

Socioeconomic Characteristics and Depression in Canada:

A Comparison between Females and Males

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Abstract

Mental health and economic well-being are strengthened when the causes and implications of depression are addressed. This paper uses data from the 2012 Canadian Community Health Survey – Mental Health component to analyze the impact of personal, work, family, and health and behaviour characteristics on the probability of being depressed. I analyze the impact on depression firstly for the whole population, followed by a comparison of the outcomes between females and males. I find that females are 5 to 7 percentage points more likely to be depressed than males, no matter the specification used. When all the characteristics are studied separately, by gender, we see that work characteristics such as low income or unemployment increases depression for males only. For females only, family characteristics such as having a child decreases depression, though being divorced, separated, or widowed instead of being married increases depression. Drug dependence increases the likelihood of being depressed for females more than males, while alcohol abuse only affects females. An Oaxaca decomposition further yields a total explained effect of zero, as well as a significant constant in the unexplained part, both of which affirm that females are more depressed than males.

1. Introduction

Depression is an illness suffered by more than 300 million people worldwide (World Health Organization, 2017). Unlike mood fluctuations or emotional responses to challenges of everyday life, depression, when experienced for long periods of time, can develop to be a serious health condition. Depression can interfere with the performance of daily life habits, making routines difficult to follow. It is no coincidence that globally, depression is also the leading cause of disability (World Health Organization, 2017). Since 2000, the consumption of antidepressants has nearly doubled across OECD countries, with Canada among the top three countries for the highest per capita prescription of antidepressants, after Iceland and Australia in 2011 (OECD, 2013). An astounding one in five Canadians develops a mental illness at one point in his or her lifetime. What is more, eight percent of Canadians will experience a *major* depressive episode in their lifetime (Mood Disorders Society of Canada, 2009).

Not only is mental illness difficult for individuals who experience it, the costs associated with depression are substantial. The annual cost of depression in Canada is about \$32.3 billion in foregone GDP due to lost productivity (Stonebridge and Sutherland, 2016). The Shepell-fgi Research Group (n.d.) notes that in Canada, absence in the workplace due to depression is greater than absence due to back pain, cardiovascular disease, hypertension, diabetes, and other mental conditions combined. Depressed workers often experience physical pains such as headaches, arthritis, and back pain. In the United States (US), absenteeism due to such pains accrued a total cost of \$14.4 billion between 2001 and 2002 (Stewart et al., 2003). Lower productivity in the workplace is not only felt from absenteeism, but also through presenteeism (Bender and Farvolden, 2008). Through presenteeism, employees with depression who have trouble functioning at work

are just as unproductive, which was estimated to cost the US \$44.0 to \$51.5 billion annually (Lerner et al., 2004).

Much of the literature has concentrated on the consequences of depression. A limited amount of research also exists on the differences in the causes of depression between females and males. This paper seeks to provide further insight into the potential factors that are related to depression for the two genders. Using data from the 2012 Canadian Community Health Survey (CCHS) – Mental Health survey, I perform a comprehensive analysis of four groups of individual characteristics that potentially cause depression. The four groups are *personal*, *work*, *family*, and *health and behaviour* characteristics, and they encompass 18 variables. These variables are further studied in six different specifications.

A major finding of this paper, which is consistent to the literature, is that females are more likely to report being depressed than males by 5 to 7 percentage points (pp). This result holds after conducting regression analysis using all 18 variables in six specifications. An Oaxaca decomposition further yields results which also support this main finding that most of the difference in depression between females and males is accounted for by differences in regression coefficients and not by differences in average characteristics. For both females and males, the probability of being depressed is lower for those who are immigrants, those who are youngest or oldest, those who have less than a secondary education or a post-secondary degree, those who speak neither English nor French at home, those earning \$80,000 or more, those who are employed, and those who do not have cancer or did not engage in smoking, drug dependence, or alcohol abuse. Some particularities were found when the analysis was conducted by gender. Income and employment effects were highly significant for males only. Meanwhile, family characteristics were highly significant for females only. Females who are divorced, separated, or widowed were 4.2 pp

more likely to be depressed than those who are married. Females with children were less likely to be depressed by 2.8 pp. The effect of drug dependence is highly significant for both females and males, while the effect of alcohol abuse on depression is significant only for females.

The remaining sections of this paper are organized as follows. Section 2 presents a literature review featuring Canadian and foreign perspectives on the correlates of depression. Section 3 presents the dataset, as well as a summary statistics analysis. Section 4 introduces the econometric model which consists of six specifications, followed by a description of the Oaxaca decomposition technique used to compare females and males in terms of the various socio-economic characteristics that are related to depression, as well as a discussion of the limitations of the analysis. Section 5 discusses the empirical results, firstly at an aggregate level, then by a focus on gender differences to identify the factors that explain why women are generally more depressed than men, followed by an Oaxaca decomposition analysis. Section 6 concludes.

2. Literature Review

This section discusses Canadian and foreign studies which reflect the recent state of knowledge on depression in relation to some of the socioeconomic factors studied in this paper. Following a description about the stigma related to depression, and about the economic costs of depression, the other socioeconomic factors reviewed are the following: education, marital status, income and household wealth, immigration, gender, diet, and smoking. Also addressed is the fact that depression is not only costly on an economic and on a health level, it can also cost the life of those who have suicidal ideation.

Stigma

Patten et al. (2014) study how Canadians perceived their mental health over a span of 20 years using data from the 1994 to 1998 cycles of the National Population Health Survey (NPHS) and from the 2000 to 2012 cycles of the Canadian Community Health Survey (CCHS). They find that, over time, Canadians became more likely to rate their mental health as merely fair or poor, as opposed to quite a bit or extremely stressful. Patten et al. (2016) study the CCHS - Mental Health survey which collected information such as whether respondents accessed health services for emotion or mental health related issues, and if they felt that they were perceived negatively for reasons related to their mental health. Their results showed that stigma was perceived by 24.4% of respondents who had accessed mental health services. This was more common among respondents who were below the age of 55, those who were not working, those who reported fair or poor mental health, and those who received a diagnosis of a mental disorder. Stigmatization was felt for a minority of the respondents with mood, anxiety, substance use disorders, as well as bipolar and psychotic disorders. Gender and education levels however, were not associated with perceived stigma. Overall, stigmatization is quite common, but it does not occur for a majority of Canadians who access services for mental health.

Economic Costs of Depression

A number of studies have attempted to estimate the costs of depression and the benefits of treating it. Vasiliadis et al. (2017) assessed the impact of increasing access to publicly-funded medical care for treating depression in Canada. They used epidemiologic and economic information from the literature as well as data from the 2012 CCHS – Mental Health component. The study modeled the progression of depression over a period of 40 years and found that over

this period, increased insurance for mental health care lowered lifetime prevalence of hospitalizations, lessened suicide rates and attempts, and led to average societal cost savings of \$2,590 per person. The authors estimated that public funding of these health services cost approximately \$123 million dollars, with savings to society at about \$247 million dollars over 40 years. They conclude that for every dollar spent for insuring mental health care through psychological services, two dollars were earned in savings – a finding which further supports increased public funding for mental health care.

The cost of depression in the US was at least \$77.4 billion dollars in 2000 (Greenberg et al., 2003). Yet, not accounted for in the monetary price are intangibles such as the lower quality of life of those depressed and of their relatives. Thus, a network of costs accumulates within society, which can be reduced by initially lowering the risk of mental illnesses. Moreover, a cost-benefit analysis conducted by Stephens and Joubert (2001) on the economic costs of mental health conditions in Canada in 1998 shows that the costs of psychologists and social workers not covered by public health insurance was at least \$278 million, with the value of reduced productivity associated with depression in the short-run at a minimum of \$6 billion. They calculate the indirect cost of days absent from work to cost another \$2.16 billion.

In an analysis of the costs of depression in the workplace, Dewa et al. (2002) study a sample of 63,000 Canadian employees out of which 2.5 percent had a short-term disability from depression. This short-term disability caused by depression was estimated to cost \$20.5 million in lost productivity and resulted in a loss of 144,731 days of work due to disability related to a nervous or mental disorder. The authors highlight that although many employees continued to participate in the labour force while being depressed, at least half of them took a short-term disability leave related to it.

Education and Depression

There are many socioeconomic factors which influence depression. Chevalier and Feinstein (2006) study the effect of education on mental health using a longitudinal dataset containing health information from childhood to adulthood. The authors find that for women, the effect of education is greater at mid-level qualifications. This effect of education applies to all ages. In addition, education is found to reduce the risk of, or transition to, depression, further strengthening the returns to education through the improvement of mental health. The benefits of education on mental health are found to be due not solely to income, family or work effects, and the benefits persist even after accounting for them. This positive causal effect implies that education has long-term positive influences on mental health. Thus, the overall return to higher education is even greater considering that poor mental health is on its own, costly.

Chevalier and Feinstein (2006) further cite Grossman (2000, 2005) whereby education and learning interventions had a positive effect on different health outcomes. Those who are more educated, and thus more capable to process information, are thereafter more health conscious. These individuals are also more apt in seeking diagnosis and in following treatment (Goldman and Lakdawall, 2001; Goldman and Smith, 2002).

Bayram and Bilgel (2008) examine the mental health of university students, using Turkish data from the Depression Anxiety and Stress Scale (DASS-42) that was completed anonymously by a sample of 1617 students. Female students showed higher anxiety and stress scores than their male peers. Additionally, first and second year students had higher scores in all three factors of depression, anxiety, and stress. Students who were satisfied with their education had lower

depression, anxiety, and stress scores. Academic stress among students calls for adequate support services to reduce mental health issues among young adults before they head into the workforce.

Ross and Mirowsky (2010) investigate the effects of higher education on depression by focussing on gender. Using the 1995 Aging, Status, and the Sense of Control (ASOC) US survey, they find that higher education benefits women's well-being more than men's, and that this result is validated by the resource substitution theory. Specifically, resource substitution implies that education's influence on depression is greater for individuals with fewer alternative resources. Following this theory, women have fewer resources and rely more on education to achieve greater psychological well-being. Due to having fewer resources than men, women have relatively higher economic dependency, less opportunities for paid employment, unfulfilling work, and less authority at work (Padavic and Reskin, 1994; Ross and Mirowsky, 2010). Education improves the well-being for women because of two main reasons according to the authors. Firstly, higher education increases work creativity more for women than for men. Secondly, higher education increases the sense of control for both sexes, but depression decreases at a steeper rate for women than for men. They find that the slope of depression with respect to education is 1.9 times higher for women than for men. However, this difference becomes insignificant at higher levels of education. Overall, in the US, more women are earning college degrees, thereby closing the gender gap in depression. Women with less than college degree education have relatively higher depression levels than men. For those with a college degree, the depression gender gap is close to zero. The authors find that higher education is linked to less depression for both men and women.

Marital Status and Depression

Akhtar-Danesh and Landeen (2007) analyze the 2002 CCHS, Cycle 1.2 with a focus on the relationship between various sociodemographic factors and depression in Ontario. They find that overall, married people had the lowest rates of depression, and those who were divorced had the highest rates of depression. Patten et al. (2006) further note that with age, single women had lower rates of depression, but for single males, the rates of depression grew.

Immigration and Depression

Those who were born in Canada were more depressed than immigrants for both men and women. Even more, immigrants are happier in Canada than their counterparts residing in their source countries (Frank et al., 2016). Smith et al. (2007) further study the impacts of gender, income, and immigration on depression, using data from the 2000 to 2001 CCHS. The authors also find that immigrants have lower levels of depression than the Canadian-born.

Income, Household Wealth, and Depression

Akhtar-Danesh and Landeen (2007) find that income and depression follow an inverse relationship. Smith et al. (2007) find a different result for immigrants depending on gender. In fact, they find that low-income, recent immigrant males have lower rates of depression than those who have a middle or high-income. Meanwhile recent immigrant females with low-income have higher rates of depression than those with a middle or high income. Other factors suggested by the authors that contribute to the lower levels of depression among immigrants, are the fact that a low-income status may only be temporary for immigrants, or that income does not reflect the overall wealth of immigrants. This study suggests additional research on the differences in depression outcomes

between genders, specifically, on why low-income recent immigrant males have a relative advantage over their counterpart, middle or high-income earning females.

Lê-Scherban, Brenner and Schoeni (2016) study the impact of childhood family wealth on mental health levels by using US data from the Panel Study of Income Dynamics, which surveyed young adults between the ages of 18 and 27 from 2005 to 2011. The main finding was that greater childhood wealth was linked to lower serious psychological distress. Consistent to this finding, Bauldry (2015) find from studying data from the US National Longitudinal Study of Adolescence to Adult Health, and by analyzing heterogeneous treatment effects, that people with more disadvantaged backgrounds had a greater protective effect against depression from obtaining a higher education. This effect is even stronger for those who have at least a four-year college degree. The author infers that it is likely due to advantaged groups having less to gain than disadvantaged groups. Bauldry cites Brand and Xie (2010) who note that the return to college degrees are higher among disadvantaged groups. Nonetheless, Bauldry finds that the protective effect of education diminishes with increasing levels of education, especially for those who are over-qualified for their jobs.

Gender Differences Facing Depression

A consistent finding in the literature is that women consistently have higher rates of depression compared to men (Kessler et al., 1994; Kornstein et al., 2000; Patten 2000; Smith et al., 2007). However, Dewa et al. (2002) find that women were more likely to take a depression-related short-term disability leave than men. Furthermore, women were more likely to return to their workplace than men. The authors suggest that despite depression being more prevalent among women, men might be more severely affected by it and thus relatively less likely to go back to

work. Another possibility is that men wait longer before seeking treatment, which can further affect the severity of the major depressive disorders. Thus, not only are men and women affected by depression differently, they handle depression differently as well.

Diet and Depression

Besides socioeconomic attributes, Jacka et al. (2013) focus on individual behaviour by studying the relationship between fruit and vegetable consumption and mental health disorders using five waves of the CCHS between 2000 and 2009. The author controls for age, gender, household income, education, physical activity, chronic illness, and smoking using a logistic model. The findings indicate that the potential exists for a healthy diet to prevent depression and anxiety. Better nutrition enhances people's overall health and thus contributes to better mental health as well.

Smoking and Depression

Patten et al. (2017) use pooled cross-sectional survey data from the 2001 to 2003 CCHS to study the change in mental health following smoking cessation in Canada. The results indicate improved mental health after smoking cessation, where major depression was higher among those who were daily smokers and lower among those who did not smoke. Although smoking is not proven to be a direct cause of depression, the authors conclude that smoking cessation improves mental health in the long-term. This finding suggests that smoking cessation be part of the management of common mood anxiety disorders as it is a valuable means of mental health care.

Suicide Ideation from Depression

Findlay (2017) examines the relationship between depression and suicidal ideation among Canadians aged 15 to 24, using the 2012 CCHS, Mental Health component. Findlay finds that about 11% of the sample have experienced depression in their lifetime, and 14% reported that they had suicidal thoughts. Lifetime depression and suicidal ideation have a correlation coefficient of 0.34, which is significant at the 1% level. Individuals with lifetime depression were four times more likely to seek professional support in the previous year, compared to those without lifetime depression. Having found that depression or suicidal thoughts increase the need for professional support, the research provides additional value for detecting the signs for effective early intervention, rather than studying the types of symptoms of depression or suicidal thoughts.

In sum, the literature just surveyed has presented vast findings in the realm of socioeconomic factors that are related to depression. A majority of them and more are further examined in the context of the current study using Canadian data from the CCHS – Mental Health survey. The literature has shown that depression is costly on a health level as well as on an economic level, and that by investing in more public mental health care, the gains for society will surpass the costs in the long-term. Certain characteristics are found to be related to depression more than others, such as having a low education, being a student, not being married, having a low income or a low household wealth, being a female, having a poor diet, and smoking. The current study will further analyze the effects of some of those characteristics on depression as well as compare these outcomes for females and males.

3. Data

The public use microdata file of the 2012 Canadian Community Health Survey – Mental Health Component (CCHS – Mental Health) is the database used for this study. This survey collects data on an array of subjects surrounding mental health, indicating cases of certain mental disorders as well as of positive mental health. The 2012 CCHS – Mental Health is part of the overarching Canadian Community Health Survey (CCHS), a survey which has been collecting health-related data at the provincial level since 2001. In addition to the annual CCHS which collects a small subset of data on mental health, the CCHS – Mental Health focusses mainly on mental health. It is an occasional survey and is currently inactive. Along with questions on access to formal and informal mental health care services, the survey studies the overall well-being of respondents, regardless of the condition of their mental health. As well, the survey includes information on many socioeconomic variables such as overall health, education, labour market, lifestyle and social conditions. The target population of the survey consists of individuals who are 15 years of age and older and who are living in the ten provinces of Canada. Not included in the survey are about 3% of the population living in the territories, on reserves and other Aboriginal settlements, full-time members of the Canadian Forces, and those who are institutionalized. The unit of observation is the individual and the survey collects cross-sectional data with a variety of topics depicting a portrait of the population at one specific point in time. The data collected from this survey has been used by policymakers and researchers from government departments, the Mental Health Commission of Canada, universities, and various mental health service providers to improve their understanding and raise greater awareness of mental health.

The number of observations in the original dataset of this sample survey is 25,113, corresponding to a 68.9 percent response rate at the Canadian level. Weights are included in the

data and are used in the analysis to ensure that the sample is representative of the population by accounting for the non-responses in the survey. After restricting the sample by removing the missing values of the variables included in the analysis, the number of usable observations decreases to 23,988, with 13,171 females, and 10,817 males. The dependent variable is an indicator variable taking the value of one if the respondent has had a major depressive episode during his or her lifetime, and the value of zero otherwise. From this sample, a weighted proportion of about 11.3 percent of the respondents had such a depressive episode. The dependent variable of having lifetime major depressive episode is derived based on the following three conditions outlined by the criteria of the CCHS – Mental Health/World Health Organization Composite International Diagnostic Interview (WHO-CIDI):

1. “two weeks or longer of depressed mood or loss of interest or pleasure and at least five symptoms associated with depression which represent a change in functioning;
2. symptoms that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning; and
3. symptoms that are not better accounted for by bereavement or symptoms last more than two months or the symptoms are characterised by a marked functional impairment, preoccupation with worthlessness, suicidal ideation, or psychomotor retardation.” (Canadian Community Health Survey Mental Health - Public Use Microdata File, Derived Variable (DV) Specifications, April 2014).

From the information provided by the survey and similarly to Sedigh et al. (2017), I define four main groups of characteristics that affect depression, providing a comprehensive view of the factors that are related to depression. Some of these characteristics studied in the literature are further analyzed in the context of this paper. The existing literature on socioeconomic factors which affect depression has motivated the study of additional health and behavioural variables of

interest in the current study. The four groups of characteristics are: *personal*, *work*, *family*, and *health and behaviour*. This includes a total of 18 variables that are studied for their effects on depression: gender, immigrant status, visible minority, age, education, languages spoken and geography (including provinces and CMAs) as *personal characteristics*; income and employment status as *work characteristics*; marital status and presence of children as *family characteristics*; and having cancer, self-assessed health, smoking habits, drug dependence, alcohol use and exercise as *health and behaviour characteristics*.

Table 1 reports the weighted mean values of the variables used in this study, firstly for the entire sample, followed by gender and then by whether individuals have been depressed or not. Looking first at the personal characteristics, there is approximately an even divide between female and male respondents in the entire sample, where 51 percent of the population are women. However, when the sample is stratified into depressed or not depressed respondents (in the latter two columns of Table 1), we see that 63 percent of those depressed are females.

Immigrants consist of 25.0 percent of the total respondents and 22.9 percent of the respondents are visible minorities. However, among the depressed respondents sample, only 16.1 percent are immigrants and 17.2 percent are visible minorities.

There are four age categories: fifteen to twenty-four, twenty-five to thirty-nine, forty to sixty-four, and sixty-five and above years of age. The largest number of respondents belong to the forty to sixty-four age group, with a proportion of 43.3 percent. The twenty-five to thirty-nine age category is selected as the control group for the regressions that will follow. The forty to sixty-four age category also has the highest proportion among the depressed respondents at 50.4 percent, which is much larger than its proportion in the population. In contrast, the sixty-five and up age

category accounts for the lowest proportion of people who are depressed, at 10.4 percent, which is lower than its proportion in the population (17.0 percent).

The variable of highest education attainment level is categorized into four groups: less than secondary school graduation, secondary school graduation and no post-secondary education, some post-secondary education, and post-secondary certificate/diploma or a university degree. The latter group includes those with a bachelor's degree or more. The reference group is the secondary graduate category. Of these education categories, those who have a post-secondary education certificate/diploma or university diploma make up the largest proportion with 59.1 percent of the total. It is interesting to note that among females, 59.4 percent belong to this highest education attainment category, while among males, about 58.8 percent belong to this education category, slightly less than females. For those who are depressed, the largest proportion of respondents is in the post-secondary education certificate/diploma or university diploma category, at 59.9 percent which is about same as the proportion in the total.

The languages spoken at the respondent's home are classified into four groups: English with or without other, French with or without other, English and French with or without other, and neither English nor French. Most of the respondents spoke English with or without another language and made up a proportion of 68.8 percent of the total. The proportions as shown by gender are very similar across all the language categories. Interestingly, although 8.5 percent of the population speaks neither English nor French at home, they account for only 4.2 percent of those who are depressed.

Geography is controlled for by province and census metropolitan area (CMA). According to Statistics Canada (2015), a CMA¹ is an agglomeration pertaining to a population of at least 100,000, of which 50,000 or more live in the core. Provincial fixed effects are used, with Ontario as the reference for the 10 provinces. In the regression analysis, the less populated provinces are regrouped: the Atlantic provinces include Prince Edward Island, Nova Scotia, New Brunswick, and Newfoundland and Labrador; as well, Manitoba and Saskatchewan are combined under the group called Prairies. The largest proportion of the population is in Ontario, as expected, at 39.3 percent, and the lowest in the Atlantic provinces at 3.7 percent. Among those who were depressed, 37.8 percent live in Ontario, a lower proportion than that of its population. However, for the 23.5 percent living in Quebec, a slightly larger proportion (25.5 percent) of the depressed live there. A majority of the respondents reside in CMAs, at 71.5 percent, but among the depressed, the proportion is slightly lower, at 69.4 percent.

Work characteristics make up the second group of variables. They include total household income and employment status. The total household income from all sources is distributed in five groups consisting of less than \$20,000, \$20,000 to \$39,000, \$40,000 to \$59,000, \$60,000 to \$79,000 and \$80,000 and above. The \$80,000 and above income category makes up the largest proportion at 48.0 percent; it is also the control group. The highest proportion of those who were

¹ The CMAs are namely: Abbotsford-Mission (B.C.), Barrie (Ont.), Brantford (Ont.), Calgary (Alta.), Edmonton (Alta.), Greater Sudbury/ Grand Sudbury (Ont.), Guelph (Ont.), Halifax (N.S.), Hamilton (Ont.), Kelowna (B.C.), Kingston (Ont.), Kitchener-Cambridge-Waterloo (Ont.), London (Ont.), Moncton (N.B.), Montreal (Que.), Oshawa (Ont.), Ottawa-Gatineau (Ont./Que.), Peterborough (Ont.), Quebec (Que.), Regina (Sask.), Saguenay (Que.), Saint John (N.B.), Saskatoon (Sask.), Sherbrooke (Que.), St. Catharines-Niagara (Ont.), St. John's (N.L.), Thunder Bay (Ont.), Toronto (Ont.), Trois-Rivières (Que.), Vancouver (B.C.), Victoria (B.C.), Windsor (Ont.), Winnipeg (Man.).

depressed in the income categories was also in the 80,000 and above category (41.6 percent), but it is lower than that of the population. In the survey, the variable of employment status in the preceding week is defined only for respondents who are between the ages of 15 and 74. The employment status is divided into three groups: employed, not employed and permanently unable to work. The employed category combines those who had a job and were at work last week as well as those who had a job but were absent from work last week. It is the control group and makes up the largest proportion of 64.5 percent. In order to keep those who are above the age of 74 in the study, I assume them to be in the not employed category. When analyzed by whether the respondent was depressed or not, the most interesting finding is that those who are unable to work, who account for 5.6 percent of the depressed, make up for merely 2.4 percent of the population.

Family characteristics are accounted for through marital status and whether the household has children. Marital status includes the categories of married, common law, single and a combined group of those who are divorced, separated, or widowed. The control group with a mean of 49.3 percent of the population is the married respondents. The lowest proportion is common law at 10.9 percent of the population. Among the depressed, those who are married account for 41.1 percent, a much smaller proportion than that of the population, while those in the common law status category account for a larger proportion than that in the population. This is also the case for those who are single and those who are divorced, separated, or widowed. Whether the household has one or more children is also controlled for. A minority of respondents had at least one child, accounting for 12.9 percent of the population, whereby a greater proportion of women had at least one child (13.5 percent) compared to men (12.3 percent).

Health and behaviour characteristics are further studied to analyze their effects on depression. The variables for this last category are self-perceived health, presence of cancer,

smoking habits, drug dependence, alcohol use, and whether the respondent engaged in moderate or vigorous physical activity in the past week. The proportion of respondents who have cancer is 6.7 percent. A larger proportion of women are diagnosed with cancer, at 7.5 percent compared to men at 5.9 percent. A greater proportion of those who are depressed have cancer (8.1 percent). The self-perceived health variable is split into two groups: the first combines those who rated their health as excellent or very good, and the second group combines those whose self-perceived health was good, fair, or poor. The proportion of the population with very good self-perceived health, specifically those who rated their health as excellent or very good, is 61.2 percent, and it remains similar when studied by gender. For those who are depressed, a much smaller proportion rated their health as very good (47.2 percent).

Since smoking is shown to have negative impacts on health overall, smoking behaviour may also have an impact on depression. In this paper, smoking is classified by those who smoke or those who do not smoke. Specifically, those respondents who identified themselves as daily and occasional smokers are both classified as smokers. A higher proportion of men than of women are smokers (24.3 percent and 17.8 percent respectively). There are 28.5 percent of depressed that are smokers compared to 20.0 percent among the not depressed. A minority of the respondents in the sample are drug dependent, with a proportion of 8.6 percent, and a smaller proportion among women (5.5 percent) than among men (11.8 percent). Alcohol abuse, under the lifetime measure is a derived variable and is identified among respondents who by the CCHS – Mental Health/WHO-CIDI criteria, fail to fulfil major roles at work, school, or home, and consume alcohol in physically hazardous situations. This includes those who have recurrent alcohol problems and continue to use despite social or interpersonal problems caused by the increased use of alcohol (Pearson, Janz and Ali, 2013). Alcohol abuse is present among 15.1 percent of the population (7.9

percent among women and 22.3 percent among men). There are 19.5 percent of the depressed respondents who are alcohol abusers and 14.6 percent of the not depressed. Whether the respondents exercised or not in the past week reflects a part of their lifestyle. The proportion of the population who engaged in moderate or vigorous physical activity in the past week is 73.5 percent, which is a relatively large majority. This proportion is smaller for those who are depressed, at 73.0 percent.

4. Econometric Model

4.1 Regression Analysis

The effects of the above variables on depression are studied through regression analysis. A linear probability model, as shown below, includes alternative specifications that combine different subsets of those variables to estimate the various socioeconomic effects on the probability of being depressed. The four categories of characteristics undergo six specifications in total. Almost identical results were obtained from having conducted the study using a probit model. The linear probability model is used in this study to provide a less esoteric interpretation. Robust standard errors were used to address the possibility of heteroskedasticity.

The first specification includes only the personal characteristics:

$$depressed_i = \beta_0 + \beta_1 personal_i + \varepsilon_i, \tag{1}$$

where $depressed_i$ is a binary variable equal to one if an individual i is depressed, and zero otherwise. The first category of variables denoted as $personal_i$, is a vector of personal characteristics with the following variables: gender, immigrant, visible minority, age, education, languages spoken, and geography. The variables of female, immigrant, and visible minority are

each binary, whereby each is equal to 1 if individual i is a female, an immigrant, or a visible minority. The education variables are broken down into four categories – each of them being a binary variable: less than secondary education, secondary education (reference category), some graduate education, and post-secondary education certificate/diploma or university diploma. Languages spoken is represented by four binary variables, those who speak English with or without another language, French with or without another language, both English and French with or without another language, neither English nor French. The neither English nor French speakers are the reference group. Geographic variables are represented by the provinces and Census Metropolitan Areas (CMAs), which are binary variables. Ontario, the province with the largest population in Canada is the reference group.

The next specification adds the second category of variables, denoted as $work_i$ which is a vector that comprises employment status and income. Employment status is categorized as employed, not employed, or permanently unable to work, all of which are binary variables. The employed is the reference group. Income is divided into five binary variables, with those earning the highest, at \$80,000 or more, as the reference group.

$$depressed_i = \beta_0 + \beta_1 personal_i + \beta_2 work_i + \varepsilon_i \quad (2)$$

The third vector includes family variables and is added to the personal characteristics vector. The family characteristics include marital status and whether the respondent has one or more children. Marital status is divided into four binary variables: married; common law; divorced, separated, or widowed; and single, with the married group as the reference. If there are children in the respondent's home, then the binary variable for children equals 1.

$$depressed_i = \beta_0 + \beta_1 personal_i + \beta_2 family_i + \varepsilon_i \quad (3)$$

Finally, the fourth vector of variables is health and behaviour. Cancer is a binary variable, which equals 1 if the respondent is diagnosed with cancer. Personal behaviours such smoking, alcohol abuse and drug dependence are all binary variables as well. The last three specifications combine the categories of variables as follows:

$$depressed_i = \beta_0 + \beta_1 personal_i + \beta_2 behaviour_i + \varepsilon_i, \quad (4)$$

$$depressed_i = \beta_0 + \beta_1 personal_i + \beta_2 work_i + \beta_3 family_i + \varepsilon_i \quad (5)$$

$$depressed_i = \beta_0 + \beta_1 personal_i + \beta_2 work_i + \beta_3 family_i + \beta_4 behaviour_i + \varepsilon_i \quad (6)$$

4.2 Oaxaca Decomposition

Continuing the above analysis in more depth, the Oaxaca decomposition technique is used to examine the disparity between females and males in the likelihood of having depression. The gap in the probability of depression between both genders is decomposed into an explained and unexplained part. Firstly, the regression for females and males are conducted:

$$\text{Regression for females: } (depressed_i^f) = X_i^f \beta^f + \varepsilon_i^f \quad (7)$$

$$\text{Regression for males: } (depressed_i^m) = X_i^m \beta^m + \varepsilon_i^m, \quad (8)$$

where $(depressed_i^f)$ and $(depressed_i^m)$ are the probabilities of being depressed of individual i for females, and males, respectively. The characteristic vectors of the four groups of socioeconomic variables for individual i are denoted X_i^f and X_i^m and the error terms are ε_i^f and ε_i^m . The Oaxaca decomposition of the average gap in probability of being depressed between females and males takes the following form:

$$\overline{(depressed^f)} - \overline{(depressed^m)} = (\overline{X^f} - \overline{X^m})\beta^m + \overline{X^f}(\beta^f - \beta^m), \quad (9)$$

where the bar signs over the variables denote the mean values. The first component of the right-hand-side (the explained part) represents the difference in probability of depression due to differences in the average value of characteristics, those characteristics being evaluated with the male coefficients. The second part of the right-hand-side (the unexplained part) represents the difference in probability of depression due to the differences in regression coefficients.

4.3 Limitations

Before proceeding with the presentation of the results, some limitations must be mentioned. This paper aims to investigate the effect of carefully selected socioeconomic characteristics on the probability of depression among females and males in Canada. While the underlying assumption of this study is that those specific characteristics affect the probability of having a major depressive disorder, the causality may very well be the other way around. The probability of having a major depressive disorder may cause one to have specific characteristics. For example, people who drink too much may become depressed, but they may also start drinking after being depressed. Identifying the direction of causality between the socioeconomic characteristics and depression is difficult and could be further studied with longitudinal data that would allow for analysis before and after meeting a specific socioeconomic characteristic. For example, with panel data, deeper analysis regarding whether an individual had a higher probability of being depressed either before or after a change in income would be possible. Instrumental variables could be used; however, careful selection of instruments would be required.

As well, there may be measurement errors in identifying the conditions used to derive the dependent variable of having a lifetime depressive episode. For example, respondents may over-

identify or under-identify the time-frame during which they experienced depression, which could affect the number of respondents being identified as having a major depressive disorder. Moreover, some respondents may feel reluctant to report that they have had depression at all, which would lead to underestimating the population that is depressed and possibly to altering the coefficient estimates. There may also be differences in reporting depression between genders, which could further affect the results. As noted by Dewa et al. (2002), women are more likely to take a depression-related short-term disability leave than men, which suggests that women recognize and act upon signs of depression more than men. Thus, it can be inferred that women and men perceive depression differently, which could lead to differences in responding to questions related to depression. The presence of measurement errors from self-reporting in surveys is a common challenge for researchers.

5. Empirical Results

5.1 Regressions for both genders

Table 2 displays the regression results after controlling for the four groups of characteristics (personal, work, family, and health and behaviour), studied in six different combinations. Focusing first on gender differentials, across all combinations of controls, the key consistent finding is that females are observed to be between 5 to 7 pp more likely to be depressed than males. Females are more likely to be depressed than males across all regressions, regardless of the variables that are controlled for. This is true at the 1% significance level. Females are the most depressed, with a difference of 6.9 pp, when personal and health and behaviour characteristics (4) are controlled for. The second largest difference is at 6.3 pp when all 18 characteristics are controlled for (6). This implies that even after adding many relevant controls, the fact that females are more depressed

than males remains constant and is even more apparent. This finding is consistent with the literature, which shows that women are generally more susceptible to depression than men.

Across all six specifications of the grouped characteristics in Table 2, immigrants are seen to be less depressed than non-immigrants. This is significant at the 1% level for all specifications. Immigrants can be less depressed in their destination country than in their home country. As was seen in the literature review, immigrants are happier in Canada than their counterparts residing in their source countries (Frank et al., 2016). Immigrants are least depressed at a magnitude of 4.2 pp when both personal and work characteristics (2) are controlled for.

The youngest respondents, those fifteen to twenty-four years of age, were consistently less likely to report being depressed than the reference age group of twenty-five to thirty-nine in all six specifications. Specifically, those who were fifteen to twenty-four years of age were 3.6 pp less depressed in the specification that includes personal and family characteristics (3), and this is significant at the 1% level. Respondents that were above the age of 65 were also less likely to be depressed at the 1% significance level, across all specifications. The magnitude of the effect of being sixty-five years of age or older on depression was highest in the specification that includes personal and work characteristics (2), by 7.0 pp compared to the reference group.

Compared to the literature which found that higher education decreased the probability of depression, this paper has partially similar findings. In the present paper, those with a less than secondary education (the lowest level of education level), are less depressed than the reference group of those with a secondary education degree. This is consistent to Akhtar-Danesh and Landeen's (2007) finding, in which those with less than secondary school education had lower levels of depression. Though this is the case across all six specifications, the significance level of

some of the coefficients is low. In all specifications, the probability of depression is not significant for respondents with a post-secondary education certificate/diploma or a university diploma in comparison to those with a secondary level education. Nonetheless, in all specifications, significant at the 5% level, are those with some post-secondary education who are more depressed than those with a secondary education degree, which differs from the literature.

In terms of languages, those who spoke English with or without another language were more likely to be depressed than the reference group of those who spoke neither English nor French. The magnitudes of these coefficients were between 2 and 3 pp, and significant at the 1% level in the personal and work characteristics specification (2). Those who spoke French with or without another language were also more likely to be depressed than the reference group. This effect is additional to the immigration effect which is already being controlled for.

When geographic factors are studied, none of the coefficients of the provinces and or of the CMA variable is significant at the 10% level. This implies that where people live is not crucial on the likelihood of being depressed.

Looking now at the second category of variables, work characteristics, income and employment status are studied for their effects on depression. With the reference group for income being \$80,000 and above, the regression results indicate that those whose incomes fall within all of the lower groups have a higher probability of depression than those in the highest category. This implies that financial means and economic well-being are major determinants of depression. Higher income signals greater stability and support for a living. Furthermore, those who are not employed or who are permanently unable to work are all more likely to be depressed, especially those in the latter situation, than those who are employed.

Within the family characteristics group, the marital status regression coefficients indicate that compared to married individuals, common law partners have a higher probability of depression (significant at the 10% level) in the specification that includes personal and family characteristics (3), and in the one that includes personal, work and family characteristics (5). Since common law partners do not necessarily have as strong a relationship as legally married couples do, this may be a reason for a higher probability of depression. Similarly, compared to the married respondents, those who are either divorced, separated, or widowed, have a higher probability of depression at 4.9 pp (significant at the 1% level) than those who are married, in the specification that includes personal and family characteristics (3). Those who are single also have a higher probability of depression with high significance in this specification. Having children however, is shown to be not associated with reporting depression.

Finally, among the health and behaviour characteristics, respondents who have cancer are 2.3 pp more likely to be depressed than those who do not, as seen in the regression that includes the personal, and health and behaviour characteristics (4). In the same specification, those who have very good self-assessed health are 6.5 pp less likely to be depressed than those whose assessed health is merely good, fair, or poor. Smokers are 2.2 pp more likely to be depressed than non-smokers, as was found in Patten et al. (2017). Those who have a drug dependence are 14.9 pp more likely to be depressed (significant at the 1% level), a large magnitude relative to the coefficients of most of the other variables of this study. Aside from negative behaviours on health, exercise would be expected to have a positive effect on health. From the regression results however, the coefficient of having exercised in the past week is insignificant.

5.2 Separate regressions by gender

Given the large differences by gender noted earlier, Table 3 presents the regression results with the specification that includes all four of the groups of characteristics by gender. This is to provide an in-depth analysis to further understand how depression manifests differently in females and males. Among the personal characteristics category, the impact of age is prevalent for both genders. Compared to the reference group of those between the ages of twenty-five and thirty-nine, females between the age of fifteen and twenty-four are less likely to be depressed by 4.5 pp. Females who are above the age of sixty-five are also less depressed, but by an even greater magnitude, at 8.7 pp. This implies that for women, the lowest and highest ages are when they are the least likely to be depressed. For men, those who are sixty-five or above are least depressed than the reference age group. However, men who are between the ages of forty and sixty-four are more likely to be depressed by 2.1 pp, which is significant at the 10% significance level.

Although the fact that immigrants are less likely to be depressed was highly significant when studied for the whole sample, when studied by gender, the probability of being less depressed is significant at the 1% significance level only among males, by 3.4 pp. Female visible minorities are less depressed by 2.5 pp (significant at the 10% level). Compared to the reference group of those who have a secondary education, only males with a less than the secondary level education have a statistically significant coefficient, and they are less depressed by 3.8 pp.

In the work characteristics category, the impact of income and employment status is highly significant across all variables for males, but not for females. Across all income categories that are less than the \$80,000 plus reference group, males are more likely to be depressed. The magnitude for the highest probability of depression due to income is 7.2 pp when males earn less than \$20,000,

which is significant at the 1% level. For females, this magnitude is 3.6 pp and significant at the 10% level only. For the other income levels, the coefficients for females are not statistically significant. Significant at the 1% level are males who are not employed, or permanently unable to work, who are more prone to depression at 3.1 pp, and 11.9 pp, respectively. These magnitudes are not significant for females.

In terms of family characteristics, the effects on depression are significant for females only in the divorced, separated, or widowed category and in the presence of children category. Females who are divorced, separated, or widowed are 4.2 pp more likely to be depressed (significant at the 5% level) than the reference group of those who are married. Females with children are 2.8 pp less likely to be depressed than those who do not have children (significant at the 10% level). The coefficients of these variables are not significant for men.

In the health and behaviour characteristics group, the impact of very good self-assessed health is highly significant for both genders at the 1% significance level. Very good self-assessed health decreases the probability of being depressed among females by 8.6 pp, and 3.1 pp for males. The positive effect of drug dependence on the probability of depression is highly significant for both females and males, but is greater in magnitude for females (21.5 pp) compared to males (11.1 pp). Moreover, for females, the effect of alcohol abuse has a positive effect of 5.2 pp on being depressed (significant at the 5% level); for males, alcohol abuse has no effect. Although men and women respond to the same variables, there are notable differences in the work characteristics and health and behaviour characteristics, which further reflect the need to study depression by gender, and capture these nuances.

5.3 Oaxaca Decomposition Analysis

Table 4 further analyzes the impact of the socioeconomic factors on the difference in the probability of depression between females and males, using the Oaxaca decomposition method. I use the specifications based on all the 18 variables, which are categorized into the four groups of characteristics. The difference between females and males in the probability of depression is 5.6 pp.

In Table 4, we see that the total explained effect on the difference, due to differences in the mean values in the characteristics, is near zero, at -0.0005. This means that the entire gap is unexplained, that is, due to differences in coefficients. However, the zero explained effect is likely due to the neutralized effect between two groups of characteristics: *work*, and *health and behaviour*. Firstly, in the explained part, the coefficient of the *work* characteristics is positive, at 0.0072, and it is significant at the 1% level. The positive sign implies that males benefit more than the females from work characteristics in reducing their probability of being depressed. As was shown in Table 1, women generally earn less and are less likely to be employed than men, and in turn, more likely to be depressed. Secondly, the *health and behaviour* characteristics have a coefficient of minus 0.0080 which is also significant at the 1% level. The negative sign implies that the health and behaviour characteristics benefit females more than males. There are generally more men engaging in behaviours such as smoking, drinking or using drugs than women, as was shown in Table 1. Interestingly, these two effects of *work* and *health and behaviour* have almost identical magnitudes, but with opposite signs. The cancelling out of these magnitudes partially explains why the overall explained effect on the difference in depression probability is near zero. The rather low magnitude of 0.0080 also indicates the small benefit that females have over men in the negative effect of health and behaviour characteristics on the probability of being depressed.

The two coefficients of 0.0072 and -0.0080 more or less cancel out, elucidating the overall zero explained effect.

In the unexplained part, the constant is the most important contributor. Consistent to the finding of Table 3, the high value of the effect due to the constant indicates that women have a higher intercept than men, indicating that women are generally more depressed than men. The *work* characteristics also have a significant negative effect in the unexplained part. In Table 3, a main finding was that *work* characteristics, as measured by income and employment status, affect men more than women. This is an advantage to women in reducing depression, but the impact is much smaller than that of the constant term.

As we saw in Table 2, the addition of new variables to the regression does not alter much the coefficient of the female variable, which remains around 5 to 7 pp, further supports the finding of Table 4 that the overall explained effect is near zero. Thus, there are two possibilities. Either there are other unobserved factors that were not included in the regression analysis that affect depression, or that being a female, on its own, is what explains the higher probability of being depressed.

6. Conclusion

This paper has examined the impact of various socioeconomic factors on the probability of being depressed. Those 18 factors were divided into four main categories, namely personal, work, family, and health and behaviour characteristics. It was observed that females are more likely to be depressed than males by 5 to 7 pp. This research has provided insight on how various factors affect depression in Canada on an aggregate level and by gender. The study further used an Oaxaca

decomposition to analyze the potential causes of the difference in the incidence of depression between females and males.

At the aggregate level, personal, work, family, and health and behaviour factors that influence the probability of depression were mostly consistent with the findings of the literature. When analyzed only by gender, income and employment effects were significant for males but not for females. In contrast, family characteristics were significant for females but not for males. The effect of drug dependence is highly significant for both females and males, with the effect of alcohol abuse on depression only significant for females. The Oaxaca decomposition results further supported the finding that, whereby no matter how many variables were added, females remained to be between 5 to 7 pp more likely to be depressed than males. In the Oaxaca decomposition, the explained effect is close to zero.

The current study analyzed the differences in the correlates of depression between females and males, and their implications on the probability of being depressed. Future steps would be to collect more comprehensive data about depression in Canada to further isolate and identify the characteristics affecting depression. Since the results of this paper indicate that the total effect of the 18 socioeconomic factors studied do not explain the gap in the probability of having depression between females and males, additional research, using longitudinal data for example, could attempt to identify other factors that are causing females to be more depressed. Nonetheless, this paper has found several correlates of depression to be different between females and males, such as marital status and behavioural characteristics of alcohol abuse and drug dependence highly affecting the probability of depression among females, and income levels to highly affecting the probability of depression among males. To decrease the possibility of measurement errors, alternative data

collection methods could be used such as relying on psychologist interviews, or by studying medical records in identifying socioeconomic characteristics related to depression.

Furthermore, as was noticed from the existing literature, few studies regarding depression exist for developing countries. Future research on depression in the developing world is an area that can be explored more to address this global illness. Additionally, with the ever-growing integration of technology and social media platforms in everyday life, more empirical analyses involving the study of technology and social media use on depression would further provide perspectives on contemporary causes of mental illnesses. Depression not only interferes with the quality of life of the affected individuals, it also affects the community surrounding them, socially, and economically. The consequences of depression are universal and thus require the attention and action of the world to better address and treat this often invisible, but treatable illness.

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Table 1: Mean values of the variables used in the analysis, by gender and by depression status

Variables	All	Females	Males	Depressed	Not Depressed
	Depressed	0.113	0.140	0.084	-
A. Personal Characteristics					
Female	0.510	-	-	0.633	0.494
Immigrant	0.250	0.250	0.250	0.161	0.261
Visible Minority	0.229	0.231	0.226	0.172	0.236
<i>Age</i>					
15-24	0.159	0.152	0.166	0.149	0.160
25-39	0.239	0.235	0.243	0.244	0.238
40-64	0.433	0.431	0.434	0.504	0.424
65+	0.170	0.182	0.157	0.104	0.178
<i>Education</i>					
Less than Secondary Education	0.179	0.172	0.187	0.141	0.184
Secondary Education	0.158	0.162	0.153	0.160	0.158
Some Post-Secondary Education	0.072	0.071	0.072	0.100	0.068
Post-Secondary Education Certificate/Diploma or University Diploma	0.591	0.594	0.588	0.599	0.590
<i>Languages</i>					
English with or without another language	0.688	0.687	0.689	0.703	0.686
French with or without another language	0.200	0.202	0.197	0.230	0.196
English and French with or without another language	0.028	0.027	0.029	0.025	0.028
Neither English or French	0.085	0.085	0.085	0.042	0.091
<i>Geography</i>					
Atlantic Provinces	0.037	0.037	0.036	0.037	0.037
Quebec	0.235	0.234	0.237	0.255	0.233
Ontario	0.393	0.396	0.389	0.378	0.394
Prairies	0.063	0.062	0.064	0.066	0.062
Alberta	0.109	0.106	0.113	0.101	0.110
British Columbia	0.132	0.132	0.131	0.133	0.132
Census Metropolitan Area (CMA)	0.715	0.714	0.715	0.694	0.717

**B. Work
Characteristics**

Income

0 < 20,000	0.043	0.048	0.037	0.071	0.039
20,000 < 39,000	0.120	0.141	0.098	0.139	0.118
40,000 < 59,000	0.182	0.189	0.174	0.182	0.182
60,000 < 79,000	0.176	0.179	0.172	0.192	0.174
80,000+	0.480	0.443	0.518	0.416	0.488

Employment Status

Employed	0.645	0.594	0.698	0.631	0.647
Not employed	0.330	0.381	0.277	0.314	0.332
Unable to work	0.024	0.025	0.024	0.056	0.020

**C. Family
Characteristics**

Marital Status

Married	0.493	0.480	0.507	0.411	0.503
Common Law	0.109	0.105	0.114	0.130	0.107
Divorced, Separated, or Widowed	0.128	0.174	0.080	0.168	0.123
Single	0.269	0.241	0.299	0.291	0.267
Children	0.129	0.135	0.123	0.111	0.132

**D. Health and
Behaviour**

Cancer	0.067	0.075	0.059	0.081	0.066
Very Good Self- Assessed Health	0.612	0.611	0.613	0.472	0.630
Smoker	0.210	0.178	0.243	0.285	0.200
Drug Dependence	0.086	0.055	0.118	0.202	0.071
Alcohol abuse	0.151	0.079	0.227	0.195	0.146
Exercised in the past week	0.735	0.075	0.768	0.730	0.736

Observations	23,988	13,171	10,817	2,948	21,040
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Note: Source: Canadian Community Health Survey, 2012: Mental Health Component dataset. Weighted means are displayed.

Table 2: Regression results on the probability of being depressed, linear probability model, specifications with various combinations of characteristics

Variables	Personal	Personal & Work	Personal & Family	Personal & Health & Behaviour	Personal, Work & Family	Personal, Work, Family & Health and Behaviour
	(1)	(2)	(3)	(4)	(5)	(6)
A. Personal						
Female	0.056*** (-0.006)	0.051*** (-0.007)	0.054*** (-0.006)	0.069*** (-0.007)	0.050*** (-0.007)	0.063*** (-0.007)
Immigrant	-0.039*** (-0.009)	-0.042*** (-0.009)	-0.035*** (-0.009)	-0.023*** (-0.009)	-0.038*** (-0.009)	-0.024*** (-0.009)
Visible Minority	-0.011 (-0.009)	-0.016* (-0.010)	-0.011 (-0.009)	-0.012 (-0.009)	-0.015 (-0.009)	-0.014 (-0.009)
<i>Age (ref: 25-39)</i>						
15-24	-0.019* (-0.011)	-0.017 (-0.011)	-0.036*** (-0.012)	-0.011 (-0.010)	-0.028** (-0.012)	-0.021* (-0.012)
40-64	0.014 (-0.009)	0.012 (-0.009)	0.015 (-0.010)	0.012 (-0.009)	0.011 (-0.010)	0.008 (-0.010)
65+	-0.049*** (-0.009)	-0.070*** (-0.011)	-0.051*** (-0.012)	-0.045*** (-0.01)	-0.071*** (-0.013)	-0.067*** (-0.013)
<i>Education (ref: secondary)</i>						
Less than Secondary Education	-0.011 (-0.011)	-0.023** (-0.011)	-0.013 (-0.011)	-0.020* (-0.010)	-0.023** (-0.011)	-0.027*** (-0.010)
Some Post-Secondary Education	0.045** (-0.018)	0.045** (-0.018)	0.042** (-0.019)	0.038** (-0.018)	0.043** (-0.018)	0.037** (-0.018)
Post-Secondary Education Certificate/Diploma or University Diploma	-0.001 (-0.01)	0.009 (-0.010)	0.001 (-0.010)	0.007 (-0.009)	0.009 (-0.010)	0.012 (-0.009)
<i>Languages (ref: Neither English nor French)</i>						
English with or without another language	0.026** (-0.011)	0.031*** (-0.011)	0.024** (-0.011)	0.022* (-0.011)	0.028** (-0.011)	0.022** (-0.011)
French with or without another language	0.036** (-0.017)	0.041** (0.017**)	0.030* (-0.017)	0.040** (-0.017)	0.035** (-0.017)	0.040** (-0.017)
English and French with or without another language	0.013	0.021	0.012	0.014	0.019	0.017

	(-0.019)	(-0.019)	(-0.019)	(-0.018)	(-0.019)	(-0.018)
<i>Region (ref: Ontario)</i>						
Atlantic Provinces	-0.012	-0.014	-0.009	-0.005	-0.013	-0.007
	(-0.010)	(-0.011)	(-0.011)	(-0.011)	(-0.011)	(-0.011)
Quebec	-0.002	-0.003	-0.002	-0.004	-0.003	-0.004
	(-0.014)	(-0.014)	(-0.014)	(-0.014)	(-0.014)	(-0.014)
Prairies	0.004	0.007	0.007	0.002	0.008	0.004
	(-0.012)	(-0.012)	(-0.012)	(-0.012)	(-0.012)	(-0.012)
Alberta	-0.01	0.001	-0.006	-0.008	0.001	-0.003
	(-0.011)	(-0.010)	(-0.011)	(-0.011)	(-0.010)	(-0.011)
British Columbia	0.007	0.009	0.008	0.004	0.009	0.004
	(-0.010)	(-0.010)	(-0.010)	(-0.010)	(-0.010)	(-0.010)
Central Metropolitan Area (CMA)	0.001	0.004	-0.002	0.002	0.003	0.003
	(-0.008)	(-0.008)	(-0.008)	(-0.008)	(-0.008)	(-0.008)
B. Work						
<i>Income (ref: 80,000+)</i>						
0 < 20,000		0.092***			0.081***	0.058***
		(-0.015)			(-0.015)	(-0.015)
20,000 < 39,000		0.050***			0.042***	0.024**
		(-0.010)			(-0.011)	(-0.011)
40,000 < 59,000		0.031**			0.026***	0.017*
		(-0.010)			(-0.009)	(-0.009)
60,000 < 79,000		0.034**			0.031***	0.026***
		(-0.010)			(-0.010)	(-0.010)
<i>Employment Status (ref: employed)</i>						
Not employed		0.015*			0.016*	0.016*
		(-0.009)			(-0.009)	(-0.009)
Unable		0.129***			0.127***	0.091***
		(-0.025)			(-0.025)	(-0.026)
C. Family						
<i>Marital Status (ref: Married)</i>						
Common Law			0.024*		0.022*	0.006
			(-0.012)		(-0.012)	(-0.012)
Divorced, Separated, or Widowed			0.049***		0.032***	0.027**
			(-0.012)		(-0.012)	(-0.011)
Single			0.036***		0.021**	0.013
			(-0.010)		(-0.010)	(-0.010)
Children			-0.011		-0.011	-0.012
			(-0.010)		(-0.010)	(-0.010)
D. Health and Behaviour						
Cancer				0.023*		0.019

				(-0.014)		(-0.014)
Very Good Self-Assessed Health				-0.065***		-0.057***
				(-0.008)		(-0.008)
Smoker				0.022**		0.016*
				(-0.009)		(-0.009)
Drug Dependence				0.149***		0.144***
				(-0.016)		(-0.016)
Alcohol Abuse				0.011		0.014
				(-0.010)		(-0.010)
Exercised				0.005		0.009
				(-0.008)		(-0.008)
<i>Constant</i>	0.076***	0.043	0.065***	0.080***	0.041**	0.053**
	(-0.008)	(-0.017)	(-0.018)	(-0.019)	(-0.018)	(-0.020)
R ²	0.021	0.032	0.024	0.053	0.033	0.06
Observations	23,988	23,988	23,988	23,988	23,988	23,988

Note: Weighted data are used. Robust standard errors in brackets. *10% significance, **5% significance, *** 1% significance

**Table 3: Regression results on the probability of being depressed,
linear probability model, by gender**

A. Personal Characteristics	Females	Males
Immigrant	-0.014 (-0.014)	-0.034*** (-0.010)
Visible Minority	-0.025* (-0.014)	-0.006 (-0.011)
<i>Education (ref: secondary)</i>		
Less than Secondary Education	-0.019 (-0.015)	-0.038*** (-0.013)
Some Post-Secondary Education	0.047 (-0.030)	0.021 (-0.020)
Post-Secondary Education Certificate/Diploma or University Diploma	0.013 (-0.014)	0.005 (-0.012)
<i>Age (ref: 25-39)</i>		
15-24	-0.045** (-0.018)	-0.005 (-0.016)
40-64	-0.005 (-0.016)	0.021* (-0.011)
65+	-0.087*** (-0.020)	-0.042** (-0.016)
<i>Languages (ref: Neither English or French)</i>		
English with or without another language	0.036** (-0.017)	0.006 (-0.014)
French with or without another language	0.065** (-0.027)	0.014 (-0.020)
English and French with or without another language	0.039 (-0.028)	-0.004 (-0.022)
<i>Geography (ref: Ontario)</i>		
Atlantic Provinces	-0.008 (-0.015)	-0.009 (-0.014)
Quebec	-0.015 (-0.023)	0.002 (-0.015)
Prairies	0.011 (-0.018)	-0.004 (-0.015)
Alberta	-0.009 (-0.017)	0.001 (-0.012)
British Columbia	0.002 (-0.016)	0.004 (-0.012)
Census Metropolitan Area (CMA)	-0.009 (-0.012)	0.015 (-0.009)
B. Work Characteristics		
<i>Income (ref: 80,000+)</i>		
0 < 20,000	0.036* (-0.021)	0.072*** (-0.021)
20,000 < 39,000	-0.012 (-0.015)	0.058*** (-0.014)
40,000 < 59,000	0.007	0.023**

	(-0.014)	(-0.010)
60,000 < 79,000	0.007	0.041***
	(-0.014)	(-0.014)
<i>Employment Status</i>		
Not employed	0.004	0.031***
	(-0.013)	(-0.012)
Unable	0.049	0.119***
	(-0.039)	(-0.034)
C. Family Characteristics		
<i>Marital Status (ref: Married)</i>		
Common Law	0.011	0.006
	(-0.017)	(-0.016)
Divorced, Separated, or Widowed	0.042**	0.018
	(-0.016)	(-0.013)
Single	0.013	0.017
	(-0.015)	(-0.013)
Children	-0.028*	0.006
	(-0.015)	(-0.014)
D. Health and Behaviour		
Cancer	0.025	-0.002
	(-0.020)	(-0.016)
Very Good Self-Assessed Health	-0.086***	-0.031***
	(-0.011)	(-0.010)
Smoker	0.017	0.012
	(-0.016)	(-0.010)
Drug Dependence	0.215***	0.111***
	(-0.030)	(-0.017)
Alcohol Abuse	0.052**	0.001
	(-0.021)	(-0.010)
Exercised	0.016	0.002
	(-0.012)	(-0.009)
<i>Constant</i>	0.145***	0.039*
	(-0.032)	(-0.023)
R ²	0.067	0.053
Observations	13,171	10,817

Note: Weighted means are used. Robust standard errors in parentheses. *10% significance, **5% significance, *** 1% significance.

Table 4: Oaxaca Decomposition of the difference in probability of depression between females and males, by characteristic

Females mean depression	0.1400*** (0.005)
Males mean depression	0.0843*** (0.004)
Difference	0.0557*** (-0.007)
Total Explained	-0.0005 (-0.003)
Total Unexplained	0.0561*** (-0.007)
<i>Explained</i>	
Personal	-0.0004 (-0.001)
Work	0.0072*** (-0.002)
Family	0.0008 (-0.001)
Health and Behaviour	-0.0080*** (-0.002)
<i>Unexplained</i>	
Personal	-0.0042 (-0.034)
Work	-0.0326*** (-0.009)
Family	-0.0011 (-0.009)
Health and Behaviour	-0.0135 (-0.014)
<i>Constant</i>	0.1075*** (-0.039)

Note: Standard errors in parentheses. *10% significance, **5% significance, *** 1% significance.