

**What Happens to the 'Healthy Immigrant Effect':**

**The Mental Health of Immigrants to Canada**

by  
Yimin Lou  
and  
Roderic Beaujot

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***Abstract:***

*This study examines the mental health of Canada's immigrants, relative to that of the native-born population, and makes a comparison between the longer term (ten or more years of residence) and more recent immigrants. The pattern of mental health may be explained by selectivity, structural strain theory from a macro perspective, or stress theory with a micro approach. Given available data, the study focuses on stress theory which suggests that persons with better mental health are either exposed to fewer stressors, or they cope better with their stress and adversity. The data are from Cycle 1.2 of the Canadian Community Health Survey in 2002. The results confirm a "healthy immigrant effect" and its decline for longer-term immigrants. The various demographic, socio-economic, stress and coping factors are found to be significantly related to mental health, but controls for these factors fails to account for the differences across immigration status, especially the advantage of recent immigrants.*

Following on the literature regarding the "healthy immigrant effect," this paper considers the mental health differentials between immigrants and the Canadian-born population, as well as the differentials among immigrants in Canada by their duration of residence. There are three main objectives: first, to test the presence of the "healthy immigrant effect" with a newly released data set on the mental health of Canadian population; second, to examine the effect of YSM (years since immigration) on the mental health of Canada's immigrants; and third, to explore possible determinants of the mental health differentials by immigration status and immigrants' length of residence in Canada.

### **Hypotheses and theory**

The “healthy immigrant effect” is expected to be manifest, with the foreign-born population on the whole enjoying better mental health than the native-born population. This has been found to apply to both physical health and mental health, based on both cross-sectional and longitudinal data sets in all the three largest receiving countries of immigrants: Canada (Ali, 2002; Chen, Ng, & Wilkins, 1996; Chen, Wilkins, & Ng, 1996; Chui, 2003; Ng, Wilkins, Gendron, & Berthelot, 2005; Noh & Avison, 1996; Pérez, 2002), the United States (Singh & Siahpush, 2001; Stephen, Foote, Hendershot, & Schoenborn, 1994), and Australia (Donovan, d’ Espaignet, Metron, & van Ommeren, 1992, as cited in Chen, Ng et al., 1996; Young, 1991). This is thought to be due to filtering through self-selection, official health screening, and employability, which selects healthier immigrants into the host societies (Ali, 2002; Chen, Ng, et al., 1996; Pérez, 2002).

The effect of YSM (years since immigration), as defined by McDonald and Kennedy (2004) is also expected to be evident, with recent immigrants having a health advantage over long-term immigrants, that is, a decline of the “healthy immigrant effect” over longer length of residence in Canada. On the one hand, selectivity is likely to play a role in the subsequent departure of the healthy immigrants, and affect the mental health profiles of the remaining immigrant population. On the other hand, there might be a “real” worsening in immigrant health with longer time living in the host country, which might be associated with poor integration into life in Canadian society that has been observed in recent decades.

The poor integration of immigrants can be theorized at both macro and micro levels, which can be respectively referred to as *structural strain theory* and *stress theory* (Thoits,

1999). From a macro perspective, newcomers arriving in Canada since the 1970s may be disadvantaged by the absence of a subsequent interlude in immigration, and the absence of sustained economic growth following the large numbers of arrivals (Chui, 2003; Picot, 2004; Reitz, 2001). The deteriorating macro social context can influence the mental health of immigrants through fewer opportunities and more competition, which could be related with poor status attainment among immigrants and slower mobility in climbing up the socioeconomic ladder (Massey, 1995).

From a micro perspective, the mental health advantage of immigrant individuals at arrival might be undermined by their acculturative stress, in the course of uprooting, relocation, and adaptation (Murphy, 1973). The form of acculturative stress results from the interplay between the exposure to certain risk factors and the effectiveness of coping factors. The stressors that could be associated with immigrants' mental health decline include alienation and discrimination, poor economic integration, worsening physical health, and elevated expectations. *Alienation* implies the isolation from home resources in terms of continuing family ties and ethnic support, while *discrimination* refers to the exclusion from the resources and opportunities in the host society, such as job promotions (Kaplan & Marks, 1990). Moreover, *economic factors* (mostly immigrants' experiences in the job market) play an important role in determining immigrants' success or failure to adjust to life in Canada (Manpower and Immigration, 1974). In addition, as mental, *physical* and *social health* are "closely interwoven and deeply interdependent," people with chronic strains or health-related dependency suffer from more mental problems (World Health Organization, 2001, p. 3). Last, higher expectations in socioeconomic performance are likely to lift the threshold of satisfaction, and thus increase the risk of stress.

The protective effect toward mental health, by the respondents themselves, their ethnic groups, and social networks, could occur through the dimensions of vulnerability, acculturation strategies, coping resources, and social capital. *Vulnerability* refers to immigrants' personal characteristics and psychological resources; those with more self-esteem and more mastery are expected to encounter less mental health problems. *Acculturation strategies* would relate to the balance between the maintenance of home culture and the acceptance of host culture (Berry, 1997; Berry & Kim, 1988). *Coping resources* provide immigrants with protective effects. In particular, European immigrants greatly benefit from a low "cultural distance" (Berry, 1997), and social networks play a crucial role for non-European immigrants in creating and facilitating the mobility process by reducing migration-related risks (Hugo, 1998). Also, *social capital*, as measured through sense of belonging to community, is considered to be related to mental health (Ross, 2002).

### **Data and Methods**

This study uses the data set collected in Cycle 1.2 of the Canadian Community Health Survey in 2002, which exclusively focused on the mental health and well-being of the Canadian population (Statistics Canada, 2004). This survey targeted the Canadian population aged 15 or above who live in private dwellings in the ten provinces. The sample size is 36,984, with a non-response rate of 23 percent (idem).

The prevalence of poor mental health is first presented for each population group, in terms of both unadjusted and age-adjusted percentages. Then logistic regression models are fitted to estimate the odds ratios to report poor mental health by immigration status and immigrants' duration of residence, respectively unadjusted and stepwise adjusted by selected demographic, socioeconomic, and mental health characteristics. A series of

nested and parallel models are built to examine the determinants of the “healthy immigrant effect,” with different risk factors or coping factors controlled.

Mental health is measured through a self-assessment measure, where “fair” and “poor” have been combined into the category of “poor” mental health, in response to the question: “In general, would you say that your mental health is excellent? Very good? Good? Fair? Poor?” (Statistics Canada, 2004). As noted in the discussion section, there may be problems in this measurement, especially in terms of differences in the willingness to report mental health difficulties across groups defined by immigration status.

### **Results**

Table 1 shows the general situation of the mental health status of the Canadian population, by immigration status and the categorical characteristics used in this study. The proportion of self-rated poor mental health among the foreign-born population is lower than that of the Canadian-born population (5.95% and 7.04% respectively). While long-term immigrants have a similar proportion to the native-born respondents (6.85% versus 7.04%), the recent immigrants have a significant advantage (3.69% report poor mental health). This pattern holds for most categories of the socio-demographic and economic indicators shown in Table 1.

#### **Immigrants as a whole are healthier than the Canadian-born population**

Comparing the mental health of Canada’s immigrants relative to that of the native-born population, immigrants appear to have lower prevalence (whether unadjusted or age-adjusted) self-rated poor mental health (Table 2). A logistic regression model is fitted to produce odds ratios for self-rated poor mental health by immigration status, controlling both demographic variables (age, sex, and marital status) and socioeconomic variables

(education and income adequacy). The results as presented in Table 3 show that the foreign-born population in general has a significantly lower likelihood (19% less) to perceive poor mental health than non-immigrants.

### **Recent immigrants are healthier than long-term immigrants**

The effect of YSM (years since immigration) is also tested for immigrants, and is supported by this study. As the foreign-born population spends more time in the Canadian society, the “healthy immigrant effect” tends to decline over time, with long-term arrivals less healthy than short-term arrivals. For immigrants with a duration of residence in Canada of ten or more years, 6.85% report poor mental health, while the proportion among those with less than ten-year residence is approximately half this amount (3.69%) (Table 2).

That is, there is a tendency toward convergence between the health of long-term immigrants and that of the native-born population, in terms of both percentage and odds ratio for self-rated poor mental health. Whether unadjusted or adjusted by age, similar proportions of long-term immigrants and non-immigrants report poor mental health (Table 2). Evidence also comes from the results of logistic regression models (Table 3), in which long-term arrivals are indistinguishable from the Canadian-born population, in terms of the likelihood of self-perceived poor mental health, net of the effect of age, sex, marital status, education, and income. While the foreign-born population as a whole is significantly healthier than the native-born population, this applies especially to recent immigrants.

Both immigrant men and women benefit from the “healthy immigrant effect”. Immigrant men have a greater advantage over their Canadian-born counterparts. After controlling age, marital status, education and income, the foreign-born men are 30% less

likely than the Canadian-born men to rate their mental health as poor, while the chance for immigrant women is 12% less than that for non-immigrant women (Table 3).

While both sexes keep the same pattern in terms of the “healthy immigrant effect” and the effect of “years since immigration,” poor mental health is more prevalent among women compared to men. In effect, while the difference with the Canadian-born is not statistically significant, the worst mental health occurs for long-term immigrant women.

### **Determinants of the “healthy immigrant effect”**

Having found evidence of the “healthy immigrant effect,” this study attempts to examine the factors associated with this phenomenon, aside from the widely accepted effect of selectivity. For this purpose, a series of logistic regression models are fitted stepwise to estimate the odds ratios for poor mental health by immigration status (the Canadian-born population, short-term immigrants, and long-term immigrants) and selected characteristics.

#### **1. Immigrant advantage is unaffected by demographic and socioeconomic characteristics**

Based on Model 1, which is the null model, three demographic variables (age, sex, and marital status) are controlled in Model 2, in addition to immigration status (Table 4). Sex and marital status are found to be significantly related to self-rated mental health. In effect, across almost all the models in Table 4, higher odds ratios for poor mental health are consistently associated with the characteristics of being younger, female, and previously married (widowed, separated, and divorced). However, these demographic factors do not appear to be the determinants of the “healthy immigrant effect,” as the pattern of mental health by immigration status remains from Model 1 to Model 2 (recent immigrants are less likely to report poor mental health than the native-born population,



which is significant at 0.001 level, while long-term immigrants have similar odds ratios as the Canadian-born group).

In Model 3, socioeconomic status is included. Education level and income adequacy are found to be significantly and positively correlated with good mental health. After controlling for education and income, the odds ratio for poor mental health among long-term immigrants remain the same as that in Model 2, while the odds ratio among recent immigrants declines by 11 percentage points, after adjustments for the lower socioeconomic status of short-term immigrants. Although Model 3 has a desirable model fit (the significance level of the Hosmer and Lemeshow Test is 0.315), it does not account for immigrants' health advantage. Nevertheless, a good sign is the decrease of -2 log likelihood through Models 1 to 3, which indicates that the incremental controls for demographic and economic factors do reduce the unexplained variation of self-rated mental health by immigration status.

## **2. Immigrant advantage is not a function of the stressors**

The risk factors include the interplay of education and occupation (to measure poor economic integration), self-rated physical health (to measure worsening physical health), respondent's opinion of own weight (again, to measure worsening physical health), and life satisfaction (to measure elevated expectations).

The interplay of occupation and education can be regarded as another measurement of socioeconomic status, which focuses on the poor economic integration of immigrants in terms of human capital and employment. Chui (2003) talked of the downward occupation shift among immigrants, who were working in occupation areas that were different from their occupations in the country of origin, and that required less education. This may affect immigrants' mental health.

To take into account the effect of lack of fit between occupation and education, a cross-product term, “occupation” by “education,” is included in the multivariate regression analysis, with demographic variables (age, sex, and marital status) controlled. The results are presented in Model 4 (Table 4). The model is a good fit (the significance level of the Hosmer and Lemeshow Test is 0.058), and the interaction term is significant. Compared with people having higher education but working in less professional occupations, those working in the occupations that match their high education have a 29% lower risk of poor mental health. However, this model does not change the basic pattern of mental health by immigration status.

The other stressors considered are self-rated physical health, respondent’s opinion of their own weight and life satisfaction. While each of these is significantly related to mental health, controls for this set of stressors does not account for the differentials in mental health across categories of immigration status (Model 7).

### **3. Immigrant advantage is not a function of the coping factors**

While better mental health may be associated with exposure to fewer stressors, it may also result from better coping. Models 5, 6 and 8 control the hypothesized moderators of potential acculturative stress, namely, self-perceived ability to handle demands (to measure vulnerability), number of resources used for mental health in life (to measure coping resources), number of close friends and relatives (again, to measure coping resources), general social support (another measurement of coping resources), and sense of belonging to local community (to measure social capital). Each of these coping factors is found to be significantly associated with self-rated mental health, but the control for these variables does not account for the mental health differences across immigration status (Model 8).

Two of the variables presented results that are worthy of attention, and these are shown separately in Models 5 and 6. The number of resources used for mental health relates to people's health care needs, and indicate individuals' help-seeking behaviour that may prevent people from future disorders. Resources for mental health include hospitalization in health care facilities, professional contacts, internet support group or chat room, self-help group, and telephone helpline. The Canadian-born population on average use more than double the resources for mental health in their life than the foreign-born population, while recent immigrants on average use less than half of the resources relative to long-term immigrants. The number of resources used for mental health in life appears to be associated with self-rated mental health significantly and negatively (Model 5 in Table 4). After controlling for this dimension, the odds ratios for poor mental health increase for both short-term and long-term immigrants, compared with the reference group, and long-term immigrants are significantly less healthy than non-immigrants. If the foreign-born population used the same amount of recourses for mental health as the native-born population, they would perceive much worse mental health. This result implies that resources used for mental health are a consequence variable rather than a mediating variable.

Similar to the larger number of resources used for mental health, the Canadian-born population have more close friends and relatives, and receive more social support in general than either short-term or long-term immigrants. This supports the unmeasured risk factor *alienation and discrimination*, where immigrants' uprooting keeps them less connected with original cultural and ethnic networks, and their relocation makes it difficult to be protected by the networks of the host society. The measure of general social support is positively associated with self-rated mental health, and it appears to act

as a suppressor since control for this variable widens the mental health differential by immigration status (Model 6). After adjusting for social support (that is, all the population groups are receiving the same amount of social support), the odds ratios for poor mental health decline for both immigrant subgroups, and the long-term cohort appears to be significantly healthier than the reference category (significant at 0.05 level). Immigrants have better mental health than the native-born population before controls, but their advantage would be even more pronounced if they receive the same amount of social support as the Canadian-born population.

### **Discussion**

Consistent with previous literature, the hypothesis of the “healthy immigrant effect” receives support from the findings of this study. Both descriptive results and regression coefficients indicate a healthier foreign-born population compared with the Canadian-born population, in terms of lower age-adjusted percentages of and lower odds ratios for poor mental health. However, the hypothesized risk factors (the disjunction between education and occupation, self-rated physical health, respondent’s opinion of own weight, and life satisfaction) and coping factors (self-perceived ability to handle demands, number of resources used for mental health in life, number of close friends and relatives, general social support, and sense of belonging to local community) do not appear to individually account for the health advantage of immigrants relative to the Canadian-born population. As shown in Models 7 and 8 respectively, neither the stressor model nor the coping model explains this mental health differential by immigration status.

The effect of YSM (years since immigration) is also found to be pronounced, with long-term immigrants reporting significantly higher prevalence and higher likelihood to perceive poor mental health than recent immigrants. However, the hypothesized risk

factors and coping factors are again not found to account for the observed differences by immigrants' duration of residence.

That is, the health status of long-term immigrants is found to become similar to that of the Canadian-born population. When controlling for the effect of demographic (age, sex, and marital status) and socioeconomic (education and income) characteristics, along with general social support, long-term immigrants demonstrate significantly better health than the native-born population (Model 5). This implies that immigrants are receiving less social support, and if they received as much as the Canadian-born population (that is, adjusting for social support), their health advantage would be even more evident. However, when taking into account the number of resources the respondents used for their mental health in life, the mental health of long-term immigrants is found to be worse than non-immigrants (Model 6). Therefore, immigrants appear to use fewer resources for mental health than the native-born population, and the used resources are for treatment rather than for prevention.

With respect to the relationship between gender and immigrant health, while both immigrant men and women benefit from the "healthy immigrant effect," men are less likely to report poor mental health than women, leaving a gender gap. This is true for each population group. In effect, men profit more than women from the "healthy immigrant effect." This advantage on mental health probably results from the filtering effect of the selection of immigrants. It has been observed that men are more likely to be independent applicants, while women are more likely to be admitted as spouses and dependents. For instance, 77% of the principal applicants in the economic class were men, during the one year period 2001-2002 (Chui, 2003). Compared to men, women's health disadvantage at arrival can be further affected during their adjustment to the host society,

as women are more likely to be occupied by the care-giving of family and children, and thus, have less opportunity to learn languages and skills and to be employed. If they fail to overcome these difficulties in integrating into Canadian society, they may perceive worsening mental health in the long run. This may in part explain why long-term immigrant women report the poorest mental health among the considered groups, even compared to the Canadian-born population.

Although the study has not succeeded in directly identifying the factors associated with the mental health advantage of immigrants over the Canadian-born population (that is, positive proof procedure), it contributes through exclusionary strategies, by identifying the characteristics that are not likely to explain the “healthy immigrant effect” (that is, negative proof procedure).

It is important to acknowledge the limits of this study. Given the cross-sectional design of the chosen data set, it cannot be determined whether the results drawn from this study are part of a social selection process or the result of social causation. Besides the effect of attrition, where immigrants with better health may be more prone to subsequently leave Canada and consequently reduce the health profile of the remaining population, there are two possibilities in terms of the relationship between integration and mental health. While poor integration in the host society can lead to the worsening of mental health, immigrants with poor mental health are more likely to experience poor integration and thus, drift to lower socioeconomic status. This process can only be specified in the models built on longitudinal data.

There are also limits associated with the measurement of mental health, especially when it comes to differences by immigration status. The respondent-assessed health indicator (self-rated mental health), can pose reporting errors due to non-objectivity or

cultural differences. In particular, there may be significant differences in the social acceptability of reporting poor mental health, across categories of immigration status. This study also includes some subjective explanatory variables (life satisfaction, self-rated physical health, respondent's opinion of own weight, self-perceived ability to handle demands). These control variables, subject to respondents' willingness to respond frankly, may contain reporting error on the one hand, and may cause problems in the overlapping of measurement due to their similarity to the dependent variable.

It should be noted that the models that are advanced by theory are not completely measured, since some variables are excluded due to measurement difficulties (the macro level factors, alienation and discrimination, and acculturation strategies), while others are poorly measured. In particular, life satisfaction is a poor measure of the frustrated expectations of immigrants, since these frustrations would only be part of the measure of life satisfaction. Also, the "number of resources used for mental health in life" is probably not only measuring the mediating effect of the coping behavior of respondents, but also the outcome of the mental health difficulties.

The study on the mental health aspect of immigrants' adjustment to the host society has a bearing on Canada's public health policy and immigration policy. In terms of policies on public health, the findings of this study help to identify a target population group of the health care system, so that health promotion programs may be designed and improved to reach those people with higher health risks. Since long-term immigrants and women appear to be more likely to suffer from poor mental health, they might need and claim more health services. Consequently, mental health services should be more accessible, and more mental health resources should be allocated to immigrants with longer duration of residence in Canada and women, especially to long-term immigrant

women. Also, the newcomers to Canada are found to be subject to the experience of health decline with increasing length of residence in Canada. This result has implications in terms of the improvement of Canada's reception system, such as the rapid absorption of new immigrants under the shelter of Canada's public health industry. This is important to prevent the new arrivals from experiencing a worsening of the protective "healthy immigrant effect."

With respect to immigration policy, the results of this study indicate the importance of giving priority to immigration applicants' characteristics that are prerequisites to rapid and successful settlement and integration in Canada, such as skills and previous working experience. Policy implications for Canadian society also include regulating the scale of immigration to match its capacity of absorption. This capacity depends considerably on the status and prospect of the domestic and global economy. The key problem for policy-making lies in how to determine an optimum level of immigration, where the national economy is supported by an adequate labor force, and the labor market provides sufficient opportunities to integrate the new arrivals.

Furthermore, both public health policy and immigration policy should work collaboratively with other policies, which also play a role in assisting the integration of immigrants into Canadian society, and therefore, may be beneficial to their mental health.

Education policy, for example, may directly promote immigrants' human capital and competitiveness in the labor market, by providing them with more training programs in official languages and working skills. Fiscal policy and monetary policy, on the other hand, are able to expand the domestic economy, and create more employment opportunities, from which immigrants may benefit. In addition, cultural policy is critical in diminishing cultural and ethnic discrimination and marginalization, and facilitating the



integration of immigrants by creating a social atmosphere with more tolerance and multiculturalism.

Given the prominence of immigrants in Canada (Chui, 2003; Citizenship and Immigration Canada, 2004; Ng et al., 2005; Statistics Canada, 2001, as cited in Ng et al., 2005), and the fact that mental health problems have become a rising cost to society (World Health Organization, 2001), it is important to examine the mental health status of Canada's immigrants and its subsequent change. Both the "healthy immigrant effect" and the effect of "years since immigration" are confirmed with data on self-assessed mental health. In addition, general social support is found to change the "healthy immigrant effect." After adding this variable to the regression model, besides demographic and socioeconomic characteristics, both long-term and short-term immigrants have a significantly lower likelihood of poor mental health than their Canadian-born counterparts. Immigrants on average receive less social support than the native-born population, and their health advantage would be more pronounced if they had the same amount of social support as non-immigrants. This study also finds that mental health resources used in life may be related to the mental health disadvantage of long-term immigrants. Immigrants are found to use fewer resources for mental health in life than their Canadian-born counterparts.

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**Table 1:** Number and percentage of self-rated poor mental health by immigration status, duration of residence, and selected characteristics, Canada excluding territories, 2002

Selected Characteristics	Total population	Canadian -born	Foreign -born	Recent immigrants	Long-term immigrants	
	<i>Number of self-rated poor mental health</i>					
<b>All persons</b>	2,497	2,012	484	84	401	
	<i>Number in total population</i>	<i>Percentage of self-rated poor mental health</i>				
<b>All persons</b>	36,706	6.80	7.04	5.95	3.69	6.85
<b>Age</b>						
15-19	3,271	5.87	6.05	4.80	4.18	5.21
20-24	2,819	6.49	6.53	6.32	6.90	5.41
25-29	2,711	5.98	6.61	2.58	0.42	5.24
30-34	3,229	6.41	7.18	3.99	2.40	5.82
35-39	3,768	6.63	7.28	4.73	2.74	5.77
40-44	4,232	7.80	8.13	6.33	0.40	8.84
45-49	3,505	7.56	7.55	7.49	4.35	8.70
50-54	3,037	7.87	7.00	10.51	17.14	9.82
55-59	2,627	7.08	7.40	6.21	3.39	6.46
60-64	2,049	6.44	6.62	5.84	5.13	5.91
65-69	1,704	4.99	4.72	5.73	3.70	5.85
70-74	1,515	6.53	7.20	4.70	4.17	4.78
75-79	1,116	7.71	8.71	5.00	0.00	5.24
80+	1,123	7.30	7.42	6.93	...	6.34
<b>Sex</b>						
Male	18,038	6.00	6.35	4.75	2.56	5.63
Female	18,667	7.57	7.71	7.10	4.72	8.01
<b>Marital Status</b>						
Married & Common-law	22,655	5.35	5.34	5.41	2.48	6.52
Widowed, separated & divorced	4,680	12.09	12.58	10.47	11.21	10.38
Single & missing	9,370	7.65	8.23	4.85	5.09	4.68
<b>Highest level of education of respondents</b>						
Post-secondary graduation	17,154	5.54	5.64	5.21	2.70	6.33
Some post-secondary	3,063	7.15	7.49	5.38	6.45	5.21
Secondary graduation & missing	7,240	6.98	7.27	5.94	4.29	6.57
Less than secondary	9,248	8.90	9.16	7.83	5.10	8.61
<b>Income adequacy</b>						
High quartile	11,058	3.94	3.90	4.19	0.69	4.78

Upper middle quartile	11,976	6.31	6.54	5.47	2.88	6.37
Low middle quartile	7,007	8.49	9.34	6.35	4.49	7.22
Low quartile	3,416	14.20	15.65	10.35	4.97	15.21
Missing category	3,248	6.90	7.18	5.87	5.32	6.42
<b>Life Satisfaction</b>						
Very satisfied	11,964	1.23	1.22	1.27	0.38	1.60
Satisfied	19,393	5.03	5.19	4.49	2.63	5.25
Neither satisfied nor dissatisfied & missing	3,681	18.66	20.32	13.92	7.49	17.04
Dissatisfied & very dissatisfied	1,667	41.27	44.55	30.29	20.34	34.72
<b>Self-rated physical health</b>						
Excellent	6,510	1.46	1.66	0.83	0.00	1.26
Very good	13,060	2.57	2.61	2.44	2.78	2.34
Good & missing	12,184	6.11	6.64	4.37	3.26	4.80
Fair	3,824	23.98	23.88	24.45	20.00	25.29
Poor	1,127	35.94	36.28	34.76	41.67	33.97
<b>Respondent's opinion of own weight</b>						
Overweight	14,843	8.17	8.48	6.94	2.31	8.33
Underweight	1,883	11.21	11.78	9.61	9.63	9.60
Just about right & missing	19,979	5.37	5.48	4.98	3.80	5.51
<b>Sense of belonging to local community</b>						
Very strong	6,776	3.85	3.72	4.33	2.33	4.93
Somewhat strong & missing	14,641	5.61	5.85	4.72	2.98	5.39
Somewhat weak	10,024	8.02	8.52	6.29	3.76	7.42
Very weak	5,265	11.59	11.86	10.64	6.20	12.90
<b>Self-perceived ability to handle demands</b>						
Excellent	8,053	2.40	2.38	2.45	2.78	2.34
Very good	16,999	3.13	3.29	2.55	2.14	2.71
Good & missing	9,744	10.24	10.79	8.64	3.98	10.68
Fair & Poor	1,910	40.52	42.39	33.74	20.79	37.94

**Data source:** Canadian Community Health Survey, Cycle 1.2, 2002

**Notes:** Household population aged 15 and over in the ten provinces; results are weighted using proportional weights, unweighted sample size is 36,728.

The numbers of subgroups may not add to the number of total group because of rounding errors in weighting cases.

... percentages that are based on fewer than ten cases

**Table 2:** Percentage of self-rated poor mental health by sex and immigration status, unadjusted and age-adjusted, Canada excluding territories, 2002

		<b>Total population</b>	<b>Canadian -born</b>	<b>Foreign -born</b>	<b>Recent immigrants</b>	<b>Long-term immigrants</b>
<b>All respondents</b>	<i>Unadjusted</i>	6.80%	7.04%	5.95%	3.69%	6.85%
	<i>Age-adjusted</i>	—	7.05%	5.85%	4.18%	6.65%
<b>Men</b>	<i>Unadjusted</i>	6.00%	6.40%	4.80%	2.60%	5.60%
	<i>Age-adjusted</i>	6.02%	6.38%	4.64%	2.39%	5.17%
<b>Women</b>	<i>Unadjusted</i>	7.60%	7.70%	7.10%	4.70%	8.00%
	<i>Age-adjusted</i>	7.57%	7.71%	7.15%	6.65%	8.36%

*Data source:* Canadian Community Health Survey, Cycle 1.2, 2002

*Notes:* Household population aged 15 and over in the ten provinces; results are weighted using proportional weights, unweighted sample size is 36,728.

*The age-adjusted rates use the age structure of total population (sample size=36,706) as the standard age distribution.*

**Table 3:** Odds ratios for self-rated poor mental health, by sex and immigration status, adjusted for demographic variables (age, sex, marital status) and socioeconomic variables (education, income), Canada excluding territories, 2002

	<b>Canadian -born§</b>	<b>Foreign -born</b>	<b>Recent immigrants</b>	<b>Long-term immigrants</b>
<b>All respondents</b>	1.00	0.805*	0.431*	0.978
<b>Men</b>	1.00	0.701*	0.344*	0.861
<b>Women</b>	1.00	0.882	0.488*	1.072

*Data source:* Canadian Community Health Survey, Cycle 1.2, 2002

*Notes:* Household population aged 15 and over in the ten provinces; results are weighted using proportional weights, unweighted sample size is 36,728.

§ Reference category

\* Significantly different from the reference category ( $p < 0.05$ )

**Table 4** Adjusted odds ratios for self-rated poor mental health, by immigration status and selected characteristics, Canada excluding territories, 2002

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<b>Immigration status</b>				
Canadian-born§	1.00	1.00	1.00	1.00
Recent immigrants (0-9 years)	0.503***	0.54***	0.43***	0.49***
Long-term immigrants (10+ years)	0.97	0.98	0.98	1.00
<b>Age (5-year age groups)</b>		1.00	0.98**	0.96***
<b>Sex</b>				
Male§		1.00	1.00	1.00
Female		1.2***	1.13**	1.15**
<b>Marital Status</b>				
Married & Common-law§		1.00	1.00	1.00
Widowed, separated & divorced		2.32***	1.78***	2.19***
Single & missing		1.47***	1.18**	1.21**
<b>Education</b>				
Post-secondary graduation§			1.00	
Some post-secondary			1.13	
Secondary graduation & missing			1.15*	
Less than secondary			1.24***	
<b>Income adequacy</b>				
High quartile§			1.00	
Upper middle quartile			1.56***	
Low middle quartile			2.04***	
Low quartile			3.31***	
Missing category			1.54***	
<b>Education*Occupation</b>				
Higher education * Less professional occupation§				1.00
Higher education * More professional occupation				0.71***
Lower education * More professional occupation				0.95
Lower education * Less professional occupation				1.12
Higher education * Occupation missing				1.53***
Lower education * Occupation missing				1.72***
Constant	0.08***	0.05***	0.04***	0.07***
	18196.75	17926.63	17597.53	17755.3
-2 Log likelihood				6
GOF	1.000	0.000	0.315	0.058

*Data source: Canadian Community Health Survey, Cycle 1.2, 2002*

*Notes: Household population aged 15 and over in the ten provinces; results are weighted using proportional weights, unweighted sample size is 36,728.*

*† p<0.10; \* p<0.05; \*\* p<0.01; \*\*\* p<0.001*

*§ Reference category*

*GOF: Significance level of the Hosmer and Lemeshow Test*



**Table 5** Adjusted odds ratios for self-rated poor mental health, by immigration status and selected characteristics, Canada excluding territories, 2002

	<b>Model 5</b>	<b>Model 6</b>	<b>Model 7</b>	<b>Model 8</b>
<b>Immigration status</b>				
Canadian-born§	1.00	1.00	1.00	1.00
Recent immigrants	0.72**	0.33***	0.46***	0.55***
Long-term immigrants	1.27***	0.87*	0.91	1.08
<b>Age (5-year age groups)</b>	0.99	0.96***	0.95***	0.98*
<b>Sex</b>				
Male§	1.00	1.00	1.00	1.00
Female	0.98	1.23***	1.15**	1.05
<b>Marital status</b>				
Married & Common-law§	1.00	1.00	1.00	1.00
Widowed, separated & divorced	1.50***	1.25***	1.30***	1.23**
Single & missing	1.18**	0.85**	1.00	0.92
<b>Education</b>				
Post-secondary graduation§	1.00	1.00	1.00	1.00
Some post-secondary	1.13	1.15†	0.95	1.10
Secondary graduation & missing	1.37***	1.16*	1.02	1.21**
Less than secondary	1.61***	1.32***	1.08	1.34***
<b>Income adequacy</b>				
High quartile§	1.00	1.00	1.00	1.00
Upper middle quartile	1.49***	1.46***	1.27***	1.37***
Low middle quartile	1.91***	1.80***	1.30***	1.58***
Low quartile	2.65***	2.47***	1.57***	1.71***
Missing category	1.60***	1.53***	1.19†	1.39**
<b>Self-rated physical health</b>				
Excellent§			1.00	
Very good			1.46**	
Good & missing			2.73***	
Fair			10.79***	
Poor			13.69***	
<b>Respondent's opinion of own weight</b>				
Overweight§			1.00	
Underweight			1.23*	
Just about right & missing			0.96	
<b>Life satisfaction</b>				
Very satisfied§			1.00	
Satisfied			3.06***	
Neither satisfied nor dissatisfied & missing			9.72***	
Dissatisfied & very dissatisfied			23.77***	
<b>Self-perceived ability to handle demands</b>				
Excellent§				1.00
Very good				1.15
Good & missing				3.22***

Fair & Poor				14.22***
<b>Number of resources used for mental health in life</b>	1.67***			1.55***
<b>Number of close friends and relatives</b>				0.99**
<b>General social support</b>		0.59***		0.75***
<b>Sense of belonging to local community</b>				
Very strong§				1.00
Somewhat strong & missing				1.25**
Somewhat weak				1.52***
Very weak				1.75***
Constant	0.02***	0.05***	0.01***	0.01***
-2 Log likelihood	15766.79	16771.08	13491.54	13620.67
GOF	0.000	0.056	0.000	0.000

**Data source:** Canadian Community Health Survey, Cycle 1.2, 2002

**Notes:** Household population aged 15 and over in the ten provinces; results are weighted using proportional weights, unweighted sample size is 36,728.

†  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

§ Reference category

GOF: Significance level of the Hosmer and Lemeshow Test