non-whites tend to have lower socioeconomic status relative to whites in Canada. The next section

will highlight the status of racial disparities in health in Canada. Following this, the relationship between immigrant status and health will be explored.

Health and Race

There is much literature on the relationship between social inequality and health in Canada. Much research also connects the idea of social inequality to race. However, there is little Canadian empirical research on the connection between race and health. The existing research has focused largely on health disparities between various ethnic groups. On the other hand, American studies have documented marked differences in health between whites and non-whites. Kawachi, Daniels and Robinson (2005) indicate that African Americans display two to three times higher rates of diabetes and hypertension than whites in America. They argue that genetic susceptibility to disease may be assumed by some scientists as the reason behind these findings, but they conclude that this is an oversimplification. They show that black populations in West Africa and the Carribean have diabetes and hypertension rates that are two to five times lower than African Americans or blacks from Britain. Williams et al. (1994) argue that sickle cell anemia, which is commonly associated with African Americans, is not a racial trait but results from geographic origin. They explain that sickle cell anemia "is most prevalent in the regions of the world where malaria was common (equatorial Africa, the Mediterranean, and parts of Asia) and appears to be a protective adaptation to malaria" (p. 28). Therefore, genetic explanations must be viewed with much skepticism. Other reasons cited for the variations in health outcomes between racial/ethnic groups in the US are cultural variations in behaviours, including dietary practices, levels of physical activity, use of drugs, alcohol and tobacco and the extent of acculturation.

In the US, controlling for differences in socioeconomic status reduces or eliminates the racial disparities (other than Hispanics) in health (Cummings & Jackson, 2008; Keil, Sutherland, Knapp, & Tyroler, 1992; Kington & Smith, 1997; Williams, 1999). Nevertheless, some US studies show that even after controlling for socioeconomic status, racial disparities in health still remain (Ren & Amick III, 1996; Williams et al., 1994). The common explanation for this is the individual and institutional discrimination that racial minorities experience that affects their health.

The next section will trace the findings of racial disparities in health in the United States. Following this, the limited available Canadian research will be highlighted.

American Findings on Health and Race

Empirical evidence in the area of health and race in the United States shows significant variations in health outcomes between racial groups (Kington & Smith, 1997; Williams, 1999). A large proportion of the American research on racial disparities in health focuses on the comparison between whites and blacks (Kaufman, Cooper, & McGee, 1997). Regarding most health outcomes, blacks experience worse health relative to their white counterparts (Kington & Smith, 1997). Farmer and Ferraro (2005) observed that blacks reported higher levels of morbidity than whites and this was especially true for diseases such as diabetes, heart disease, stroke and hypertension. Furthermore, blacks were more likely to report suffering from chronic illnesses. Cummings and Jackson (2008) found that blacks also perceived their health more poorly in comparison to the rest of the population. The authors report that socioeconomic status accounted for the disproportions in health for black males in relation to white males. Other American studies have corroborated the findings that socioeconomic status significantly reduces or

eliminates racial variations in health outcomes (Keil et al., 1992; Kington & Smith, 1997; Williams, 1999). These studies have showed that race can be a proxy for class differences when explaining health outcomes.

Farmer and Ferraro's (2005) findings substantiated the "diminishing returns hypothesis". This hypothesis proposes that the greatest number of disparities in health between blacks and whites exists at the highest gradients of socioeconomic status. As black people's education increased, neither their income nor their health improved. However, the opposite was the case for white respondents in the study. Ren and Amick III (1996) found that race continues to be a significant predictor of health even after controlling for socioeconomic factors. The authors indicate that differences in health between blacks and whites in America could be attributed to structural and institutional discrimination. Institutional discrimination can affect health because "racism can determine the quantity and quality of medical care" (Williams et al., 1994, p. 29). Individual discrimination can affect life satisfaction as well as be related to physical and mental distress (Williams et al., 1994). We can add that these types of discrimination contribute to a lower socioeconomic status for blacks, which further worsens their health.

Regarding Hispanics in the United States, research shows that their health status is often labelled as the "Hispanic epidemiological paradox" (Abraído-Lanza, Chao, & Flórez, 2005; Kington & Smith, 1997; Zsembik & Fennell, 2005). This refers to the idea that Latinos (like blacks) have lower socioeconomic statuses in comparison to whites but contrary to expectations, they also experience lower mortality and morbidity rates (Abraído-Lanza, Dohrenwend, Ng-Mak, & Turner, 1999). Abraído-Lanza et al. (1999) indicate that, "Relative to non-Latino whites, Latinos have a health advantage for

cardiovascular disease, cancer from all causes, and cancer of the lung, colon, breast, and prostate" (p. 1546). Other studies have not displayed the "Hispanic epidemiological paradox". Ren and Amick III (1996) found that blacks and Hispanics rated their health more poorly in comparison to whites and also reported having more functional limitations that prevented them from doing daily activities. Kington and Smith (1997) found that Hispanics reported higher diabetes and hypertension rates than whites. Williams (1999) asserts that Hispanics have higher mortality rates resulting from diabetes and HIV/AIDS in comparison to their white counterparts.

Zsembik and Fennell (2005) argue that Latino health outcomes are diverse and hence a "pan-ethnic Latino category in health research" is problematic (p. 61). For example, Mexicans have better health than whites and this remains the case regardless of socioeconomic status (Scribner, 1996; Zsembik & Fennell, 2005). One reason for this may be the migration selectivity whereby healthier immigrants are selected to enter the US and those immigrants who become sick or acquire disabilities and/or impairments are repatriated to Mexico (Zsembik & Fennell, 2005). Scribner (1996) asserts that 50 percent of Mexicans in the United States were born in Mexico and therefore still hold ties to their homeland. The author indicates that culture can explain the good health experienced by Mexicans. As a whole, Mexicans (and Latinos) in the United States eat healthier foods, smoke less tobacco and drink less alcohol in comparison to whites (Abraído-Lanza et al., 2005; Scribner, 1996). In contrast, Puerto Ricans have worse health across different outcomes in comparison to whites. Socioeconomic status greatly explains the variations in health between whites and Puerto Ricans, Dominicans and Cubans. Higher levels of socioeconomic status are associated with better health for these three ethnic groups

(Zsembik & Fennell, 2005). Ren and Amick III (1996) reported that education significantly reduced the gaps in health between whites and Hispanics regarding self-rated health and functional limitations. Other studies have found that socioeconomic status significantly reduces the gap in health between Hispanics and whites (Kington & Smith, 1997; Williams, 1999).

Asian and Pacific Islanders (APIs) are another racial category in the United States that have started receiving increasing attention in the public health arena despite being almost invisible in the past (Srinivasan & Guillermo, 2000). This category consists of those people from the continent of Asia (e.g., Korean, Chinese, Vietnamese, Indian, Pakistani and Bangladeshi) and occasionally includes people from Hawaii. APIs have significantly lower overall mortality rates and better overall health in comparison to whites and other racial groups including blacks, Hispanics and American Indians (Lin-Fu, 1988; Williams, 1999; Williams et al., 1994). Williams (1999) indicates that this is possibly because a substantial number of people (approximately three-quarters according to Frisbie, Cho, & Hummer, 2001) that fall within this category are foreign-born. Frisbie et al., (2001) found evidence for the healthy immigrant effect among APIs. They found that immigration selectivity and acculturation were valid factors in the health of APIs. Although APIs have lower mortality rates as a whole, the health of the population also varies between groups. For example, Lin-Fu (1988) observed that Hawaiians displayed higher breast cancer rates than blacks and whites, while Filipinos experienced lower rates. APIs exhibit higher prevalence rates of type 2 diabetes (Srinivasan & Guillermo, 2000). Explanations as to the findings of these studies are limited due to the inadequate recognition of this population in American health research.

Canadian Findings on Health and Race

American research has shown marked differences in health outcomes between racial groups. While some of the research has found evidence for race as a proxy for socioeconomic status, other evidence has pointed to the importance of race as an independent predictor of health, which exists above and beyond controlling for socioeconomic status. Apart from socioeconomic status and race, immigrant status is also an important predictor of the variations in health between groups. Canadian research in the area of race and health has been limited, and much of the research has focused on ethnic variations in health.

Wu and Schimmele (2005b) looked at the connection between race/ethnicity and health disparities in Canada and investigated whether socioeconomic conditions or health risk cultural/behavioural differences account for these disparities in health. In looking at socioeconomic explanations in order to explain health disparities, the authors point out that in Canada (as well as in the US), visible minority groups face "socioeconomic disadvantages and discrimination" (p. 711). Using the 1996-1997 National Population Health Survey, the authors looked at self-rated and functional health to measure health status. However, the authors found that socioeconomic status did not significantly explain ethno-racial health variation. The authors do maintain that despite the fact that the socioeconomic perspective in this instance fails to account for variations in health among ethno-racial groups, this finding does not mean that SES is not an important indicator of health. Other Canadian studies have shown that socioeconomic status can account for variations in health between racial/ethnic groups. Frideres (1998) argues that the treatment of illness using medicine in Canada is useful but it does not change the fact that

the underlying problem is the economic and social conditions. The author discusses how "environmental conditions" contribute to the poor health of Aboriginal people and these conditions include poor nutrition and overcrowding. For Frideres, these attributes of poor health are a result of poor social status (e.g., among other variables, lower socioeconomic status).

Quan et al. (2006) in their research discussed the differences in the utilization of health care services between visible and non-visible minority populations. Using data from the 2001 Canadian Community Health Survey, the authors found that while there was no evidence to indicate that visible minorities used family physicians less often than non-visible minorities, visible minority groups did utilize hospitals and cancer screening services far less frequently. The authors suggest that this could be due to the fact that new immigrants are often healthier than the Canadian population at large. However, other studies have found (as indicated previously) that the health status of immigrants tended to decline with time. In addition, the authors found that those visible minorities that were born in Canada tended to utilize health services less than non-visible minorities.

Lynam and Cowley (2007) showed that "while research in Canada is not extensive, there is evidence that immigrants and refugees are over-represented in the lower echelons of the labour force and their health declines over time" (p. 138). The authors utilized a qualitative study of first-generation migrant mothers and their teenage daughters in Britain and Canada. They found that "the vicious cycle of poverty, social exclusion, educational failure and ill health is mutually reinforcing" (p. 147). They communicate that this cycle needs to be broken and policies need to be created that commit to addressing health inequalities through structural changes. The authors

concluded that the state must generate and enforce policies that create and sustain "inclusion and underscore rights of citizenship" (p. 148).

Kobayashi et al. (2008) used the 2000/2001 Canadian Community Health Survey to examine the differences in self-rated and functional health between immigrants who are first-generation and those who are Canadian-born. The authors maintain that studies examining the relationship between health and race generally indicate ethno-racial disparities in health. They concluded that the results of their study showed that visible minority groups (excluding Aboriginals) had better health. Regarding immigrant status, Canadian-born Chinese and South Asians had better health than their foreign-born counterparts. However, Chinese and South Asians had health advantages that exist regardless of their immigrant status. In analyzing the role of socioeconomic status in relation to the ethno-racial disparities in health, the authors found that once socioeconomic and lifestyle factors were held constant, visible minorities and Aboriginals had equal health to those who were non-visible minorities. Their findings support the argument that ethno-racial health disparities are linked to structural inequalities.

Veenstra (2009a) used survey data from the 2003 Canadian Community Health Survey to observe the relationship between racial identity and health status. In assessing health, he used such indicators as diabetes, hypertension and self-rated health. The author concluded through the study that relative to white respondents, the risk of diabetes was significantly greater for those respondents who were Aboriginal, black, Filipino or South Asian. Furthermore, the risks for hypertension were higher among those respondents identifying as black or Filipino (relative to white respondents). In analyzing the

relationship between the racial health disparities and socioeconomic status, Veenstra found that SES was only a factor in the health status of those respondents who were Aboriginal or Aboriginal/white. The author adopts the stance that:

> Some of the unexplained health disparities by racial/cultural identification in this dataset reflect the wear and tear of experiences of racism and discrimination in regular encounters with societal institutions and in everyday life, a premise that demands further investigation in Canada (p. 542).

The limited research in Canada on race and its relationship to health outcomes has demonstrated that variations do exist between ethnic and racial groups regarding health. Nevertheless, the explanations for the variations in health between racial groups remain inconclusive. Some research has pointed to differences in socioeconomic status as an explanation while others have found that race or ethnicity remains a significant predictor even when other factors (including, but not limited to, socioeconomic status) have been controlled for.

Immigrant Health

Research in the area of health and race in Canada would not be complete without the inclusion of the immigrant experience. Immigrants (according to the 2001 Canadian Census) make up 18% of the Canadian population (McDonald & Kennedy, 2004) and empirical evidence has shown that the health status of immigrants differs from native-born Canadians. Raphael (2010) asserts that racialized groups make up 75 percent of the recent immigrants to Canada. Furthermore, one-third of the racialized population is Canadian-born while two-thirds are comprised of immigrants. Research in Canada on immigrant health seems to confirm the existence of what has come to be known as "the healthy immigrant effect" (Chen, Ng, & Wilkins, 1996; Gee, Kobayashi, & Prus, 2004; McDonald & Kennedy, 2004; Newbold, 2006; Newbold & Danforth, 2003). The "healthy

immigrant effect" refers to the idea that on average, immigrants upon arrival to Canada seem to have better health than native-born Canadians. This has been found to be true for health outcomes such as life expectancy, self-reported health, chronic illnesses and disability (Newbold, 2006). Chen et al. (1996) indicate that the "healthy immigrant effect" can be found regardless of the immigrant's country of origin but it "is most evident among those from non-European countries, who constitute the majority of recent immigrants to Canada" (p. 33).

Two common explanations are cited in the literature to account for the "healthy immigrant effect". One reason is the vigorous health screening that immigrants[2] must go through to be able to migrate to Canada under the *Immigration and Refugee Protection Act* (Ali, McDermott, & Gravel, 2004; Dunn & Dyck, 2000; Gee et al., 2004; McDonald & Kennedy, 2004). Section 38 of the *Act* deems a person inadmissible on specific health grounds if an individual has a health condition that: a) poses a danger to the public; b) poses a danger to public safety; or c) may cause excessive burdens on Canadian health or social services. The health screening tests include a complete physical and mental examination, a review of medical history, and tests including but not limited to blood and urinalysis, syphilis, HIV and a chest x-ray (CBC, 2002). In addition, candidates are asked to self-report conditions such as (but not limited to) "certain cancers, potential multi-organ failure, endstage disease, and serious incapacity requiring extensive nursing care" that can lead to inadmissibility (Gushulak & Williams, 2004, p. 28). This screening would ensure that only those individuals with good health would be chosen for entry. The second related reason for the "healthy immigrant effect" is self-selection (Ali et al., 2004;

[2] Refugees are exempt from the required health screening tests under section 38(2) (b) of the *Immigration and Refugee Protection Act*.

Gee et al., 2004; McDonald & Kennedy, 2004) where healthier individuals are more likely to self-select to emigrate.

The literature on immigrant health in Canada, however, indicates that this initial good health found for recent immigrants declines with increased time spent in Canada (commonly cited at 10 years) and eventually becomes equivalent to native-born levels (Chen et al., 1996; Gee et al., 2004; McDonald & Kennedy, 2004; Newbold, 2006; Newbold & Danforth, 2003). At least two reasons are cited in the literature for the decline in immigrant health. The most cited is acculturation, where new immigrants begin to take on behaviour and lifestyles of the host country including diet changes, less exercise, exposure to common environmental factors, smoking and an increase in alcohol consumption (Gee et al., 2004; McDonald & Kennedy, 2004; McDonald & Kennedy, 2005; Newbold, 2005; Veenstra, 2009b). Another reason cited are the problems that immigrants face regarding the utilization of health services due to cultural, economic or language barriers (McDonald & Kennedy, 2004; McDonald & Kennedy, 2005; Veenstra, 2009b).

CHAPTER III

METHODOLOGY

This section begins by examining the specific hypotheses that are informed by the reviewed literature in the previous chapter. Subsequently, a description of the National Population Health Survey (NPHS) will be given. The operationalization and measurement of the variables employed in the analysis will then be described followed by a detailed explanation of the methods of statistical analyses that is utilized.

Study Hypotheses

Specifically, on the basis of the literature highlighted on the relationship between health, race and socioeconomic status, the following hypotheses are derived and will be tested:

Hypothesis 1:

Given the relationship between race and health as identified in the literature, one would expect that whites would have lower health problems than non-whites.

Hypothesis 2:

Given self-selection and health screening tests of immigrants, one would expect that immigrants would face lower health problems in comparison to those born in Canada. However, this gap should disappear for immigrants who have been in Canada for more than ten years.

Hypothesis 3:

Given the relationship between ethno-racial origins and inequality and between inequality and health, the differences in health outcomes between ethno-racial groups

would be diminished when education, occupation, income and food security are taken into account.

Data

To analyze the relationship between race, health and socioeconomic status, the public use microdata from Cycle 2 of the 1996-1997 National Population Health Survey (NPHS) will be used. The NPHS is a cross-sectional and longitudinal survey that consists of three components. For the purpose of this analysis, the cross-sectional household component is employed which takes data obtained from household residents for each of the ten provinces. Particular segments of the Canadian population are excluded from the NPHS and these include the homeless, those living on Indian Reserves or Canadian Forces bases and those residing in certain remote areas (Statistics Canada, 1996).

The NPHS is the first national Canadian health survey of its kind designed to further develop understanding of factors that influence health. The survey collects information regarding the health of Canadians as well as factors impacting their health and related socio-demographic records (Peaudet, Chen, Pérez, Ross, & Wilkins, 1998). Cycle 1 was conducted in 1994/95 and consisted of 17,276 individuals being interviewed. The same individuals were then interviewed a second time in 1996/97 for Cycle 2. Data will be collected from these individuals for a period of two decades. The public use microdata file does not include the longitudinal component and therefore the focus will be on the household component in 1996/97.

Data for Cycle 2 of the NPHS were collected from the period of June 1996 to August 1997. Survey responses were voluntary and 95% of interviews were conducted by telephone and 5% were conducted in person for those who did not own a phone (Peaudet

et al., 1998). In addition to the longitudinal aspect, which surveyed 15,670 individuals, 210,377 individuals responded to the general health questions for cross-sectional purposes. Among these, 81,804 individuals responded to the in-depth health questions (Peaudet et al., 1998). For the purpose of this analysis, only those respondents who were 25 years and older are included in this analysis (N=61,282). This was due to the fact that opportunity must be given in order for individuals to complete their education (Nakhaie et al., 2007). After dealing with missing data (which will be discussed below), the number of respondents is further reduced to a final sample size of 57,547.

Operationalization and Conceptualization of Variables

Measurement of Health

Health is a multi-dimensional and multi-faceted concept. Various measures of health status have been employed by social scientists to analyze health in epidemiological research. The inconsistency in the literature when it comes to operationalizing health is mainly due to the lack of a clear definition of health. The most widely cited and accepted definition of health comes from the World Health Organization (WHO), which asserts that "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (1948).

Two measures of health are employed in this analysis. The first is the respondent's self-rated health. Respondents are asked to rate their overall health as being "Poor" (1), "Fair" (2), "Good" (3), "Very Good" (4) or "Excellent" (5). The higher the score on the scale, the better the reported health of the individual. Self-rated health is a widely used indicator of one's actual health. A number of studies have found that self-rated health is a valid predictor of mortality and morbidity (Bailis, Segall, &

Chipperfield, 2003; Chandola & Jenkins, 2000; Farmer & Ferraro, 1997; Idler & Benyamini, 1997). Chandola and Jenkins (2000) find that despite the concerns by some authors regarding different social groups and their interpretations of "health", self-rated health remains as an applicable measure of health across people of different racial and ethnic groups.

The second measure of health is chronic conditions. The NPHS considers a condition as "chronic" if it is diagnosed by a health care professional and is expected to last a period of six months or longer. In order to get a measure of chronic conditions, the NPHS employs a count to establish if the respondent answers "yes" to a number of diseases associated with chronic health. These include food and other allergies, asthma, arthritis or rheumatism, back problems, high blood pressure, migraine headaches, chronic bronchitis or emphysema, sinusitis, diabetes, epilepsy, heart disease, cancer, stomach or intestinal ulcers, effects of a stroke, urinary incontinence, a bowel disorder, Alzheimer's or other dementia, cataracts, glaucoma, thyroid condition and other chronic conditions. The higher the score, the higher the number of chronic illnesses that the respondent experiences. The minimum score is 0 and the maximum is 10.

Measurement of Ethno-Racial Origins

Previous epidemiological research in Canada has focused on ethnicity and health for the most part. Research in the area of race and health has been scarce in Canada**.** This analysis uses terms such as "non-whites" and "whites" and it should be noted that these concepts have no biological significance and are social constructs with important social implications for racialized groups.

The variable measuring a respondent's race asked participants to identify themselves as being "white" or "other". The category of "other" includes ethno-racial groups such as Chinese, South Asian (East Indian, Pakistani, Punjabi, Sri Lankan), black, Native/Aboriginal people of North America, Arab/West Asian (Armenian, Egyptian, Iranian, Lebanese, Moroccan), Filipino, South-East Asian (Cambodian, Indonesian, Laotian, Vietnamese), Latin American, Japanese, Korean, and other. A limitation of the public use microdata file is that it does not specify detailed ethnic origins of the respondents and thereby lumps a very heterogeneous population into one category titled "other".

This author realizes that people who are considered non-whites are a largely heterogeneous group. To rectify these issues for the purpose of this analysis, a person's racial origin will be conjoined with their country of birth. This decision is based on the recognition that the place of birth can play an important role in health outcomes. Depending on a country, there are different health problems encountered for that population. For example, Beiser (2005) writes, "Regardless of where they live in the diaspora, South Asians suffer high rates of cardiovascular disease" (p. 37). Similarly, Japanese people living in the United States are twice as likely to have cancer as those born in Japan. Such findings indicate the need to control for country of birth as well as racial origins when looking at people's health status.

Thus, race and a respondents' country of birth are combined into a new variable. This new variable is based on geographically located racial categories and will hereupon be referred to as "geo-racial origins". These categories include those who are: non-whites born in Canada, non-whites born in Europe, non-whites born in Asia, and whites born in

Europe, Asia or other areas. Those individuals who indicate that they are white and born in Canada are used as the reference category.

In addition, a variable measuring a respondent's length of time in Canada was included in the analysis. Dummies were created to reflect those who have resided in Canada for: 0-4 years; 5-9 years; 10 years or more. Those respondents who were born in Canada are used as the reference category.

Measurement of Social Inequality

Although inequality can be seen and felt in Canada, the concept is problematic in that it is often difficult to define or operationalize (Grabb, 2002). After all, ideas of "inequality" are relative and situational. In addition, there is no standard benchmark or measure of what constitutes equality. Frank (1996) proposes that inequality be defined in terms of socioeconomic status. Although this may be imperfect, Frank indicates that "the choice of measuring social inequality in terms of education, employment and income is made out of expediency, practicality and, to a large extent, consistency with the prevailing culture and ideology" (p. 10). In trying to understand social inequality in Canadian society, a discussion of class must take place as often the inequalities faced by individuals are structured.

The existence of class-based inequalities in Canada has long since established (Allahar & Côté, 1998; Hunter, 1986; Veltmeyer, 1986). However, the notion of class has been used differently. Two of the most important sociologists who have tackled this concept are Karl Marx and Max Weber (Nakhaie, 1999). Marx traced inequalities in the distribution of resources as a consequence of class relations (Nakhaie, 1999). In order to analyze class under capitalism, Marx divided society into two classes based on ownership

of the means of production – the property owners (bourgeoisie) and the propertyless workers (proletariats). The inequality between the classes resulted from the development of private property, accumulation of capital and the dehumanization of the worker. Those who owned the means of production were able to control or determine other aspects of society. Marx did make mention of other classes existing in capitalist societies (i.e. petty bourgeoisie, lumpenproletariat, etc.). However, Marx asserts that other classes are "transitional" and will get swallowed up by either the property-owning class or the propertyless working class. To rid society of class privilege, the solution lies in the abolition of private property (Allahar & Côté, 1998). For the purpose of this analysis, however, "class" will be analyzed in a Weberian context mainly due to the fact that the NPHS data do not allow for a Marxian analysis of "class" in that it does not enable us to distinguish between owners of businesses of varying sizes.

Max Weber, like Marx, used class as a crucial part of his work as class has an effect on one's life chances (Wright, 2005). Weber saw members of a class as sharing similar life chances (Breen, 2005). Both Marx and Weber saw the market as a source of power where advantages of some individuals over others are due to the possession of certain traits. He too, like Marx, defined class by ownership but that is where their analyses diverge. Giddens notes that Weber further distinguishes the propertyless class by using the idea of marketing skills (Giddens, 1973). The "life chances" distributed by the market depend on the skills and resources that individuals afford as well as income that enables individuals to purchase goods (Breen, 2005, p. 32). Marketing skills include for example the possession of education, which is considered by Weber a "recognized skill". It plays an important role in what the individual brings to the market and can result in

higher income (Giddens, 1973). Therefore, education, occupation and income are all measures of social class that affect one's life chances in the market. They are often referred to as socioeconomic statuses. This analysis adds food insecurity as another measure of social inequality in the analysis. One main reason for this decision is that in 1998-1999, approximately 3 million Canadians (10 percent of the total population) reported living in a household with food insecurity (Che & Chen, 2001).

Income is measured by a respondent's derived total household income reported from all sources. Respondents are asked to estimate the total income (from all sources) for all members of their household before taxes for the past 12 months.

Respondents are asked to specify the highest level of education that they have attained. The categories are then recoded into the following: those individuals who possess a college diploma, other post-secondary or some university; those with a bachelor's degree (e.g., B.A., B.Sc., LL.B.); those who have a master's degree (e.g., M.A., M.Sc., M.Ed.), a doctorate (e.g., Ph.D., D.Sc., D.Ed.) or a degree in medicine (including dentistry, veterinary medicine and optometry). Respondents who indicated that they are a secondary school graduate or less are used as the reference category.

Another socioeconomic status measure is occupation. It is coded into five categories: upper white collar; lower white collar; farmers; and other. Those individuals who are blue collar workers are used as the reference category. Upper white collar consists of those respondents who are self-employed, employed professionals, high level and middle management and semi-professionals. Lower white collar consists of those individuals who are technicians, supervisors, skilled, semi-skilled and unskilled clerical

and sales. Blue collar consists of those respondents who are foremen/women, skilled crafts and trade, semi and unskilled manual labourers.

In addition to the above measures of socioeconomic status, a variable measuring food security is used. Respondents are asked to identify whether any person in their household received food from a charity (i.e. food bank, soup kitchen, etc.) within the past 12 months. This variable identifies whether a household has ever run out of food; and for those who have run out of food, it identifies whether they have received food from a charitable organization. Responses are recoded into those who received food from a charity and those who did not, using those whose household never ran out of food as the reference category.

Control Variables

Research shows that generally, as people age, their health begins to deteriorate. As stated earlier, only participants 25 years of age and over are included in this analysis. Age is measured in 11 categories representing five-year intervals with the exception of the last, which consists of individuals who are 80 and older. Empirical evidence demonstrates the existence of gender-based health disparities. Women, in general, appear to have poorer health and greater morbidity than men (McDonough & Walters, 2001; Denton, Prus, & Walters, 2004). A dummy variable was created to reflect those individuals who classify themselves as female, using males as the reference category. The province of residence was recoded into the following categories, using those respondents who reside in Ontario as the reference category: British Columbia, Quebec, Atlantic provinces, and Prairie provinces. Additionally a variable for household size was included

which consists of one, two, three, four and five or more persons in a household. The inclusion of this variable is a necessary control for the use of household income.

Empirical evidence on the relationship between marital status and health conclude that adults who are married have lower mortality and morbidity rates and generally better physical health than their unmarried counterparts and this is especially true for men (Trovato, 1992; Waldron, Hughes, & Brooks, 1996; Lillard & Panis, 1996). Respondents of the NPHS were asked to identify their marital status. The categories of marital status were recoded into three groupings with those married or in common law partnerships being the reference category. The second consists of those respondents who are single (i.e. never married). The third category includes those respondents who are divorced, separated or widowed.

Lifestyle differences are measured by two variables. Smoking cigarettes has been linked to the presence of diseases such as cancer, respiratory, cardiovascular and coronary heart disease as well as premature mortality (Edwards, 2004; Hummer, Nam, & Rogers, 1998; Kuller et al., 1991; Rogers, Hummer, Krueger, & Pampel, 2005). Smoking is measured by a variable that asks respondents to indicate what type of smokers they are. Responses are recoded into five categories: those who smoke daily, those who occasionally smoke, those who are former daily smokers and those who are former occasional smokers. Those individuals who indicate that they have never smoked are used as the reference category.

Empirical research on the relationship between alcohol consumption and health indicates that those individuals who are occasional or moderate drinkers experience a reduced risk of coronary heart disease, cardiovascular disease and total mortality in

comparison to regular drinkers and non-drinkers (Hanna, Chou, & Grant, 2006; Hoffmeister, Schelp, Mensink, Dietz, & Böhning, 1999; Klatsky, 2010). Alcohol consumption is measured by asking respondents what type of drinker they perceive themselves to be. The responses are recoded into four categories: those who are abstainers, those who are regular drinkers and those who are former drinkers. Those respondents who indicate that they are occasional drinkers are used as the reference category. Regular drinkers are those individuals who consume at least one alcoholic drink a month. Occasional drinkers consume less than one drink a month. Former drinkers are those individuals who have not had a drink in the last 12 months.

Social support is a strong and consistent predictor of good physical and mental health (Hale, Hannum, & Espelage, 2005; Israel, Farquhar, Schulz, James, & Parker, 2002; Reis & Franks, 1994). Nakhaie and Arnold (2010) critiqued prior Canadian studies looking at the relationship between social support and health indicating that the use of a social support index does not allow one to understand how specific measures of social support affect health. They showed that a loving relationship (perceived love) is directly linked to changes in health status while other social support measures are not significantly related to changes in health status. Therefore, for the purposes of this analysis, rather than utilizing a social support index, individual social support measures are used to analyze the effects of each on health. Social support is measured using a respondent's "yes/no" answers to four questions. Respondents are asked whether they have someone to confide in regarding their private feelings or concerns, someone they can count on during a crisis situation, someone to ask advice from when making

important decisions about their life, and someone who makes them feel loved and cared for. The "yes" answer to each question is used as the reference category.

Missing Data

Due to the nature of survey data, variables with missing values need to be addressed. Listwise deletion is employed for the self-rated health and chronic illness variable in order to avoid imputing the dependent variable. This method is also used for the variables of race, country of birth, length of time in Canada, food security and marital status, due to the small number of cases with missing data in each of the variables. Listwise deletion is also applied to the four social support variables. A missing values analysis is conducted on the four variables to analyze the pattern of the missing values. The analysis concludes that there are 1933 cases where the respondents do not answer all four social support questions. Therefore, imputing the social support variables would be problematic and thus these cases are excluded from the analysis.

However, an imputation method needs to be used for those variables that have quite a large number of missing cases. This is done to avoid decreasing the sample size as well as statistical/analytical power and prevent the possibility of biased estimates that may arise from data which are not missing at random (Patrician, 2002; Roth, 1994). Income (21.1% missing), derived type of drinker (1.2% missing), education (1.1% missing) and derived type of smoker (0.4% missing) are imputed using the statistical imputation method of expectation-maximization (EM) algorithm.

Linearity

In checking the association between age and income with self-rated health and chronic illness, it is evident that the relationships are non-linear. In order to correct for

this, variable transformations have to be conducted. Regarding age and self-rated health, a spline is introduced at age 55-59. For chronic illness and age, a spline is introduced at age 40-44. Regarding income, the variable is truncated at $5000-$9999 and again at $40,000-$49,999. The results of these transformations indicate much more linear relationships.

Sample Weights

In order to avoid biased estimates, sample survey weights are used in the analyses. It should be noted that the standard errors are much greater than they would be if weights were not applied. However, due to the sample size an increase in standard errors can be tolerated.

Statistical Analyses

A bivariate analysis is undertaken to assess the relationship between the health outcomes and predictors. Mean values of self-rated health and chronic conditions for each predictor are obtained. A means test is also employed to see if the differences between the means for various categories of predictors are statistically significant at an alpha level of 0.05.

The problem with the subjective health measure is that it is an ordinal level measure for which the distance between points on the scale is unknown. For example, the distance between having “good” health and having “excellent” health is not clear. Treating this variable as a numerical score is considered valid if the “intervals between consecutive points on the scale can be considered equivalent” (Armstrong & Sloan, 1989, p. 191). In testing whether it is appropriate to use the subjective health measure as an interval variable, a Rasch transformation is undertaken. This method treats each response

in the scale as a dichotomy. It estimates the logged odds of answering "yes" to each response on the scale. To do so, one takes the percentage that answered "yes", converts that into odds and then logs it. Once the Rasch scores for the subjective health measure are obtained, they are correlated with the original subjective health measure, which yield a correlation of .880. Furthermore, when plotting the logits against the originals, linearity is present across four of the categories that are not arbitrarily scored (the bottom, which is hard to estimate, is out of line). When working from the other end of the scale, asking not what fraction has yet to say yes, but what fraction has yet to say no, it is the upper category that is hard to estimate (the plot shows the upper category to be out of line). Therefore, since all the categories when straightforwardly estimated are fine, there is good reason to treat the original subjective health measure as an interval.

In treating the subjective health measure as an interval variable, a hierarchical ordinary least square (OLS) regression is employed for self-rated health. However, regarding chronic illness, an OLS regression cannot be applied due to the fact that the majority of responses are in the lower end of the scale. There is a possibility of getting coefficient values below zero, which would indicate a downward bias. Therefore, a tobit analysis is employed to limit the lower values to zero. Model 1 assesses the relationship between the health outcomes and the socio-demographic variables including age, sex, marital status and province of residence. Model 2 measures the effect of geo-racial origins. Model 3 introduces respondents' length of time in Canada. Model 4 comprises of socioeconomic status variables. Model 5 incorporates lifestyle/health behaviours. Model 6 then looks at the effects of social support.

A series of logistic regressions are performed on each of the detailed chronic conditions (that are used to make up the dependent variable of chronic condition) with all the predictors in the final model. Those that have fewer than 500 cases are omitted from this logistic regression procedure and this includes epilepsy (339 cases) and Alzheimer's (131 cases). The logistic regressions are performed to assess the geo-racial origin effect on specific health conditions.

CHAPTER IV

FINDINGS AND ANALYSIS OF RESULTS

Bivariate Analyses

Self-Rated Health

Table 1 displays the mean values for self-rated health with each of the predictors. Statistical tests are employed to see if the differences between categories within variables are significant at alpha $\leq .05$. Bolded categories are used as the reference category. Table 1 shows that non-whites born in Canada and whites born in US/Europe/Australia report significantly lower subjective health (X=3.45 and X=3.60, respectively) than whites born in Canada (X=3.70). There is no other significant difference between whites born in Canada and other ethno-racial groups. This table further demonstrates that although immigrants report significantly better subjective health than those born in Canada within their first 9 years in Canada, after 10 years their subjective health becomes significantly worse than native-born Canadians.

With respect to socioeconomic status, those with higher education, occupation, income and food security are significantly more likely to report better health than their counterparts. As an example, those individuals with a university education report "very good" health (score above 4) while those with lower than university education report a score of less than 4 indicating "good" health. Similarly, those with higher incomes and in upper white collar occupations identify a "very good" health when compared to those in lower occupations or income categories who identify as having "good" health. Food insecurity is also related to subjective health in the expected direction. Those who run out

of food and/or receive food from charity report significantly poorer health than other groups.

In line with the literature on age and health, self-reported health seems to decline as respondents got older and the differences are statistically significant. Females report significantly lower self-rated health than males. Additionally, respondents who are widowed, separated or divorced report significantly poorer health in comparison to individuals who are married/common-law. People residing in the Atlantic and Prairie provinces report worse health than people living in Ontario. Also, self-rated health increases as household size increases.

Daily, occasional and former daily smokers report lower self-rated health (X=3.56, X=3.68 and X=3.61, respectively) in comparison to those who have never smoked and this coincides with empirical evidence on smoking and its effect on health outcomes. Regarding alcohol consumption, regular drinkers report significantly better health (X=3.84) than respondents who are occasional drinkers (X=3.63), former drinkers (X=3.33) and abstainers (X=3.48).

In analyzing the relationship between social support and self-rated health, the patterns that arise coincide with the literature. Those respondents with social support report significantly better health than those without.

Chronic Conditions

Table 2 displays the mean values for chronic conditions with each of the predictors. Similar to Table 1, statistical significance tests are done to show whether relationships between the variables are meaningful at an alpha $\leq$.05 and bolded categories denote the reference category. Table 2 demonstrates that whites born in

US/Europe/Australia have a significantly higher number of chronic conditions and non-whites born in Asia, a lower number in relation to whites born in Canada. Similar to the bivariate findings of self-rated health, immigrants have a lower number of chronic conditions in the first 9 years of residence in Canada but after 10 years, they begin reporting a higher number of chronic conditions.

Regarding socioeconomic status, the more education and income a respondent possesses, the lower the number of chronic conditions he or she reports. For example, individuals who possess a master's, doctorate or degree in medicine report having 26% (100-[(1.17/1.57)*100]) fewer chronic conditions than individuals who are secondary school graduates or less. Individuals in low-income households report 82% more chronic conditions than those in high-income households. Individuals who receive food from a charity report 74% more chronic conditions compared to those whose household never run out of food. However, the relationship between occupational status and chronic conditions does not follow the same pattern as highlighted with self-rated health. Upper white and lower white collar workers report significantly higher chronic conditions (19% and 28% more, respectively) than blue collar workers.

The relationship between age and chronic conditions follows an expected pattern. For example, respondents who are 65 years and older report experiencing 158% more chronic conditions than those who are ages 25-34. Additionally, females report 51% more chronic conditions than males. Widowed, separated and divorced individuals report 70% more and single individuals report 4% fewer chronic conditions than their married counterparts. Those living in Quebec or the Prairie provinces report significantly lower

number of chronic conditions in relation to those living in Ontario. Also, as household size increases, the number of chronic conditions decreases.

In terms of lifestyle variables, former daily smokers report 19.4% more chronic conditions than those who have never smoked. Moreover, regular drinkers report 25% fewer and former drinkers report 23% more chronic conditions than individuals who are occasional drinkers.

In terms of social support and chronic conditions, the same patterns arise as with self-rated health. Those who report having social support experience fewer chronic conditions than those who do not have social support.

The bivariate analyses demonstrate some support for the hypothesis that there are differences in health between whites and non-whites in Canada regarding both the Canadian-born and immigrant population. Additionally, the findings demonstrate evidence for the relationship between socioeconomic status and health outcomes as discussed in the reviewed literature. However, it is unclear from these tables if the observed relationships are a function of some other variables, which need to be controlled for. Moreover, bivariate relationships tell us little with respect to the role of socioeconomic status in increasing or decreasing geo-racial differences in health. The remainder of this chapter focuses on the findings of the multivariate analysis.

Multivariate Analyses

Self-Rated Health

Table 3 depicts the regression coefficients[3] for the relationship between self-rated health and predictors. The predictors are entered in steps in order to evaluate the change on their effect as new variables are entered.

In Model 1, the demographic variables are included. Generally, their relationship with health is in the expected direction. Individuals who are older, single, widowed/separated/divorced, living in the Atlantic or Prairie provinces and in larger households report a significantly lower subjective health than their counterparts.

In Model 2, the geo-racial categories are entered into the hierarchical regression. After accounting for demographic variables, the results show that non-whites, with the exception of those born in the US, Europe or Australia and those whose country of origin is unknown, report significantly lower subjective health than whites born in Canada. For example, non-whites born in Canada score about a quarter of a unit ($b=-0.255$, $p\leq.01$) lower subjective health than whites born in Canada. Similarly, the coefficients for non-whites from Asia are -0.176. This effect for non-whites from Asia disappears in Model 3 when length of residence in Canada is included. However, it reappears in Model 4 when socioeconomic variables are included in the model.

In Model 4, when socioeconomic factors are entered into the equation, all non-whites (with the exception of those whose country of origin is unknown) and whites born in "other" report significantly lower self-rated health in comparison to whites born in Canada.

The inclusion of lifestyle and social support variables in Models 5 and 6 does not substantially alter the effect of geo-racial origins on health as reported in Model 4. This table also demonstrates that geo-racial origin has an independent effect on self-rated

[3] Positive b coefficients for self-rated health indicate better subjective health.

health even after socioeconomic, socio-demographic, lifestyle and social support variables are included in the final model.

Socioeconomic, lifestyle and social support variables also generally confirm a significant relationship with self-rated health even after accounting for other variables. Daily smokers, occasional smokers and former daily smokers report lower self-rated health in comparison to those respondents who have never smoked. However, regular drinkers report better self-rated health than occasional drinkers (b=0.0967, $p \leq .01$). Former drinkers as well as abstainers report lower self-rated health than occasional drinkers (b=-0.167, $p \leq .01$ and b=-0.0664, $p \leq .1$, respectively). In terms of social support and health, cross-sectional data seem to indicate that having somebody to confide in and having someone to provide advice are the most important social support predictors of self-rated health.

The socioeconomic status variables seem to make the largest change in the R^2 of each model. For example, in Model 2 (when geo-racial origins are entered), the R^2 is 0.0702 and this changes to 0.1323 when socioeconomic status is controlled for (Model 4). When socioeconomic status is controlled for, women actually report better self-rated health than men (b=0.0419, $p \leq .05$) and they report even better health when lifestyle factors are controlled for (b=-0.0496, $p \leq .01$). Age remains a statistically significant predictor of self-rated health in each model of the hierarchical regression. However, after the age of 55-59 (as indicated by variable "age spline"), when controlling for socioeconomic status, the decline in self-rated health slows as one gets older (b=-0.0232, $p \leq .05$ to b=0.0430, $p \leq .01$). Those respondents who are widowed, separated or divorced report statistically significant lower self-rated health in relation to those respondents who

are married (b=-0.136, p≤.01). Nevertheless, this difference becomes insignificant when socioeconomic status predictors are entered into the hierarchical regression in Model 4. Controlling for socioeconomic status also causes the differences in health between those residing in the Atlantic provinces and those in Ontario to become insignificant. This finding suggests that the lower self-rated health of widowed, separated or divorced individuals and those residing in the Atlantic provinces is due to their socioeconomic status and not their marital status or region of residence. Furthermore, only when socioeconomic status is controlled for do household size and the differences in self-rated health between those living in Quebec and Ontario become significant.

Chronic Conditions

Table 4 shows the tobit regression coefficients[4] for the relationship between the number of chronic conditions and predictors. The predictors are entered in steps in order to evaluate the change on their effect as new variables are entered.

Model 1 includes socio-demographic variables. The results illustrate that respondents who are females, older, single, widowed/separated/divorced, as well as those residing in the Atlantic provinces, Quebec and British Columbia report having significantly more chronic conditions than their counterparts. Respondents living in the Prairies report having fewer chronic conditions relative to those living in Ontario. Additionally, individuals living in larger households report fewer chronic conditions.

When geo-racial origins are entered in Model 2, results indicate that non-whites born in Canada and those born in US/Europe/Australia report having more chronic conditions than whites born in Canada (b=0.336, p≤.01 and b=0.323, p≤.05,

[4] The interpretation of tobit coefficients can be read in the same manner as ordinary least-square regression coefficients as long as the combination of scores on the independent variables do not imply a $\hat{y}$ below zero.

respectively).[5] However, whites born in US/Europe/Australia and "other" as well as non-whites born in Asia and "other" report fewer chronic conditions than whites born in Canada after controlling for socio-demographic factors.

In Model 3, the difference in chronic conditions become insignificant for whites and non-whites born in US/Europe/Australia and for those whose country of origin is unknown (compared to whites born in Canada) when length of time in Canada is introduced. Despite the fact that those who have resided in Canada for less than 4 years have fewer chronic conditions, as their length of residence increases, their number of chronic conditions increases and even surpasses those born in Canada (though not significantly). This relationship remains even after controlling for socioeconomic, lifestyle and social support factors.

When socioeconomic variables are entered into the equation in Model 4, the coefficient for non-whites born in Canada drops from 0.336 to 0.225. Thus, for this population, socioeconomic factors account for approximately one-third of the differences in reported number of chronic conditions when compared to whites born in Canada. Regarding non-whites born in Asia, socioeconomic variables reduce the differences in chronic conditions with whites born in Canada. This is also true with respect to whites born in US/Europe/Australia. However, socioeconomic status increases the differences for whites and non-whites whose country of origin is unknown. Further, the insignificant relationship for non-whites whose country of origin is unknown reported in Model 3 reappears in Model 4 when socioeconomic variables are included in the model.

[5] Positive b coefficients for chronic conditions indicate possessing more chronic conditions and thereby poorer health.

The differences in chronic conditions between whites born in US/Europe/Australia as well as whites and non-whites whose country of origin is unknown disappear when lifestyle factors are entered into the equation in Model 5. Controlling for lifestyle factors also causes the differences between non-whites born in Asia and whites born in Canada to decrease (b=-0.391, $p \leq .01$ to b=-0.316, $p \leq .05$). However, neither lifestyle factors nor social support variables cause a considerable variation in the differences in chronic conditions between non-whites born in Canada and whites born in Canada.

In Table 4, socioeconomic and lifestyle variables all confirm a significant relationship with chronic conditions even after accounting for other variables (with the exception of occasional and former occasional smokers). As expected, increased household income leads to experiencing fewer chronic conditions (b=-0.0657, $p \leq .01$). Furthermore, those who experience food insecurity suffer more chronic conditions than respondents who do not. However, with respect to occupation, upper white collar and lower white collar workers both report significantly more chronic conditions than blue collar workers (b=0.151, $p \leq .05$ and b=0.0956, $p \leq .05$, respectively) and this remains even after controlling for lifestyle factors and social support.

Additionally, when controlling for socioeconomic and socio-demographic factors, those who have a post-secondary education are more likely to have chronic conditions. This contradicts the earlier-mentioned bivariate findings (see Table 2), which show that as education increases, reported chronic conditions decrease. However, separate analysis (not shown here) shows that these results are a function of including three other socioeconomic status predictors (i.e. income, occupation and food insecurity) in the

model without which the only significant relationship is between those with a college education and those that have a high school diploma or less. Those with university degrees do not show a statistically significant difference from those who are high school graduates or less. Thus, the original relationship between education and chronic health found in Table 2 may be a function of a lack of control for other socioeconomic variables.

As expected, in the final model of Table 4, daily smokers and former daily smokers experience more chronic conditions than those respondents who have never smoked ($b=0.107$, $p\leq.05$ and $b=0.198$, $p\leq.01$, respectively). However, regular drinkers and abstainers report having fewer chronic conditions than occasional drinkers while former drinkers report having more chronic conditions. In terms of social support, having someone to count on in a crisis and provide advice are statistically significant predictors of low chronic conditions.

In order to assess the geo-racial effect on specific chronic conditions, a series of logistic regressions are performed for each chronic condition with all predictors (see Table 5). Table 5 depicts the coefficients as well as the logged odds of each chronic condition for geo-racial origins, length of time in Canada as well as socioeconomic status. The results indicate that the odds of having food allergies (1.4521), asthma (1.4521) and diabetes (1.7246) are significantly higher for non-whites born in Canada when compared to whites born in Canada. Moreover, non-whites born in Canada are less likely to have cancer, bowel disorder and other chronic conditions. Additionally, whites and non-whites born in US/Europe/Australia have higher odds than whites born in Canada of reporting thyroid conditions (3.1740 and 13.7495, respectively). However,

they are less likely to have food allergies and cataracts. Non-whites born in US/Europe/Australia are also less likely to experience asthma. The odds of whites born in "other" having sinusitis (5.6463) are also higher in comparison to whites born in Canada. Nevertheless, whites and non-whites born in "other" are less likely to possess food allergies, cancer and cataracts. Whites born in "other" are also less likely to have bowel disorders and asthma. Non-whites and whites born in Asia are less likely to experience food allergies and cancer. Additionally, non-whites born in Asia are also less likely to have asthma and bowel disorders while whites from Asia are less likely to have cataracts. Finally, geo-racial origins have no effect on chronic conditions such as other allergies, arthritis, stomach ulcers, stroke, urinary incontinence, back problems, high blood pressure, migraine headaches, bronchitis and heart disease.

CHAPTER V

CONCLUSIONS AND DISCUSSIONS

Summary of Findings

The findings of this analysis lend support to the hypothesis that non-whites have greater health problems than whites born in Canada. However, the health disadvantages seem to be more common among non-whites born in Canada than other non-whites. For example, in both bivariate and multivariate analyses, non-whites born in Canada report experiencing lower self-rated health and more chronic conditions than whites born in Canada. Additionally, all non-whites (with the exception of those whose country of origin is unknown) report significantly lower self-rated health in comparison to whites born in Canada. This relationship remains even after controlling for demographic, socioeconomic, lifestyle and social support factors.

The findings also offer support for the hypothesis that immigrant health problems are fewer in comparison to those born in Canada but that these health problems increase as the duration of residence increases. As well, length of time in Canada has a significant independent effect on chronic conditions. In particular, those immigrants who have resided in Canada for less than 4 years have significantly fewer chronic conditions than those born in Canada. This relationship remains even after controlling for socioeconomic, lifestyle and social support factors. However, immigrants who have resided in Canada for a period of ten years or longer report significantly lower subjective health and a higher number of chronic conditions relative to Canadian-born respondents.

Finally, the findings of this analysis provide support for the hypothesis that the relationship between geo-racial origins and health is mediated in part by socioeconomic

status. Regarding the number of chronic conditions of respondents who are born in Canada, socioeconomic status accounts for approximately one-third of the differences between whites and non-whites. Similarly, in the case of self-rated health, socioeconomic status accounts for just less than half of the health disparities between whites and non-whites born in Canada. Moreover, in both health measures, differences between whites and non-whites born in Canada continue after controlling for socioeconomic, lifestyle and social support factors, thus pointing to the independent effect of geo-racial origin on health. Regarding other geo-racial groups, controlling for socioeconomic factors increases the differences in subjective health between whites born in Canada with non-whites born in US/Europe/Australia and Asia. Further, only when socioeconomic variables are accounted for do whites whose country of origin is unknown have significantly lower health relative to whites born in Canada. In looking at chronic conditions, controlling for socioeconomic factors further serves to lower the number of chronic conditions for whites born in US/Europe/Australia and "other" and non-whites born in Asia and "other" relative to whites born in Canada. In sum, the analysis generally confirms the stated hypotheses.

Discussion

The findings of this analysis point to the mediating influence of socioeconomic status for the health outcomes of geo-racial groups. For non-whites born in Canada, socioeconomic status accounts for a substantial portion of the difference in self-rated health and chronic conditions relative to whites born in Canada. This finding is consistent with research in the US (Cummings & Jackson, 2008; Keil et al., 1992; Kington & Smith, 1997; Williams, 1999) as well as Canada (Frideres, 1998; Kobayashi et al., 2008). For

example, Cummings and Jackson (2008) found that in the US, blacks perceived their health more poorly in comparison to the rest of the population and socioeconomic status accounted for all the disproportions in health for black males in relation to whites. Similarly, in Canada, Kobayashi et al. (2008) observed that once socioeconomic and lifestyle factors were held constant, visible minorities and Aboriginals had equal health to those who were non-visible minorities, which supports the argument that ethno-racial health disparities are linked to structural inequalities. However, the present analysis does not find that socioeconomic status accounts for all the variations in health. Perhaps this is due to the way in which "race" is measured. Cummings and Jackson (2008) examined black and white differences in their study, while Kobayashi et al. (2008) looked at ethnocultural differences (i.e., white Canadian, white French, white other, white English, Aboriginal, black, Chinese, South Asian, other Asian, West Asian, Arab and other).

The findings of this analysis with relation to the mediating effects of socioeconomic status are contrary to Wu and Schimmele (2005b) who, using the1996 NPHS, found that socioeconomic status did not explain ethno-racial variation in health. One possible reason for the divergence in findings could be the differences in the way in which ethno-racial categories were measured. Wu and Schimmele's measure of race consisted of categories including East and Southeast Asian, Chinese, South Asian, Aboriginal, black, Arab and West Asian, Latin American, Jewish, French, English, mixed racial groups and other whites. Additionally, the present analysis deviates from Wu and Schimmele in its measurement of socioeconomic status, which adds food security and occupation to the measure.

In analyzing specific chronic conditions, non-whites born in Canada have higher odds of reporting conditions such as diabetes, food allergies and asthma. All three chronic conditions may be a function of one's environment, lifestyle and diet. Empirical evidence has illustrated the link between food security and chronic conditions including diabetes and food allergies (Che & Chen, 2001; Olson, 1999; Stuff et al., 2004; Vozoris & Tarasuk, 2003). Other studies have demonstrated the link between low socioeconomic status with asthma (Almqvist, Pershagen, & Wickman, 2005; Basagaña et al., 2004; Litonjua, Carey, Weiss, & Gold, 1999) and diabetes (Connolly, Unwin, Sherriff, Bilous, & Kelly, 2000; Everson, Maty, Lynch, & Kaplan, 2002; Robbins, Vaccarino, Zhang, & Kasi, 2001). Socioeconomic status, in turn, can significantly influence one's environment, lifestyle and diet.

However, socioeconomic status does not eradicate all the differences in health between geo-racial groups. With respect to self-rated health, differences between whites born in Canada and non-whites (with the exception of those whose country of origin is unknown) remain even after controlling for socioeconomic status, lifestyle factors and social support. Part of the existing health difference (after accounting for socioeconomic status) may be due to the perceived as well as actual individual and institutional discrimination that racialized groups encounter, which can affect health outcomes (Ren & Amick III, 1996; Veenstra, 2009a; Veenstra, 2009b; Williams et al., 1994). Veenstra (2009b) argues that experiences of racism can directly affect the health of minorities through the "negative physical and psychological consequences of the interpersonal racial discrimination incurred during the course of everyday life" (p. 357). He explains that racism can result in the internalization of racial oppression thereby damaging self-esteem

as well as compromising available social support. Moreover, individual discrimination can affect life satisfaction as well as be related to physical and mental distress (Williams et al., 1994). Discrimination can also affect health through indirect means such as institutional racism, which includes the systematic exclusion of racialized groups from social, political and economic arenas that then result in lower health (Veenstra, 2009b). Additionally, Galabuzi (2002) found that visible minorities also face racism in the health care system that is characterized by "language barriers, stereotypical views held by some health professionals, lack of cultural sensitivity, absence of cultural competencies, barriers to access and utilization, and inadequate funding for community health services" (p. 4).

The findings of this study also lend support for the "healthy immigrant effect" (Chen et al., 1996; Gee et al., 2004; McDonald & Kennedy, 2004; Newbold, 2006; Newbold & Danforth, 2003). Those immigrants who have resided in Canada for less than four years demonstrate significantly fewer chronic conditions than those born in Canada and this relationship remains even after controlling for other variables. The lower number of chronic conditions reported by recent immigrants may be attributed to the vigorous health screening tests that immigrants must undergo before migrating to Canada. Through these tests, immigration officials are able to screen candidates for chronic conditions.

The findings also provide support for the literature that the initial good health found for recent immigrants declines with increased time spent in Canada (commonly cited at 10 years) and eventually becomes similar to or worse than that found in native-born Canadians (Chen et al., 1996; Gee et al., 2004; McDonald & Kennedy, 2004; Newbold, 2006; Newbold & Danforth, 2003). Bivariate findings demonstrate that the

prevalence of chronic conditions and lower self-rated health for immigrants seems to increase with length of time spent in Canada. As immigrants reside in Canada for a period of 10 years or longer, their level of health begins to converge with that of the Canadian-born or even worsen. Such deterioration in health is explained by poor socioeconomic status of recent immigrants, problems of acculturation and/or the hurdles that immigrants face regarding the utilization of health services due to cultural, economic or language barriers (Gee et al., 2004; McDonald & Kennedy, 2004; McDonald & Kennedy, 2005; Newbold, 2005).

Not only do socioeconomic variables mediate to some extent the differences in health of geo-racial groups, they also have independent effects on health. The findings provide support for the vast literature on the social determinants of health (Frohlich et al., 2006; Hay, 1988; Kobayashi et al., 2008; Kosteniuk & Dickinson, 2003; Pomerleau et al., 1997; Raphael, 2010).

This research finds that in terms of occupation, upper white collar workers and farmers report significantly higher self-rated health than blue collar workers. However, this difference disappears when lifestyle factors are controlled for in Model 4 and remain insignificant when social support variables are introduced in Model 5. Cross-tabulations between occupational status and smoking show that blue collar workers (37%) are more likely to be daily smokers than upper white collar (19%) and farmers (23%). Literature on smoking and health has shown that daily smokers are more likely to have poor health relative to non-smokers (Edwards, 2004; Hummer et al., 1998; Kuller et al., 1991; Rogers et al., 2005). Jarvis and Wardle (1999) observed that the odds of being a daily smoker increased for those individuals in lower occupational groups. Raphael (2004) argues that

one's social and economic environment often determines whether an individual takes up health-risk behaviours such as smoking and alcohol consumption. He further argues that "tobacco use, excessive alcohol use and carbohydrate-dense diets result from lack of material resources and are also means of coping with such circumstances" (p. 14).

Additionally, controlling for lifestyle factors causes the differences in chronic conditions of whites born in US/Europe/Australia whose country of origin is unknown from whites born in Canada to disappear. Both populations report fewer chronic conditions when compared to whites born in Canada but this relationship becomes insignificant when lifestyle factors are accounted for. Perhaps this is due to the fact that 51% of whites whose country of origin is unknown report being regular drinkers and 48% are or have been smokers. Similarly, 56% of the respondents who are whites born in US/Europe/Australia are or have been smokers and 54% are regular drinkers. In analyzing specific chronic conditions, whites born in US/Europe/Australia have higher odds of reporting thyroid conditions. Epidemiological evidence demonstrates a strong link between cigarette smoking and thyroid conditions (Utiger, 1995; Utiger, 1998; Vestergaard, 2002). Thus, lifestyle factors rather than geo-racial origins may play a significant role in determining thyroid conditions.

This study also provides evidence for the need to account for country of origin when looking at the health of racial groups. A separate multivariate analysis (not shown here) is employed with all predictors where race is recoded into "non-white" using "white" as the reference category. The results demonstrate that non-whites (as a whole) report significantly fewer chronic conditions relative to whites. However, this relationship becomes statistically insignificant when length of time in Canada is

introduced and this relationship continues when socioeconomic, lifestyle and social support factors are controlled for. Therefore, failing to account for country of birth serves to mask important intra-group differences. For example, non-whites born in Canada report significantly more chronic conditions relative to whites born in Canada. On the contrary, non-whites born in Asia report significantly fewer chronic conditions when compared to whites born in Canada. However, when these two geo-racial origins are lumped under the category "non-whites", these differences are not significant.

Policy Implications

The findings of this study have important policy implications with respect to the relationship between geo-racial groups and health. Findings suggest that racial differences in health status can be accounted for in part by socioeconomic status. As such, it is important for policies to be aimed at alleviating the structural barriers and socioeconomic inequalities experienced by non-white populations. Fixing the material conditions, as well as focusing on treatment of illnesses, might be the key to decreasing racial disparities in health. Although individuals can find ways to improve their health through exercise or other health-related behaviours (i.e. good diet, physical activity, limited consumption of alcohol and tobacco), their low education, occupation, and income would limit healthy behaviour and increase their health disadvantages.

Literature has demonstrated that, in general, visible minority immigrants tend to be more educated than foreign-born and Canadian-born non-visible minorities (Frank, 1996; Hou et al., 2009; Li, 2001). Yet, visible minority immigrants are less likely to be working in their field of expertise or in higher-status occupations (Basran & Zong, 1998; Bauder, 2003; Li, 2001). A specific policy solution is to enact effective and appropriate

mechanisms to assess the foreign credentials of immigrants. Currently, there are no consistent mechanisms to assess foreign credentials in Canada for non-regulated occupations (which are the vast majority of occupations). Employers of non-regulated occupations decide whether an individual's qualifications are equivalent to Canadian standards. For regulated occupations, foreign credentials are assessed by the professional organization or regulatory body that governs the occupation (Canadian Information Centre for International Credentials, 2011). Thus, having consistent and appropriate mechanisms to assess foreign credentials would assist employers in hiring skilled immigrants. In return, this would improve the income of racial minority immigrants, which in turn would provide them with better quality of life.

Moreover, given the fact that geo-racial effects remain even after accounting for socioeconomic status, policy makers may want to focus on the role of prejudice and discrimination for health. Education and raising awareness aimed at individual discrimination should be taught at an earlier age from an anti-racism framework rather than a multicultural one. Additionally, stronger enforcement needs to be undertaken of employment policies that are aimed at alleviating institutional discrimination.

Limitations

This study is subject to five limitations. The first limitation is the cross-sectional nature of the data employed, which limits causal inferences between socioeconomic status and health. Without longitudinal data, it may be difficult to establish a strong connection as to whether socioeconomic status affects health or whether it is health that affects one's socioeconomic standing.

The second limitation concerns the measurement of ethno-racial origins in this study. The limitation of using the NPHS public use microdata file is that it homogenizes a largely heterogeneous population into a category called "other". Considerable variation exists within this population with relation to socioeconomic status as well as other factors that can affect health outcomes. Although steps are taken in order to account for the heterogeneity of "race", it would be more advantageous to have detailed ethno-racial categories. It would be interesting to see whether the findings of this study continue to apply when specific ethno-racial categories are employed. Furthermore, the NPHS does not include a measure of discrimination or perceived discrimination. Such a measure would be useful in determining whether discrimination can account for the remaining variation in health between whites and non-whites born in Canada.

Thirdly, the findings of this analysis demonstrate the importance of accounting for immigrant status for health outcomes. Immigrant health differs from the health of the Canadian-born population and much of this is found to be due to socioeconomic status and the length of time in Canada. However, it should be noted that for the purposes of this analysis, the NPHS public data file does not distinguish between types of immigrants (i.e. refugees, economic immigrants, etc.). Refugees migrate under entirely different circumstances and experience different levels and types of immigration screening, inequality and discrimination when compared to economic immigrants. For example, refugees are exempt from the required health screening tests under section 38(2)(b) of the *Immigration and Refugee Protection Act*. Additionally, refugees may experience trauma associated with the situations in their homeland as well as with the process of migration.

Such processes have different consequences for health of economic immigrants and refugees.

The fourth limitation pertains to the socioeconomic status of food security. It should be noted that due to the exclusion of certain key populations by the NPHS such as Aboriginal people living on reserves as well as homeless people, the occurrence of food insecurity may be underestimated (Vozoris & Tarasuk, 2003).

Finally, issues relating to missing data arise due to the nature of survey data. Missing data are most evident for the variable measuring household income with 21.1% missing cases. The imputation of missing cases helps in the retention of cases but could also have biased the results for income.

Table 1. Mean Values of Self-Rated Health Based on Exogenous Variables

Variable	Mean	Std. Deviation	N
Race/Nativity:			
White – Canada	3.70	1.003	46,544
White – US/Europe/Aus	3.60*	1.049	6,997
White – Asia	3.95	.918	117
White – Other	3.91	.919	309
Non-white – Canada	3.45*	1.102	1,171
Non-white – US/Europe/Aus	3.75	1.064	109
Non-white – Asia	3.70	.956	1,476
Non-white – Other	3.75	1.044	824
Length of Time in Canada:			
0 to 4 years	3.86*	.919	542
5 to 9 years	3.87*	.935	1,015
10 years or more	3.60*	1.046	8,215
Born in Canada	3.69	1.006	47,775
Education:			
Secondary graduate or less	3.48	1.041	24,736
College diploma/other post-sec/some university	3.77*	.973	23,256
Bachelor's degree	4.04*	.880	7,222
Master's/doctorate/Med	4.09*	.863	1,873
Household Income:			
Low income	3.35	1.090	20,454
Medium income	3.81*	.931	26,111
High income	4.00*	.861	10,982
Occupation:			
Upper white collar	4.03*	.851	11,561
Lower white collar	3.89*	.878	10,822
Blue collar	3.78	.898	10,646
Farmers	3.77	.924	1,646
Other	3.30*	1.102	20,523
Food Insecurity:			
Received food from charity	2.98*	1.196	959
Did not receive food from charity	3.33*	1.124	2,689
Household never ran out of food	3.72	.993	53,899

Variable	Mean	Std. Deviation	N
Age:			
25-34	3.99	.877	13,692
35-44	3.84*	.935	14,020
45-54	3.69*	1.007	10,123
55-64	3.48*	1.074	7,767
65+	3.28*	1.039	11,945
Sex:			
Male	3.70	1.000	26,281
Female	3.67*	1.020	31,266
Province of Residence:			
Atlantic	3.64*	1.002	2,786
Prairie	3.65*	.994	21,060
Quebec	3.73	.982	1,991
Ontario	3.71	1.023	30,565
British Columbia	3.66	1.028	1,145
Marital Status:			
Married/common-law	3.75	.974	36,438
Single	3.77	.995	8,886
Widowed/separated/divorced	3.42*	1.083	12,223
Derived Household Size:			
1 person	3.51	1.080	14,196
2 persons	3.61*	1.027	19,716
3 persons	3.79*	.958	9,045
4 persons	3.89*	.906	9,553
5+ persons	3.88*	.901	5,037
Derived Type of Smoker:			
Daily smoker	3.56*	1.017	14,268
Occasional smoker	3.68*	1.013	2,007
Former daily smoker	3.61*	1.026	14,280
Former occasional smoker	3.80	.971	3,608
Never smoked	3.79	.990	23,384
Derived Type of Drinker:			
Regular drinker	3.84*	.926	31,251
Occasional drinker	3.63	1.010	12,563
Former drinker	3.33*	1.122	8,848
Abstainer	3.48*	1.104	4,885

Variable	Mean	Std. Deviation	N
Social Support:			
Someone to confide in:			
Yes	3.72	.997	52,165
No	3.37*	1.092	5,382
Someone to count on:			
Yes	3.70	1.001	54,909
No	3.28*	1.130	2,638
Someone who gives advice:			
Yes	3.71	.996	53,689
No	3.32*	1.133	3,858
Feel loved and cared for:			
Yes	3.70	1.003	55,646
No	3.27*	1.146	1,901

* denotes $p \leq .05$
Bolded categories denote the reference category.

Table 2. Mean Values of Chronic Conditions Based on Exogenous Variables

Variable	Mean	Std. Deviation	N
Race/Nativity:			
White – Canada	1.45	1.651	46,544
White – US/Europe/Aus	1.59*	1.717	6,997
White – Asia	1.06	1.452	117
White – Other	.98	1.229	309
Non-white – Canada	1.50	1.823	1,171
Non-white – US/Europe/Aus	1.12	1.282	109
Non-white – Asia	.84*	1.145	1,476
Non-white – Other	1.14	1.499	824
Length of Time in Canada:			
0 to 4 years	.64*	1.128	542
5 to 9 years	.69*	1.084	1,015
10 years or more	1.55*	1.680	8,215
Born in Canada	1.45	1.655	47,775
Education:			
Secondary graduate or less	1.57	1.735	24,736
College diploma/other post-sec/some university	1.41*	1.630	23,256
Bachelor's degree	1.18*	1.416	7,222
Master's/doctorate/Med	1.17*	1.420	1,873
Household Income:			
Low income	1.95*	1.920	20,454
Medium income	1.20*	1.448	26,111
High income	1.07	1.290	10,982
Occupation:			
Upper white collar	1.11*	1.338	11,561
Lower white collar	1.19*	1.410	10,822
Blue collar	.93	1.205	10,646
Farmers	1.01	1.278	1,646
Other	2.13*	1.944	20,523
Food Insecurity:			
Received food from charity	2.43*	2.247	959
Did not receive food from charity	1.94*	2.003	2,689
Household never ran out of food	1.40	1.609	53,899

Variable	Mean	Std. Deviation	N
Age:			
25-34	.91	1.223	13,692
35-44	1.04*	1.323	14,020
45-54	1.39*	1.628	10,123
55-64	1.78*	1.770	7,767
65+	2.35*	1.917	11,945
Sex:			
Male	1.13	1.386	26,281
Female	1.71*	1.803	31,266
Province of Residence:			
Atlantic	1.51	1.659	2,786
Prairie	1.40*	1.620	21,060
Quebec	1.17*	1.392	1,991
Ontario	1.48	1.683	30,565
British Columbia	1.54	1.679	1,145
Marital Status:			
Married/common-law	1.26	1.496	36,438
Single	1.21*	1.486	8,886
Widowed/separated/divorced	2.14*	1.984	12,223
Derived Household Size:			
1 person	1.95	1.926	14,196
2 persons	1.56*	1.672	19,716
3 persons	1.17*	1.431	9,045
4 persons	.96*	1.248	9,553
5+ persons	.95*	1.239	5,037
Derived Type of Smoker:			
Daily smoker	1.34	1.601	14,268
Occasional smoker	1.32	1.622	2,007
Former daily smoker	1.66*	1.741	14,280
Former occasional smoker	1.42	1.649	3,608
Never smoked	1.39	1.615	23,384
Derived Type of Drinker:			
Regular drinker	1.20*	1.419	31,251
Occasional drinker	1.60	1.737	12,563
Former drinker	1.97*	1.980	8,848
Abstainer	1.66	1.833	4,885

Variable	Mean	Std. Deviation	N
Social Support:			
Someone to confide in:			
Yes	1.42	1.631	52,165
No	1.71*	1.817	5,382
Someone to count on:			
Yes	1.43	1.637	54,909
No	1.76*	1.894	2,638
Someone who gives advice:			
Yes	1.41	1.625	53,689
No	1.87*	1.931	3,858
Feel loved and cared for:			
Yes	1.43	1.640	55,646
No	1.85*	1.907	1,901

* denotes $p \leq .05$
Bolded categories denote the reference category.

Table 3. Unstandardized and Standardized Regression Coefficients of Self-Rated Health and Predictors

Variable	Model 1		Model 2		Model 3	
	b	**Beta**	**b**	**Beta**	**b**	**Beta**
Demographic Variables:						
Female	-0.0137	-0.00674	-0.0140	-0.00691	-0.0141	-0.00693
Age (grouped)	-0.0725***	-0.232	-0.0727***	-0.233	-0.0730***	-0.234
Age spline	-0.0232**	-0.0412	-0.0232**	-0.0412	-0.0230**	-0.0408
Single	-0.130***	-0.0465	-0.115***	-0.0411	-0.115***	-0.0412
Widowed/separated/divorced	-0.136***	-0.0549	-0.130***	-0.0524	-0.130***	-0.0525
Atlantic	-0.0865***	-0.0184	-0.103***	-0.0219	-0.103***	-0.0218
Prairie	-0.0688***	-0.0328	-0.0724***	-0.0345	-0.0725***	-0.0345
Quebec	0.0173	0.00313	0.00547	0.000989	0.00577	0.00104
British Columbia	-0.0289	-0.00400	-0.0197	-0.00272	-0.0192	-0.00265
Household size	-0.0199**	-0.0249	-0.0130	-0.0163	-0.0131	-0.0164
Geo-racial Origins:						
Non-white – Canada			-0.255***	-0.0357	-0.255***	-0.0357
Non-white – US/Europe/Aus			-0.406	-0.0175	-0.453	-0.0195
Non-white – Asia			-0.176***	-0.0275	-0.216	-0.0337
Non-white – Other			-0.0806	-0.00948	-0.126	-0.0148
White – US/Europe/Aus			-0.00806	-0.00261	-0.0550	-0.0178
White – Asia			-0.0829	-0.00370	-0.128	-0.00570
White – Other			-0.159	-0.0115	-0.205	-0.0148
Length of Time in Canada:						
0 to 4 years					-0.00612	-0.000585
5 to 9 years					0.0495	0.00644
10 years or more					0.0502	0.0174
R-Square	**0.0672**		**0.0702**		**0.0703**	
N	**57,547**		**57,547**		**57,547**	

*** p<.01, ** p<.05, * p<.1

Reference categories: male, married/common-law, Ontario, White – Canada, born in Canada. secondary school or less, blue collar, household never ran out of food, never smoked, occasional drinker, has somebody to confide in, count on in crisis, provide advice and feels loved.

Table 3. Unstandardized and Standardized Regression Coefficients of Self-Rated Health and Predictors (cont'd)

Variable	Model 4		Model 5		Model 6	
	b	**Beta**	**b**	**Beta**	**b**	**Beta**
Demographic Variables:						
Female	0.0419**	0.0206	0.0496***	0.0244	0.0393**	0.0194
Age (grouped)	-0.0639***	-0.204	-0.0613***	-0.196	-0.0587***	-0.188
Age spline	0.0430***	0.0764	0.0360***	0.0640	0.0329***	0.0584
Single	-0.0530*	-0.0189	-0.0506*	-0.0181	-0.0436	-0.0156
Widowed/separated/divorced	-0.0171	-0.00693	-0.00115	-0.000464	0.0112	0.00454
Atlantic	-0.0255	-0.00541	-0.00751	-0.00159	-0.00816	-0.00173
Prairie	-0.0701***	-0.0334	-0.0656***	-0.0313	-0.0626***	-0.0298
Quebec	0.0533**	0.00964	0.0567**	0.0102	0.0684***	0.0124
British Columbia	-0.0246	-0.00339	-0.0278	-0.00384	-0.0266	-0.00368
Household size	-0.0222***	-0.0277	-0.0177**	-0.0222	-0.0181**	-0.0226
Geo-racial Origins:						
Non-white – Canada	-0.144***	-0.0201	-0.133**	-0.0186	-0.127**	-0.0177
Non-white – US/Europe/Aus	-0.552*	-0.0237	-0.554*	-0.0238	-0.573**	-0.0246
Non-white – Asia	-0.335**	-0.0524	-0.340**	-0.0532	-0.338**	-0.0528
Non-white – Other	-0.184	-0.0216	-0.217	-0.0255	-0.228	-0.0268
White – US/Europe/Aus	-0.174	-0.0564	-0.205	-0.0664	-0.213	-0.0690
White – Asia	-0.345	-0.0154	-0.383	-0.0171	-0.355	-0.0158
White – Other	-0.361*	-0.0261	-0.391*	-0.0283	-0.401*	-0.0290
Length of Time in Canada:						
0 to 4 years	0.259	0.0247	0.277	0.0265	0.297	0.0284
5 to 9 years	0.216	0.0281	0.229	0.0298	0.259	0.0338
10 years or more	0.158	0.0547	0.175	0.0606	0.188	0.0649
Socioeconomic Status:						
Income	0.0729***	0.108	0.0588***	0.0868	0.0560***	0.0826

Table 3. Unstandardized and Standardized Regression Coefficients of Self-Rated Health and Predictors (cont'd)

Variable	Model 4		Model 5		Model 6	
	b	**Beta**	**b**	**Beta**	**b**	**Beta**
Other post-sec/some uni/college	0.119***	0.0578	0.0986***	0.0479	0.0988***	0.0480
Bachelor's degree	0.293***	0.0961	0.236***	0.0773	0.234***	0.0768
Master's/doctorate/Med	0.319***	0.0561	0.257***	0.0451	0.251***	0.0440
Upper white collar	0.0602**	0.0239	0.0445	0.0176	0.0415	0.0165
Lower white collar	0.0436	0.0169	0.0327	0.0126	0.0287	0.0111
Farmers	0.0740*	0.0122	0.0659	0.0109	0.0599	0.00988
Other	-0.276***	-0.131	-0.271***	-0.129	-0.274***	-0.130
Received food from charity	-0.523***	-0.0663	-0.480***	-0.0608	-0.464***	-0.0588
Did not receive food from charity	-0.244***	-0.0510	-0.206***	-0.0430	-0.197***	-0.0411
Lifestyle:						
Daily smoker			-0.219***	-0.0936	-0.215***	-0.0918
Occasional smoker			-0.141***	-0.0255	-0.140***	-0.0254
Former daily smoker			-0.0853***	-0.0365	-0.0817***	-0.0349
Former occasional smoker			-0.0130	-0.00312	-0.0126	-0.00301
Regular drinker			0.0967***	0.0477	0.0984***	0.0485
Former drinker			-0.167***	-0.0591	-0.160***	-0.0566
Abstainer			-0.0664*	-0.0183	-0.0623*	-0.0172
Social Support:						
Has nobody to confide in					-0.0721**	-0.0208
Has nobody to count on in crisis					-0.0374	-0.00774
Has nobody to provide advice					-0.138***	-0.0340
Does not feel loved or cared for					-0.0502	-0.00887
R-Square	**0.1323**		**0.1463**		**0.1496**	
N	**57,547**		**57,547**		**57,547**	

*** p<.01, ** p<.05, * p<.1

Table 4. Unstandardized Tobit Coefficients of Chronic Conditions and Predictors

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	b	b	b	b	b	b
Demographic Variables:						
Female	0.560***	0.559***	0.560***	0.452***	0.448***	0.457***
Age (grouped)	0.0730***	0.0775***	0.0705***	0.108***	0.0967***	0.0935***
Age spline	0.130***	0.128***	0.132***	0.0527***	0.0595***	0.0628***
Single	0.0722**	0.0763***	0.0682**	-0.0257	-0.0119	-0.0160
Widowed/separated/divorced	0.351***	0.349***	0.348***	0.204***	0.208***	0.192***
Atlantic	0.397***	0.340***	0.339***	0.280***	0.256***	0.255***
Prairie	-0.168***	-0.202***	-0.206***	-0.209***	-0.214***	-0.216***
Quebec	0.244***	0.210***	0.208***	0.170***	0.167***	0.169***
British Columbia	0.513***	0.515***	0.513***	0.469***	0.453***	0.451***
Household size	-0.0409***	-0.0299***	-0.0326***	-0.0200**	-0.0245***	-0.0236***
Geo-Racial Origins:						
Non-white – Canada		0.336***	0.334***	0.225***	0.216***	0.205***
Non-white – US/Europe/Aus		0.323**	0.172	0.158	0.224	0.250
Non-white – Asia		-0.409***	-0.436***	-0.391***	-0.316**	-0.317**
Non-white – Other		-0.152**	-0.239	-0.271*	-0.207	-0.192
White – US/Europe/Aus		-0.168***	-0.332**	-0.283**	-0.230	-0.222
White – Asia		-0.128	-0.246	-0.238	-0.151	-0.177
White – Other		-0.177*	-0.302*	-0.309*	-0.255	-0.229
Length of Time in Canada:						
0 to 4 years			-0.454***	-0.679***	-0.707***	-0.726***
5 to 9 years			-0.144	-0.205	-0.234	-0.273*
10 years or more			0.214	0.176	0.134	0.120
Socioeconomic Status:						
Income				-0.0657***	-0.0531***	-0.0506***
Other post-sec/some uni/college				0.263***	0.276***	0.272***
Bachelor's degree				0.140***	0.189***	0.184***
Master's/doctorate/Med				0.197***	0.255***	0.261***

Reference categories: male, married/common-law, Ontario, White – Canada, born in Canada. secondary school or less, blue collar, household never ran out of food, never smoked, occasional drinker, has somebody to confide in, count on in crisis, provide advice and feels loved.

Table 4. Unstandardized Tobit Coefficients of Chronic Conditions and Predictors (cont'd)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	b	b	b	b	b	b
Upper white collar				0.151***	0.145***	0.149***
Lower white collar				0.0956***	0.0892***	0.0926***
Farmers				-0.147*	-0.149**	-0.146*
Other				0.532***	0.515***	0.521***
Received food from charity				0.985***	0.954***	0.929***
Did not receive food from charity				0.656***	0.632***	0.625***
Lifestyle:						
Daily smoker					0.105***	0.0980***
Occasional smoker					0.0605	0.0606
Former daily smoker					0.200***	0.195***
Former occasional smoker					0.0526	0.0519
Regular drinker					-0.164***	-0.164***
Former drinker					0.203***	0.194***
Abstainer					-0.156***	-0.163***
Social Support:						
Has nobody to confide in						-0.0969***
Has nobody to count on in crisis						0.0900*
Has nobody to provide advice						0.274***
Does not feel loved or cared for						0.0368
Pseudo R-Square	**0.0321**	**0.0328**	**0.0332**	**0.0394**	**0.0408**	**0.0411**
N	**57,547**	**57,547**	**57,547**	**57,547**	**57,547**	**57,547**

*** p<.01, ** p<.05, * p<.1

Table 5. Logistic Regression Coefficients for Detailed Chronic Conditions

Variable	Food Allergies		Other Allergies		Asthma		Arthritis/Rheumatism	
	b	exp (b)	b	exp (b)	b	exp (b)	b	exp (b)
Geo-racial Origins:								
Non-white – Canada	0.373**	1.452084	0.107	1.112934	0.373*	1.452084	0.241	1.272521
Non-white – US/Europe/Aus	-2.134**	0.118363	-0.137	0.87197	-0.0915	0.912561	0.0971	1.101971
Non-white – Asia	-1.445**	0.235746	0.0777	1.080798	-1.686**	0.185259	-0.774	0.461165
Non-white – Other	-1.214*	0.297007	0.177	1.193631	-0.830	0.436049	-0.653	0.520482
White – US/Europe/Aus	-1.426**	0.240268	0.0633	1.065346	-0.519	0.595115	-0.384	0.681131
White – Asia	-1.483*	0.226956	0.154	1.166491	-1.377	0.252334	-0.492	0.611402
White – Other	-1.887***	0.151526	0.00655	1.006571	-1.935**	0.144424	-0.800	0.449329
Length of Time in Canada:								
0 to 4 years	0.155	1.167658	-1.413***	0.243412	-0.259	0.771823	-0.393	0.675029
5 to 9 years	0.740	2.095936	-0.652	0.521003	0.0248	1.02511	-0.283	0.75352
10 years or more	1.204*	3.333424	-0.250	0.778801	0.456	1.57775	0.348	1.416232
Socioeconomic Status:								
Income	-0.0554*	0.946107	-0.0230	0.977262	-0.0753**	0.927465	-0.0362*	0.964447
Other post-sec/some uni/college	0.298***	1.347162	0.389***	1.475505	0.191**	1.210459	0.0749	1.077776
Bachelor's degree	0.332***	1.393753	0.497***	1.643783	0.181	1.198415	-0.203**	0.816278
Master's/doctorate/Med	0.405**	1.499303	0.464***	1.590423	0.304	1.355269	-0.289*	0.749012
Upper white collar	0.569***	1.7665	0.126	1.134282	0.395***	1.484384	-0.186*	0.830274
Lower white collar	0.322**	1.379885	0.0506	1.051902	0.0959	1.100649	-0.266***	0.766439
Farmers	-0.0451	0.955902	0.0815	1.084913	-0.135	0.873716	0.0832	1.086759
Other	0.324**	1.382647	0.111	1.117395	0.412***	1.509834	0.270***	1.309964
Received food from charity	0.130	1.138828	0.0810	1.084371	0.0625	1.064494	0.689***	1.991723
Did not receive food from charity	0.283**	1.327105	0.220**	1.246077	0.232*	1.26112	0.645***	1.905987

*** p<.01, ** p<.05, * p<.1

All other predictors are included in the model.

Table 5. Logistic Regression Coefficients for Detailed Chronic Conditions (cont'd)

Variable	Back Problems		High Blood Pressure		Migraine Headaches		Bronchitis/Emphysema	
	b	exp (b)	b	exp (b)	b	exp (b)	b	exp (b)
Geo-racial Origins:								
Non-white – Canada	0.104	1.1096	0.189	1.208041	0.0521	1.053481	-0.106	0.899425
Non-white – US/Europe/Aus	-0.316	0.729059	-0.141	0.868489	0.699	2.01174		
Non-white – Asia	-0.605	0.546074	-0.452	0.636354	-0.500	0.606531	-0.995	0.369723
Non-white – Other	-0.409	0.664314	-0.289	0.749012	-0.127	0.880734	-0.365	0.694197
White – US/Europe/Aus	-0.381	0.683178	-0.810	0.444858	0.0824	1.08589	-0.0198	0.980395
White – Asia	-0.374	0.687977	-1.234	0.291126	-0.540	0.582748	0.520	1.682028
White – Other	-1.080*	0.339596	-1.369	0.254361	-0.451	0.636991	0.694	2.001706
Length of Time in Canada:								
0 to 4 years	-0.482	0.617547	-0.305	0.737123	0.0266	1.026957	-1.875	0.153355
5 to 9 years	0.141	1.151425	0.688	1.989732	-0.331	0.718205	-0.700	0.496585
10 years or more	0.366	1.441955	0.865	2.375006	0.0917	1.096036	-0.500	0.606531
Socioeconomic Status:								
Income	-0.0210	0.979219	0.0154	1.015519	-0.0188	0.981376	-0.0945**	0.909828
Other post-sec/some uni/college	0.266***	1.304735	-0.0440	0.956954	0.184**	1.202016	-0.0381	0.962617
Bachelor's degree	-0.0414	0.959445	-0.166	0.847046	0.112	1.118513	-0.389*	0.677734
Master's/doctorate/Med	0.0737	1.076484	-0.218	0.804125	0.0450	1.046028	-0.434	0.647912
Upper white collar	-0.0594	0.94233	-0.0758	0.927002	-0.0897	0.914205	0.113	1.119632
Lower white collar	-0.0753	0.927465	0.153	1.165325	-0.0113	0.988764	0.0976	1.102522
Farmers	0.0685	1.070901	0.0933	1.097791	-0.740***	0.477114	-0.429	0.65116
Other	0.186**	1.204422	0.442***	1.555816	0.149	1.160673	0.548***	1.72979
Received food from charity	0.647***	1.909803	0.384**	1.468145	0.436***	1.546509	0.943***	2.567673
Did not receive food from charity	0.664***	1.942547	0.326**	1.385415	0.437***	1.548056	0.254	1.289172

*** p<.01, ** p<.05, * p<.1

All other predictors are included in the model.

Table 5. Logistic Regression Coefficients for Detailed Chronic Conditions (cont'd)

Variable	Sinusitis		Diabetes		Heart Disease		Cancer	
	b	exp (b)	b	exp (b)	b	exp (b)	b	exp (b)
Geo-racial Origins:								
Non-white – Canada	0.113	1.119632	0.545**	1.724608	-0.378	0.685231	-1.385***	0.250324
Non-white – US/Europe/Aus	0.522	1.685395	1.650	5.20698	-0.958	0.383659		
Non-white – Asia	-0.0548	0.946674	0.342	1.40776	0.312	1.366155	-1.010*	0.364219
Non-white– Other	0.572	1.771807	0.295	1.343126	0.110	1.116278	-1.346**	0.260279
White – US/Europe/Aus	-0.0105	0.989555	-0.0113	0.988764	0.286	1.331092	-0.0726	0.929973
White – Asia	0.0915	1.095817	-0.688	0.50258	-0.588	0.555437	-2.962***	0.051715
White – Other	1.731**	5.646297	-0.803	0.447983	0.103	1.108491	-3.091***	0.045456
Length of Time in Canada:								
0 to 4 years	-1.909**	0.148229	-0.624	0.535797	-0.955	0.384812		
5 to 9 years	-0.961	0.38251	-0.00255	0.997453	-0.294	0.745276	-0.217	0.80493
10 years or more	-0.480	0.618783	-0.174	0.840297	-0.474	0.622507		
Socioeconomic Status:								
Income	-0.0667*	0.935476	-4.17e-05	0.999958	-0.0362	0.964447	-0.0339	0.966668
Other post-sec/some uni/college	0.256***	1.291753	0.0114	1.011465	-0.0305	0.96996	0.227	1.25483
Bachelor's degree	0.241*	1.272521	-0.0989	0.905833	-0.0843	0.919155	-0.0950	0.909373
Master's/doctorate/Med	0.836***	2.30712	0.117	1.124119	-0.0777	0.925242	0.203	1.225072
Upper white collar	-0.0184	0.981768	-0.318	0.727603	0.0993	1.104398	0.713**	2.040102
Lower white collar	-0.0103	0.989753	0.0190	1.019182	0.0387	1.039459	0.632**	1.88137
Farmers	0.244	1.276344	-0.470	0.625002	0.330	1.390968	0.165	1.179393
Other	0.234	1.263644	0.550**	1.733253	0.667***	1.948383	1.501***	4.486173
Received food from charity	0.730***	2.075081	0.375	1.454991	0.948***	2.580543	1.105**	3.019224
Did not receive food from charity	0.318**	1.374376	0.331*	1.39236	0.520***	1.682028	0.496*	1.64214

*** p<.01, ** p<.05, * p<.1

All other predictors are included in the model.

Table 5. Logistic Regression Coefficients for Detailed Chronic Conditions (cont'd)

Variable	Stomach Ulcers		Urinary Incontinence		Bowel Disorder		Cataracts	
	b	exp (b)	b	exp (b)	b	exp (b)	b	exp (b)
Geo-racial Origins:								
Non-white – Canada	0.309	1.362062	-0.476	0.621263	-0.612**	0.542265	0.452	1.571452
Non-white – US/Europe/Aus	-1.706	0.181591	-0.250	0.778801	-0.449	0.638266	-3.284***	0.037478
Non-white – Asia	-0.0983	0.906377	-1.227	0.293171	-2.085***	0.124307		
Non-white – Other	-0.179	0.836106	-0.695	0.499074	-1.015**	0.362402	-1.742**	0.17517
White – US/Europe/Aus	-0.718	0.487727	-0.0630	0.938943	-0.284*	0.752767	-1.754**	0.17308
White – Asia	-0.486	0.615082	-0.142	0.867621	0.0824	1.08589	-2.885***	0.055855
White – Other	-0.265	0.767206	-0.821	0.439991	-1.125*	0.324652	-1.845**	0.158025
Length of Time in Canada:								
0 to 4 years	-0.0170	0.983144	0.854	2.349024	0.496	1.64214	1.686*	5.397846
5 to 9 years	0.00501	1.005023	0.609	1.838592	-0.507	0.6023	1.461	4.310268
10 years or more	0.720	2.054433	-0.176	0.838618			1.645**	5.18101
Socioeconomic Status:								
Income	-0.107**	0.898526	-0.118**	0.888696	-0.0340	0.966572	-0.0673	0.934915
Other post-sec/some uni/college	-0.0937	0.910556	0.149	1.160673	0.122	1.129754	0.0233	1.023574
Bachelor's degree	-0.707***	0.493121	0.356	1.427608	0.302	1.352561	0.000384	1.000384
Master's/doctorate/Med	-0.758**	0.468603	-0.211	0.809774	0.426	1.531121	-0.350	0.704688
Upper white collar	0.157	1.169996	0.441	1.554261	0.155	1.167658	-0.0666	0.935569
Lower white collar	-0.327*	0.721084	0.230	1.2586	0.0259	1.026238	-0.280	0.755784
Farmers	-0.312	0.731982	0.135	1.144537	-1.223***	0.294346	0.414	1.512857
Other	0.101	1.106277	1.059***	2.883486	0.467*	1.595201	0.508	1.661964
Received food from charity	0.672***	1.95815	0.341	1.406353	0.901***	2.462064	0.944**	2.570242
Did not receive food from charity	0.414**	1.512857	0.703***	2.019803	0.651***	1.917457	0.0123	1.012376

*** p<.01, ** p<.05, * p<.1

All other predictors are included in the model.

Table 5. Logistic Regression Coefficients for Detailed Chronic Conditions (cont'd)

Variable	Glaucoma		Thyroid		Stroke		Other Chronic	
	b	exp (b)	b	exp (b)	b	exp (b)	b	exp (b)
Geo-racial Origins:								
Non-white – Canada	0.475	1.608014	0.316	1.37163	0.0370	1.037693	-0.517**	0.596307
Non-white – US/Europe/Aus	-2.297	0.10056	2.621***	13.74947	0.433	1.541876	1.012	2.751098
Non-white – Asia	-1.481	0.22741	1.071	2.918296	-1.064	0.345073	0.0244	1.0247
Non-white – Other	0.354	1.424755	0.801	2.227768	-0.836	0.433441	-0.444	0.641465
White – US/Europe/Aus	-0.411	0.662987	1.155*	3.174023	0.0958	1.100539	-0.191	0.826133
White – Asia	-0.343	0.709638	1.448	4.254597			1.482	4.40174
White – Other	0.239	1.269979	-0.426	0.653116	-1.577	0.206594	1.197	3.310171
Length of Time in Canada:								
0 to 4 years	-0.874	0.417279	-2.449***	0.08638	0.443	1.557372	-0.743	0.475685
5 to 9 years	0.226	1.253576	-1.436*	0.237877	0.314	1.36889	-0.221	0.801717
10 years or more	0.212	1.236148	-1.140*	0.319819	0.130	1.138828	0.0683	1.070686
Socioeconomic Status:								
Income	-0.0250	0.97531	0.0525	1.053903	-0.0657	0.936412	0.0193	1.019487
Other post-sec/some uni/college	0.294*	1.341784	0.268***	1.307347	-0.00446	0.99555	0.187**	1.205627
Bachelor's degree	0.214	1.238623	-0.177	0.83778	-0.111	0.894939	0.322**	1.379885
Master's/doctorate/Med	-0.265	0.767206	0.427	1.532653	-0.257	0.773368	0.618**	1.855214
Upper white collar	0.339	1.403543	0.153	1.165325	-0.292	0.746769	0.138	1.147976
Lower white collar	-0.180	0.83527	-0.106	0.899425	0.173	1.188866	0.326**	1.385415
Farmers	0.438	1.549605	-0.00179	0.998212	-0.258	0.772595	0.291	1.337765
Other	0.684**	1.981789	0.367*	1.443398	1.096***	2.992173	0.708***	2.029927
Received food from charity	-0.466	0.627507	-0.0467	0.954374	0.0169	1.017044	0.953***	2.593478
Did not receive food from charity	-0.165	0.847894	0.227	1.25483	0.291	1.337765	0.397***	1.487356

*** p<.01, ** p<.05, * p<.1

All other predictors are included in the model.

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