

Vancouver Centre of Excellence



Research on Immigration and Integration in the Metropolis

Working Paper Series

No. 05-15

Health Care Utilization of Later-Stage Immigrants in British Columbia

Zheng Wu and Christoph M. Schimmele

June 2005

RIIM

Research on Immigration and Integration in the Metropolis

The Vancouver Centre is funded by grants from the Social Sciences and Humanities Research Council of Canada, Citizenship & Immigration Canada, Simon Fraser University, the University of British Columbia and the University of Victoria. We also wish to acknowledge the financial support of the Metropolis partner agencies:

- Health Canada
- Human Resources Development Canada
- Department of Canadian Heritage
- Department of the Solicitor General of Canada
- Status of Women Canada
- Canada Mortgage and Housing Corporation
- Correctional Service of Canada
- Immigration & Refugee Board

Views expressed in this manuscript are those of the author(s) alone. For more information, contact the Co-directors of the Centre, Dr. Don DeVoretz, Department of Economics, SFU (e-mail: devoretz@sfu.ca) or Dr. Daniel Hiebert, Department of Geography, UBC (e-mail: dhiebert@geog.ubc.ca).

Health Care Utilization of Later-Stage Immigrants in British Columbia*

Zheng Wu
Christoph M. Schimmele
Department of Sociology
University of Victoria
P. O. Box 3050
Victoria, BC
V8W 3P5

June 2005

*The authors gratefully acknowledge financial support from a Research on Immigration and Integration in the Metropolis (RIIM) grant. Additional research support was provided by the Department of Sociology, the University of Victoria. Direct E-mail to: zhengwu@uvic.ca

Abstract: Using the 2000-01 Canadian Community Health Survey (Cycle 1.1), British Columbia component, this study compares later-stage immigrants (individuals aged ≥ 45 year upon immigration) to non-immigrants in terms of health care utilization. The findings indicate that later-stage immigrants utilize fewer health care resources than non-immigrants; in specific, later-stage immigrants have a lower hospitalization rate, fewer medical doctor visits, and fewer non-medical doctor visits. Health care utilization among later-stage immigrants is also lower compared to immigrants whose age at immigration was under 45 years. Except for non-medical doctor usage, this study observes that these health care utilization differences disappear after introducing controls for medical needs, and a comparatively low prevalence of chronic conditions among later-stage immigrants appears to account for their lower health resources consumption. The difference in non-medical doctor visits between later-stage immigrants and non-immigrants attenuates after introducing controls based on the Andersen-Newman model of health care utilization. These results suggest that socio-demographic and behavioral characteristics account for an under-utilization of non-MD care among later-stage immigrants.

Key Words: Later-stage immigration, health care utilization, unmet health needs, British Columbia

Introduction

The “sustainability” question is integral to current debates on the Canadian health care system. Established in 1971, the Canadian public health insurance program was designed to provide all legal residents with complete coverage for medically necessary consultations, examinations, treatments, and hospitalizations, regardless of individual differences in income level and employment status (Berlin-Deber, 2003). The popular opinion, however, is that the single-payer health care system is reaching a breaking point. The excessively long waiting periods for essential services and the affordability of sustaining a comprehensive and universal insurance program are predominant concerns among policy-makers, taxpayer advocacy groups, pundits, and health care users. An article distributed by the Associated Press outlines the putative health care delivery crisis emerging on the horizon, emphasizing that fiscal constraints and untimely access to crucial services threaten to undermine the system (Duff-Brown 2005). The article reports that the average waiting time between GP referrals and getting treatment for British Columbians neared 20 weeks in 2004, double the 1993 waiting period. This startling increase in waiting time is very likely associated with a parallel rise in the overall demand for services, and may therefore reflect changing health care utilization rates.

What accounts for health care utilization? Although related, health care utilization and health care access are not equivalent concepts. Health care access refers to the regional availability of health care services, timely treatment, and equitable delivery of medically necessary health services. Health care utilization is a measurement of the usage of available health care services. Under universal health care, medical need is obviously the most important determinant of health care utilization, but non-medical factors also influence the consumption of health care services. For example, some individuals may under-utilize non-critical care because they are uneducated about or indifferent toward the benefits of getting regular check-ups and using preventive medicine (Goddard and Smith 2001). Hence, health care utilization encompasses several basic policy issues:

- Health care utilization involves patterned social differences in the consumption of health care services.
- Health care utilization indicates individual differences in health care demands that involve factors other than medical needs.
- Health care utilization patterns identify the heaviest consumers and the under-consumers of health care resources.

These are imperative issues because the cost-effective delivery of health care services appears to be a growing dilemma. The British Columbian government already allocates 42% of the provincial

budget to health care, which leaves little room for further spending without compromising other programs or raising taxes. Health care utilization represents a barometer of effective demand for health care resources, and thus informs policy-makers about the social distribution of health care consumption. Understanding this distribution has two principal policy implications. First, knowledge about this distribution is necessary for reducing heavy usage by specifically targeting high users with less costly preventive interventions. Second, this distribution helps gauge whether under-utilization is symptomatic of social disparities in health care usage.

Prior research documents that health care utilization differs across the Canadian population by age, gender, income, province, and rural residence (Statistics Canada 1999). Our contribution to this literature involves analysis of health care utilization in British Columbia, comparing later-stage immigrants (definition below) to non-immigrants. In general, immigrants (especially recent, visible minority migrants) have fewer medical needs than non-immigrants – health scientists term this finding the *healthy migrant effect* – and immigrants use hospital and physician services in similar amounts as non-immigrants (Chen, Ng, and Wilkins 1996). Medical screening regulations within Canadian immigration policy and a selection effect in the migration process largely account for this effect (Kinnon 1999). As the immigrant population is heterogeneous, however, the healthy migrant effect may be disproportionately concentrated among specific immigrants while others experience health disadvantages.

Our primary objective is to determine whether later-stage immigration affects the demand for health care services. Our analysis begins by investigating whether differences in medical need accounts for variation in health care utilization between these immigrants and non-immigrants. We also identify the specific medical needs that account for this variation. Our main analysis continues by examining whether socio-demographic and behavioural differences, *independent of medical need*, explain these differences in health care utilization. The study concludes by indicating whether unmet health needs disparities obtain between our comparison groups.

Immigration to British Columbia

Current immigration trends are transforming the socio-demographic profiles, cultural environments, and economies of Canada's largest metropolitan areas (Hiebert 1998). In general, British Columbia offers fertile ground for estimating the impact immigration has on host populations. The province is a principal host population for immigration to Canada and North America, and receives 35–38,000 immigrants per annum (Statistics Canada 2003). These immigrants arrive largely from non-European sources, with most coming from Asian countries. Amounting to one-fifth of Canadian immigrants, around 26% of British Columbia's population is foreign-born, and 60% of these immigrants are visible racial/ethnic minorities.

By comparison, California, which hosts more immigrants than any other US state, is 22% foreign-born (Malone, Baluja, Costanzo, and Davis 2004). For the BC lower mainland, China, Hong Kong, Taiwan, and India represented the principal source countries from 1991–2001, accounting for almost two-thirds of 1990s immigration (Statistics Canada 2003). This immigration pattern is driving the rapid racial/ethnic diversification of the lower mainland. In 2001, visible minorities – who Statistics Canada defines as non-White persons other than Aboriginals – accounted for over 36% of the lower mainland’s general population (compared to 14% in 1981), which is considerably above the 13% national average. One-third of the lower mainland’s population has Asian racial/ethnic origins.

As classical migration theory suggests, voluntary immigration tends to “select” younger individuals as these people experience fewer social and personal obstacles to cross-border mobility. Indeed, age appears to be the most important factor influencing who migrates, and the “risk” of immigration is highest among those aged 18–30 years (Koby, Harner, and Gober 2004). Of BC immigrants landing in 2000, 50.3% were aged 25–44 years and 14.5% were aged 15–24 years (Bauder, Waters, and Teo 2001). Another 19.9% were aged ≤ 14 years, but the individuals within this age group are rarely selected through conventional push-pull forces because most arrive as dependents of older immigrants. As most immigration occurs during early life course stages, our study defines later life course stage immigrants (termed *later-stage immigrants*) as individuals aged ≥ 45 years upon arrival to Canada. These immigrants accounted for 15.4% of all arrivals to BC in 2000. As life course theory suggests, the timing of an event influences how the event “behaves” in terms of individual outcomes (Elder 1985). Age upon arrival is an important consideration because this variable influences individual differentials in services consumption, health risks, labor market status, and the capacity to integrate into the host population (Angel, Buckley, and Sakamoto 2001; de Vries 1999; Health Canada 2002; Kinnon 1999; Schaafsma and Sweetman 2001).

Health Care Utilization Patterns

In the United States, socioeconomic status is a major determinant of health care utilization because the affordability of health insurance is the primary barrier that prevents low-income persons from receiving adequate health care. In contrast, the Canada Health Act (1984) guarantees all Canadians equal access to all medically necessary services and treatment, but demographic, social, and environmental factors remain influential forces on health care utilization patterns among Canadians. According to National Population Health Survey (NPHS) data, 81% of Canadians contacted a medical doctor in 1998–99 (Statistics Canada 1999). However, the prevalence of contacting a medical doctor (MD) varied within the general population by age, gender, rural residence, household income, and province. Of these

demographic characteristics, age seems to have the strongest effect on health care utilization. Aging consistently increases the MD contact rate: 91% of Canadians aged ≥ 65 years contacted a MD in 1998–99, compared with 83% of those aged 45 – 64 years and 79% of those aged 25–44 years. A similar pattern obtained for the consumption of other medical services. About 28% of individuals aged ≥ 80 years received formal home care, compared to 8% of those aged 65 – 79 years and 1% of those aged under 65 years. The NPHS further indicates that 16% of those aged ≥ 65 years reported being hospitalized in the 12 months preceding the survey, compared to 7% of those aged 45 – 64 years and 6% of those aged 25–44 years.

The relatively high risk of health care utilization among Canada's elderly individuals stems largely from their high need-based demand for health care. Population aging is a complex phenomenon concerning more than just well-being among elderly persons, for it encompasses important issues for general public health, especially the delivery and availability of services (Health Canada 2002). A hot concern is the implications of Canada's "greying" age structure for present and future health care consumption, and how expected increases in such consumption can be managed to maintain access to health care services without massive spending increases. As of 2004, Statistics Canada data indicate that British Columbia has over 1 million persons aged ≥ 55 years, which translates into roughly one-quarter of the provincial population (BC Stats, 2005). This compares to 600,000 individuals in 1984, or 20% of the population, which illustrates that people aged ≥ 55 years are increasing in both absolute and proportional numbers. Today, BC seniors (individuals aged ≥ 65 years) account for 14% of the population. The BC oldest old (individuals aged ≥ 80 years) number 158,000 individuals, up from 65,410 in 1984, which represents a crude indication of increasing longevity (and inter-provincial migration patterns). For women, Canada-wide life expectancy at birth has increased from 76 years to 81.4 years between 1970 and 1997; for men, the increase went from 69 years to 75.8 years (Health Canada, 2002). These upward trends are expected to continue into the future.

In general, people are living longer, but are they also living better in terms of their health status? There is no question that biological realities increase the chances of disease and disability among elderly persons, which thus implies that lower mortality rates may expose individuals to more cumulative health problems and more time spent living with a health problem (Crimmins, Hayward, and Saito 1994). However, most Canadian seniors rate their health good (38%), very good (28%), or excellent (12%), which is a very positive sign that living in decent health does indeed accompany gains in longevity (Health Canada, 2002). Nevertheless, one-quarter of Canadians aged ≥ 65 years and one-half of those aged ≥ 85 years experience activities of daily living (ADL) restrictions associated with a long-term health problem. Of those with severe disabilities and living alone, a very large proportion draw upon formal support from external agencies (e.g., public and private home care services) to complete daily tasks

(Moore, Rosenberg, and Fitzgibbon 1999). Among this group, for instance, 71% of women and 63% of men required formal meal preparation services; and 77% of women and 64% of men required assistance for personal care, such as bathing, dressing, and transferring. The prevalence of chronic conditions (e.g., arthritis, high blood pressure, heart disease) also increases with advanced age (Moore, Rosenberg, and Fitzgibbon 1999; Rosenberg and Moore 1997). Around 72% of men and 78% of women aged ≥ 55 years report at least one chronic condition, and 27% of men and 33% of women aged ≥ 55 years report 3 or more conditions.

What are the implications of population aging for health services utilization? Rapid population aging holds the potential of imposing a heavy health care burden on the economy and thus the working-age population (Rapoport, Jacobs, Bell, and Klarenbach 2004). Between 1991 and 2011, Moore and associates (1999) project a 71–75% increase (dependent upon gender) in the need for ADL support among Canadian seniors. They anticipate similarly large increases in the absolute prevalence of chronic conditions, including life-threatening and costly disorders such as heart disease and stroke. Although comparable Canadian figures are unavailable, US figures offer some idea of the financial burden associated with treating chronic conditions. In 1999, among Medicare beneficiaries, per capital expenditures amounted to US \$211 among individuals without a chronic condition compared to US \$13,973 among individuals with 4 or more conditions (Wolff, Starfield, and Anderson 2002).

Of course, new literature discredits the alarmist interpretation of population aging, termed apocalyptic demography, and observes that population aging is a *putative* problem that can be resolved by adapting social policies and public institutions to accommodate this demographic transition (Cheal 2003; Gee and Gutman 2000). Indeed, if a health care crisis obtains, this will be triggered by *disproportionate* growth in health care utilization by elderly persons, not simply growth in the *potential* number of elderly users (Barer, Evans, Hertzman, and Lomas 1987). If only the number of elderly persons determined health care utilization, then policy-makers could not manage the impact of demographic change; but the demand for health care, on the other hand, has definite policy solutions (e.g., preventive medicine), which suggests that normal economic growth can support population aging.

NPHS data illustrate that age influences overall health care utilization (Rosenberg and Moore 1997). For those with poor self-reported health, there are small age-specific differences in the number of general practitioner (GP) consultations. For those with good self-reported health (SRH), however, there appears to be an age-specific effect. Interestingly, among elderly persons, especially men, GP consultations are *higher* for those with good to excellent SRH than for those with fair to poor SRH. For example, men aged 65–69 years with good to excellent SRH report an average of about 9 GP visits per annum, compared to under 4 visits among those with fair to poor SRH. This finding appears to suggest that GP consultations may be an important source of health management and preventive medicine. But

SRH among elderly persons is rather complex: for example, prior research observes that elderly persons are less likely than younger persons to report themselves as being “sick” despite having higher a morbidity rate (Clarke 1987). As a subjective assessment, SRH is a general indicator of successful ageing, and partially reflects an individual’s ability to effectively adapt to their changing health status and life circumstances (Smith, Borchelt, Maier, and Jopp 2002). Many oldest old people are indeed satisfied with their lives despite having functional limitations. This finding is termed the *disability paradox* and refers to an individual’s ability to adjust to and accept changing circumstances (von Faber *et al.* 2001). Although being healthy and functionally independent are important criteria of successful aging, the standard for health and functional independence is variable across age groups and between individuals.

Despite the SRH paradox, GP consultations among elderly Canadians are indeed associated with the comparatively high prevalence of chronic conditions among this sub-population (Rosenberg and Moore 1997). Independent of self-reported health, chronic conditions and the aging process increase GP consultations. Elderly Canadians with cancer, diabetes, disabilities, heart disease, and high blood pressure were more likely to use GP services in greater frequency than other elderly persons. In most cases, frequent GP usage should not be interpreted as heavy or over usage of health care services without careful consideration as high numbers of GP consultations may lower ambulatory care sensitive (ACS) health crises. ACS conditions refer to hospitalizations thought to be preventable through public health interventions and disease management. These include chronic health problems that can be managed through regular GP treatment and check-ups to control early symptoms and reduce health risks. Prior evidence demonstrates that elderly persons with limited social support and nutritional deficiencies were nearly 6 times more likely to use critical care services (e.g., hospitalization) than other elderly people (Paddock and Hirdes 2003). This finding supports the notion that regular non-critical health care utilization is a cost-effective strategy as such interventions can reduce the ACS hospitalization rate.

Although health care utilization generally increases with advanced age, Canadian seniors are a diverse group, and their individual health care demands are thus structured by differences in gender, socioeconomic status, and ethno-cultural background, among other socio-demographic variables (Health Canada 2002). Our study investigates whether immigrant status represents a significant health care utilization differential by comparing later-stage immigrants to non-immigrants. Research from Canada, the United States, and several other advanced industrial countries supports an unresolved epidemiological paradox: foreign-born populations have superior health profiles than native-born populations, including lower mortality rates, fewer chronic conditions, disabilities, and overnight hospitalizations, and less mental illness (Ali 2002; McKay, Macintyre, and Ellaway 2003, Pérez 2002). Gee, Kobayashi, and Prus (2004) observe that immigrants aged 45–64 years upon immigration to Canada report superior functional health and self-reported health than non-immigrants and longer-term immigrants of similar age. In

contrast, immigrants aged ≥ 65 years upon immigration have comparatively poor health profiles, though this disadvantage attenuates after considering socio-demographic and behavioral characteristics.

There does appear to be some *age-specific* patterns in health care utilization between immigrants and non-immigrants (Globerman 1998). Among individuals aged ≥ 65 years, most immigrants are heavier users of GP services than non-immigrants. Asian immigrants appear to be especially intense users, with 37% reporting ≥ 6 GP visits per annum, compared to 30% of non-immigrants. On the bright side, the “extra” GP visits among Asian immigrants may actually lower acute care costs, for this group also reports a lower overnight hospitalization rate than non-immigrants. Among individuals aged 50–64 years, immigrants are more intense GP users than non-immigrants, with Asian immigrants being the notable exception. In any case, these differences between immigrants and non-immigrants are fairly minor. Again, Asian immigrants within this age category have a lower hospitalization rate than non-immigrants, but those from South America and Africa and the US and Mexico report a higher hospitalization rate. However, the picture of health care utilization among later-stage immigrants remains largely unspecified. Our principal objectives are to determine whether later-stage immigrants represent a health care burden for the Canadian public, and to identify the reasons behind any health care utilization differences between these immigrants and non-immigrants.

Research Concepts

In principle, the Canada Health Act (1984) guarantees all legal Canadian residents equal access to health care services for all medically necessary hospitalizations, GP and specialist consultations, and surgical-dental procedures (Health Canada 2001a). The Act ensures that an individual’s medical needs will be treated regardless of income, employment status, or province. The Act also stipulates that immigrants must not be made to wait longer than 3 months before being enrolled in a provincial insurance plan. There is some concern, however, that immigrant status is associated with non-financial factors influencing health care provision and utilization (Health Canada 2001b). Although availability of service is not a problem, utilization of health care services among immigrants may be complicated for several reasons. As detailed below, Health Canada reports several immigrant-specific barriers that may impede health care utilization (Health Canada 2001b; Kinnon 1999).

- Research indicates that immigrants tend to use preventive services less frequently than non-immigrants. For example, immigrants under-utilize cancer screening programs compared to the general population. Their under-utilization may be associated with unfamiliarity with what services are available, language barriers, and socio-cultural differences in appropriate preventive care. The utilization of preventive care is an important issue because preventative

services can avert health care crisis through reducing health risks and early diagnosis, thereby compressing morbidity.

- Although the Health Act reduces financial barriers to health care access, there are indirect financial costs associated with the utilization of health services. For example, indirect costs such as day care, transportation, or getting time off work may discourage individual from low-income households from seeking the care they need. Among those with few workplace benefits, for example, time off work for medical consultations and treatment often results in pay losses. These problems are germane to recent immigrants because their social support networks and labour market status reflect their length of residence in Canada.
- As most recent immigrants arrive from non-European sources, socio-cultural barriers may affect health care utilization. There is a *subjective* dimension to how individuals experience illness, which means that health needs are not just neutral conditions related to corresponding medical problems. Rather, socially specific beliefs about health and illness define how individuals perceive their health needs, and these norms guide their help-seeking behaviours (Anderson, 1986). This logic implies that both nativity and ethnicity may influence social differences in the demand for health care services.
- Canadian language difficulties present another barrier to health care utilization among immigrants. Over 40% of immigrants speak neither English or French upon arrival in Canada, with this language incompetence being especially prevalent among elderly immigrants. Language-based miscommunication between health care users and health care providers can cause misdiagnosis, untimely or inappropriate treatment, and unmet health care needs. There is also evidence that language problems tend to decrease the utilization of preventative health care services.

In these cases, immigrants may under-utilize services or be misdiagnosed, which could potentially trigger a higher demand for acute care overtime. The distinction between recent immigrants and long-term immigrants is crucial in these regards (Kinnon 1999). Later-stage immigration may intensify this distinction because such migration may be associated with greater difficulties in integrating and adjusting to unfamiliar environments and norms. For example, a US study observes that later-stage Hispanic immigrants face difficulties (e.g., restricted social support) that impede functional health and lower their life satisfaction (Angel and Angel 1992).

Medical screening prevents many immigrants from presenting a public health risk or health care burden, but this immigration policy applies mainly to severely ill persons (severe illness also tends to discourage individuals from considering migrating in the first place) and is not a zero-tolerance policy guaranteeing that all immigrants will be in perfect health (Kinnon 1999; Uppaluri *et al.* 2002; Zowall *et*

al. 1992). However, we expect that differences in medical need (health status) will account for much of the health care utilization difference between immigrants and non-immigrants. Apart from medical need, which is the strongest general determinant of health care demand, other factors influence health care utilization. The Anderson-Newman model is a popular conceptual approach for classifying behavioral differences in health care utilization (Andersen 1995; Andersen and Newman 1982). The Andersen-Newman model conceptualizes individual determinants health care utilization under two components other than medical need:

Predisposing Characteristics. This component includes demographic, social structural, and health belief variables. The demographic aspect involves factors such as gender and age, i.e., biological differences in health needs. Social structure is measured by education, occupation, and ethnicity, which are significant utilization variables among Canadians (Dunlop, Coyte, and McIsaac, 2000). Health beliefs represent attitudes toward and knowledge of physical symptoms and medical care. As noted, socio-cultural differences in health beliefs may affect health care utilization.

Enabling Resources. Enabling resources include the presence of health care professionals and facilities, without which utilization could obviously not occur, and resources that are more variable across social groups, such as knowledge of available health care services and entitlements, access to transportation, and having social support. As noted, immigrant status may reduce an individual's knowledge of health care services and entitlements, thus impeding their health care utilization.

Previous studies have used the Andersen-Newman model to examine health care utilization trends among elderly individuals and immigrants (e.g., Chappell and Blandford 1987; LeClere, Jensen, and Biddlecom 1994). Our analysis adapts the Andersen-Newman model to incorporate barriers to utilization.

Research Hypotheses

Our analysis of health care utilization differences between later-stage immigrants and non-immigrants examines 8 hypotheses:

H1 As noted, medical screening and a selection effect in the migration process contributes to the comparatively robust health of immigrants. We hypothesize that health care utilization will be lower among later-stage immigrants than among non-immigrants because immigrants' relatively superior health status associates with fewer medical needs.

- H2 We hypothesize that differences in medical needs stemming from chronic health disorders will strongly influence health care utilization differences between later-stage immigrants and non-immigrants.
- H3 We hypothesize that later-stage immigrants will be less intense users of high-cost medical services (hospitalization) than non-immigrants largely because they experience fewer chronic disorders.
- H4 As noted, elderly immigrants tend to have more GP visits than elderly non-immigrants. We hypothesize that later-stage immigrants will have more GP visits than elderly non-immigrants.
- H5 As noted, immigrants tend to under-utilize non-MD health services (e.g., preventive services), independent of medical needs. We therefore hypothesize that later-stage immigrants will consume fewer non-MD services than elderly non-immigrants, after controlling for differences in medical needs.
- H6 We hypothesize that health care utilization among later-stage immigrants will be lower than among other immigrants because length of residence appears to affect health care utilization trends.
- H7 Using the Andersen-Newman model, we hypothesize that behavioural differences will account for the under-consumption of non-MD health care services by later-stage immigrants.
- H8 We hypothesize that later-stage immigrants may have more unmet health care needs than non-immigrants because of their apparent under-consumption of non-MD health care services.

Data and Methods

Data Source

The Canadian Community Health Survey (CCHS) Cycle 1.1 provides the data for our analysis. The CCHS 1.1 started in September 2000 with the purpose of collecting regular cross-sectional estimates of health determinants, health status, and health care utilization for 136 health regions across Canada. The CCHS 1.1 excluded individuals living on Indian Reserves, Canadian Forces Bases, and some remote areas. The CCHS 1.1 has two components. The regional-level survey consisted of a 45-minute telephone interview covering common content, optional content, and socioeconomic and demographic content. The provincial-level survey was a one-hour telephone interview on common content and one focal topic. Besides English and French, the official languages of Canada, the survey was available in numerous other languages. The target population included household residents aged 12 and older, with some negligible

exclusions. Detailed Information about CCHS design and sample selection is available elsewhere (Beland 2002). The British Columbia version of the CCHS covered 20 health regions and included 18,090 respondents. Our study sample consists of 5,653 British Columbians aged ≥ 55 years.

Dependent Variables

Our analysis examines four different aspects of health care utilization. First, we measured overnight hospitalization with a count variable that captures the total number of nights spent in a hospital in the 12 months prior to the survey. The CCHS measured hospitalization rates by asking the following questions: In the past 12 months, have you been a patient overnight in a hospital, nursing home, or convalescent home? For how many nights in the past 12 months?

Second, we measured medical doctor visits with a count variable indicating the number of MD consultations in the past 12 months. Discounting consultations during overnight hospitalization, the CCHS measured MD usage with the following question: In the past 12 months, how many times have you seen, or talked on the telephone, about your physical, emotional, or mental health [with a medical doctor]? The CCHS defined medical doctors as general practitioners and specialists (e.g., optometrists, surgeons, cardiologists). Using this question, we also measured non-MD visits with a count variable. Examples of non-medical doctors include nurses, therapists, and social workers.

Finally, we measured alternative health care utilization using a dichotomous variable. The CCHS asked: In the past 12 months, have you seen or talked to an alternative health care provider such as an acupuncturist, homeopath, or massage therapist about your physical, emotional, or mental health?

Independent Variables

Our comparison groups include later-stage immigrants, other immigrants, and non-immigrants aged ≥ 55 years. Using CCHS questions on nativity and length of residence, we identified later-stage immigrants by subtracting their length of residence in Canada from their age at the time of the survey. We defined later-stage immigrants as individuals aged ≥ 45 upon immigration to Canada. The definitions and descriptive statistics for our selected independent variables are presented in the Appendix.

Our analysis introduced controls for *medical need* because health needs appear to be the strongest determinants of health care utilization among elderly persons (Chappell and Blandford, 1987). First, we measured chronic conditions, which the CCHS defined as any long-term health conditions diagnosed by a health professional, in three levels: any serious illness, any other chronic illness, and no chronic illness. We defined serious chronic illnesses as disorders that tend to steeply increase the demand for health care, such as cancers, diabetes, and heart disease. Other chronic illnesses include allergies, incontinence, arthritis, etc.

Second, we measured functional health. The CCHS scored functional health using the McMaster Health Utility Index that measures vision, hearing, speech, mobility, dexterity, emotion, cognition, and pain (Roberge, Berthelot, and Wolfson 1995).

Third, we measured depression using a continuous variable capturing the number of depressive symptoms. The CCHS 1.1 measured depression using screening questions and depressive symptoms from the CIDI (World Mental Health – Composite International Diagnostic Interview) short-form. The screening questions included: being “sad, empty, or depressed,” “losing interest in most things,” and “feeling discouraged about how things are going in life.” The depressive symptoms included weight change, eating and sleeping problems, chronic fatigue, poor concentration, etc.

Finally, we measured self-reported health on a five-point scale ranging from poor to excellent.

We measured *predisposing characteristics* with the following variables. We measured age with a continuous variable and gender with a dichotomous variable. We measured race/ethnicity using five taxonomic categories, including Chinese, Southeast Asian, South Asian, other visible minorities, and whites. These groupings obviously conflate distinct socio-cultural groups, but they also represent the dominant racial/ethnic structure in British Columbia. We measured education in 10 levels ranging from grade 8 or lower to a university degree. Using the CCHS scale, we measured mastery, which the CCHS defined as the extent to which a person believes they have control over their life chances.

We measured *enabling resources* in three dimensions. We used the Medical Outcomes Study (MOS) scale of social support (Sherbourne and Stewart, 1991). The MOS scale taps four dimensions of social support: tangible support (4 items), affection (3 items), positive social interaction (4 items), and emotional or informational support (8 items). The scale ranges from 0 to 76 (Cronbach’s alpha = .92). Based on a CCHS question, we measured community belonging with a four-level ordinal variable ranging from very weak to very strong. We also included one dichotomous variable that differentiates between married (or cohabiting) and unmarried respondents, and another indicating whether respondents were living alone.

We measured *barriers to utilization* using three indicators. Low income is measured with a dummy variable indicating those who fall under the lowest income quartile. We used a dummy variable indicating respondents who cannot speak English, and another dummy variable to indicate rural residence.

Analytical Procedure

Because our dependent variables include three count variables and one binary variable, we used generalized linear models (GLMs) in our data analysis (McCullagh and Nelder 1989). We chose the

negative binomial and the binomial distributions for the count and binary response variables, respectively. Although it is natural to use the Poisson distribution to model count data, our preliminary analyses suggested that our data are over-dispersed. Overdispersion undermines statistical inferences for regression coefficients (McCullagh and Nelder 1989). A common approach to correcting for overdispersion is to employ the negative binomial model, which has an additional parameter that is used to account for overdispersion.

The mean deviance (deviance divided by degrees of freedom) was used to assess goodness-of-fit of postulated models. In general, if the mean deviance is not appreciably larger than 1, it indicates that the model fits data well and the response data are not overly dispersed (Myers, Montgomery, and Vining, 2002).

Results

Table 1 presents a short demographic profile of British Columbians aged ≥ 55 based on the respondents in our study sample. The table illustrates that later-stage immigrants differ substantially from non-immigrants and other immigrants in terms of ethno-cultural backgrounds. The later-stage immigrant group is about 50% Chinese and 27% South Asian. In total, almost 88% of later-stage immigrants belong to a visible minority group. In contrast, very few non-immigrants are either Chinese or South Asian, for the majority (95%) are white. Other immigrants are also largely white (75%), with 12% being Chinese and 6% being South Asian. Compared to non-immigrants, a larger proportion of later-stage immigrants are currently married, and living with others. Later-stage immigrants tend to be somewhat younger than non-immigrants, having a mean age of 65.2 years compared to 68.2 years. However, gender representation of later-stage immigrants is similar to non-immigrants and other immigrants. Overall, these findings confirm that later-stage immigrants tend to have different socio-demographic backgrounds than non-immigrants, and these differences may influence health care utilization differences.

TABLE 1. Demographic Profiles of Persons Aged 55+: British Columbia, 2001

Demographics	Late-in-life Immigrants	Other Immigrants	Non- Immigrants
Ethnicity***			
Chinese	50.3%	12.0%	0.5%
Southeast Asian	8.7%	3.7%	1.1%
South Asian	27.4%	5.7%	0.3%
Other visible minority	1.2%	3.4%	2.9%
White	12.5%	75.1%	95.2%
Total	100%	100%	100%
Gender			
Women	48.3%	51.5%	53.4%
Men	51.7%	48.5%	46.6%
Total	100%	100%	100%
Marital status***			
Currently married	80.4%	72.7%	67.6%
Not currently married	19.6%	27.3%	32.4%
Total	100%	100%	100%
Age*** (mean value)	65.2	69.2	68.2
Living arrangement***			
Living alone	2.9%	19.7%	25.2%
Living with other(s)	97.1%	80.3%	74.8%
Total	100%	100%	100%

*** $p < .001$; $N = 5,653$.

Table 2 presents the GLM models of health care utilization on immigrant status and selected variables of health care needs. The values of mean deviance suggest that the models are generally adequate for the response data, with the exception of model D of hospital nights where the mean deviance is 10.4. As noted in the table, the Poisson model was estimated here because the negative binomial model did not converge in the initial analysis. Thus, the variances for regression coefficients may be underestimated. Caution should be exercised when interpreting the statistical inference of the coefficients.

Our initial purpose in Table 2 is to detail any gross health care utilization differences between our comparison groups. Table 2 examines four aspects of health care utilization: number of nights spent hospitalized; number of MD visits or consultations; number of non-MD visits or consultations; and any visit or consultation with an alternative health care provider. These categories provide a comprehensive and specific illustration of health services consumptions differences. Table 2 compares hospitalization

rates because hospitalization is the most cost-intensive form of health care. Moreover, hospitalization is usually available only in medically necessary cases, and thus medical need should predict any differences in hospitalization between our comparison groups. In contrast, MD usage, non-MD usage, and alternative care usage are more discretionary, and thus subject to individual differences independent of medical need. For instance, some individuals suffering from influenza may seek formal medical care, whereas others may be satisfied using over-the-counter medications or home remedies. As noted, some evidence suggests that immigrants use fewer preventive services than non-immigrants, and this could lower their non-MD visits and consultations, regardless of medical need.

We hypothesized (H1) that health care utilization would be comparatively low among later-stage immigrants because of the healthy migrant effect. Confirming H1, Table 2 (model A) indicates that later-stage immigrants report a lower hospitalization rate, lower MD usage, and lower non-MD usage before controlling for medical needs. Compared to later-stage immigrants, non-immigrants spend (an average of) 3.6 times ($e^{1.524} = (4.59 - 1) \times 100$) more nights in the hospital per annum. The MD visitation rate among non-immigrants is 36% greater than among later-stage immigrants. Non-immigrants also report 1.7 times more non-MD visits and consultations than later-stage immigrants. The difference in alternative health care usage is non-significant. These findings are unsurprising because prior research suggests that immigrants are healthier than non-immigrants (Chen, Ng, and Wilkins, 1996). These initial findings should reassure Canadian policy-makers that later-stage immigrants do not represent a health care burden.

TABLE 2. Generalized Linear Models of Health Care Utilization on Immigrant Status and Selected Variables on Health Care Needs: British Columbia, Canada, 2001

Model	Health Care Utilization			
	No. of hospital nights	No. of MD visitors	No. of non-MD visits	Use of alternative care
A.				
Immigrant status				
Non-immigrant	1.524 **	0.306 **	0.975 ***	-0.310
Other immigrant	1.175 *	0.320 **	0.971 ***	-0.189
Late-in-life immigrant ^a				
Deviance/ <i>d.f.</i>	0.280	1.119	1.044	0.686
B.				
Immigrant status				
Non-immigrant	1.055	0.077	0.713 ***	-0.443
Other immigrant	0.597	0.128	0.717 ***	-0.325
Late-in-life immigrant ^a				
Deviance/ <i>d.f.</i>	0.286	1.107	1.044	0.679
C.				
Immigrant status				
Non-immigrant	0.894	0.221 *	0.859 ***	-0.327
Other immigrant	0.516	0.228 *	0.845 ***	-0.214
Late-in-life immigrant ^a				
Deviance/ <i>d.f.</i>	0.286	1.116	1.044	0.685
D.				
Immigrant status				
Non-immigrant	1.465 ^b ***	0.260 *	0.900 ***	-0.357
Other immigrant	1.128 ^b ***	0.285 *	0.914 ***	-0.226
Late-in-life immigrant ^a				
Deviance/ <i>d.f.</i>	10.430	1.118	1.044	0.681
E.				
Immigrant status				
Non-immigrant	1.859 ***	0.276 **	0.958 ***	-0.309
Other immigrant	1.729 **	0.315 **	0.994 ***	-0.189
Late-in-life immigrant ^a				
Deviance/ <i>d.f.</i>	0.285	1.113	1.044	0.686
F.				
Immigrant status				
Non-immigrant	0.992	0.090	0.677 ***	-0.491
Other immigrant	0.658	0.136	0.681 ***	-0.368
Late-in-life immigrant ^a				
Deviance/ <i>d.f.</i>	0.291	1.104	1.044	0.674

Note : Model A includes no controls; model B controls for chronic condition (see Appendix); model C controls for functional health; model D controls for depression; model E controls for self-reported health; and model F combines models A - E.

^a Reference category.

^b Poisson model is fitted.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed test).

Other studies observe that medical need constitutes that most crucial health care utilization differential among elderly Canadians (Chappell and Blandford 1987). Table 2 continues by investigating whether medical needs account for the health care utilization differences between our comparison groups. Table 2 considers four types of medical needs, including chronic conditions (model B), functional health (model C), depression (model D), and self-reported health (model E). Table 2 introduces controls for chronic conditions and functional health because later-stage immigrants may be healthier than non-immigrants in these regards (Gee, Kobayashi, and Prus 2004). Since the majority of later-stage immigrants are visible minorities (see Table 1), Table 2 controls for depression because prior research observes a linkage between ethnic/racial discrimination and mental health services utilization (Spencer and Chen, 2004). Finally, Table 2 controls for SRH because, as a subjective assessment, this measure may capture what biomedical assessments cannot: how individuals interpret and cope with their health problems (Kaplan and Baron-Epel 2002).

We hypothesized (H2) that medical needs stemming from chronic conditions would significantly attenuate health care differences between our comparison groups, and that (H3) later-stage immigrants would consequently be less intense hospital users. Table 2 confirms H2 and H3. Model B indicates that the differences in hospitalization and MD visits disappear after controls for chronic conditions are introduced. Model C shows that variation in functional health attenuates differences in hospitalization, but between group differences remain significant for MD visits and non-MD visits. Models D and E indicate that variation in depression-related health needs and self-reported health have a non-consequential effect on differences in hospitalization, MD visits, and non-MD visits. Model F (a combination of models A – E) confirms our hypothesis (H6) that later-stage immigrants would tend to utilize fewer non-MD services than non-immigrants, regardless of medical needs. However, Table 2 discredits H4 because the findings in model F indicate that later-stage immigrants are not more intense users of MD services.

We also hypothesized (H6) the overall health care utilization would be lower among later-stage immigrants than among other immigrants. Table 2 confirms this hypothesis. Again, overall medical need accounts for differences in hospitalization and MD visits, but cannot account for the difference in non-MD visits. In summary, variation in medical needs accounts for health care utilization differences between our comparison groups, with the exception being non-MD visits.

Table 3 uses the Andersen-Newman model to determine whether predisposing characteristics, enabling resources, and health care barriers account for the remaining differences in utilization of non-MD services. Model A indicates that predisposing characteristics account for the differences between later-stage immigrants and non-immigrants, but not between later-stage immigrants and other immigrants. According to models B and C, differences in enabling resources and health care barriers appear to have non-consequential effects on differences in non-MD visits between our comparison groups. Overall

(model D), Table 3 confirms the hypothesis (H7) that the Andersen-Newman model would account for any utilization differences remaining between later-stage immigrants and non-immigrants after controlling for medical needs. However, the Andersen-Newman model cannot explain the remaining difference in non-MD usage between later-stage immigrants and other immigrants.

TABLE 3. Generalized Linear Models of Non-MD Visits on Immigrant Status and Variables on Predisposing Characteristics, Enabling Resources, Health Care Barriers: British Columbia, Canada, 2001

Model	b	S. E.
A.		
Immigrant status		
Non-immigrant	0.387	0.198
Other immigrant	0.428 *	0.197
Late-in-life immigrant ^a		
Deviance/ <i>d.f.</i>	1.045	
B.		
Immigrant status		
Non-immigrant	0.655 ***	0.176
Other immigrant	0.663 ***	0.179
Late-in-life immigrant ^a		
Deviance/ <i>d.f.</i>	1.045	
C.		
Immigrant status		
Non-immigrant	0.558 **	0.558
Other immigrant	0.565 **	0.565
Late-in-life immigrant ^a		
Deviance/ <i>d.f.</i>	1.045	
D.		
Immigrant status		
Non-immigrant	0.359	0.203
Other immigrant	0.406 *	0.201
Late-in-life immigrant ^a		
Deviance/ <i>d.f.</i>	1.047	

Note : All models control for health care needs; model A adds predisposing characteristics (see Appendix); model B adds enabling resources; model C adds health care barriers; and model D combines models A - C.

^a Reference category.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed test).

Table 4 illustrates the effects of health care needs, predisposing characteristics, enabling resources, and barriers to health care on health care utilization. As expected, health care needs have a significant influence on hospitalization, MD visits, non-MD visits, and alternative care utilization. For example, individuals with a serious chronic condition spend 3.8 times more nights hospitalized and have 1.8 times the number of MD visits compared with those without a serious chronic condition. Among predisposing characteristics, age influences all utilization categories except for MD visits. Gender influences non-MD and alternative care usage only, with women using more of these services than men. Chinese respondents use fewer non-MD services but more alternative care services than whites. Southeast Asian respondents are hospitalized for more nights than white respondents, but Southeast Asian ethnic status is otherwise non-significant. South Asians report more MD visits but fewer non-MD visits than whites. In comparisons with whites, other visible minority status increases all health care utilization except for alternative care. Except hospitalization, utilization increases with education. Mastery reduces MD visits but increases the use of alternative care. Table 4 also shows that enabling resources have a marginal influence on health care utilization. Among health barriers, having trouble with English increases MD visits, and low income reduces non-MD visits.

TABLE 4. The Effects of Health Care Needs, Predisposing Characteristics, Enabling Resources, Health Care Barriers: British Columbia, Canada, 2001

Variable	Health Care Utilization			
	No. of hospital nights	No. of MD visitors	No. of non-MD visits	Use of alternative care
<i>Health Care Needs</i>				
Chronic condition				
Serious illness	1.572 ***	1.012 ***	0.662 ***	0.865 ***
Other chronic condition	0.612 **	0.638 **	0.529 ***	0.844 ***
None ^a				
Functional health	-1.500 ***	-0.404 ***	-1.066 ***	-0.751 ***
Depression	0.105 *	0.053 ***	0.077 ***	0.107 ***
Self-reported health	-0.395 ***	-0.242 ***	-0.066 **	-0.064
<i>Predisposing characteristics</i>				
Age	0.053 ***	-0.000	-0.012 ***	-0.033 ***
Female	-0.121	0.039	0.114 *	0.761 ***
Race/ethnicity				
Chinese	-0.578	0.016	-0.554 ***	0.690 *
Southeast Asian	1.018 *	-0.025	-0.167	-0.113
South Asian	0.182	0.349 **	-0.391 *	0.400
Other visible minority	1.129 **	0.160 *	0.264 *	0.173
White ^a				
Education	-0.027	0.025 ***	0.060 ***	0.121 ***
Mastery	-0.016	-0.010 **	-0.012	0.038 **
<i>Enabling resources</i>				
Social support	0.001	0.002	-0.001	0.003
Community belonging	0.090	0.034 **	0.028	0.089 *
Married	0.070	-0.020	0.016	-0.091
Alone	0.183	0.023	0.143	-0.032
<i>Barriers to health care</i>				
Low income	0.279	0.069	-0.142 *	-0.198
Language	-0.937	0.343 **	-0.085	0.175
Rural residence	0.163	-0.112 **	0.106	0.225 *

Note: All models control for immigrant status.

^a Reference category.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed test).

Table 5 presents the GLM models of unmet health care needs on immigrant status. We hypothesized (H8) that later-stage immigrants may have more unmet health care needs than non-immigrants because they tend to under-utilize non-MD care. Table 5 disproves H8 as the findings show that the difference in unmet needs is non-significant.

TABLE 5. Generalized Linear Models of Unmet Health Needs on Immigrant Status: British Columbia, Canada, 2001

Independent Variable	Model 1	Model 2 ^a
Immigrant status		
Non-immigrant	0.233	-0.206
Other immigrant	0.117	-0.293
Late-in-life immigrant ^a		
Deviance/ <i>d.f.</i>	0.623	0.554

^a Model includes the control variables shown in Table 4.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed test).

Policy Discussion

Our analysis of health care utilization confirms that later-stage immigrants tend to use fewer health services than non-immigrants and other immigrants. We conclude that lower health care utilization among later-stage immigrants is associated with the healthy immigrant effect, which reflects a combination of medical screening requirements in Canadian immigration policy and a selection effect in the migration process. Our findings indicate that most differences in health care utilization between our comparison groups disappear after considering differences in health care needs. Our main findings are summarized as follows:

- Non-immigrants spend 3.6 times more nights hospitalized than later-stage immigrants. Other immigrants spend 2.2 times more nights hospitalized than later-stage immigrants. A higher prevalence of chronic conditions explains why non-immigrants and other immigrants have a higher hospitalization rate than later-stage immigrants.
- Non-immigrants use 36% more MD services and 165% more non-MD services than later-stage immigrants. Other immigrants use 38% more MD services and 164% more non-MD services. Again, our findings suggest that the differences in health care utilization disappear after controls for chronic conditions are introduced.

- After introducing controls for chronic conditions, functional health, depression, and self-reported health, later-stage immigrants still use less non-MD services than non-immigrants and other immigrants. Examples of non-MD health care professional include nurses, social workers, therapists, and dentists. This finding suggests that later-stage immigrants *under-utilize* some non-critical services.
- The difference in non-MD services utilization between later-stage immigrants and non-immigrants is associated with variation in predisposing characteristics. This difference disappears after considering compositional differences in age, ethnic background, education, and mastery. Of these, mastery does not appear to have a significant effect on non-MD services utilization.
- In general, chronic conditions appear to be the strongest predictor of health care utilization. Respondents with a serious chronic condition (e.g., cancers, heart disease, diabetes) spend 3.8 times more nights hospitalized than those without any chronic condition. Respondents with a serious chronic condition also report 1.8 times more MD visits and higher usage of non-MD and alternative care.
- Ethnic background significantly influences health care utilization in certain respects. Southeast Asians spend 1.8 times more and other visible minorities spend 2 times more nights hospitalized than whites. South Asians use 42% more and other visible minorities use 17% more MD services than whites. On the other hand, Chinese and South Asian respondents use less non-MD services.
- Not having sufficient English language proficiency appears to constitute another health care utilization barrier. Respondents with a language problem report using 41% *more* MD services than those without a language problem. Being from a low-income household appears to significantly decrease the utilization of non-MD services.

Our main findings are largely unsurprising and consistent with the literature. For example, prior Canadian research indicates that, in general, immigrants have fewer chronic conditions and disabilities than non-immigrants (Chen, Ng, and Wilkins 1986). This healthy migrant effect is particularly robust among recent, non-European immigrants. For example, the age-adjusted prevalence of chronic conditions is 37% among recent, non-European immigrants, compared to 57% among non-immigrants and 50% among all immigrants.

The comparatively low health care utilization among later-stage immigrants is a positive indication that these immigrants are not straining the health care system. Our findings, however, do present several policy concerns. First, the under-utilization of non-MD services warrants further attention

because this finding parallels research that indicates that immigrants use preventive health services in lower frequencies than non-immigrants. Studies indicate that enrolment in cancer screening programs, for instance, is comparatively low among visible minority immigrants (Juon, Kim, and Han 2004; Lee, 2000). These studies observe that culturally sensitive interventions could increase participation in preventive programs, as language barriers, low motivation, and health knowledge represent salient barriers to preventive health care among immigrants. Among later-stage immigrants, our concern is that low non-MD visits may represent unawareness of or indifference towards the need for non-critical care. While later-stage immigrants are healthier today, their under-utilization of certain non-MD services (e.g., preventive care) could involve them needing *more* health services overtime by lowering the chances for early detection and treatment of disease. Future research is needed to investigate whether low non-MD usage in the present leads to future health issues among later-stage immigrants. On the other hand, although we controlled for chronic conditions, functional health, depression, and self-reported health, which constitute a robust, global measure of general health, there is still the possibility that unaccounted aspects of good health could explain their lower usage of non-MD services.

Second, our findings indicate that not speaking fluent English tends to *increase* utilization of MD services. Although data limitations prevented an examination of this hypothesis, we speculate that communication problems between patients and health care providers may be responsible for this relationship. For instance, a recent Canadian study reports that health services can be unresponsive toward minority ethno-cultures, and demonstrates that language problems prevent some Chinese immigrants from effectively articulating their symptoms to health care professionals (Lee, Rodin, Devins, and Weiss 2001). This study also observes that health professionals often fail to understand immigrants' medical complaints. Consequently, language problems could reduce the timeliness of diagnosis and effectiveness of treatment, leading to more frequent MD visits and consultations. Put differently, language-based miscommunication could increase the need for more service by causing inadequate treatment during the initial consultation. The literature indicates that language barriers, which are heavily concentrated among immigrants, restrict primary health care access, and consequently represent additional costs for the health care system because delayed diagnosis and treatment increases the utilization of critical care services (Health Canada 2001b).

Finally, the close similarity between other immigrants and non-immigrants in health care utilization may indicate that health problems increase with length of residence. As observed above, other immigrants utilize more health services than later-stage immigrants, but health care needs related to chronic conditions mostly accounts for this difference. Though the evidence is mixed, there is some suggestion that the acculturation process may be health damaging for immigrants. For example, Canadian evidence indicates that some immigrant groups have greater risks of insufficient protein and micro

nutrient intakes than non-immigrants (Pomerleau, Ostbye, and Bright-See 1998). According to US evidence, preventable health issues such as nutritional deficiencies increase the ACS (preventable conditions) hospitalization rate among some elderly racial/ethnic minorities (Laditka, Laditka, and Mastanduno 2003). One Canadian study demonstrates that some immigrants gradually change their eating habits, and this behavior could increase their health risks over time. This study indicates that some ethnic minority immigrants increase their risk of experiencing chronic health disorders by adopting “Western” diets (Suja and Moore-Orr, 2002). Many South Asian immigrants develop new eating habits such as increasing their consumption of high-fat foods, fast foods, and soft drinks. Further research is needed to determine whether acculturation triggers higher utilization of health care services among immigrants.

Unfortunately, data limitations prevented us from investigating whether health care utilization among later-stage immigrants changes overtime. Does health care utilization among later-stage immigrants increase over time? If so, is this increase a reflection of a growing prevalence of chronic conditions? Are these chronic conditions associated with acculturation or under-utilization of preventative care? These are questions for future research.

References

- Ali, J. 2002. Mental health of Canada's immigrants. *Health Reports* 13 (Supplement), 101–13.
- Andersen, R.M. 1995. Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior* 36, 1–10.
- Andersen, R.M. and J.F. Newman. 1982. Societal and individual determinants of medical care utilization in the United States. *Milbank Memorial Quarterly* 51, 95–24.
- Anderson, J.M. 1986. Ethnicity and illness experience: Ideological structures and the health care delivery system. *Social Science and Medicine* 22, 1277–83.
- Angel, J.L. and R.J. Angel. 1992. Age at migration, social connections, and well-being among elderly Hispanics. *Journal of Aging and Health* 4, 480–99.
- Angel, J.L., C.J. Buckley, and A. Sakamoto. 2001. Duration or disadvantage? Exploring nativity, ethnicity, and health in midlife. *Journal of Gerontology: Social Sciences* 56B, S275–84.
- Barer, M.L., R.G. Evans, C. Hertzman, and J. Lomas. 1987. Aging and health care utilization: New evidence on old fallacies. *Social Science and Medicine* 24, 851–62.
- Bauder, H., J. Waters, and S.Y. Teo. 2001. *Impacts of Immigration on British Columbia: Population, Labour Markets, Housing Markets, and International Linkages*. RIIM Working Paper Series, No. 01–17.
- BC Stats. 2005. *BC Population by Age and Gender, 1971–2004*. Online: www.bcstats.gov.bc.ca. Date accessed: March 14, 2005.
- Beland Y. 2002. Canadian Community Health Survey – Methodological overview. *Health Reports* 13, 9–14.
- Berlin-Deber, R. 2003. Health care reform: Lessons from Canada. *American Journal of Public Health* 93, 20–24.
- Chappell, N.L. and A.A. Blandford. Health service utilization by elderly persons. 1987. *Canadian Journal of Sociology* 12, 195–215.
- Cheal, D., ed. 2003. *Aging and Demographic Change in Canadian Context*. Toronto: University of Toronto Press.
- Chen, J., E. Ng, and R. Wilkins. 1996. The health of Canada's immigrants in 1994-95. *Health Reports* 7, 33–45.
- Citizenship and Immigration Canada. 2003. *Annual Report to Parliament on Immigration, 2003*. Ottawa, Minister of Public Works and Government Services Canada.
- Clarke, J. 1987. The paradoxical effects of aging on health. *Journal of Gerontological Social Work* 10, 3–20.
- Crimmins, E.M., M.D. Hayward, and Y. Saito. 1994. Changing mortality and morbidity rates and the health status and life expectancy of the older population. *Demography* 31, 159–75.
- de Vries, J. 1999. Foreign-born language acquisition and shift. In *Immigrant Canada: Demographic, Economic, and Social Challenges*, ed. S.S. Halli and L. Driedger, 261–81. Toronto: University of Toronto Press.
- Duff-Brown, B. 2005. Canada's health care in crisis. *The Associated Press*, March 21, 2005.

- Dunlop, S., P.C. Coyte, and W. McIsaac. 2000. Socio-economic status and the utilisation of physicians' services: Results from the Canadian National Population Health Survey. *Social Science and Medicine* 51, 123–33.
- Elder, G.H., ed. 1985. *Life Course Dynamics: Trajectories and Transitions, 1968–1980*. Ithaca, NY: Cornell University Press.
- Gee, E. and G.M. Gutman, eds. 2000. *The Overselling of Population Aging: Apocalyptic Demography, Intergenerational Challenges, and Social Policy*. Don Mills: Oxford University Press.
- Gee, E., K. Kobayashi, and S. Prus. 2004. The health of Canada's older immigrants: Examining the healthy immigrant effect. *Canadian Journal on Aging* 23, S55–63.
- Globerman, S. 1998. *Immigration and Health care Utilization Patterns in Canada*. RIIM Working Paper Series, No. 98–08.
- Goddard M. and Smith P. 2001. Equity of access to health care services: Theory and evidence from the UK. *Social Science and Medicine* 53, 1149–62.
- Health Canada. 2001a. *Canada Health Act*. Ottawa, Minister of Public Works and Government Services.
- . 2001b. *"Certain Circumstances": Issues in Equity and Responsiveness in Access to Health Care in Canada*. Ottawa, Minister of Public Works and Government Services.
- . 2002. *Canada's Aging Population*. Ottawa, Minister of Public Works and Government Services.
- Hiebert, D. 1998. *The Changing Social Geography of Immigrant Settlement in Vancouver*. RIIM Working Paper Series, No. 98–16.
- Juon, H S., M. Kim, and W. Han. 2004. Predictors of adherence to screening mammography among Korean American women. *Preventive Medicine*, 39, 474–81.
- Kaplan, G. and O. Baron-Epel. 2002. What lies behind the subjective evaluation of health status? *Social Science and Medicine* 56, 1669–76.
- Kaplan, M.S., H. Huguet, J.T. Newsom, and B.H. McFarland. 2004. The association between length of residence and obesity among Hispanic immigrants. *American Journal of Preventive Medicine* 27, 323–26.
- Kinnon, D. 1999. *Canadian Research on Immigration and Health*. Ottawa, Minister of Health.
- Koby, M., J. Harner, and P. Gober. 2004. *Human Geography in Action*. 3d ed. New York, NY: John Wiley.
- Laditka, J.N., S.B. Laditka, and M.P. Mastanduno. 2003. Hospital utilization for ambulatory care sensitive conditions: Health outcome disparities associated with race and ethnicity. *Social Science and Medicine* 57, 1429–41.
- LeClere, F.B., L. Jensen, and A.E. Biddlecom. 1994. Health care utilization, family context, and adaptation to the United States. *Journal of Health and Social Behavior* 35, 370–84.
- Lee, M. C. 2000. Knowledge, barriers, and motivators related to cervical cancer screening among Korean-American women. *Cancer Nursing* 23, 168–75.
- Lee R., G. Rodin, G. Devins, and M.G. Weiss. 2001. Illness experience, meaning, and help-seeking among Chinese immigrants in Canada with chronic fatigue and weakness. *Anthropology and Medicine* 8, 89–107.

- McCullagh, P. and J.A. Nelder. 1989. *Generalized linear models*. Second Edition. London, UK: Chapman and Hall.
- McKay, L., S. Macintyre, and A. Ellaway. 2003. *Migration and Health: A Review of the International Literature*. Glasgow: Medical Research Council Social and Public Health Sciences Unit.
- Malone, N., K.F. Baluja, J.M. Costanzo, and C.J. Davis. 2003. *The Foreign-Born Population: 2000*. Census 2000 Brief. Washington, DC: US Census Bureau.
- Moore, E.G., M.W. Rosenberg, and S.H. Fitzgibbon. 1999. Activity limitations and chronic conditions in Canada's elderly, 1986–2011. *Disability and Rehabilitation* 21, 196–210.
- Myers, R.H., D.C. Montgomery, and G.G. Vining. 2002. *Generalized Linear Models: With Applications in Engineering and the Sciences*. New York: Wiley.
- Paddock, K. and J.P. Hirdes. 2003. Acute health care service use among elderly home care clients. *Home Health Care Quarterly* 22, 75–85.
- Pérez, C.E. 2002. Health status and health behaviour among immigrants. *Health Reports* 13 (Supplement) 98–109.
- Pomerleau, J., T. Ostbye, and E. Bright-See. 1998. Place of birth and dietary intake in Ontario. *Preventive Medicine* 27, 41–49.
- Rapoport, J., P. Jacobs, N.R. Bell, and S. Klarenbach. 2004. Refining the measurement of the economic burden of chronic diseases in Canada. *Chronic Diseases in Canada* 25, 13–21.
- Roberge, R., J-M. Berthelot, and M. Wolfson. 1995. The Health Utility Index: Measuring health differences in Ontario by socioeconomic status. *Health Reports* 7, 25–32.
- Rosenberg, M.W. and E.G. Moore. 1997. The health of Canada's elderly population: current status and future implications. *Canadian Medical Association Journal* 157, 1025–32.
- Schaafsma, J. and A. Sweetman. 2001. Immigrant earnings: Age at immigration matters. *Canadian Journal of Economics* 34, 1066–99.
- Sherbourne, C.D. and A.L. Stewart. 1991. The MOS Social Support Survey. *Social Science and Medicine* 32, 705–14.
- Smith, J., M. Borchelt, H. Maier, and D. Jopp. 2002. Health and well-being in the young old and oldest old. *Journal of Social Issues* 58, 715–32.
- Spenser, M.S. and J. Chen. 2004. Effect of discrimination on mental health service utilization among Chinese Americans. *American Journal of Public Health* 94, 809–14.
- Statistics Canada. 1999. Health care services – recent trends. *Health Reports* 11, 91–109.
- . 2003. *Canada's Ethnocultural Portrait: The Changing Mosaic*. Ottawa: Minister of Industry.
- Suja, V. and R. Moore-Orr. 2002. Dietary acculturation and health-related issues of Indian immigrant families in Newfoundland. *Canadian Journal of Dietetic Practice and Research* 63, 72–79.
- Uppaluri, A., M.Naus, N. Haywood, J. Brunton, D. Kerbel, and Wobeser, W. 2002. Effectiveness of the Immigration Surveillance Program for Tuberculosis. *Canadian Journal of Public Health* 93, 88–91.
- von Faber, M., A. Bootsma-van der Wiel, E. van Exel, J. Gussekloo, A.M. Lagaay, E. van Dongen, D.L. Knook, S. van der Geest, and R.G.J. Westendorp. 2001. Successful aging in the oldest old. *Archives of Internal Medicine* 161, 2694–2700.

- Wolff, J.L., B. Starfield, and G. Anderson. 2002. Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Archives of Internal Medicine* 162, 2269–76.
- Zowall, H., R.D. Fraser, N. Gilmore, A. Deutsch, and S.A. Grover. 1992. Economic Impact of HIV Infection and Coronary Heart Disease in Immigrants to Canada. *Canadian Medical Association Journal* 147, 1163–72.

APPENDIX. Definitions and Descriptive Statistics for Independent Variables Used in the Analyses of Health Care Utilization, Aged 55+: British Columbia, Canada, 2001

Variable	Variable Definition and Code	Mean or %	S. D.
<i>Immigrant status</i>			
Late-life immigrant	Dummy indicator (1 = arrived in Canada at age 45+, 0 = otherwise)	3.6%	—
Other immigrant	Dummy indicator (1 = yes, 0 = otherwise)	32.7%	—
Native-born	Reference category	63.7%	—
<i>Health Care Needs</i>			
Chronic condition ^a			
Serious illness	Dummy indicator (1 = yes, 0 = no)	31.1%	—
Other chronic condition	Dummy indicator (1 = yes, 0 = no)	51.9%	—
None	Reference category	16.9%	—
Functional health	Generic health index (range = -0.347 - 1) ^a	0.81	0.22
Depression	Ordinal measure based on a subset of DMS-III-R (range = 0 - 8)	0.40	1.24
Self-reported health	Ordinal measure in 5 levels (1 = poor, ..., 5 = excellent)	3.31	0.99
<i>Predisposing characteristics</i>			
Age	Age in years	67.48	8.03
Female	Dummy indicator (1 = yes, 0 = no)	52.6%	—
Race/ethnicity			
Chinese	Dummy indicator (1 = yes, 0 = no)	6.1%	—
Southeast Asian	Dummy indicator (1 = yes, 0 = no)	2.3%	—
South Asian	Dummy indicator (1 = yes, 0 = no)	3.0%	—
Other visible minority	Dummy indicator (1 = yes, 0 = no)	3.0%	—
White	Reference category	85.7%	—
Education	Educational attainment in 10 levels (1 = grade 8 or less, ..., 10 = university degree or above)	4.92	2.35
Mastery	Sense of mastery scale (7 items; range: 0 - 28; Cronbach's $\alpha = 0.77$) ^a	19.34	3.29
<i>Enabling resources</i>			
Social support	Perceived social support scale (19 items; range: 0 - 76; Cronbach's $\alpha = 0.92$) ^a	62.77	13.04
Community belonging	Sense of belonging to community in 5 levels (1 = very weak, ..., 5 = very strong)	3.43	1.08
Married	Dummy indicator (1 = yes, 0 = no)	69.8%	—
Alone	Living alone (1 = yes, 0 = no)	22.6%	—
<i>Barriers to health care</i>			
Low income	Income was inadequate (1 = yes, 0 = no)	10.7%	—
Language	Dummy indicator (1 = don't speak English/French, 0 = otherwise)	3.2%	—
Rural residence	Residing in rural areas (1 = yes, 0 = no)	14.9%	—
<i>N</i>		5,653	

Note: Weighted means or percentages, unweighted *N*.

^a See text for detailed description.

No.	Author(s)	Title	Date
03-01	David Ley	Offsetting Immigration and Domestic Migration I Gateway Cities: Canadian and Australian Reflections on an 'American Dilemma'	01/03
03-02	Don DeVoretz and Kangqing Zhang	Citizenship, Passports and the Brain Exchange Triangle	01/03
03-03	Johanna L. Waters and Sin Yih Teo	Social and Cultural Impacts of Immigration: An Examination of the Concept of 'Social Cohesion' with Implications for British Columbia	01/03
03-04	June Beynon, Roumiana Ilieva, and Marela Dichupa	"Do you know your language?" How Teachers of Punjabi and Chinese Ancestries Construct their Family Languages in their Personal and Professional Lives	01/03
03-05	Daniel Hiebert, Jock Collins, and Paul Spoonley	Uneven Globalization: Neoliberal Regimes, Immigration, and Multiculturalism in Australia, Canada, and New Zealand	02/03
03-06	Daniel Hiebert	Are Immigrants Welcome? Introducing the Vancouver Community Studies Survey	03/03
03-07	Yan Shi	The Impact of Canada's Immigration Act on Chinese Independent Immigrants	04/03
03-08	Roger Andersson	Settlement Dispersal of Immigrants and Refugees in Europe: Policy and Outcomes	03/03
03-09	Daniel Hiebert and Ravi Pendakur	Who's Cooking? The Changing Ethnic Division of Labour in Canada, 1971-1996	03/03
03-10	Serviy Pivnenko and Don DeVoretz	Economic Performance of Ukrainian Immigrants in Canada and the United States	03/03
03-11	Don J. DeVoretz, Sergiy Pivnenko, Diane Coulombe	The Immigrant Triangle: Québec, Canada and the Rest of the World	05/03
03-12	David W. Edgington, Michael A. Goldberg, and Thomas A. Hutton	The Hong Kong Chinese in Vancouver	04/03
03-13	Margaret Walton-Roberts and Geraldine Pratt	Mobile Modernities: One South Asian Family Negotiates Immigration, Gender and Class	09/03
03-14	Leonie Sandercock	Rethinking Multiculturalism for the 21 st Century	10/03
03-15	Daniel Hiebert and David Ley	Characteristics of Immigrant Transnationalism in Vancouver	10/03
03-16	Sin Yih Teo	Imagining Canada: The Cultural Logics of Migration Amongst PRC Immigrants	10/03
03-17	Daniel Hiebert, Lisa Oliver and Brian Klinkenberg	Immigration and Greater Vancouver: A 2001 Census Atlas (Online format only)	10/03
03-18	Geraldine Pratt (in collaboration with The Philippine Women Centre)	From Migrant to Immigrant: Domestic Workers Settle in Vancouver, Canada	11/03

No.	Author(s)	Title	Date
03-19	Paul Spoonley	The Labour Market Incorporation of Immigrants in Post-Welfare New Zealand	11/03
03-20	Leonie Sandercock	Integrating Immigrants: The Challenge for Cities, City Governments, and the City-Building Professions	12/03
04-01	Rosa Sevy and John Torpey	Commemoration, Redress, and Reconciliation in the Integration of Immigrant Communities: The Cases of Japanese-Canadians and Japanese-Americans	02/04
04-02	Don DeVoretz and Sergiy Pivnenko	Immigrant Public Finance Transfers: A Comparative Analysis by City	02/04
04-03	Margaret Walton-Roberts	Regional Immigration and Dispersal: Lessons from Small- and Medium-sized Urban Centres in British Columbia	02/04
04-04	Don J. DeVoretz, Sergiy Pivnenko, and Morton Beiser	The Economic Experiences of Refugees in Canada	02/04
04-05	Isabel Dyck	Immigration, Place and Health: South Asian Women's Accounts of Health, Illness and Everyday Life	02/04
04-06	Kathy Sherrell, Jennifer Hyndman and Fisnik Preniqi	Sharing the Wealth, Spreading the "Burden"? The Settlement of Kosovar Refugees in Smaller B.C. Cities	02/04
04-07	Nicolas Marceau and Steeve Mongrain	Interjurisdictional Competition in Law Enforcement	03/04
04-08	Shibao Guo	Responding to the Changing Needs of the Chinese Community in Vancouver: The Contribution of SUCCESS (1973-1998)	04/04
04-09	Amanda Aizlewood and Ravi Pendakur	Ethnicity and Social Capital in Canada	04/04
04-10	Kathy Sherrell and Jennifer Hyndman	Global Minds, Local Bodies: Kosovar Transnational Connections Beyond British Columbia	05/04
04-11	Krishna Pendakur and Ravi Pendakur	Colour my World: Has the Minority-Majority Earnings Gap Changed over Time?	05/04
04-12	Leonie Sandercock with Leslie Dickout and Ranja Winkler	The Quest for an Inclusive City: An Exploration of Sri Lankan Tamil Experience of Integration in Toronto and Vancouver	05/04
04-13	Don DeVoretz	Immigration Policy: Methods of Economic Assessment	06/04
04-14	Min-Jung Kwak	An Exploration of the Korean-Canadian Community in Vancouver	07/04
04-15	Daniel Hiebert and Min-Jung Kwak	Transnational Economies of Export Education	07/04
04-16	Harald Bauder	Attitudes Towards Work: Ethnic Minorities and Immigrant Groups in Vancouver	07/04
04-17	Leslie Dickout	The Quest to Negotiate Equitable Civic Engagement: Response of Toronto's Sri Lankan Tamil Community to Social Development Planning in Canada's Largest Multicultural Metropolis	08/04

No.	Author(s)	Title	Date
04-18	Zheng Wu and Christoph M. Schimmele	Immigrant Status and Unmet Health Care Needs in British Columbia	08/04
04-19	Jennifer Hyndman and Nadine Schuurman	Size Matters: Attracting new Immigrants to Canadian Cities	10/04
04-20	Heather A. Smith	The Evolving Relationship between Immigrant Settlement and Neighbourhood Disadvantage in Canadian Cities, 1991-2001	10/04
04-21	Don J. DeVoretz and Sergiy Pivnenko	The Economic Causes and Consequences of Canadian Citizenship	11/04
04-22	Kenny Zhang and Minghuan Li	To Stay or to Move? Chinese Migrant Workers in Cities	12/04
05-01	David Ley	Indicators of Entrepreneurial Success among Business Immigrants in Canada	01/05
05-02	Diane Dagenais and Patricia Lamarre	Representations of Language among Multilingual Youth in Two Canadian Cities	01/05
05-03	Kelleen Toohey and Natalia Gajdamaschko	Communities of Practice, Figured Worlds and Learning Initiative in the Second Language Education of Immigrant Students	01/05
05-04	Kelleen Toohey	Assigning Marginality: The Case of an “ESL/learning Disabled” Student	01/05
05-05	Loren B. Landau	Urbanization, Nativism, and the Rule of Law in South Africa’s ‘Forbidden’ Cities	01/05
05-06	Gillian Creese	Negotiating Belonging: Bordered Spaces and Imagined Communities in Vancouver, Canada	01/05
05-07	Don J. DeVoretz and Sergiy Pivnenko	Self-Selection, Immigrant Public Finance Performance and Canadian Citizenship	02/05
05-08	Shibao Guo and Don J. DeVoretz	The Changing Faces of Chinese Immigrants in Canada	02/05
05-09	David Ley and Audrey Kobayashi	Back in Hong Kong: Return Migration or Transnational Sojourn?	04/05
05-10	Krishna Pendakur and Ravi Pendakur	Ethnic Identity and the Labour Market	05/05
05-11	Krishna Pendakur	Visible Minorities in Canada’s Workplaces: A Perspective on the 2017 Projection	05/05
05-12	Krishna Pendakur	Visible Minorities and Aboriginals in Vancouver’s Labour Market	05/05

No.	Author(s)	Title	Date
05-13	Harald Bauder	Immigrants' Attitudes towards Self-Employment: The Significance of Ethnic Origin, Rural and Urban Background and Labour Market Context	06/05
05-14	Daniel Hiebert	Migration and the Demographic Transformation of Canadian Cities: The Social Geography of Canada's Major Metropolitan Centres in 2017	06/05

For information on papers previous to 2003, please see our Website

<http://www.riim.metropolis.net/research/policy>

Back issues of working papers are available for \$5 from

Vancouver Centre of Excellence: Immigration, WMX4653, Simon Fraser University, 8888 University Drive, Burnaby, B.C, Canada V5A 1S6. Tel: (604) 291-4575 Fax: (604) 291-5336

E-mail: riim@sfu.ca

<http://www.riim.metropolis.net/>