

## Units of Analysis and Variables

### An exercise using the Canadian Community Health Survey

#### Introduction

The **unit of observation** is a basic concept in quantitative research that represents the objects that are observed and about which information is systematically collected.

The **unit of analysis** is the object about which generalizations are made based on an analysis.

The **unit of observation** and **unit of analysis** are the same when the generalizations being made from a statistical analysis are attributed to the unit of observation.

The **unit of observation** is determined by the method by which observations have been selected; the **unit of analysis** is determined by an interest in exploring or explaining a specific phenomenon.

In research literature, the actual unit of analysis is often implicit and one must read between the lines to identify. Furthermore, a particular study may consist of multiple units of analysis, which makes the identity of the objects all the more important.

When trying to determine an article's unit of analysis in which the unit has not been clearly stated, a useful strategy is to review the variables in the article. Variables belong to a unit of analysis; they are the attributes and characteristics of the objects that have been observed, measured, held constant, or manipulated. A question to ask when isolating a unit of analysis is, "To whom do these data belong, that is, what is the object being described by the content of these variables?" The answer to this question will not always identify a single unit of analysis, but the answer should get you close.

#### Exercise

Included in this exercise is a copy of an article from **Health Reports Supplement** entitled, *Mental Health of Canada's Immigrants*. Use this article to answer the following questions.

- A. The name of the survey used in this article is:
  
  
  
  
  
  
  
  
  
  
- B. Unit of Analysis: identify the social, spatial and time characteristics of the unit of analysis for the survey used in this article.

|         |  |
|---------|--|
| Social  |  |
| Spatial |  |
| Time    |  |

- C. Variables: looking at the variables in Appendix Table A, what would you say they describe or to whom do they belong?
- D. Missing data: in the Methods section on page 2, how was missing data handled? How does this modify the unit of analysis?

# Mental Health of Canada's Immigrants

- *Immigrants had lower rates of depression and alcohol dependence than the Canadian-born population. Among immigrants, those who arrived in Canada recently had the lowest rates. Long-term immigrants reported the same rates of depression as the Canadian-born.*
- *Immigrants from Asia had the lowest rates of depression, and those from Africa had the lowest rates of alcohol dependence.*
- *After adjustment for time since arrival, age, sex, marital status, income, and education, all immigrants except those who had arrived at least 30 years ago had lower rates of alcohol dependence than the Canadian-born population. Similarly, adjustment for social factors did not affect the patterns for depression. These demographic and socio-economic factors do not explain the "healthy immigrant effect".*
- *Proficiency in English or French, employment status, and sense of belonging were not related to immigrants' lower rates of depression and alcohol dependence.*

## Abstract

### Objectives

This paper compares immigrants with the Canadian-born population in terms of depression and alcohol dependence. It explores whether the "healthy immigrant effect" observed for physical health holds for mental health. Several sources of diversity among immigrants are also considered.

### Data source

The data are from the 2000/01 Canadian Community Health Survey, which collected information on health status and health care utilization from over 131,000 respondents aged 12 or older in all provinces and territories.

### Analytical techniques

Age- and sex-adjusted prevalence rates of depression and alcohol in immigrants and the Canadian-born population were compared. Variation by length of residence in Canada and country of birth was examined. Multivariate logistic regression models were run separately for depression and alcohol dependence, with adjustment for age, sex, marital status, income, and education. The model was elaborated to consider language barriers, employment status, and sense of belonging.

### Main results

Immigrants had lower rates of both depression and alcohol dependence than the Canadian-born population. This "healthy immigrant effect" was strongest among recent immigrants and among immigrants from Africa and Asia. These two trends are related, since recent immigrants have tended to come from Africa and Asia, whereas the majority of long-term immigrants came from Europe. Long term immigrants have similar rates of depression as the Canadian-born. The lower rates observed for immigrants were not due to demographic or socio-economic differences (age, sex, marital status, income, and education) between immigrants and the Canadian-born population. After adjustment for all of these factors, recent immigrants still had the lowest risk for both depression and alcohol dependence. Furthermore, language barriers, immigrants' higher unemployment rates, and their lower sense of belonging to the local community did not diminish the gap between immigrants and the Canadian-born population.

### Key words

depression, major depressive episode, alcohol dependence, mental health, immigrants, epidemiology, community health

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According to the 2001 report of the World Health Organization (WHO),<sup>1</sup> mental disorders are a common and growing health problem worldwide, expected to affect more than 25% of all people at some time in their lives. The WHO's 2000 analysis of the global burden of disease ranked depression as the fourth leading cause of burden on society and also cited the high burden of alcohol dependence.<sup>1</sup> Canadian trends reflect these worldwide trends. In 1998/99, about 4% of Canadians reported symptoms indicating that they had suffered an episode of major depressive disorder in the previous year.<sup>2</sup> Besides biological and genetic causes, evidence suggests that social and environmental factors play an important role in mental health. The necessity of identifying groups at risk, as well as groups who are relatively healthy and who can serve as models for understanding how to minimize mental health problems, is thus more important now than ever.

## Methods

### Data sources

The data used in this paper are from the 2000/01 Canadian Community Health Survey (CCHS 2000/01). The CCHS collected information on various aspects of health and health care utilization from over 131,000 Canadians aged 12 or older in all provinces and territories. Because individual health regions had the option of not using the depression module of the survey, a total of 1,180 respondents from the two health regions that did not select this module are excluded from the analysis (see below). Respondents who are missing data for any of the questions used in the analysis are excluded. The sample size for analysis is 92,379 Canadians between ages 15 and 75. If respondents spoke neither English nor French, they were interviewed in their own language, and almost 5% of immigrants were interviewed in a language other than English or French. Twenty-three percent of these respondents had been in Canada for less than 5 years, and 55% had been in Canada for less than 10 years.

### Analytical techniques

Rates of depression and alcohol dependence were standardized by age and sex. The proportions of the Canadian-born population and immigrants with depression and alcohol dependence were estimated and elaborated by duration of residence in Canada, and region of origin. Multivariate logistic regression analyses were run to predict the odds of having an episode of depression and alcohol dependence when other factors influencing depression and alcohol dependence were taken into consideration. The basic model included length of residence in Canada, age, age squared, sex, marital status, income, and education. This model was elaborated through three additional models that added knowledge of one of the official

languages, employment status, and sense of belonging individually to the basic model. All analyses were weighted with a normalized weight.

### Limitations

Two of the 136 health regions decided not to ask the questions on depression. This resulted in the omission from the analysis of the 1,180 respondents from those health regions. Individuals' lifetime history of depression was unknown. Consequently, respondents who had previously experienced a depressive episode but not within the past year were not identified. Previous research has suggested the existence of some cultural differences in the interpretation of mental health questions.<sup>3</sup> In addition, there may be cultural differences in willingness to report symptoms of depression or alcohol dependence.<sup>3</sup> The extent of these reporting biases is unknown.

Because the study was cross-sectional, it was not possible to directly examine the effect on depression or alcohol dependence on the process of immigration or adjustment to and integration into Canadian society. The situation for immigrants who have now been in Canada for a long period is not necessarily predictive of the process for immigrants arriving now. For such analyses, longitudinal data would be required. Another limitation is the possibility of additional variability among immigrants who entered in different categories (e.g., refugee, independent, investment, family reunion). Immigrants' mental health may also be affected by their settlement and integration experiences in Canada, including the location where they settle. However, these distinctions cannot be determined from the current survey data.

Relatively little is known about the mental health of Canadian immigrants, despite the fact that they represent about 16% of Canada's population and form an important part of Canada's social, cultural, and economic institutions. There are several reasons for examining the mental health of immigrants as a specific group. Canada relies on immigrants to meet labour needs. Because mental health problems compromise labour productivity,<sup>4-6</sup> it is useful to know how immigrants compare with the Canadian-born population in this respect. Immigrants undergo health screening that denies entry to those who would impose an excessive burden on the health care system. However, this screening excludes only the most severe cases. The mental health of immigrants living in Canada is unknown. Moreover, experiences in

Canada may affect an immigrant's mental health. Studying immigrants is therefore important for identifying potential impact on the health care system, as well as for understanding how immigrants fare once they are living in Canada and how their level of mental health compares with that of the Canadian-born population.

Previous research examining physical health suggests that immigrants in Canada exhibit a "healthy immigrant effect." Across a range of indicators of physical health, immigrants appear healthier than the Canadian-born population and also use the health care system less.<sup>7-9</sup> This effect is attributed in part to Canada's immigration policy, which screens out immigrants who might impose a burden on the health care system or pose a danger to public health.

## Canada's immigrant population

Canada's immigrants comprise about 16% of the Canadian population and come from diverse backgrounds. Nearly half of the country's immigrant population has lived here for more than 20 years.<sup>10</sup> The places of origin of immigrants have changed over time. Immigrants who arrived before 1971 were mostly from Europe. Since then, the proportion of immigrants from Europe has declined, while the proportion from Asia and other non-European areas has steadily increased. For example, between 1981 and 1991, 48% of immigrants came from Asia and the Middle East.<sup>10</sup> The shift has continued in the past 10 years, with increasing representation from Asia, the Middle East, and Africa. Between 1991 and 1996, the top 10 places of birth for new immigrants were Hong Kong, China, India, the Philippines, Sri Lanka, Poland, Taiwan, Vietnam, the United States, and the United Kingdom.<sup>11</sup>

However, the same research suggests that, with time in Canada, immigrants' physical health and use of the health care system begin to more closely resemble those of the Canadian-born population. This research has focused on physical health, and it is of interest to determine whether the healthy immigrant effect extends to mental health.

Mental health research suggests that the pattern may be different for depression and alcohol dependence than it is for physical health, and the assumption cannot be made that immigrants have better mental health than the Canadian-born population. Mental health problems are more prevalent among people experiencing more stress, as well as among socially and economically disadvantaged groups. Therefore, immigrants may experience mental health problems if they have stress associated with their immigration experience or if they feel marginalized or encounter discrimination.<sup>9,12,13</sup>

Mental health research in Canada has focused on specific segments of the immigrant population, such as refugees or recent immigrants from Southeast Asia. Some research, particularly that focusing on recent refugees, has found that immigrants experience elevated levels of depression, substance abuse, and other psychiatric disorders, at least in the period soon after immigration.<sup>14</sup> However, less is known about the mental health of immigrants as a whole or about how different cohorts of immigrants compare with each other and with the Canadian-born population.

At the same time, immigrants constitute a diverse group. Length of residence in Canada, country of origin, and social and economic position in Canada may all contribute to variations in immigrants' mental health, as they do for physical health.<sup>7,9,15</sup>

In addition, some of the sources of immigrant diversity - age, marital status, income, and education - are themselves determinants of mental health. Inclusion of these factors in the present investigation of immigrant mental health allows some of the variation within the immigrant population to be taken into consideration.

This article examines depression and alcohol dependence, and compares the Canadian-born population with immigrants for these aspects of mental health. It explores whether the healthy immigrant effect observed for physical health holds for mental health and whether length of residence in Canada and place of origin or ethnicity are related to variation in immigrants' mental health.

### ***Depression and alcohol dependence lower among immigrants***

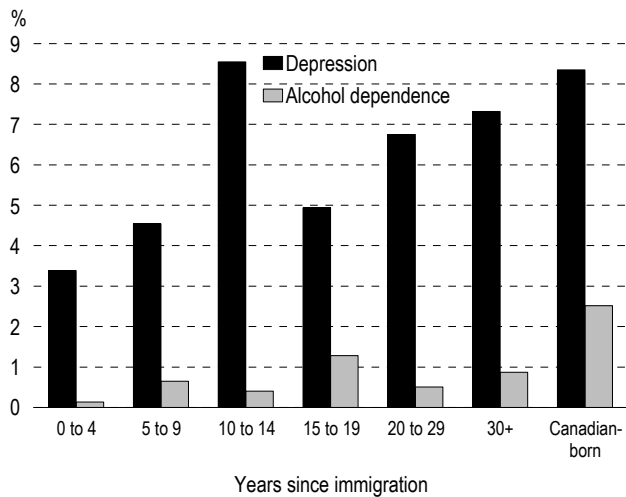
According to the Canadian Community Health Survey (CCHS, 2000/01), 7.9% of Canadians aged 12 or older reported symptoms suggesting that they had experienced at least one major depressive episode in the 12 months before the survey interview. The rate among those born in Canada was 8.3%, whereas the rate among immigrants was significantly lower, at 6.2% (Appendix Table A).

Immigrants also had lower rates of alcohol dependence than the Canadian-born population. Overall, 2.1% of Canadians reported symptoms suggesting that they had experienced problems with alcohol dependence in the 12 months before the interview. About 2.5% of the Canadian-born population but only 0.5% of immigrants reported such symptoms (Appendix Table A).

### ***Lowest rates of depression and alcohol dependence among recent immigrants***

Immigrants who had arrived in Canada in the previous few years had the lowest rates of both depression and alcohol dependence (Chart 1). Those who had arrived 10 to 14 years ago or more than 20 years ago were not significantly different from the Canadian-born population in depression. Longer-term immigrants reported slightly higher rates of alcohol dependence than recent immigrants (0 to 14 years), and but rates of alcohol dependence were significantly lower than the Canadian-born for all immigrants except those who had been in Canada 30 years or longer.

Chart 1  
Depression and alcohol dependence, by length of residence in Canada

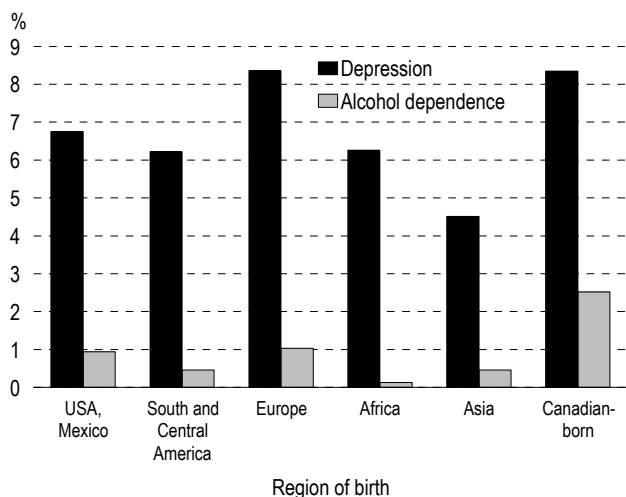


Data source: Canadian Community Health Survey, cycle 1.1, 2000/01  
Note: Rates are adjusted by age and sex to the Canadian-born group.

**Fewest problems with depression and alcohol for Asian and African immigrants**

Immigrants from Asia reported far fewer depressive experiences in the previous 12 months than immigrants from any other region (Chart 2). Rates for immigrants from Africa, South and Central America and the Caribbean were also significantly lower than

Chart 2  
Depression and alcohol dependence, by region of birth



Data source: Canadian Community Health Survey, cycle 1.1, 2000/01  
Notes: Oceania was omitted because the cell sizes were too small for accurate estimates.  
Rates are adjusted by age and sex to the Canadian-born group

the Canadian-born average. Immigrants reported lower rates of alcohol dependence than the Canadian-born population, regardless of their region of birth. African immigrants reported the lowest rates of alcohol dependence.

Region of birth was associated with length of residence in Canada, since the places of origin of immigrants have changed through time. Asia was the birthplace of about 56% of the immigrants who had been in Canada for less than 10 years, whereas Europe was the birthplace for the majority of immigrants (77%) who had been in Canada for more than 30 years. Similarly, most European immigrants (59%) had been in Canada for more than 30 years.

**Patterns of depression and alcohol dependence unaffected by demographic and socio-economic characteristics**

Canada's immigrant population is highly variable, in terms of not only length of residence and region of birth, but also other factors associated with mental health. Social characteristics that have been demonstrated to influence mental health include age, sex, marital status, income, and education.<sup>16</sup> The lower rates of depression and alcohol dependence reported by immigrants might therefore reflect differences among immigrants in terms of these other social factors. To examine this possibility, multivariate logistic regression was performed to take account of length of residence in Canada, age, sex, marital status, income, and education. Table 1 presents the odds ratios for length of residence in Canada, which reveal

Table 1  
Odds ratios of a depressive episode and alcohol dependence, by length of residence in Canada, with adjustment for age, sex, marital status, income, and education, age 15 to 75, Canada, 2000/01

| Length of residence       | Depression |                         | Alcohol dependence |                         |
|---------------------------|------------|-------------------------|--------------------|-------------------------|
|                           | Odds ratio | 95% confidence interval | Odds ratio         | 95% confidence interval |
| Canadian-born (reference) | 1.00       |                         | 1.00               |                         |
| 0-4 years                 | 0.33*      | 0.26, 0.41              | 0.05*              | 0.02, 0.12              |
| 5-9 years                 | 0.45*      | 0.37, 0.54              | 0.27*              | 0.17, 0.41              |
| 10-14 years               | 0.90       | 0.78, 1.03              | 0.15*              | 0.09, 0.26              |
| 15-19 years               | 0.55*      | 0.43, 0.69              | 0.42*              | 0.25, 0.70              |
| 20-29 years               | 0.90       | 0.79, 1.03              | 0.33*              | 0.21, 0.52              |
| 30+ years                 | 1.15       | 1.02, 1.28              | 0.74               | 0.50, 1.09              |

Data source: Canadian Community Health Survey, cycle 1.1, 2000/01  
Note: Variables included in the model but not presented are age, age squared, sex, marital status (married, previously married, never married), income, and education. Odds ratios for all variables are presented in Appendix Table B.  
\* p < 0.01.

how different cohorts of immigrants compare to the Canadian-born population when other factors are considered.

Compared with the Canadian-born population, the odds that immigrants experienced a depressive episode in the previous year were lower for recent cohorts but not for longer-term ones, with the exception of immigrants who arrived 15-19 years ago. For alcohol dependence, the all immigrants had significantly lower odds except immigrants who had resided in Canada for at least 30 years. These long-term immigrants reported alcohol dependence similar to the Canadian-born population once all other factors had been taken into consideration. The pattern shown in Chart 1, whereby more-recent immigrants had the lowest rates of depression and alcohol dependence, this advantage being less pronounced with increasing length of residence in Canada, was still evident. For the most recent immigrants (arrival up to 4 years previously) and those who had been in Canada for 5 to 9 years, the odds of having experienced a depressive episode were less than half the odds for the Canadian-born population. The immigrant advantage was more pronounced for alcohol dependence. Except for immigrants who had been in Canada for over 30 years, the odds of alcohol dependence for all cohorts were substantially lower than for the Canadian-born population. The risk of alcohol dependence for recent immigrants (0 to 4 years) was 95% lower than for the Canadian-born population. The odds increased with length of residence in Canada, but even immigrants who had been here for 20 to 29 years had a risk a third that of people born in Canada.

### ***Immigrant advantage unaffected by language barriers***

Immigrants who cannot speak either English or French may experience isolation in Canadian society that could cause higher rates of depression and alcohol dependence. To examine this possibility, a variable assessing whether a respondent could converse in either or neither of the official languages was added to the model shown in Table 1. Just over 7% of immigrants and less than 1% of the Canadian-born population reported speaking neither English nor French. The results (Appendix table C) reveal that inability to speak either official language did not increase the risk of depression or alcohol dependence among immigrants. In fact, when social characteristics are taken into consideration, respondents who could not speak either English or French reported the same rates of depression and alcohol dependence as those who could.

### ***Immigrant advantage unaffected by employment status***

Employment status is another factor that might account for some of the differences between immigrants and the Canadian-born population. Inclusion of employment status in the model shown in Table 1 did not change the risk of depression or alcohol dependence for immigrants relative to the Canadian-born population (Appendix table D). Although immigrants were less likely to have held a job during the week before the interview (Appendix Table A), and although being employed is associated with a lower risk of depression (Appendix table D), the odds of depression remained about the same as when employment status was not included for each cohort

## **Definitions**

Major depressive episodes were assessed for the previous 12 months. *Depression* is characterized by a depressed mood or lack of interest in most things (or both), along with other symptoms, that lasts at least 2 weeks. Symptoms include appetite or sleep disturbance, decreased energy, difficulty concentrating, feelings of worthlessness, or suicidal thoughts, or any combination of these. Prevalence of depression is the percentage of the population that is estimated to have experienced a depressive episode at some time in the year before the survey interview. From this information, the probability of a depressive episode occurring was estimated. For this analysis, respondents were considered to have had a depressive episode if they had a probability of 0.90 or more (five or more symptoms).<sup>17</sup>

*Alcohol dependence* was also assessed for the previous 12 months. A respondent was classified as having experienced alcohol dependence if the estimated probability of dependence was 0.85 or more, which means that the respondent reported at least three of the following symptoms of alcohol dependence: being drunk or hungover while at work or school or while caring for children, engaging in risk-taking behaviour while drunk or hungover, having psychological problems related to alcohol use, experiencing a persistent desire for alcohol, drinking too much or for too long, or experiencing increased tolerance.<sup>17</sup>

*Immigrants* were defined as anyone who was born outside of Canada and was not born a Canadian citizen. This category includes landed immigrants, refugees, non-permanent residents, and naturalized Canadian citizens.

The *Canadian-born population* refers to people who are Canadian citizens by birth. Although most were born in Canada, a small number were born outside Canada to Canadian parents.

(defined by length of residence in Canada). Holding a job was not associated with alcohol dependence.

### ***Immigrant advantage unaffected by sense of belonging***

Immigrants reported a significantly lower sense of belonging to the local community than the Canadian-born population (Appendix table A). Perhaps immigrants with a lower sense of belonging to the local community experience a greater risk of mental health problems. When sense of belonging was added to the model shown in Table 1, it was determined that this factor was associated with lower risk of both depression and alcohol dependence (Appendix table E). However, the addition of sense of belonging to the model did not alter the lower risk for depression and alcohol dependence enjoyed by immigrants.

### ***Concluding remarks***

Overall, immigrants had lower rates of depression and alcohol dependence than the Canadian-born population. Among immigrants, time since arrival in Canada was associated with these two aspects of mental health. The gap between immigrants and the Canadian-born population was larger for more recent immigrants than for cohorts who had arrived earlier, and recent immigrants reported lower rates of depression and alcohol dependence than longer-term immigrants. Immigrants living in Canada for over 10 to 14 years and 20 years have the same rates of depression as the Canadian-born.

To take the diversity of immigrants into consideration, a number of factors were examined that are associated with mental health and on which immigrants might be expected to differ. Variation in mental health does exist among immigrants but this variation follows unexpected patterns. Immigrants reporting the fewest mental health problems were not from countries economically or culturally similar to Canada. Thus, the findings do not support the notion that recent immigrants who face a cultural adjustment process and non-European immigrants are more likely to suffer mental health problems. In fact, immigrants from Asia and Africa reported fewer problems than did European immigrants.

This pattern may reflect a selection effect, whereby the immigrants from non-European countries represent the most educated and wealthiest segment of their society. Regional differences may also reflect cultural or religious differences. For example, it may be that a higher proportion of immigrants from Africa and Asia than from other regions follow a religion that

prohibits alcohol, such as Islam. If so, lower rates of alcohol dependence would be expected, at least to the extent to which people adhere to such religious prohibitions.

The lower rates of depression and alcohol dependence among immigrants held even when demographic and socio-economic factors were taken into consideration. Thus, the healthy immigrant effect does not merely reflect differences in income and education. Furthermore, these patterns held when ability to conduct a conversation in one of the official languages, employment status, and sense of belonging to the local community were considered.

There may be some cultural differences in willingness to report symptoms of depression or alcohol dependence that could account, at least in part, for the lower rates reported by immigrants. Likewise, despite the fact that respondents who could not understand English or French were interviewed in their own language, the possibility of misunderstanding or misinterpretation of the questions might also have affected the responses. However, given the magnitude of the differences between immigrants and the Canadian-born population, it is unlikely that these factors alone could account for the results observed.

These results are consistent with previous findings on physical health, which have shown that immigrants in Canada are in better physical health than the Canadian-born population. This analysis found a similar healthy immigrant effect for mental health, and, on the whole, immigrants reported fewer mental health problems than the Canadian-born population. The findings are inconsistent with some predictions from the mental health literature suggesting that immigrants represent a vulnerable population at risk for higher rates of depression and alcohol dependence.<sup>18</sup> This discrepancy may relate to the fact that the mental health literature has typically focused on specific subsets of individuals (such as refugees) who are more likely to have elevated rates of depression. Although it is clear that there are vulnerable sub-groups among immigrants, it appears that most immigrants, particularly recent immigrants, exhibit fewer mental health problems than the Canadian-born population. Whether this pattern reflects greater resiliency or a difference in how immigrants approach stress and adversity in their lives is a question that could be addressed in future research.



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## Appendix

Table A  
Distribution of selected characteristics, by immigration status, household population aged 15 to 75, Canada, 2000/01

|   | All respondents |             | Canadian-born population |             | Immigrants    |             |
|---|-----------------|-------------|--------------------------|-------------|---------------|-------------|
|   | Sample size     | %           | Sample size              | %           | Sample size   | %           |
| <b>Depression</b>                                   |                 |             |                          |             |               |             |
| No depression                                       | 85,064          | 92.08       | 67,607                   | 91.65       | 17,457        | 93.80       |
| Depression  | 7,315           | 7.92        | 6,161                    | 8.35        | 1,153         | 6.20        |
| <b>Alcohol dependence</b>                           |                 |             |                          |             |               |             |
| No alcohol dependence                               | 90,421          | 97.88       | 71,912                   | 97.48       | 18,509        | 99.45       |
| Alcohol dependence                                  | 1,958           | 2.12        | 1,857                    | 2.52        | 101           | 0.55        |
| <b>Immigration status</b>                           |                 |             |                          |             |               |             |
| Canadian-born                                       | 73,769          | 79.85       |                          |             |               |             |
| Immigrant   | 18,610          | 20.15       |                          |             |               |             |
| <b>Length of residence in Canada</b>                |                 |             |                          |             |               |             |
| 0-4 years   |                 |             |                          |             | 2,498         | 13.42       |
| 5-9 years   |                 |             |                          |             | 2,598         | 13.96       |
| 10-14 years   |                 |             |                          |             | 2,687         | 14.44       |
| 15-19 years   |                 |             |                          |             | 1,482         | 7.97        |
| 20-29 years   |                 |             |                          |             | 3,454         | 18.56       |
| 30+ years   |                 |             |                          |             | 5,891         | 31.66       |
| <b>Age group</b>                                    |                 |             |                          |             |               |             |
| 15-24   | 14,757          | 15.97       | 13,052                   | 17.69       | 1,705         | 9.16        |
| 25-44   | 39,076          | 42.30       | 31,223                   | 42.33       | 7,853         | 42.20       |
| 45-64   | 29,574          | 32.01       | 22,770                   | 30.87       | 6,804         | 36.56       |
| 65+   | 8,972           | 9.71        | 6,724                    | 9.11        | 2,248         | 12.08       |
| <b>Region of birth</b>                              |                 |             |                          |             |               |             |
| USA, Mexico   |                 |             |                          |             | 952           | 5.12        |
| South America, Central America, Caribbean           |                 |             |                          |             | 2,273         | 12.22       |
| Europe  |                 |             |                          |             | 7,749         | 41.64       |
| Africa  |                 |             |                          |             | 1,139         | 6.12        |
| Asia  |                 |             |                          |             | 6,314         | 33.93       |
| Oceania   |                 |             |                          |             | 181           | 0.97        |
| <b>Sex</b>  |                 |             |                          |             |               |             |
| Male  | 44,403          | 48.07       | 35,248                   | 47.78       | 9,154         | 49.19       |
| Female  | 47,977          | 51.93       | 38,521                   | 52.22       | 9,456         | 50.81       |
| <b>Marital status</b>                               |                 |             |                          |             |               |             |
| Married†  | 58,422          | 63.24       | 45,351                   | 61.48       | 13,071        | 70.23       |
| Previously married                                  | 10,409          | 11.27       | 8,267                    | 11.21       | 2,142         | 11.51       |
| Never married                                       | 23,548          | 25.49       | 20,150                   | 27.32       | 3,398         | 18.26       |
| <b>Education</b>                                    |                 |             |                          |             |               |             |
| Less than secondary graduation                      | 21,455          | 23.23       | 17,855                   | 24.20       | 3,600         | 19.35       |
| Secondary graduation                                | 18,054          | 19.54       | 14,402                   | 19.52       | 3,652         | 19.62       |
| Some post-secondary                                 | 8,024           | 8.69        | 6,715                    | 9.10        | 1,309         | 7.03        |
| Post-secondary graduation                           | 44,846          | 48.55       | 34,796                   | 47.17       | 10,049        | 54.00       |
| <b>Household income</b>                             |                 |             |                          |             |               |             |
| Lowest  | 3,511           | 3.80        | 2,623                    | 3.56        | 888           | 4.77        |
| Lower-middle  | 6,526           | 7.06        | 4,846                    | 6.57        | 1,680         | 9.03        |
| Middle  | 19,467          | 21.07       | 14,813                   | 20.08       | 4,654         | 25.01       |
| Upper-middle  | 33,509          | 36.27       | 27,212                   | 36.89       | 6,297         | 33.83       |
| Highest   | 29,365          | 31.79       | 24,274                   | 32.90       | 5,092         | 27.36       |
| <b>Work status (previous week)</b>                  |                 |             |                          |             |               |             |
| Worked at job or business/had a job but was absent  | 63,653          | 68.90       | 51,491                   | 69.80       | 12,161        | 65.35       |
| Did not hold a job/unable to work                   | 28,726          | 31.10       | 22,278                   | 30.20       | 6,449         | 34.65       |
| <b>Sense of belonging to local community</b>        |                 |             |                          |             |               |             |
|   | 92,379          | Mean = 2.58 | 73,769                   | Mean = 2.59 | 18,610        | Mean = 2.55 |
| <b>Official language proficiency - conversation</b> |                 |             |                          |             |               |             |
| English and/or French spoken                        | 90,643          | 98.12       | 73,364                   | 99.45       | 17,279        | 92.85       |
| Neither English nor French spoken                   | 1,736           | 1.88        | 405                      | 0.55        | 1,331         | 7.15        |
| <b>TOTAL</b>  | <b>92,379</b>   |             | <b>73,769</b>            |             | <b>18,610</b> |             |

Data source: Canadian Community Health Survey, cycle 1.1, 2000/01

Note: Weighted with normalized weight that sums to sample size.

† Includes common-law and living with partner.

## Definitions:

**Depression (dependent variable):** The Canadian Community Health Survey (CCHS) uses the same measure of depression as the National Population Health Survey (NPHS). Major depressive disorder in the past 12 months is assessed with the short form of the Composite International Diagnostic Interview (CIDI). These questions cover a cluster of symptoms for a depressive disorder, which are listed in the DSM-III-R (the psychiatric diagnostic manual of the American Psychiatric Association).<sup>19</sup> The results are transformed into probability estimates of a diagnosis, which are used as the basis for creating a dummy variable for probable cases. A probability of 90% or more (five or more symptoms) is coded as a probable depressive episode.

**Alcohol dependence (dependent variable):** The CCHS uses the same measure of alcohol dependence (in the past year) as the NPHS. As for depression, it is determined from the short form of the CIDI, which is based on the DSM-III-R.<sup>19</sup> A probability of 85% or more (three or more symptoms) is coded as a probable episode of alcohol dependence.

**Immigrants:** Anyone who was born outside of Canada. This category includes landed immigrants, refugees, non-permanent residents, and naturalized Canadian citizens.

**Canadian-born:** People who are Canadian citizens by birth. Although most were born in Canada, a small number were born outside Canada to Canadian parents.

**Length of residence:** For immigrants, years of residence in Canada, defined by the number of years since residence in Canada was first established. Assumes continuous residence in Canada between year first established and the present. Operationalized as dummy variables as follows: 0-4, 5-9, 10-14, 15-19, 20-29, 30+. The reference group in regression analyses is the Canadian-born population.

**Region of birth:** Canada, other North America, South America, Central America, Caribbean, Europe, Africa, Asia, Oceania (Oceania is omitted from presentation because of small numbers).

## Controls:

**Marital status:** Married/common-law, widowed/separated/divorced, single, never married.

**Household income:** Household income before taxes, adjusted for family size. Lowest: 1-4 people - less than \$10,000; 5 or more people, less than \$15,000. Lower-middle: 1 or 2 people, \$10,000 to \$14,999; 3 or 4 people, \$10,000 to \$19,999; 5 or more people, \$15,000 to \$29,999. Middle: 1 or 2 people, \$15,000 to \$29,999; 3 or 4 people, \$20,000 to \$39,999; 5 or more people, \$30,000 to \$59,999. Upper-middle: 1 or 2 people, \$30,000 to \$59,999; 3 or 4 people, \$40,000 to \$79,999; 5 or more people, \$60,000 to \$79,999. Highest: 1 or 2 people, \$60,000 or more, 3 or more people, \$80,000 or more.

**Education:** Highest education acquired. Less than secondary graduation, secondary graduation (no post-secondary), some post-secondary, post-secondary graduation.

**Sex:** Male, female.

**Age:** Categorical variable (15-24, 25-44, 45-64, 65+) used for age- and gender-adjusted prevalences of depression and alcohol dependence; continuous variable used in logistic regression with squared term.

**Employment status:** Working status in the week prior to interview. Worked or held a job in the week before interview/had a job but was absent; did not hold a job/unable to work.

**Language of conversation:** Languages in which respondent can hold a conversation.

**Sense of belonging:** Response to the question "How would you describe your sense of belonging to your local community?" Responses coded in reverse, such that 1 = very weak, 2 = somewhat weak, 3 = somewhat strong, 4 = very strong.

Table B  
Full model for Table 1: Odds ratios for a depressive episode and alcohol dependence, by selected characteristics, household population aged 15 to 75, Canada, 2000/01

|                                       | Depression |                         | Alcohol dependence |                         |
|---------------------------------------|------------|-------------------------|--------------------|-------------------------|
|                                       | Odds ratio | 95% confidence interval | Odds ratio         | 95% confidence interval |
| <b>Length of residence in Canada</b>  |            |                         |                    |                         |
| Canadian-born (reference)             | 1.00       |                         | 1.00               |                         |
| 0-4 years                             | 0.33*      | 0.26, 0.41              | 0.05*              | 0.02, 0.12              |
| 5-9 years                             | 0.45*      | 0.37, 0.54              | 0.27*              | 0.17, 0.41              |
| 10-14 years                           | 0.90       | 0.78, 1.03              | 0.15*              | 0.09, 0.26              |
| 15-19 years                           | 0.55*      | 0.43, 0.69              | 0.42*              | 0.25, 0.70              |
| 20-29 years                           | 0.90       | 0.79, 1.03              | 0.33*              | 0.21, 0.52              |
| 30+ years                             | 1.15       | 1.02, 1.28              | 0.74               | 0.50, 1.09              |
| <b>Age</b>                            | 1.10*      | 1.09, 1.11              | 1.09*              | 1.06, 1.12              |
| Age <sup>2</sup>                      | 1.00*      | 1.00, 1.00              | 1.00*              | 1.00, 1.00              |
| <b>Sex</b>                            |            |                         |                    |                         |
| Female (reference)                    | 1.00       |                         | 1.00               |                         |
| Male                                  | 0.53*      | 0.50, 0.55              | 2.92*              | 2.63, 3.23              |
| <b>Marital status</b>                 |            |                         |                    |                         |
| Married (reference)†                  | 1.00       |                         | 1.00               |                         |
| Previously married                    | 2.21*      | 2.06, 2.38              | 3.30*              | 2.78, 3.93              |
| Never married                         | 1.66*      | 1.55, 1.77              | 2.91*              | 2.55, 3.31              |
| <b>Household income</b>               |            |                         |                    |                         |
| Lowest                                | 2.29*      | 2.05, 2.55              | 1.79*              | 1.47, 2.18              |
| Lower-middle                          | 1.93*      | 1.76, 2.12              | 1.48*              | 1.24, 1.76              |
| Middle                                | 1.47*      | 1.37, 1.58              | 1.01               | 0.88, 1.15              |
| Upper-middle                          | 1.21*      | 1.14, 1.30              | 0.88               | 0.78, 1.00              |
| Highest (reference)                   | 1.00       |                         | 1.00               |                         |
| <b>Education</b>                      |            |                         |                    |                         |
| Less than secondary graduation        | 1.25*      | 1.17, 1.34              | 1.17               | 1.02, 1.34              |
| Secondary graduation                  | 1.08       | 1.01, 1.16              | 1.32*              | 1.16, 1.50              |
| Some post-secondary                   | 1.21*      | 1.11, 1.31              | 1.97*              | 1.71, 2.26              |
| Post-secondary graduation (reference) | 1.00       |                         |                    |                         |
| -2 log L                              | 48,365     |                         | 16,045             |                         |

Data source: Canadian Community Health Survey, cycle 1.1, 2000/01

Notes: † Includes common-law and living with partner.

\* p < 0.01.

Table C  
Full model for Table 1: Odds ratios for a depressive episode and alcohol dependence, by selected characteristics and knowledge of official language, household population aged 15 to 75, Canada, 2000/01

|   | Depression |                         | Alcohol dependence |                         |
|---|------------|-------------------------|--------------------|-------------------------|
|   | Odds ratio | 95% confidence interval | Odds ratio         | 95% confidence interval |
| <b>Length of residence in Canada</b>          |            |                         |                    |                         |
| Canadian-born (reference)                     | 1.00       |                         | 1.00               |                         |
| 0-4 years                                     | 0.34*      | 0.27, 0.42              | 0.05*              | 0.02, 0.12              |
| 5-9 years                                     | 0.46*      | 0.38, 0.56              | 0.27*              | 0.18, 0.42              |
| 10-14 years                                   | 0.92       | 0.80, 1.06              | 0.15*              | 0.09, 0.27              |
| 15-19 years                                   | 0.56*      | 0.44, 0.70              | 0.42*              | 0.25, 0.71              |
| 20-29 years                                   | 0.91       | 0.80, 1.04              | 0.33*              | 0.21, 0.52              |
| 30+ years                                     | 1.15       | 1.03, 1.29              | 0.74               | 0.50, 1.09              |
| <b>Age</b>                                    | 1.10*      | 1.09, 1.11              | 1.09*              | 1.06, 1.12              |
| Age <sup>2</sup>                              | 1.00*      | 1.00, 1.00              | 1.00*              | 1.00, 1.00              |
| <b>Sex</b>                                    |            |                         |                    |                         |
| Female (reference)                            | 1.00       |                         | 1.00               |                         |
| Male  | 0.53*      | 0.50, 0.55              | 2.92*              | 2.63, 3.23              |
| <b>Marital status</b>                         |            |                         |                    |                         |
| Married (reference)†                          | 1.00       |                         | 1.00               |                         |
| Previously married                            | 2.21*      | 2.06, 2.37              | 3.30*              | 2.77, 3.93              |
| Never married                                 | 1.65*      | 1.55, 1.77              | 2.90*              | 2.55, 3.30              |
| <b>Household income</b>                       |            |                         |                    |                         |
| Lowest  | 2.29*      | 2.05, 2.56              | 1.80*              | 1.47, 2.19              |
| Lower-middle                                  | 1.93*      | 1.76, 2.12              | 1.48*              | 1.24, 1.76              |
| Middle  | 1.47*      | 1.37, 1.58              | 1.01               | 0.88, 1.15              |
| Upper-middle                                  | 1.22*      | 1.14, 1.30              | 0.88               | 0.79, 0.99              |
| Highest (reference)                           | 1.00       |                         | 1.00               |                         |
| <b>Education</b>                              |            |                         |                    |                         |
| Less than secondary graduation                | 1.26*      | 1.18, 1.35              | 1.17               | 1.02, 1.34              |
| Secondary graduation                          | 1.09       | 1.02, 1.16              | 1.32*              | 1.16, 1.50              |
| Some post-secondary                           | 1.21*      | 1.11, 1.32              | 1.97*              | 1.71, 2.26              |
| Post-secondary graduation (reference)         | 1.00       |                         |                    |                         |
| -2 log L                                      | 48,359     |                         | 16,042             |                         |
| <b>Conversation in English or French</b>      |            |                         |                    |                         |
| Can converse in English or French (reference) | 1.00       |                         | 1.00               |                         |
| Cannot converse in English or French          | 0.77       | 0.61, 0.96              | 0.56               | 0.29, 1.10              |
| -2 log L                                      | 48,359     |                         | 16,042             |                         |

Data source: Canadian Community Health Survey, cycle 1.1, 2000/01

Notes: † Includes common-law and living with partner.

\* p < 0.01.

Table D  
Full model for Table 1: Odds ratios for a depressive episode and alcohol dependence, by selected characteristics and employment status, household population aged 15 to 75, Canada, 2000/01

|  | Depression |                         | Alcohol dependence |                         |
|--|------------|-------------------------|--------------------|-------------------------|
|  | Odds ratio | 95% confidence interval | Odds ratio         | 95% confidence interval |
| <b>Length of residence in Canada</b>             |            |                         |                    |                         |
| Canadian-born (reference)                        | 1.00       |                         | 1.00               |                         |
| 0-4 years  | 0.31*      | 0.25, 0.38              | 0.05*              | 0.02, 0.12              |
| 5-9 years  | 0.44*      | 0.36, 0.53              | 0.27*              | 0.17, 0.41              |
| 10-14 years                                      | 0.89       | 0.77, 1.02              | 0.15*              | 0.09, 0.26              |
| 15-19 years                                      | 0.54*      | 0.43, 0.69              | 0.42*              | 0.25, 0.70              |
| 20-29 years                                      | 0.91       | 0.80, 1.04              | 0.33*              | 0.21, 0.52              |
| 30+ years  | 1.15       | 1.03, 1.29              | 0.74               | 0.50, 1.09              |
| <b>Age</b>                                       | 1.12*      | 1.11, 1.13              | 1.09*              | 1.06, 1.12              |
| Age <sup>2</sup>                                 | 1.00*      | 1.00, 1.00              | 1.00*              | 1.00, 1.00              |
| <b>Sex</b>                                       |            |                         |                    |                         |
| Female (reference)                               | 1.00       |                         | 1.00               |                         |
| Male   | 0.54*      | 0.52, 0.57              | 2.92*              | 2.63, 3.23              |
| <b>Marital status</b>                            |            |                         |                    |                         |
| Married (reference) <sup>†</sup>                 | 1.00       |                         | 1.00               |                         |
| Previously married                               | 2.27*      | 2.11, 2.43              | 3.30*              | 2.78, 3.93              |
| Never married                                    | 1.68*      | 1.57, 1.80              | 2.91*              | 2.55, 3.31              |
| <b>Household income</b>                          |            |                         |                    |                         |
| Lowest   | 1.93*      | 1.72, 2.17              | 1.80*              | 1.47, 2.20              |
| Lower-middle                                     | 1.68*      | 1.53, 1.85              | 1.48*              | 1.24, 1.77              |
| Middle   | 1.38*      | 1.29, 1.49              | 1.01               | 0.88, 1.15              |
| Upper-middle                                     | 1.19*      | 1.11, 1.27              | 0.88               | 0.79, 0.99              |
| Highest (reference)                              | 1.00       |                         | 1.00               |                         |
| <b>Education</b>                                 |            |                         |                    |                         |
| Less than secondary graduation                   | 1.19*      | 1.11, 1.27              | 1.17               | 1.02, 1.35              |
| Secondary graduation                             | 1.07       | 1.00, 1.14              | 1.32*              | 1.16, 1.50              |
| Some post-secondary                              | 1.18*      | 1.08, 1.28              | 1.97*              | 1.72, 2.26              |
| Post-secondary graduation (reference)            | 1.00       |                         | 1.00               |                         |
| <b>Employment status (week before interview)</b> |            |                         |                    |                         |
| Held a job                                       | 0.69*      | 0.65, 0.73              | 1.01               | 0.90, 1.13              |
| Did not hold job (reference)                     | 1.00       |                         |                    |                         |
| -2 log L   | 48,217     |                         | 16,045             |                         |

Data source: Canadian Community Health Survey, cycle 1.1, 2000/01

Notes: † Includes common-law and living with partner.

\* p < 0.01.

Table E  
Full model for Table 1: Odds ratios for a depressive episode and alcohol dependence, by selected characteristics and sense of belonging, household population aged 15 to 75, Canada, 2000/01

|  | Depression |                         | Alcohol dependence |                         |
|--|------------|-------------------------|--------------------|-------------------------|
|  | Odds ratio | 95% confidence interval | Odds ratio         | 95% confidence interval |
| <b>Length of residence in Canada</b>         |            |                         |                    |                         |
| Canadian-born (reference)                    | 1.00       |                         | 1.00               |                         |
| 0-4 years                                    | 0.31*      | 0.25, 0.39              | 0.04*              | 0.02, 0.11              |
| 5-9 years                                    | 0.44*      | 0.37, 0.53              | 0.27*              | 0.18, 0.41              |
| 10-14 years                                  | 0.88       | 0.77, 1.01              | 0.15*              | 0.08, 0.26              |
| 15-19 years                                  | 0.55*      | 0.43, 0.69              | 0.42*              | 0.25, 0.70              |
| 20-29 years                                  | 0.89       | 0.78, 1.02              | 0.32*              | 0.20, 0.50              |
| 30+ years                                    | 1.15       | 1.03, 1.29              | 0.74               | 0.50, 1.09              |
| <b>Age</b>                                   | 1.10*      | 1.08, 1.11              | 1.08*              | 1.05, 1.11              |
| Age <sup>2</sup>                             | 1.00*      | 1.00, 1.00              | 1.00*              | 1.00, 1.00              |
| <b>Sex</b>                                   |            |                         |                    |                         |
| Female (reference)                           | 1.00       |                         | 1.00               |                         |
| Male   | 0.53*      | 0.50, 0.55              | 2.92*              | 2.64, 3.24              |
| <b>Marital status</b>                        |            |                         |                    |                         |
| Married (reference) <sup>†</sup>             | 1.00       |                         | 1.00               |                         |
| Previously married                           | 2.14*      | 1.99, 2.30              | 3.15*              | 2.65, 3.76              |
| Never married                                | 1.61*      | 1.51, 1.73              | 2.80*              | 2.46, 3.18              |
| <b>Household income</b>                      |            |                         |                    |                         |
| Lowest                                       | 2.22*      | 1.99, 2.48              | 1.72*              | 1.41, 2.10              |
| Lower-middle                                 | 1.90*      | 1.73, 2.09              | 1.43*              | 1.20, 1.70              |
| Middle                                       | 1.46*      | 1.36, 1.57              | 0.98               | 0.86, 1.12              |
| Upper-middle                                 | 1.21*      | 1.13, 1.29              | 0.87               | 0.77, 0.97              |
| Highest (reference)                          | 1.00       |                         | 1.00               |                         |
| <b>Education</b>                             |            |                         |                    |                         |
| Less than secondary graduation               | 1.24*      | 1.16, 1.33              | 1.18               | 1.03, 1.35              |
| Secondary graduation                         | 1.07       | 1.00, 1.15              | 1.32*              | 1.16, 1.50              |
| Some post-secondary                          | 1.20*      | 1.11, 1.31              | 1.98*              | 1.73, 2.28              |
| Post-secondary graduation (reference)        | 1.00       |                         | 1.00               |                         |
| <b>Sense of belonging to local community</b> |            |                         |                    |                         |
|  | 0.81*      | 0.79, 0.83              | 0.75*              | 0.72, 0.79              |
| -2 log L                                     | 48,120     |                         | 15,926             |                         |

Data source: Canadian Community Health Survey, cycle 1.1, 2000/01

Notes: † Includes common-law and living with partner.

\* p < 0.01.

## Annex

Many analyses presented in this Health Reports Supplement are based on Statistics Canada's Canadian Community Health Survey (CCHS). Data collection for cycle 1.1 of the CCHS began in September 2000 and was conducted over 14 months. The CCHS covers the household population aged 12 or older in all provinces and territories, except persons living on Indian reserves, on Canadian Forces Bases, and in some remote areas.

Cycle 1.1 of CCHS was designed to collect information at the health region level.<sup>1</sup> For administrative purposes, each province is divided into health regions (HR); each territory is designated as a single HR. When cycle 1.1 of the CCHS was designed, there were 139 health regions in Canada. The CCHS combines data collection for the Burntwood and Churchill health regions in Manitoba because of Churchill's small population. There are two remote health regions for which the CCHS does not collect data: the Région du Nunavik and the Région des Terres-Cries-de-la-Baie-James, both in Québec.

The CCHS uses the area frame designed for the Labour Force Survey as its primary sampling frame. A multistage stratified cluster design was used to

sample dwellings within the area frame. A list of the dwellings was prepared, and a sample of dwellings was selected from the list. The majority (83%) of the sampled households came from the area frame, and face-to-face interviews were held with respondents randomly selected from households in this frame. In some HRs, a random digit dialling (RDD) and/or list frame of telephone numbers was also used. Respondents in the telephone frames, who accounted for the remaining 17% of the targeted sample, were interviewed by telephone.

In approximately 82% of the households selected from the area frame, one person was randomly selected; two people were randomly chosen in the remaining households. For households selected from the telephone frames, one person was randomly chosen. The response rate was 84.7%. The responding sample size for cycle 1.1 was 131,535. A total of 6.3% of interviews were obtained by proxy.

## References

- 1 Béland Y. Canadian Community Health Survey— Methodological overview. *Health Reports* (Statistics Canada, Catalogue 82-003) 2002; 13(3): 9-14.