# Examining the Healthy Immigrant Effect in Mid- To Later Life: Findings from the Canadian Community Health Survey

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## RÉSUMÉ

De récentes études ont démontré qu'il existait au Canada un « effet de l'immigrant en bonne santé » — les immigrants sont généralement en meilleure santé que les personnes nées au Canada — toutefois, cet effet s'estompe avec le temps, et la santé des immigrants s'aligne sur la norme canadienne. Cet effet a été étudié en fonction du lieu de naissance, de la langue, de la situation de famille, du statut socio-économique, de l'aptitude linguistique telle que définie dans la Charte, et de la catégorie de statut d'immigrant au Canada, par contre, on en sait moins sur l'« effet de l'immigrant en bonne santé » à diverses étapes du tracé de vie, notamment de l'âge adulte au troisième âge, où le risque de déclin physique et mental est plus grand. L'auteur étudie, à partir des données de l'Enquête sur la santé dans les collectivités canadiennes de 2000-2001, comment l'âge des nouveaux immigrants adultes et du troisième âge influe sur leur santé comparativement aux personnes nées au Canada. Ces données indiquent que l'« effet de l'immigrant en bonne santé » s'applique aux immigrants adultes; c.-à-d. que les immigrants récents — ceux qui ont immigré depuis moins de 10 ans — âgés de 45 à 64 ans sont en meilleure santé que leurs compatriotes qui ont immigré depuis plus longtemps — 10 ans ou plus — et dont l'état de santé se rapproche de celui des personnes nées au Canada. On notera avec intérêt que cela n'est pas vrai des immigrants récents plus âgés (65 ans et plus) qui, dans l'ensemble, sont en moins bonne santé que les personnes nées au Canada. Toutefois, lorsque divers facteurs socio-démographiques, socio-économiques, et comportements sanitaires sont maîtrisés, cette différence tend à disparaître. Dans ses conclusions, l'auteur analyse les retombées de cette question sur la planification des politiques et programmes de santé canadiens visant les immigrants au soir de leur vie.

## ABSTRACT

Recent studies have established that a *healthy immigrant effect* operates in Canada—immigrants are generally healthier than Canadian-born persons—but that this effect tends to diminish over time, as the health of immigrants converges to the Canadian norm. Although this effect has been examined by place of birth, language, marital status, socio-economic status, charter-language ability, and category of immigrant status in Canada, less is known about the healthy immigrant effect at different stages of the life course, particularly in mid- to later adulthood, stages at which there is an increased likelihood of decline in physical and mental health status. This study examines how age at immigration affects the health of mid- to later-life immigrants, compared to Canadian-born persons, using data from the 2000–2001 Canadian Community Health Survey. These data indicate that the healthy immigrant effect applies to later mid-life immigrants; that is, new immigrants—those who immigrated less than 10 years ago—aged 45 to 64 have better health than their longer-term counterparts—those who immigrated 10 or more years ago—whose health status is similar to that of Canadian-born persons. Interestingly, a different picture emerges in old age (65 years and over), where recent immigrants have poorer overall health compared to Canadian-born persons. When a number of socio-demographic, socio-economic, and health behaviour factors are controlled, however, this disadvantage largely disappears. The findings are discussed in terms of their implications for Canadian health care policy and program planning for immigrants in the latter stages of the life course.

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## Introduction

*A Profile of Immigrants in the Canadian Population*
According to the 2001 census, 18.4 per cent (5,400,000) of the Canadian population is foreign-born, the highest proportion in 70 years. This figure, up from 17.4 per cent in 1996, reflects the increasing number of immigrants entering Canada, particularly in the past two decades. Further, of those who are born outside of the country, one third (1,800,000) are recent immigrants who arrived between 1991 and 2001.

In addition to the growth of the foreign-born population over time, the make-up of this population according to country of birth has also changed. Until the early 1970s, the primary sources of immigrants were European countries. In the last decade, however, immigrants were most likely to be from Asia, with China and India being the major source countries. Concomitantly, an increasing proportion of new immigrants are allophones—neither English nor French as their mother tongue—while the proportion with English as their mother tongue has been on the decline.

A break down of the adult (20+) immigrant population in Canada by age in 2001 indicates that 35.6 per cent (the rate is 36% for males and 35.3% for females) are mid-life (45–64 years) individuals, while approximately 19.4 per cent (18.1% for males and 20.7% for females) are older adults (65 years and over). Further, recent immigrants (< 10 years since immigration) comprise 13.6 per cent (the rate is 14.2% for males and 13.1% for females) of the mid-life immigrant population, but only 6.2 per cent (6% for males and 6.4% for females) of the later-life group. An examination of immigrants (excluding refugees) and their length of residence in Canada in these two age categories is important in that it may provide insights into the reasons for immigration. For example, it is assumed that recent immigrants who are currently 65 years of age or older have moved to Canada to join adult children, as they have most likely completed their work-force participation and are in the retirement stage of their lives. Longer-term immigrants (10 years or more of residence) who are currently in the mid-life category (45–64 years), however, were most likely seeking employment or further education–training in Canada at the time of their immigration. These variations in reasons for immigration, dependent on age at immigration and other socio-demographic variables like gender and marital status, may be related to status in other domains like work and health over time.

With regard to health, mid- and later life are important age categories to examine, given that both of these stages in the life course are periods of time when great physical and psycho-emotional changes are likely to occur, particularly for women. Do the recent changes in Canada's immigrant population—its size and composition—have implications for the health status and/or health care utilization patterns of its members? An examination of the *healthy immigrant effect* by adult age group attempts to respond to this inquiry.

*The Healthy Immigrant Effect*
The healthy immigrant effect hypothesis maintains that recent immigrants are healthier (and consequently, that they use the health care system less) than their Canadian-born counterparts but that over time this health status advantage decreases. It is believed that the effect is strongest among new immigrants for two reasons: (a) Healthier (and younger, better-educated) individuals self-select into the immigration process, and (b) the health requirements in the Immigration Act for entrance into Canada tend to disqualify people with serious medical conditions (Oxman-Martinez, Abdool, & Loiselle-Léonard, 2000). It is thought that the decline in health status over time can be attributed to the adoption of mainstream (Canadian) beliefs, attitudes, and lifestyle behaviours (e.g., smoking, dietary changes, increased alcohol consumption) by immigrants, resulting in a convergence in health status (and health care utilization) between the foreign- and non-foreign-born populations (Ali, 2002; Chen, Ng, & Wilkins, 1996a; Hull, 1979; Perez, 2002; Zambrana, Scrimshaw, Collins, & Dunkel-Schetter, 1997). This argument is supported by Canadian studies comparing immigrants by time since immigration, which tend to show that longer-term immigrants are not as healthy as newly arrived individuals due to a deterioration in their health over time.

Using data from the 1994–1995 National Population Health Survey, Chen et al. (1996a) found the following support for the healthy immigrant effect: Immigrants, particularly recent immigrants, were less likely than the Canadian-born population to have chronic conditions or disabilities. Further, their results indicated that the effect was strongest for those from non-European countries (i.e., China, Hong Kong, Taiwan, India), who constitute the majority of recent immigrants to Canada.

Recent research by Perez (2002) and Ali (2002) provides further support for the healthy immigrant effect in Canada. In examining health status and health behaviour in the Canadian population, Perez (2002) compared the physical health (incidence of heart disease, diabetes, high blood pressure, and cancer) of immigrants with that of the Canadian-born, while Ali (2002) focused on variations in mental health (incidence of depression and dependence on alcohol). Both studies observed the healthy immigrant effect with respect to selected physical and mental health indicators. In addition, the findings indicated that time since immigration was also related to variations in the health of immigrants; that is, the longer the period of residence in Canada, the more likely the health status of immigrants was to converge with the Canadian norm. Additionally, these findings remained significant when a number of demographic, socio-economic, and lifestyle variables were held constant.

Further research, using a number of different measures of health (e.g., disability, dependency, life expectancy), also found evidence for the healthy immigrant effect in Canada (Chen, Ng, & Wilkins, 1996b, 1995; Dunn & Dyck, 2000; Hyman, 2001; Parakulam, Krishnan, & Odynak, 1992). These studies indicated that length of residence in Canada (along with country of birth and demographic–SES factors) contributes to variations in the health of immigrants.

### The Healthy Immigrant Effect and Age

Globerman (1998), in his study on the health care utilization patterns of immigrants, concluded that "age is the strongest single determinant of health problems" (p. 31), regardless of immigrant status; in fact, his research suggested that immigrants and the Canadian-born utilize health care resources in similar ways at all stages of the life course, including in old age. According to Globerman, a healthy immigrant effect does not exist with regard to the use of health care services, even in later life. However, research to date on the healthy immigrant effect has yet to explore the intersection between immigrant status, time since immigration, health status, and age.

This study uses a population health perspective to examine the relationship between length of residence in Canada (time since immigration) and health status in mid- to later-life individuals. Such a perspective recognizes that the immigrant, socio-economic, and demographic (gender, ethnicity, language, age, marital status) characteristics of individuals, rather than "medical care inputs and health behaviours" (Dunn & Dyck, 2000, p. 2) are the most salient predictors of health status over the life course. This study explores differences between recent immigrants, longer-term immigrants, and non-immigrant Canadians using overall–global measures of health status.

## Methods

### Data

Although recent research shows strong support for the healthy immigrant effect among the immigrant–Canadian-born population in general, the current study examines whether or not this effect applies equally to mid- and later life populations. Data used in this analysis come from Statistics Canada's 2000–2001 Canadian Community Health Survey (CCHS) Cycle 1.1 (Public Use Microdata File), which collects cross-sectional information on health status, health care utilization, and health determinants for the Canadian population. The sample consists of about 131,000 respondents from all provinces and territories aged 12 or older and living in private occupied dwellings, with an overall response rate of approximately 85 per cent. The large sample size of the CCHS makes it possible to compare health outcomes by length of residence of immigrants in later life (45 years and over). Sample weights, which were adjusted to sum to sample size, were used to account for unequal probabilities of selection in the multistage stratified cluster sampling design employed in the CCHS.

### Measures

The CCHS Public Use Microdata File (PUMF) contains general information on respondents' country of birth (i.e., Canada or *other*). Those who were not born in Canada (or as Canadian citizens) were defined as immigrants and grouped by their length of time in Canada since initial immigration: 0 to 9 years (*new immigrants*) and 10 years and over (*longer-term immigrants*).

We measured the healthy immigrant effect in terms of global or overall health, as opposed to a specific health condition–problem (e.g., heart disease, depression). To provide a more comprehensive measure of global health status, health was measured on both *subjective* and *objective* (i.e., self-reported indicators of physical health) levels.

Subjective health status, which provides a respondent's assessment of his/her overall health, was based on the question, "In general, would you say your health is: *excellent*, *very good*, *good*, *fair*, or *poor*?" It can be assumed that self-rated health (SRH) is an indicator of how an individual perceives his/her physical health. Researchers often collapse SRH into two logical, divergent groups: *positive* health perception (good, very good, or excellent) and *negative* health perception (poor or fair). The current study also uses this approach.

Two tangible measures of global health status were also used. Together, they provided a fairly objective measure of overall functional limitations and disabilities. First, the Health Utility Index (HUI) provided an overall index of functional ability. The HUI is based on respondents' answers to questions about their vision, hearing, speech, mobility, dexterity, cognition, emotions, and pain and discomfort. Scores range from 0 (*completely non-functional*) to 1 (*perfect functional health*) in increments of 0.001. The second objective measure examined health limitations that might affect daily activities. *Activity restriction* (AR) (or disability) refers to the need for help—as a result of any health problem–condition, including a disability or handicap, that has lasted 6 months or more—with *instrumental activities of daily living*, such as preparing meals, shopping for groceries or other necessities, doing everyday housework, doing heavy household chores, and personal care (washing, dressing or eating, or moving about inside the house). Restriction of activities is often considered a very broad measure of individual health.

### Analysis

The goal of this article is to examine the healthy immigrant effect (i.e., the relationship between length of residence in Canada and health) in mid- to later-life. Logistic regression analysis was used to estimate the odds of reporting positive SRH and AR for mid- to later-life Canadian-born, new immigrant, and longer-term immigrant groups, and analysis of variance was used to estimate mean HUI scores for these groups. This analysis was done separately for the aged 45-to-64 years and the aged 65-years-or-more populations because reasons for entry into Canada (and hence the characteristics—e.g., health and socio-economic status (SES)—of immigrants) are likely to differ by age. Specifically, older adults are more likely than persons of working age to come to Canada for family reasons.

Both unadjusted and adjusted odds and means are presented. Unadjusted coefficients describe actual differences in health between immigrants and non-immigrants. On the other hand, adjusted coefficients describe fundamental differences, since they take into consideration the well-known differences in socio-demographic (sex, age, marital status, race, and language proficiency), SES (income and education), and lifestyle (alcohol–tobacco use and diet) factors between immigrants and non-immigrants (Perez, 2002).

In terms of socio-demographic control variables, age is a categorical variable, divided into 5-year intervals, but we assigned a value indicating age to each category (45–49 = 47, 50–54 = 52, …); marital status is categorized as *married–common-law*, *single*, or *divorced–separated–widowed* (reference category); cultural–racial origin in the CCHS is coded as *white* or *visible minority*; and language proficiency (i.e., language[s] in which the respondent can converse) is coded as *English and/or French* or *neither English nor French*.

Education and income adequacy provided a control for SES. Education is categorized in the CCHS into four groups: *less than secondary school graduation* (reference category), *secondary school graduation*, *some post-secondary*, and *post-secondary graduation*. Income is measured using an income adequacy indicator—based on total household income (before taxes) and the number of persons in the household—produced by Statistics Canada, which is comprised of five discrete income-adequacy categories: *low* (reference category), *low–middle*, *middle*, *upper–middle*, and *high*.

Three health behaviour controls were included in this analysis: alcohol consumption (i.e., the sum of numbers of drinks consumed on all days in the week prior to the interview), number of years smoked (for current daily smokers only; all others are coded as 0 years), and fruit–vegetable consumption (i.e., the average number of times per day fruits and vegetables were consumed).

Some variables in the CCHS have missing cases. While the number of missing cases is relatively small for most variables, two methods were used to include them in the sample (i.e., to keep a fuller and less biased sample). First, a dummy variable for missing cases in categorical variables was created (see Table 1). Second, for continuous-type variables (e.g., alcohol–cigarette consumption) that had missing data, a regression model (based on age, gender, education, and so on) was developed to impute values for these missing data.

## Results

### The Healthy Immigrant Effect by Age

The healthy immigrant effect hypothesis maintains that immigrants are healthier than Canadian-born persons and that the effect is strongest among recent immigrants because healthier (and younger, better educated) individuals are more likely to enter Can-

ada. With the passage of time, as immigrants become more assimilated into Canadian society and begin to adopt more Westernized health beliefs and behav- iours, a convergence in health status between immi- grants and Canadian-born persons occurs. Indeed, Table 1 shows that recent immigrants, in both the

**Table 1: Summary statistics for health, socio-demographic, SES, and behavioural variables, by age and years since immigration**

| Variables | 45–64 Years | | | 65+ Years | | |
|---|---|---|---|---|---|---|
| | 0–9 | 10+ | Can Born | 0–9 | 10+ | Can Born |
| **AR*** | | | | | | |
| No | 90.9% | 85.1% | 84.7% | 49.8% | 58.5% | 60.1% |
| Yes | 9.1 | 14.9 | 15.3 | 50.2% | 41.5 | 39.9 |
| **SRH*** | | | | | | |
| Positive | 87.1% | 83.3% | 85.4% | 62.9% | 68.3% | 71.4% |
| Negative | 12.9 | 16.7 | 14.6 | 37.1 | 31.7 | 28.6 |
| HUI* | 0.881 | 0.861 | 0.866 | 0.765 | 0.763 | 0.792 |
| | (0.167) | (0.201) | (0.202) | (0.286) | (0.276) | (0.259) |
| **Sex*** | | | | | | |
| Male | 52.1% | 49.6% | 49.4% | 44.5% | 46.1% | 43.0% |
| Female | 47.9 | 50.4 | 50.6 | 55.5 | 53.9 | 57.0 |
| **Age*** | 51.3 | 53.9 | 53.1 | 72.8 | 73.5 | 73.5 |
| | (4.9) | (5.5) | (5.4) | (5.4) | (5.5) | (5.6) |
| **Marrriage Status*** | | | | | | |
| Married/CL | 85.0% | 79.9% | 75.6% | 66.2% | 64.4% | 59.1% |
| Wid/Dv/Sp | 9.9 | 14.0 | 16.3 | 33.8 | 32.5 | 35.3 |
| Single | 4.6 | 5.9 | 8.0 | — | 3.0 | 5.5 |
| Missing | 0.5 | 0.1 | 0.1 | — | — | 0.1 |
| **Race*** | | | | | | |
| Non-Vis Min | 26.5% | 64.3% | 97.2% | 24.3% | 82.0% | 98.1% |
| Vis Min | 72.6 | 34.8 | 2.3 | 75.3 | 17.5 | 1.5 |
| Missing | 0.9 | 1.0 | 0.5 | 0.3 | 0.5 | 0.4 |
| **Language*** | | | | | | |
| Eng/Fren | 66.0% | 92.8% | 99.5% | 39.5% | 87.6% | 99.5% |
| Non-Eng/Fr | 34.0 | 7.2 | 0.5 | 60.5 | 12.4 | 0.5 |
| **Education*** | | | | | | |
| <High School | 19.4% | 20.8% | 25.1% | 40.3% | 42.1% | 52.0% |
| High School | 18.7 | 20.4 | 18.9 | 20.5 | 19.9 | 14.4 |
| Some Post-secondary | 4.2 | 5.2 | 6.6 | 1.7 | 5.5 | 5.0 |
| Post-secondary | 55.6 | 52.7 | 48.4 | 34.9 | 31.3 | 27.4 |
| Missing | 2.1 | 0.9 | 1.0 | 2.7 | 1.2 | 1.1 |
| **Income*** | | | | | | |
| Low | 7.0% | 2.8% | 4.0% | 14.0% | 3.9% | 2.4% |
| Lower-middle | 10.9 | 5.0 | 4.9 | 13.0 | 10.1 | 12.5 |
| Middle | 29.3 | 16.7 | 14.9 | 35.7 | 30.8 | 33.2 |
| Upper-middle | 26.4 | 33.8 | 33.4 | 13.0 | 28.5 | 27.1 |
| High | 14.5 | 10.4 | 33.9 | 14.3 | 13.7 | 10.8 |
| Missing | 11.8 | 33.8 | 9.0 | 10.0 | 13.0 | 14.0 |
| **Alcohol*** | 1.4 | 2.6 | 3.5 | 0.8 | 2.4 | 2.2 |
| | (3.9) | (4.9) | (6.3) | (2.7) | (4.7) | (5.2) |
| **Smoke*** | 2.9 | 4.6 | 8.6 | 1.4 | 4.0 | 5.8 |
| | (8.8) | (11.8) | (15.3) | (7.9) | (13.8) | (16.6) |
| **Fruit-Veg*** | 4.9 | 5.0 | 4.6 | 4.8 | 5.2 | 5.1 |
| | (2.4) | (2.8) | (2.6) | (2.0) | (2.9) | (2.4) |

Sample sizes for aged 45–64 are 0–9 = 1,206; 10+ = 7,634; and Canadian born = 27,695.

Sample sizes for aged 65+ are 0–9 = 300; 10+ = 4,525; and Canadian born = 13,488.

Groups (i.e., 0–9, 10+, and Canadian born) are significantly different at: *$p \geq 0.05$.

Standard deviations for continuous variables are in brackets.

45-to-64 and 65-and-over age groups, were younger on average and more likely to be male, married, and post-secondary graduates than those in the Canadian-born population. They were also less likely to smoke and drink excessively than both longer-term residents and Canadian-born persons.

It is, therefore, not surprising that Table 2 shows strong support for the healthy immigrant effect among the 45-to-64 age group: new immigrants had better functional health. However, this advantage decreased with time spent in Canada. Specifically,

recent immigrants in this age group were healthier than their Canadian-born counterparts. They were less likely to have a physical disability (i.e., limitation of daily activities) than Canadian-born persons (*OR* 0.553, p<=.05). They also had a significantly higher mean HUI score. Ranging from 0 to 1, where the latter equals perfect or full health, the mean HUI score for recent immigrants was 0.881, compared to 0.866 for Canadian-born persons (this difference is statistically significant at $p < =0.05$).

**Table 2: Odds ratios for selected health outcomes, by years since immigration, before and after socio-demographic, SES, and behavioural controls, 45–64 years of age**

| Years since immigration | Odds of AR | Odds of Positive SRH | Mean HUI |
|---|---|---|---|
| **Before Controls** | | | |
| 0–9 | 0.553* | 1.161 | 0.881[ac] |
| (95% C.I.) | (0.453, 0.674) | (0.977, 1.378) | (0.870, 0.892) |
| 10+ | 0.967 | 0.857* | 0.861 |
| (95% C.I.) | (0.901, 1.039) | (0.800, 0.918) | (0.857, 0.866) |
| Canadian Born | 1.00 | 1.00 | 0.866 |
| | | | (0.863, 0.868) |
| Model Fit | 30,847 | 30,868 | 5.3 |
| **After Controls** | | | |
| 0–9 | 0.489* | 1.323* | 0.891[abc] |
| (95% C.I.) | (0.389, 0.615) | (1.077, 1.626) | (0.878, 0.903) |
| 10+ | 1.001 | 0.778* | 0.854 |
| (95% C.I.) | (0.921, 1.088) | (0.717, 0.845) | (0.850, 0.859) |
| Canadian Born | 1.00 | 1.00 | 0.867 |
| | | | (0.865, 0.870) |
| Model Fit | 28,907 | 27,997 | 118.7 |

Sample sizes are: 0–9 = 1,206; 10+ = 7,634; and Canadian born = 27,695.

Significantly different from reference group (Canadian Born) at *$p \geq 0.05$

Difference between: [a] [0–9 and 10+] [b] [10+ and CB] [c] [0–9 and Canadian born] is significant at *$p \geq 0.05$

Control variables: sex, age, marital status, race, language, education, income, alcohol consumption, years smoked, fruit/vegetable consumption.

Model fit based on -2 Log likelihood for AR and SRH and on *F*-ratio for HUI.

Second, and in support of the healthy immigrant effect hypothesis, the results also suggest that there may be a gradient of deterioration in health with time since immigration (i.e., a convergence in health differences between immigrants and Canadian-born persons). In contrast to new arrivals, longer-term immigrants aged 45 to 64, compared to Canadian-born persons, were just as likely to experience a disa-

bility or to have a comparable level of overall functional health (HUI) and were even less likely to rate their health as good or better.

Although the findings from Table 1 are consistent with the assumptions of the healthy immigrant effect hypothesis, the adjusted coefficients in Table 2 contradict the assumption that a healthier immigrant population stems from advantages in socio-demographic,

**Table 3: Odds ratios for selected health outcomes, by years since immigration, before and after socio-demographic, SES, and behavioural controls, 65+ years of age**

| Years Since Immigration | Odds of AR | Odds of Positive SRH | Mean HUI |
|---|---|---|---|
| **Before Controls** | | | |
| 0–9 (95% C.I.) | 1.518* (1.207, 1.910) | 0.677* (0.534, 0.858) | 0.765[b] (0.735, 0.795) |
| 10+ (95% C.I.) | 1.067 (0.996, 1.143) | 0.865* (0.804, 0.930) | 0.763 (0.756, 0.771) |
| CB (95% C.I.) | 1.00 | 1.00 | 0.792 (0.787, 0.796) |
| Model Fit | 24,674 | 22,185 | 18.8 |
| **After Controls** | | | |
| 0–9 (95% C.I.) | 1.251 (0.946, 1.656) | 0.759 (0.575, 1.001) | 0.799[b] (0.766, 0.831) |
| 10+ (95% C.I.) | 1.084* (1.001, 1.175) | 0.819* (0.755, 0.889) | 0.765 (0.757, 0.773) |
| CB (95% C.I.) | 1.00 | 1.00 | 0.790 (0.786, 0.795) |
| Model Fit | 21,740 | 21,062 | 72.9 |

Sample sizes are: 0–9 = 300; 10+ = 4,525; and Canadian born = 13,488.

Significantly different from reference group (Canadian born) at *$p \geq 0.05$.

Difference between: [a] [0–9 and 10+] [b] [10+ and Canadian born] [c] [0–9 and Canadian born] is significant at *$p \geq 0.05$.

Control variables: sex, age, marital status, race, language, education, income, alcohol consumption, years smoked, fruit/vegetable consumption.

Model fit based on -2 Log likelihood for AR and SRH and on *F*-ratio for HUI.

SES, and lifestyle factors. When these factors are controlled, recent immigrants still have the lowest risk of disability, the highest odds of reporting positive health, and the highest average HUI score. Hence, these factors do not appear to explain the healthy immigrant effect. More research is needed, therefore, on what controls–explanatory variables (e.g., social-psychological factors, which are not available in the data used here) might account for the healthy immigrant effect among this population.

Table 3 describes the relationship between immigrant status and health for persons 65 years of age and older. These results differed from those reported for the 45-to-64 year age group in a few important ways. First, the healthy immigrant effect did not apply to the older adult population. In fact, recent older adult arrivals had significantly poorer health compared to their Canadian-born counterparts—this is in opposition to the findings reported in Table 2. The odds of having a limitation of activity for new immigrants

aged 65 years and older were 1.5 times those of older Canadian-born persons, and they were also disadvantaged in overall functional health relative to the older Canadian-born population (0.765 vs. 0.792, $p < =0.05$). Further, recent older arrivals were less likely to rate their health in a positive manner relative to Canadian-born older adults (*OR* 0.677, $p < 0.05$). It is important to note that while statistically significant differences in health between immigrant groups partly depended on sample size—which was smallest for the new immigrant sample—the magnitude of these differences indicates that it is unlikely that these results can simply be attributed to sample size alone.

Second, when the data were adjusted for socio-demographic, SES, and lifestyle differences, the health of recent immigrants became more similar to that of non-immigrants. In other words, when the disparities faced by recent older immigrants observed in Table 1 (especially deficiencies in speaking an official language and in income) were partialled out, rates of dis-

ability, positive self-rated health, and average HUI score for older new immigrants became more comparable to those of their Canadian-born counterparts.

## Conclusions

### Discussion

The findings from the current study indicate that the healthy immigrant effect applies to mid-life immigrants in Canada. Specifically, recent mid-life (45–64 years) immigrants—those who immigrated less than 10 years ago—have better functional and self-rated health compared to their longer-term counterparts—those who immigrated 10 or more years ago. The latter group's health status is similar to that of Canadian-born persons. Interestingly, a different picture emerges in old age (65 years and over), where recent immigrants have poorer overall health compared to longer-term residents and the Canadian-born. This disadvantage, however, disappears when socio-demographic and socio-economic status and health-related behaviour factors are held constant.

Based on these findings, there are a number of implications for the development of Canadian health care policy and program planning for immigrants in mid- to late adulthood, individuals who make up over one half of the foreign-born adult population. First, health care policies must begin to address the differential needs of immigrant adults by age group. A mid-life group of recent immigrants will have fewer needs for services and programs in the early years of their residency in Canada, while certain sub-groups of older new immigrants may have an increased need for services, due to poor health status. Policies must be developed at both the federal and provincial levels, particularly in Ontario (Toronto), Quebec (Montreal), and British Columbia (Vancouver), provinces in which the majority of immigrants choose to reside, that (a) target immigrants as they age over time, and (b) respond to the needs of an older immigrant population from the outset.

Second, with respect to physical health status, older immigrants from large South Asian or Asian source countries like India or Taiwan may experience nutritional deficiencies, as diet and dietary behaviours change at an accelerated rate after immigration. The rate at which lifestyle behaviours converge with the Canadian norm will, of course, vary according to a number of different factors related to the assimilation process, including age at immigration, country of birth, level of adherence to traditional (country of birth) value and belief systems, place of residence (urban vs. rural), and degree of *institutional completeness* of the immigrant's ethno-cultural group in the place of residence. In the end, these and other related factors must be considered in any comprehensive Canadian health care policy and program planning initiatives for mid- to later life adults.

### Limitations

Although the CCHS provides information on the health status and health care needs of older adult Canadians, there were a number of limitations involved in using data from the CCHS for this study. First, despite the fact that its data allow for an examination of health status and health care utilization among immigrant arrivals, the CCHS does not collect information on immigrant status or on the reasons for immigrants' entry into Canada. Hence, a more detailed analysis of immigrant health was not possible; that is, important variations in health status among naturalized citizens, landed immigrants, refugees, and non-permanent residents could not be examined in this study. Further, differences in health care utilization between *family reunion* (e.g., spouses, children, and parents of Canadian citizens–residents), *refugee*, and *investment and independent* (e.g., skilled workers and business persons) immigrants could not be determined. The study, therefore, is not able to provide specific mid- to later-life insights into Perez's (2002) findings that refugees are more likely to be disadvantaged in health than any other type of immigrant.

Second, it is important to note that, while CCHS respondents who could not understand English or French were interviewed in their own language, language (as well as cultural) barriers faced by new immigrants may have prevented them from consulting health care professionals, resulting in an under-diagnosis of health problems (Laroche, 2000; Perez, 2002). Relatedly, cultural factors like adherence to traditional values and beliefs may influence an individual's willingness to report health problems (Ali 2002; Kopec, Williams, To, & Austin, 2001), as there may be differences in their fundamental concepts of health and illness (Saldov, 1991). Overall, the extent to which cultural and language differences in the Canadian population influence the interpretation and reporting of health problems is not well known. However, the magnitude of the differences in health status between immigrant and Canadian-born populations reported in the results here make it unlikely that cultural factors exclusively explain these results.

Third, it is important to note that despite evidence of a healthy immigrant effect among the 45-to-64-year age group, longitudinal data are needed to verify a true convergence in health status between immigrants and Canadian-born persons over time. It is not possible, with the cross-sectional data used here, to rule out a cohort effect, whereby differences in health among

immigrant groups are partly due to the country of birth of immigrants. For instance, longer-term immigrants are more likely to be from Europe and recent immigrants from non-European regions, and both regions vary in terms of general population health—today's immigrants may make up a healthier cohort than cohorts who immigrated earlier—and in the type and quality of health care systems; additionally, health requirements for entry into Canada have changed over time (Perez, 2002).

Finally, in using the CCHS PUMF as the primary data source, this examination was limited, in that age is defined in 5-year groups (e.g., 45–49 years) as opposed to respondents' actual age. Consequently, some of the key variations between immigrants and non-immigrants may have been due to small differences in the average age of respondents within each age-cohort group. Further, another limitation of the PUMF is that it did not allow for the consideration of key variables, such as ethnicity (i.e., country of birth), as both control and independent variables in the current analyses.

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