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and Peter M. Smith

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# Trends in the prevalence of depression and anxiety disorders among working-age Canadian adults between 2000 and 2016

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## ABSTRACT

### Background

Understanding the prevalence of major depressive episodes (MDEs) and anxiety disorders at the population level among different labour force segments is critical to assessing and planning equitable mental health policies for Canadians adults. This study quantified prevalence trends of annually reported MDEs, anxiety disorders, and comorbid MDEs and anxiety disorders among working-age Canadians by labour force status between 2000 and 2016.

### Data and methods

This study used multiple cycles of the Canadian Community Health Survey. MDE prevalence was assessed using variants of the Composite International Diagnostic Interview and the Patient Health Questionnaire-9. Anxiety disorder prevalence captured the presence of an anxiety disorder diagnosed by a healthcare professional. Prevalence estimates were calculated in each survey cycle for three labour force groups: employed, unemployed and not participating in the labour force. A meta-analytic framework stratified by labour force status estimated prevalence trends.

### Results

Between 2000 and 2016, MDE prevalence remained statistically stable over time at 5.4% (95% confidence interval [CI]: 4.7% to 6.0%), 11.7% (95% CI: 10.4% to 13.0%) and 9.8% (95% CI: 8.5% to 11.2%) among participants who were employed, unemployed, and not participating in the labour force, respectively. Anxiety prevalence ranged from 4.6% to 10.8%, and increased over time (employed:  $\beta=0.26\%/year$ , 95% CI: 0.08% to 0.45%; unemployed:  $\beta=0.34\%/year$ , 95% CI: -0.10% to 0.78%; not participating in the labour force:  $\beta=0.55\%/year$ , 95% CI: 0.15% to 0.95%). Stable comorbid MDE and anxiety prevalence ranged from 1.2% to 4.1% between 2003 and 2016.

### Interpretation

Trends suggest that MDE prevalence has remained stable among all labour force groups since 2000, while anxiety disorder prevalence has modestly increased since 2003. Disorder prevalence increased as labour force attachment decreased across all outcomes studied.

### Keywords

depression, anxiety, mental health, labour force, prevalence, surveillance, employment, unemployment, Canada

## AUTHORS

Ms. Kathleen G. Dobson ([kathleen.dobson@mail.utoronto.ca](mailto:kathleen.dobson@mail.utoronto.ca)) and Dr. Cameron Mustard hold affiliations with the Department of Epidemiology, Dalla Lana School of Public Health, University of Toronto and with the Institute for Work & Health (Toronto, Canada). Dr. Simone N. Vigod holds affiliations with Department of Psychiatry, University of Toronto and Women's College Hospital and Research Institute (Toronto, Canada). Dr. Peter M. Smith holds affiliations with the Department of Epidemiology, Dalla Lana School of Public Health, University of Toronto and the Institute for Work & Health (Toronto, Canada). He also holds an affiliation with the Department of Epidemiology and Preventive Medicine, Monash University, Melbourne (Victoria, Australia).

### *What is already known on this subject?*

- Depression and anxiety disorders are extremely costly to the Canadian economy; the lost productivity in the labour force associated with these disorders is a significant contributor to these costs.
- Although it has been suggested that the prevalence of these disorders has remained stable among the general Canadian population, little is known about trends in the prevalence of these disorders over time among different sectors of the labour force.
- Internationally, there is little evidence that documents prevalence trends among a population-based sample of labour force participants where prevalence of depression and anxiety disorders are collected consistently over multiple time periods.

### *What does this study add?*

- Using 17 years of consistently collected cross-sectional data from national cohorts, average prevalence and trends in prevalence of major depressive episodes, length of depressive episodes, anxiety disorders diagnosed by a healthcare professional, and co-occurring depressive episodes and anxiety disorders are reported for employed Canadians, unemployed Canadians and Canadians who are not participating in the labour force.
- Depression prevalence has remained stable among all labour force groups, while anxiety disorder prevalence has modestly increased.
- The prevalence of depression and anxiety disorders is lowest among employed Canadians compared with Canadians who are unemployed or not participating in the labour force.
- Future research should explore how mental health policies, healthcare utilization, macroeconomic conditions, health literacy, and stigma influence prevalence trends across each segment of the labour force.

The Global Burden of Disease project reported that mental disorders have accounted for at least 14% of years of life lost due to disability since 1990.<sup>1</sup> Common mental disorders—such as major depressive disorder and anxiety disorders—rank highly among the major causes of disease burden; globally, they are estimated to be associated with at least 12 billion days of lost productivity per year, costing approximately \$925 billion USD.<sup>2,3</sup> Given their high morbidity and societal cost, concerns exist that the prevalence of these common mental disorders have been increasing in developed countries over the past 30 years.

Evidence supporting these concerns is uncertain,<sup>4</sup> in part because there has not been significant epidemiologic surveillance that has applied consistent measures of morbidity continuously over a long duration in population-based samples. Surveillance in Germany among those aged 18 to 79, and in Canada among those aged 12 and older observed stable depression prevalence measured over a ten-year period ending in 2012.<sup>5–7</sup> In contrast, a United States surveillance report noted a slight increase in depression among those aged 12 and older between 2005 and 2015.<sup>8</sup> A meta-analytic synthesis of primarily European general population samples showed no increase in anxiety disorders from 1990 to 2010.<sup>9</sup> However, in Australia, general population samples from the National Survey of Mental Health and Wellbeing showed an increase in anxiety symptoms among adults older than age 18 from 1997 to 2007.<sup>10</sup>

Part of the reason for the uncertainty in general population samples is that these samples may mask trends in higher-risk subgroups. Unemployment or not being in the labour force is associated with a higher risk of mental illness,<sup>11</sup> yet few studies have taken this into account in longitudinal prevalence estimates.<sup>10,12</sup> Given the changes in workplaces, job markets, and macroeconomic conditions that have impacted labour forces over the past two decades,<sup>13</sup> there is a need for surveillance that explores the impact of microeconomic and macroeconomic conditions on prevalence trends among various labour force groups at the population level. This evidence can be used by researchers, economists, employers and policy makers to manage the burden of mental disorders on labour markets.

Optimal characteristics for these surveillance systems include continuity of measurement over time, consistency of measurement over time, population-based sampling, and reliability in the measurement of health status and health risks.<sup>14</sup> Although these criteria are particularly salient for monitoring prevalence trends of common mental disorders at the population level, they have limitations in currently available evidence. This study aims to address these gaps by examining prevalence in a high-income country by implementing a repeated cross-sectional study design to estimate trends in the prevalence of depression and anxiety disorders in representative samples of working-age Canadian adults over a 17-year period.

**Table 1**  
**Sample size for each Canadian Community Health Survey cycle**

Survey, survey type and years surveyed	Survey response rate	Number of participants
Canadian Community Health Survey 1.1, annual, 2000 and 2001	84.7	85,954
Canadian Community Health Survey 1.2, mental health focused, 2002	77.0	25,422
Canadian Community Health Survey 2.1, annual, 2003	80.7	33,187
Canadian Community Health Survey 3.1, annual, 2005	78.9	44,802
Canadian Community Health Survey, annual, 2007 and 2008	77.6	31,224
Canadian Community Health Survey, annual, 2009 and 2010	72.3	37,265
Canadian Community Health Survey - Mental Health, mental health focused, 2012	68.9	16,190
Canadian Community Health Survey, annual, 2013 and 2014	66.2	25,112
Canadian Community Health Survey, annual, 2015 and 2016	59.5	31,890
<b>Total numbers</b>	...	<b>331,046</b>

... not applicable

Source: Canadian Community Health Survey.

## Methods

### Data source

This study used multiple cycles of the annual cross-sectional Canadian Community Health Survey (CCHS). The CCHS is a national survey that examines the health status and behaviours of Canadians aged 12 and older. It employs a complex, multistage stratified cluster design, using an area and telephone sampling frame. Roughly 3% of the Canadian population is excluded from the CCHS sampling frame (institutionalized individuals, children in foster care, those living on First Nations reserves, full-time members of the Canadian Armed Forces, and those living in specific Quebec regions).

The CCHS began in 2000 and until 2007 was conducted biennially with approximately 130,000 participants. From 2007 to 2016, the CCHS was conducted annually, with approximately 65,000 participants to reduce sampling burden. The CCHS underwent a content and sampling redesign in 2015. In the first CCHS cycle (1.1), the national response rate was approximately 85%. This decreased to approximately 60% in the last CCHS cycle (2015 to 2016).

Two mental health-focused CCHS cycles were conducted in 2002 (CCHS 1.2) and 2012 (CCHS-MH) to provide estimates of mental health determinants, status, and prevalence rates among Canadians aged 15 and older. The sample sizes of these surveys were approximately 27,500 to 30,000 participants, with response rates of ~77% (CCHS 1.2) and ~69% (CCHS-MH).

### Sample

Both mental health CCHS cycles and all annual CCHS cycles from 2000 to 2016 were studied, except for the annual 2011 and 2012 CCHS cycles which were excluded because of the small sample size that remained after the depression module inclusion criteria was applied (resulting in unreliable prevalence

estimates). Annual CCHS cycles from 2007 onward were analyzed in two-year periods (e.g., 2007 to 2008, 2009 to 2010, etc.).

In each survey cycle, CCHS participants were included if they were 18-64 years old, not full-time students, were asked information on their past week labour force status, and were asked about mental health indicators. Depression assessment was optional for annual CCHS cycles and was included at the discretion of provincial health regions. This reduced the sample size considerably across some cycles.

After the study criteria were applied, 331,046 participants were included (Table 1). Of these participants eligible to be in the sample, almost all (approximately 97%) in the CCHS 1.1, CCHS 1.2, and CCHS-MH cycles had information on depression status within the past year. Of the participants eligible to be in the sample for all other cycles, approximately 30% to 55% were in health regions that had opted to include depression status survey content.

### Labour force status

Three past-week labour force groups were explored in the study: employed, unemployed, and not participating in the labour force. Participants were asked about their working status in the last week and whether they did anything in the past four weeks to find work. Participants were considered employed if they had or were absent from a paid job in the past week (irrespective of whether they were looking for new employment). Participants were considered unemployed if they did not have a job in the past week, but had been looking for work in the past month. Participants were considered as not participating in the labour force if they were unable to work, or if they did not have a job in the past week and had not been looking for work in the past month (Table 2).

Across survey cycles, approximately 80% of participants were employed, 16% were not participating in the labour force, and

**Table 2**  
**Definitions and percentage of participants aged 18 to 64 years in each labour force group across Canadian Community Health Survey cycles**

Labour force group and category definition	Canadian Community Health Survey cycle									
	2000 and 2001 (1.1)	2002 (1.2)	2003 (2.1)	2005 (3.1)	2007 and 2008	2009 and 2010	2012 (CCHS-MH)	2013 and 2014	2015 and 2016 <sup>†</sup>	
	percent									
<b>Employed last week</b>										
Reported either working at a job or were absent from a job last week	78	78	81	79	80	79	80	79	80	
<b>Unemployed last week</b>										
Reported not working in the past week AND reported that they had been looking for work in the past four weeks	4	4	4	3	3	4	4	5	4	
<b>Not participating in labour force last week</b>										
Reported being permanently unable to work OR reported not working in the past week AND reported that they did not look for work in the past four weeks	18	17	15	17	16	16	16	17	16	

<sup>†</sup> Labour force questions used different nomenclature in the 2015 and 2016 Canadian Community Health Survey cycles because of a survey redesign.

**Notes:** Percentage estimates are weighted and rounded. CCHS-MH: Canadian Community Health Survey - Mental Health.

**Source:** Canadian Community Health Survey.

4% were unemployed in the week preceding the survey. The unemployment rate for Canadians older than age 15 ranged between 6.0% and 8.3% between 2000 and 2016.<sup>15</sup> Additional labour force participation information from the CCHS suggested that approximately 80% unemployed participants and approximately 15% of participants not participating in the labour force had worked for pay or profit at some point in the past year.

**Depression and anxiety indicators**

*Presence of a major depressive episode in the past 12 months*

This indicator was a composite of a high likelihood of experiencing a major depressive episode (MDE) using the following:

- the Composite International Diagnostic Interview Short Form (CIDI-SF), where a score of  $\geq 5/8$  assessed in annual CCHS cycles from 2000 to 2014 aligned to a high likelihood of experiencing a MDE in the past year;<sup>16</sup>
- the World Mental Health CIDI (WMH-CIDI), which was assessed in the CCHS 1.2 and CCHS-MH and aligned to the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition criteria for experiencing a MDE in the past year;
- the Patient Health Questionnaire-9 (PHQ-9), where a score of  $\geq 10/27$  assessed in the 2015 to 2016 CCHS cycles aligned to criteria for experiencing a MDE in the past two weeks.<sup>17</sup>

*Number of weeks experiencing depressive symptoms among those with a MDE in the past 12 months*

Participants who reported on the CIDI-SF that they had felt sad, blue or depressed—or had lost interest in things like hobbies, work, or activities—were asked for how many weeks these feelings had lasted. Participants could report between 2 and 53

weeks. This indicator was examined among participants who met MDE criteria and was modelled on the log scale given the skewness of the variable.

*Presence of a self-reported anxiety disorder diagnosed by a healthcare professional*

Beginning in the CCHS 2.1 cycle (2003), participants were asked about their health conditions that were diagnosed by a healthcare professional and that were expected to last for at least six months. Participants could respond “yes” or “no” to the question, “Do you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?”

*Comorbid MDE and diagnosed anxiety disorder*

For the CCHS 2.1 cycle and onward, MDE and anxiety variables were combined to explore the presence of both a MDE in the past year and the presence of a self-reported anxiety disorder diagnosis.

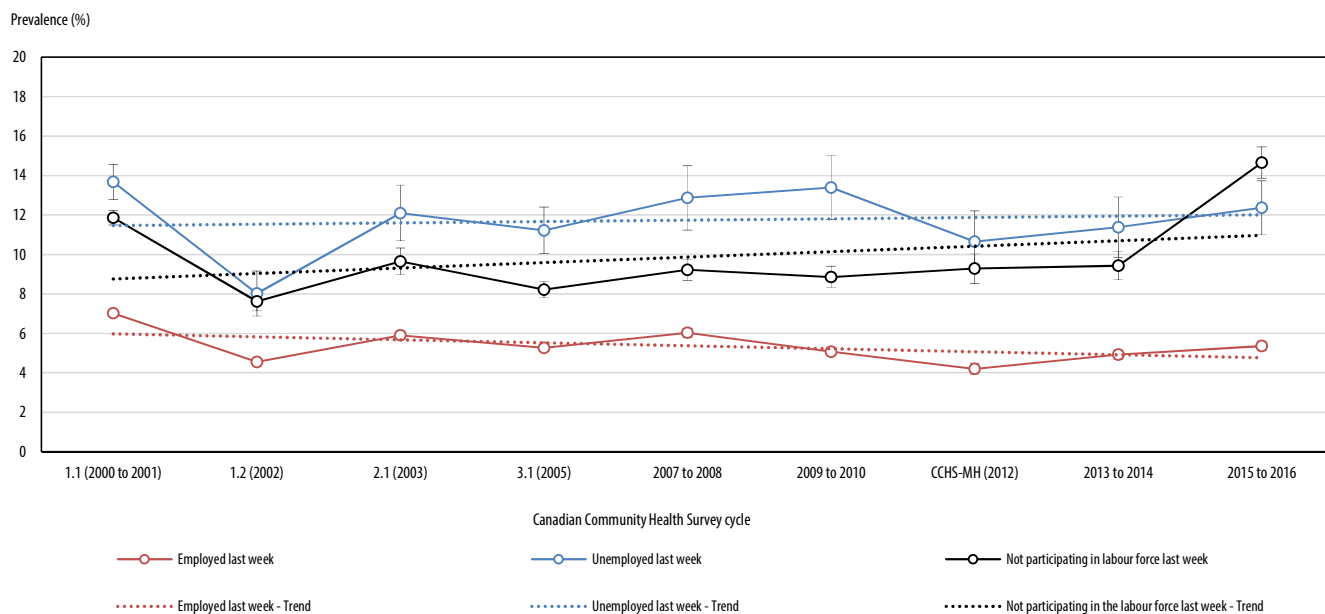
**Statistical analyses**

For each survey cycle, prevalence estimates for depression and anxiety indicators were calculated in SAS version 9.3 for each labour force group. To account for the surveys’ complex sampling structure, prevalence estimates and their variances incorporated survey weighting and 500 to 1,000 (2015 to 2016 cycle) bootstrap weights. A random effects meta-analysis (following the DerSimonian and Laird method)<sup>18</sup> stratified by labour force status was used to determine the pooled prevalence of each outcome in STATA v15. To quantify the rate of change in prevalence for each outcome, a linear random effects meta-regression approach was used, modelling

$$Prevalence_i = \alpha + \beta year_i + \mu_i + \varepsilon_i$$

Where  $\alpha$  represents the intercept,  $\beta$  represents the average change in prevalence per each increase in year,  $\mu_i$  represents the within-cycle error for each prevalence estimate, and  $\varepsilon_i$

**Figure 1**  
Trends in annual major depressive episode prevalence from 2000 to 2016



Note: CCHS-MH = Canadian Community Health Survey - Mental Health.  
Source: Canadian Community Health Survey.

represents the between-cycle error. Statistical significance for estimates was cross-referenced using 1,000 Monte Carlo trials.<sup>6</sup> Differences between pooled prevalence and trend coefficients between labour force groups were tested using chi-square and comparison of slope procedures.

**Sensitivity analyses**

Multiple sensitivity analyses were conducted, including: 1) age- and sex-standardizing estimates to the 2005 CCHS population, 2) excluding the 2015 to 2016 CCHS cycle to account for differences in survey redesign and depression measurement tools, 3) including dummy variables for survey instruments for MDE prevalence to account for differences in measurement tools, 4) exploring whether results differed for CCHS participants sampled from the area or telephone sampling frame, and 5) exploring whether trends followed a linear or other functional form.

Self-reported mood disorder (depression, bipolar, mania or dysthymia) diagnosed by a healthcare professional and its comorbidity with the MDE and anxiety indicators was also explored as a mental health indicator in sensitivity analyses. Lastly, MDE prevalence estimates were corrected by incorporating the measurement tool sensitivity and specificity with the following equation:<sup>19</sup>

$$Prevalence = \frac{(proportion\ with\ outcome + test\ specificity - 1)}{(test\ sensitivity + test\ specificity - 1)}$$

**Results**

Table 3 highlights the participant characteristics stratified by labour force status for the 2000 to 2001, 2007 to 2008, and 2015 to 2016 CCHS cycles. Briefly, approximately 55% of employed participants and 30% of participants not participating in the labour force were men. This was consistent across cycles. In the earliest CCHS cycle, approximately 52% of unemployed participants were men; this increased to 63% across cycles.

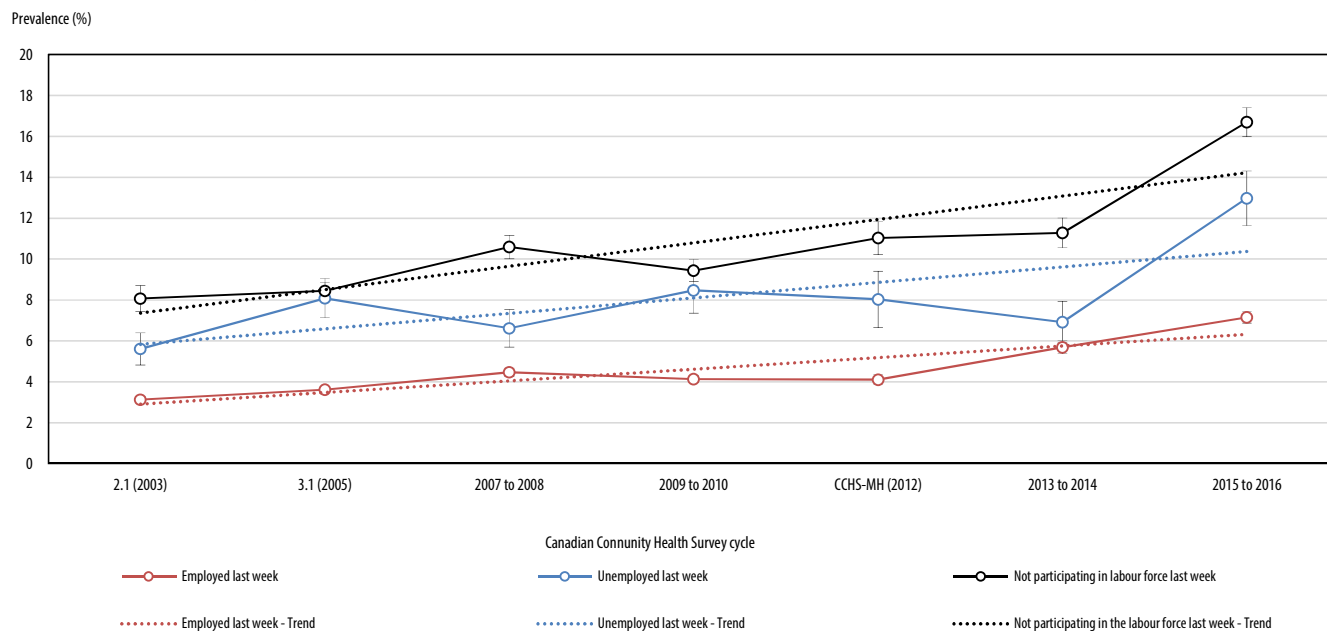
Most employed participants were between 30 and 49 years old. Most unemployed participants were between 20 and 39 years old, and most respondents not participating in the labour force were older than age 50. A distribution shift in age was seen over time; more recent cohorts had a greater proportion of older participants. Most participants in all groups were Caucasian and were born in Canada, although this distribution shifted slightly over time.

**Prevalence findings**

Average annual MDE prevalence was 5.4% (95% CI: 4.7% to 6.0%) among employed participants, 11.7% (95% CI: 10.4% to 13.0%) among unemployed participants and 9.8% (95% CI: 8.5% to 11.2%) among participants not participating in the labour force (Table 4).

Prevalence estimates were statistically lower among employed participants compared with unemployed participants ( $\chi^2 =$

**Figure 2**  
Trends in self-reported anxiety disorder prevalence from 2003 to 2016



**Note:** CCHS-MH = Canadian Community Health Survey - Mental Health.  
**Source:** Canadian Community Health Survey.

61.06,  $p < 0.001$ ) and participants not participating in the labour force ( $\chi^2 = 29.78$ ,  $p < 0.001$ ). No difference was seen between unemployed participants and participants not participating in the labour force ( $\chi^2 = 3.68$ ,  $p = 0.06$ ).

Lower point prevalence estimates were seen in 2002 and 2012 (cycles using the CIDI-WMH), but these were not statistically different than in other cycles. No statistically significant trend in depression prevalence between 2000 and 2016 was seen for any labour force group (Table 4, Figure 1).

Among participants who experienced a MDE in the past year, the average number of weeks experiencing depressive symptoms was approximately 7.6 weeks for employed participants (95% CI: 7.2% to 8.0%), 9.6 weeks for unemployed participants (95% CI: 8.8% to 10.4%) and 11.4 weeks among participants not in the labour force (95% CI: 10.3% to 12.6%). Chi-square tests suggested that prevalence estimates were only statistically different between employed participants and those not participating in the labour force ( $\chi^2 = 33.38$ ,  $p < 0.001$ ). The number of weeks that participants experienced depressive symptoms increased by approximately 0.6% to 1.9% per year and were not statistically significant.

The average annual prevalence of a self-reported anxiety disorder was 4.6% for employed participants (95% CI: 3.7% to 5.4%), 8.0% for unemployed participants (95% CI: 6.4% to 9.5%) and 10.8% for participants not participating in the labour force (95% CI: 8.8% to 12.7%). Each prevalence estimate was statistically different from the other. All groups saw a modest increase in prevalence over time, which was statistically

significant among employed participants ( $\beta$ : 0.26%; 95% CI: 0.08% to 0.45%) and among participants not participating in the labour force ( $\beta$ : 0.55%; 95% CI: 0.15% to 0.95%; Figure 2). No statistical difference was seen between trend estimates for employed participants and those not participating in the labour force ( $\chi^2$ : 2.76;  $p$ : 0.10). The trend estimate for unemployed participants ( $\beta$ : 0.34%) was not statistically significant, potentially because of the small sample size for this group.

The prevalence of reporting both an anxiety disorder and a MDE in the past year was 1.2% among employed participants, 3.0% among unemployed participants and 4.1% among participants not participating in the labour force. The prevalence estimate for employed participants was statistically lower than that of unemployed participants and those not participating in the labour force ( $\chi^2$ : ~32;  $p$ : <0.001). Prevalence estimates for unemployed participants and those not participating in the labour force did not differ ( $\chi^2$ : 3.56;  $p$ : 0.06). Results from the meta-regression suggested that comorbid prevalence remained stable among all labour force groups.

Most prevalence and regression coefficient estimates showed high heterogeneity, which suggests that factors other than time may be influencing trends. Results remained consistent when estimates were standardized by age and sex, when the 2015 to 2016 CCHS cycles were excluded, and when variables for the MDE instrument were included in regression analysis. Trends did not show evidence of following a different functional form with time. Prevalence estimates were slightly lower among participants sampled through the telephone sampling frame



**Table 3**  
Select demographic characteristics, by past week labour force status

	Canadian Community Health Survey cycle								
	1.1 CCHS (2000 and 2001)			2007 and 2008 CCHS			2015 and 2016 CCHS		
	Employed	Unemployed	Not participating in labour force	Employed	Unemployed	Not participating in labour force	Employed	Unemployed	Not participating in labour force
	percent								
<b>Sex</b>									
Female	45	48	70	47	40	66	47	37	68
Male	55	52	30	53	60	34	53	63	32
<b>Age (years)</b>									
Younger than 20	2	6	1	2	5	1	1	6	1
20 to 29	19	30	11	20	28	10	18	29	10
30 to 39	27	24	17	24	23	12	23	22	16
40 to 49	30	24	19	28	20	16	25	16	15
50 to 59	18	14	29	22	20	32	24	21	28
60 and older	3	2	23	5	4	29	8	6	29
<b>Provincial region</b>									
Maritimes	7	10	10	13	14	15	12	21	16
Quebec	24	30	27	57	68	64	N/A	N/A	N/A
Ontario	39	33	35	N/A	N/A	N/A	75	69	72
Prairies	17	12	14	29	18	21	13	9	11
British Columbia	13	14	13	N/A	N/A	N/A	N/A	N/A	N/A
Territories	<1	1	<1	<1	1	<1	<1	<1	<1
<b>Immigrant status</b>									
Non-immigrant	80	76	76	86	81	88	72	70	75
Immigrant <sup>†</sup>	20	24	24	14	19	12	28	30	25
<b>Self-reported race or ethnicity</b>									
White	86	78	84	88	81	89	72	64	73
Other ethnicities	13	19	14	10	15	8	24	29	20
Indigenous living off reserve	1	3	2	2	4	3	4	7	7
<b>Highest level of education</b>									
Less than high school	14	23	35	10	20	28	6	12	17
High school diploma	29	31	28	21	24	25	21	28	28
College diploma or equivalent	36	29	25	44	37	33	39	35	34
Bachelor's degree	21	17	12	24	19	14	33	25	21
<b>Experienced a MDE in the past year</b>									
Yes	7	14	12	6	13	9	5	12	15
<b>Self-reported anxiety disorder</b>									
Yes	N/A	N/A	N/A	4	7	11	7	13	17
<b>Self-reported anxiety disorder and MDE in the past year</b>									
Yes	N/A	N/A	N/A	1	2	4	2	4	7

<sup>†</sup> lower proportion of immigrant participants may have been seen in the 2007 to 2008 CCHS cycle because the MDE instrument was not included in the CCHS questionnaires administered in Ontario and British Columbia.

N/A indicates no available data.

Notes: Percentage estimates are weighted and rounded. CCHS: Canadian Community Health Survey. MDE: major depressive episode.

Source: Canadian Community Health Survey.

compared with those sampled through the area sampling frame. When mood disorder diagnosis was explored as an indicator, results were similar to those presented in this study (data available upon request).

When MDE test sensitivity and specificity were incorporated, MDE prevalence estimates were higher for all labour force groups, ranging from approximately 8% to 18% after adjustment.

## Discussion

This study suggests that between the early 2000s and 2016 MDE prevalence remained relatively stable while anxiety disorder prevalence increased modestly. These trends were consistent among all labour force groups. However, all depression and anxiety indicators suggest that prevalence was

lowest among employed participants and higher among unemployed participants or participants who were not participating in the labour force.

Directly comparing prevalence estimates seen in this study to those seen in other studies is hampered by significant methodological differences between surveys and samples and thus should be interpreted cautiously.<sup>20,21</sup> Nevertheless, literature from the United States has estimated that depression prevalence is between 5.5% and 10.5% for employed individuals,<sup>22,23</sup> between 15.9% and 20.3% for unemployed individuals,<sup>24</sup> and between 8.4% and 9.8% for individuals who are not participating in the labour force.<sup>24</sup> The European Study of the Epidemiology of Mental Disorders found similar 12-month mood disorder estimates for employed (3.4%) and unemployed (9.1%) individuals, but slightly higher estimates for anxiety disorders (6.2% to 9.3%).<sup>25</sup> This difference may be

**Table 4**  
**Pooled prevalence and trend results**

	Random effects meta-analysis							Random effects meta-regression				
	Number of cycles	Pooled estimate	95% confidence intervals		Q <sup>†</sup>	p-value <sup>‡</sup>	I <sup>2‡</sup> (percent)	Tau-squared	β (percent)	95% confidence intervals		p-value
			from	to						from	to	
<b>Presence of a MDE in the past 12 months</b>												
Employed	9	5.40	4.70	6.00	200.50	<0.001	96.00	0.0001	-0.09	-0.21	0.04	0.15
Unemployed	9	11.70	10.40	13.00	18.05	0.02	55.70	0.0002	0.02	-0.30	0.34	0.90
Not participating in the labour force	9	9.80	8.50	11.20	110.33	<0.001	92.70	0.0004	0.14	-0.20	0.48	0.38
<b>Number of weeks feeling depressive symptoms, among participants with a MDE<sup>†</sup></b>												
Employed	6	7.61	7.23	8.00	18.04	<0.01	72.30	0.0027	0.01	-0.01	0.02	0.22
Unemployed	6	9.58	8.83	10.41	0.99	0.96	0.00	0.0000	0.01	-0.02	0.03	0.56
Not participating in the labour force	6	11.39	10.33	12.57	19.12	<0.01	73.90	0.0106	<b>0.02</b>	<b>0.001</b>	<b>0.04</b>	<b>0.05</b>
<b>Self-reported anxiety disorder</b>												
Employed	7	4.60	3.70	5.40	190.44	<0.001	96.80	0.0001	<b>0.26</b>	<b>0.08</b>	<b>0.45</b>	<b>0.01</b>
Unemployed	7	8.00	6.40	9.50	25.20	<0.001	76.20	0.0003	0.34	-0.10	0.78	0.10
Not participating in the labour force	7	10.80	8.80	12.70	118.04	<0.001	94.90	0.0007	<b>0.55</b>	<b>0.15</b>	<b>0.95</b>	<b>0.02</b>
<b>Presence of a MDE in the past 12 months and self-reported anxiety disorder</b>												
Employed	7	1.20	1.00	1.40	41.53	<0.001	85.60	0.0000	0.05	-0.01	0.12	0.09
Unemployed	7	3.00	2.50	3.50	7.16	0.31	16.20	0.0000	0.06	-0.12	0.24	0.40
Not participating in the labour force	7	4.10	3.20	5.00	66.09	<0.001	90.90	0.0001	0.23	-0.05	0.50	0.09

<sup>†</sup> modelled on the log scale and transformed back into original units

<sup>‡</sup> heterogeneity statistics and test result.

**Notes:** MDE: major depressive episode, B = beta. Q refers to the chi-square statistic, I<sup>2</sup> indicates the amount of variability in the pooled prevalence estimate that is due to heterogeneity rather than chance; tau-squared is an estimate of between-survey cycle variance.

**Source:** Canadian Community Health Survey.

because of methodological differences between these surveys and the present study, and because of different economic conditions seen around the year 2000.<sup>26,27</sup> This may suggest that prevalence estimates from the present study are similar to European estimates, but may be lower than American estimates.

Although unsurprising given the healthy worker effect (i.e., that one must be in sufficient health to be able to work),<sup>28</sup> prevalence estimates for MDE, anxiety disorders, and co-occurring MDE and anxiety disorder diagnoses among unemployed participants and those not participating in the labour force were found to be roughly double those of employed participants. This effect size is consistent with that found in multiple American and European studies conducted in the 1990s,<sup>21,29</sup> and suggests that disparities in mental health among unemployed working-aged adults continue to persist. Nevertheless, both poor working conditions and employment loss impact the risk of depressive and anxiety disorders.<sup>30</sup>

The higher initial prevalence estimates among unemployed participants and those not participating in the labour force have known implications for individual socioeconomic mobility and for macro-level labour force functioning.<sup>11</sup> In Canada, individuals who are unemployed or of lower socioeconomic status use the healthcare system less frequently than those who are employed.<sup>31</sup> If they experience depression, individuals who are unemployed or of lower socioeconomic status are more likely to receive pharmacological treatment instead of psychological treatment.<sup>32</sup> These factors may negatively impact

recovery time and the prevention of subsequent episodes, which in turn may increase the length of time someone is unemployed or out of the labour force. Prolonged symptoms may impact working ability during employment, such as reduced productivity or receiving fewer promotions.<sup>33</sup>

Defined by the presence of depressive symptoms, MDE prevalence was found to be stable among all labour force groups between 2000 and 2016. Depression prevalence has been reported to be stable in general population cohorts.<sup>4,6,34</sup> It has been suggested that the changes in depression prevalence observed at the general population level may be caused by changes in the demographic distributions, the improved health literacy of nations, and the perception of poor general mental health.<sup>7,9</sup> In the present study, trends were similar when prevalence estimates were standardized by age and sex, which suggests that demographic shifts may be less influential among working-aged adults. However, prevalence trends in general populations may not be representative of workforce subgroups (e.g., occupation groups, precarious workers).

This study cannot determine whether changes in mental healthcare use, mental health literacy, stigma, or labour force conditions influenced prevalence trends similarly for each labour force group. However, it is likely that the influence of these factors may not be equitable. For example, unemployed individuals may perceive themselves to be in worse mental and overall health compared with employed individuals.<sup>35</sup>

Since reasons for not participating in the labour force differ across the life course (e.g., starting a family, stopping work because of a disability, retirement, etc.), comparison statements are difficult. Study participants who were not participating in the labour force were older than participants who were employed and unemployed. Although the prevalence of major depressive disorder and anxiety disorders is typically lower in older adults,<sup>36,37</sup> given that older individuals with mental illness are more likely to prematurely exit the labour force,<sup>38</sup> this may have influenced the prevalence in these groups. The heterogeneous role of these factors must be explored to further this area of mental health surveillance research.

During the period explored in this study, Canada experienced several changes in provincial and national policies related to mental health, work, and welfare; increased mental illness prevention efforts; and a global economic recession.<sup>39</sup> The effect of these events may counteract each other, resulting in stable trends. For example, increased awareness (e.g., through national health promotion initiatives) may result in increased prevalence,<sup>6,9</sup> while positive policy interventions could reduce time spent in a MDE, which may have decreased prevalence. Conversely, although these initiatives and events are important for individuals and workplaces, their impact may not yet be evident at the population level.

In this study, the reported MDE stability that included the economic recession period counters some previous literature that observed prevalence increases among working populations.<sup>40</sup> For example, Greece observed increases in one-month depression prevalence between 2008 (3.3% prevalence) and 2013 (12.3% prevalence).<sup>41</sup> The impacts of the 2008 recession on prevalence are likely smaller among the Canadian workforce compared with workforces in other countries that were more severely impacted.<sup>13</sup>

Assuming that there is a consistent change in prevalence among the two-year CCHS cycles beginning in 2007, anxiety disorder diagnosis prevalence increased at a rate of approximately 0.26% to 0.55% per year among all labour force groups. This prevalence may be increasing because of changes in help-seeking behaviours, and/or because of higher self-reporting of general poor mental health and burnout among the general population.<sup>4,7</sup>

Although this increasing trend is modest in size, it may have significant implications for labour force functioning. Increased severity of anxiety symptoms is associated with reduced work performance, increased time spent on disability leave, disruptions in career advancement, and early exit from the labour force.<sup>42,43</sup> Furthermore, anxiety disorders commonly co-occur with other mental and physical conditions that may lower productivity at work and increase the time a worker needs to regain their optimal health capital. Since the lifetime cost of generalized anxiety disorders in Canada has been conservatively estimated at \$31,213 (2008 CAD),<sup>44</sup> this trend may have significant cost implications and other implications

for employers, workplace mental health strategies, and employment benefit plans.

### Limitations

The MDE module was optional in the annual CCHS cycles and was administered at the discretion of provincial health regions. This resulted in a reduced sample size, reduced generalizability to the Canadian labour force population, and a limited ability to explore labour force subpopulations. Compared with the CCHS participants whose questionnaires included the MDE module (i.e., participants who were included in the sample), CCHS participants whose questionnaires did not contain the module generally had a similar demographic profile. However, there was a trend that participants who did not receive the MDE module may have had higher distress levels (as measured by the Kessler Psychological Distress Scale), and more participants may have self-reported mood or anxiety disorder diagnoses. This would suggest that any bias associated with the reduced sample size would lead to an underestimation in the findings.

The continuity of the annual CCHS cycles may have also introduced bias into the study. The annual CCHS underwent a sampling redesign and survey content change in 2015, which may have resulted in a different demographic profile compared with previous CCHS cycles. To account for this difference, the study used a random-effects meta-analytic design that models within-cycle error and between-cycle error. Generally, the proportion of participants in each labour force group and responses on mental health measures were similar to previous cycles.

The differences in MDE measurement tools may have also introduced measurement bias. The 2015 to 2016 CCHS cycle used a different MDE instrument (the PHQ-9) compared with previous annual cycles. A sensitivity analysis was conducted that excluded these CCHS cycles, and the results showed that estimates that were originally statistically significant remained so. Pooled prevalence estimates were similar, but slightly smaller when the 2015 to 2016 CCHS cycle was excluded. Although not statistically different from other estimates, the MDE prevalence estimates calculated by the WMH-CIDI in the 2002 and 2012 CCHS cycles were lower than those calculated with the CIDI-SF and PHQ-9.

Because anxiety disorders were self-reported, they may be underestimated, particularly in the earlier CCHS cycles when these disorders may have been slightly more stigmatized. Further, there may be bias associated with exploring a combined measure of depressive symptoms versus a self-reported anxiety disorder diagnosis. However, when an indicator of self-reported mood disorder diagnosis was explored, results showed similar magnitudes and trends.

Certain characteristics of the mental illnesses studied—combined with employment status—may have made participants less likely or willing to share their mental health

information or to participate in the CCHS at all. This may have caused prevalence underestimations in these groups.

Lastly, the participation rate in the CCHS has decreased over time. However, any bias associated with this decrease would be assumed to be non-differential across labour force groups and survey weights developed by Statistics Canada were used to try to minimize this bias.

### **Conclusions**

Between the early 2000s and 2016, the prevalence of an annual MDE was approximately 5.4%, the presence of an anxiety disorder was 4.6%, and presence of an anxiety disorder and a MDE was approximately 1.2% among working-aged employed Canadians. These estimates were higher among participants who were unemployed and those not participating in the labour force. MDE prevalence remained stable between 2000 and 2016, although there was a modest increase in self-reported medically diagnosed anxiety disorders. Findings also highlight existing limitations of national surveillance data to explore the mental health of labour force participants.

### **Implications**

The COVID-19 pandemic has caused changes in distress and in labour force displacement among the Canadian population.<sup>45-47</sup> This study found higher average MDE and anxiety disorder prevalence among unemployed Canadians and Canadians not

participating in the labour force, stable MDE prevalence trends over time among each labour force group, and an increase in anxiety disorder diagnosis prevalence across all labour force groups. In the context of COVID-19, the results of this study are critical to informing equitable mental health, workplace, and labour policies to retain and integrate Canadians with mental illnesses in the labour force during and after the pandemic. This study also highlights important gaps in existing data regarding the study of depression and anxiety among the Canadian labour force at the population level.

### **Conflict of interest**

None of the authors have any conflicts of interest to declare.

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