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*Original Research*

# Prevalence of Mental Disorders and Suicidality in Canadian Provinces

## Prévalence des Troubles Mentaux et de la Suicidabilité dans les Provinces Canadiennes

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## Abstract

**Objective:** There is limited information to guide health-care service providers and policy makers on the burden of mental disorders and addictions across the Canadian provinces. This study compares interprovincial prevalence of major depressive disorder (MDD), bipolar disorder, generalized anxiety disorder (GAD), alcohol use disorder, substance use disorders, and suicidality.

**Method:** Data were extracted from the 2012 Canadian Community Health Survey—Mental Health ($n = 25{,}113$), a representative sample of Canadians over the age of 15 years across all provinces. Cross tabulations and logistic regression were used to determine the prevalence and odds of the above disorders for each province. Adjustments for provincial sociodemographic factors were performed.

**Results:** The past-year prevalence of all measured mental disorders and suicidality, excluding GAD, demonstrated significant interprovincial differences. Manitoba exhibited the highest prevalence of any mental disorder (13.6%), reflecting high prevalence of MDD and alcohol use disorder compared to the other provinces (7.0% and 3.8%, respectively). Nova Scotia

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exhibited the highest prevalence of substance use disorders (2.9%). Quebec and Prince Edward Island exhibited the lowest prevalence of any mental disorder (8.5% and 7.7%, respectively). Manitoba also exhibited the highest prevalence of suicidal ideation (5.1%); however, British Columbia and Ontario exhibited the highest prevalence of suicidal planning (1.4% and 1.3%, respectively), and Ontario alone exhibited the highest prevalence of suicide attempts (0.7%).

**Conclusions:** Significant interprovincial differences were found in the past-year prevalence of mental disorders and suicidality in Canada. More research is necessary to explore these differences and how they impact the need for mental health services.

**Abrégé**

**Objectif :** L'information est limitée pour guider les prestataires de soins de santé et les décideurs à propos du fardeau des troubles mentaux et des toxicomanies dans les provinces canadiennes. Cette étude compare la prévalence interprovinciale du trouble dépressif majeur (TDM), du trouble bipolaire (TB) et du trouble d'anxiété généralisée (TAG), du trouble d'utilisation de l'alcool, des troubles d'utilisation de substances, et de la suicidabilité.

**Méthode :** Les données ont été extraites de l'Enquête sur la santé dans les collectivités canadiennes - Santé mentale de 2012 ($n = 25,113$), un échantillon représentatif des Canadiens de plus de 15 ans dans toutes les provinces. Des tableaux croisés et la régression logistique ont servi à déterminer la prévalence et les probabilités des troubles ci-dessus pour chaque province. Des ajustements ont été apportés pour les facteurs sociodémographiques provinciaux.

**Résultats :** La prévalence de l'année précédente mesurée pour tous les troubles mentaux et la suicidabilité, à l'exclusion du TAG, a démontré des différences interprovinciales significatives. Le Manitoba affichait la prévalence la plus élevée de tout trouble mental (13.6%), reflétant une prévalence élevée du TDM et du trouble d'utilisation de l'alcool comparativement aux autres provinces (7.0% et 3.8%, respectivement). La Nouvelle-Écosse avait la prévalence la plus élevée de troubles d'utilisation de substances (2.9%). Le Québec et l'Île-du-Prince-Édouard indiquaient la prévalence la plus faible de tout trouble mental (8.5% et 7.7%, respectivement). Le Manitoba présentait également la prévalence la plus élevée d'idéation suicidaire (5.1%); cependant, la Colombie-Britannique et l'Ontario avaient la prévalence la plus élevée de la planification d'un suicide (1.4% et 1.3%, respectivement) et l'Ontario à elle seule affichait la prévalence la plus élevée de tentatives de suicide (0.7%).

**Conclusions :** Des différences interprovinciales significatives ont été constatées dans la prévalence de l'année précédente des troubles mentaux et de la suicidabilité au Canada. Il faut plus de recherche pour explorer ces différences et la façon dont elles influent sur le besoin de services de santé mentale.

**Keywords**

mental health services, prevalence, epidemiology, affective disorders, substance use disorders, suicide, anxiety

## Introduction

Mental disorders, including substance use disorders, are common, affecting up to one in five Canadians each year.[1] Despite the association between mental disorders and significant morbidity,[2] a sizable proportion of those affected do not receive sufficient mental health services to meet their needs.[3,4] Alongside increasing recognition of this need,[5,6] the Canadian federal government affirmed an investment of 5 billion dollars into the mental health-care system over the next 10 years.[7] The equitable allocation of these funds has garnered considerable interest.[8] Although one approach would be to distribute funding across Canada based on population size alone, a more prudent approach might be to consider the relative need for mental health services and supports, beginning with an analysis of regional differences in burden of mental disorders.

There are few recent studies examining differences in the need for mental health care across Canada. The Centre for Applied Research in Mental Health and Addiction (CARMHA) published a report in 2017 comparing several mental health service performance indicators across five Canadian jurisdictions, using provincial health administrative data. Therein, Manitoba had a higher prevalence of suicide attempts among those with a mental or substance use disorder compared to the other provinces (though this did not appear to translate to a higher incidence of deaths by suicide).[9] Using administrative health services data, this report only captured those individuals who accessed measurable services. An important step to further delineate interprovincial need for mental health resources would be to examine interprovincial differences in the prevalence of mental disorders and suicidality using representative samples of the population drawn from all 10 Canadian provinces.

We chose to analyze data from the 2012 Canadian Community Mental Health Survey because it is one of two nationally representative mental health surveys ever conducted in Canada. The survey used state-of-the-art epidemiologic methods with a reliable and valid computer-assisted interview. The response rate was high and examined a breadth of common mental disorders. The objective of the current study was to establish and compare the past-year prevalence of mental disorders and suicidality between each Canadian province. Specific attention was paid to comparisons with Manitoba, in line with a provincial need to

systematically review addictions and mental health services. Due to the previously observed variation,[9] and to known differences in population sociodemographic variables across the provinces, we hypothesized that interprovincial differences in the past-year prevalence of these conditions would be observed. This article does not specifically examine Indigenous health, due to limitations within the methodology (individuals living in First Nations reserves were not included in the Canadian Community Health Survey—Mental Health [CCHS-MH]).

## Methods

### Data and Sample

Data were drawn from the 2012 CCHS-MH, a nationally representative survey of Canadians age 15 years and older living in each of the 10 provinces ($n = 25{,}113$).[10,11] Data were collected by Statistics Canada and excluded those living in the three Canadian territories, on First Nations reserves, in institutions, and full-time members of the Canadian Armed Forces. Collectively, these groups represent under 3% of the Canadian population, although the size of the nonsurveyed population varies across the provinces (e.g., on-reserve First Nations).[10] In-person, computer-assisted interviews were conducted by trained lay interviewers; the household response rate was 79.8%, and the individual response rate was 68.9%. Informed consent was obtained prior to each interview, and privacy and confidentiality were explained to each respondent.[10,11]

### Measurements

*Sociodemographic variables.* Sociodemographic variables included in this analysis were as follows: province of residence (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island (PEI), Nova Scotia, and Newfoundland), sex (male, female), age (15 to 34 years old, 35 to 49 years old, 50 to 64 years old, and 65 years old or greater), marital status (married/common law, separated/divorced/widowed, single/never married), household income (≤$29,999, $30,000 to $49,999, $50,000 to $79,999, $80,000 or greater), education (less than high school, high school, no postsecondary, some postsecondary, trade school or college, university degree), race (White, other), country of birth (Canada, other), and urban/rural living (urban, rural). The "other" variable within the race category includes individuals who identified as Aboriginal (North American Indian, Metis, or Inuit) as well as all other derived racial/ethnic groups other than "White only." A full definition can be found as a footnote to Table 1.

### Mental Disorders and Suicidality

Past-year prevalence of major depressive disorder (MDD), bipolar disorder, generalized anxiety disorder (GAD), alcohol use disorder, and substance use disorders other than alcohol was derived from the World Health Organization version of the Composite International Diagnostic Interview based on criteria from the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition.[12,13] A past-year "any mental disorder" variable was also computed that classified respondents who were diagnosed with one or more of MDD, bipolar disorder, GAD, alcohol use disorder, or substance use disorder into the "yes" category. Past-year suicidal ideation, plans, and attempts were assessed using three separate questions that asked whether the respondent had (1) thought about committing suicide or taking their own life (yes/no), (2) made a plan for committing suicide (yes/no), and (3) attempted suicide or tried to take their own life (yes/no).

### Statistical Analysis

Cross tabulations were used to compute the distribution of sociodemographic variables and calculate the frequency of past-year mental disorders and suicidality across all 10 provinces. Associations between province and past-year mental disorders and suicidality were calculated using logistic regressions, with additional comparisons between all provinces performed by using each province as the reference group. Logistic regressions were repeated between all provinces after adjusting for sociodemographic variables including: sex, age, income, marital status, race, education, Canadian born, and urban/rural living. Survey weights were applied. Bootstrapping was used as a variance estimation technique using bootstrap weights derived by Statistics Canada to account for the complex survey design.[10]

## Results

The distribution of sociodemographic variables found in the 2012 CCHS-MH for each Canadian province and the Canadian population as a whole is presented in Table 1. Table 2 presents the past-year prevalence of mental disorders and suicidality by province and in Canada overall. The national prevalence of any mental disorder was 9.59% (95% CI, 9.03 to 10.18). MDD was the most prevalent specific mental disorder, with a national prevalence of 4.72% (95% CI, 4.33 to 5.15). This was followed by GAD (2.57%; 95% CI, 2.30 to 2.87) and alcohol use disorder (2.22%; 95% CI, 1.94 to 2.55). Suicidality followed a pattern of progression with suicidal ideation demonstrating the highest national prevalence (3.34%; 95% CI, 3.02 to 3.71), followed by suicidal planning (1.14%; 95% CI, 0.92 to 1.41) and suicide attempt(s) (0.53%; 95% CI, 0.36 to 0.76).

The associations between province and past-year mental disorders and suicidality are presented, with unadjusted models in Table 3 and models adjusted for sociodemographic covariates in Table 4. Significant differences have been reported using $P \leq 0.05$, as well as $P \leq 0.01$ for the more conservative reader, given the extent of testing performed. For parsimony, and because results were not substantively different, only results from the adjusted models will be discussed in detail. Most mental disorders and

**Table 1.** Distribution of Sociodemographic Variables across Provinces in Canada.

| Sociodemographic Variables | Canada % (95% CI) | BC % (95% CI) | AB % (95% CI) | SK % (95% CI) | MB % (95% CI) | ON % (95% CI) | QC % (95% CI) | NB % (95% CI) | PEI % (95% CI) | NS % (95% CI) | NFLD % (95% CI) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sex | | | | | | | | | | | |
| Male | 49.28 (49.28 to 49.28) | 49.22 (49.22 to 49.22) | 50.87 (50.87 to 50.87) | 49.66 (49.66 to 49.66) | 49.38 (49.38 to 49.38) | 48.91 (48.91 to 48.91) | 49.45 (49.45 to 49.45) | 48.42 (48.42 to 48.42) | 48.66 (48.66 to 48.66) | 47.82 (47.82 to 47.82) | 48.73 (48.73 to 48.73) |
| Female | 50.72 (50.72 to 50.72) | 50.78 (50.78 to 50.78) | 49.13 (49.13 to 49.13) | 50.34 (50.34 to 50.34) | 50.62 (50.62 to 50.62) | 51.09 (51.09 to 51.09) | 50.55 (50.55 to 50.55) | 51.58 (51.58 to 51.58) | 51.34 (51.34 to 51.34) | 52.18 (52.18 to 52.18) | 51.27 (51.27 to 51.27) |
| Age | | | | | | | | | | | |
| 15 to 34 years | 31.65 (30.99 to 32.32) | 29.56 (28.04 to 31.12) | 35.43 (33.51 to 37.41) | 32.88 (31.00 to 34.82) | 33.73 (31.85 to 35.65) | 31.76 (30.61 to 32.94) | 31.50 (30.08 to 32.96) | 28.15 (26.39 to 29.98) | 30.31 (28.15 to 32.56) | 28.08 (26.51 to 29.71) | 27.56 (24.97 to 30.32) |
| 35 to 49 years | 25.44 (24.52 to 26.38) | 27.08 (25.12 to 29.12) | 26.24 (23.77 to 28.86) | 24.18 (21.50 to 27.07) | 25.11 (21.86 to 28.68) | 26.32 (24.68 to 28.02) | 23.25 (21.35 to 25.26) | 23.95 (21.20 to 26.93) | 23.46 (19.90 to 27.44) | 23.40 (20.95 to 26.05) | 25.76 (22.34 to 29.52) |
| 50 to 64 years | 25.69 (25.06 to 26.32) | 25.24 (23.73 to 26.81) | 25.16 (23.80 to 26.58) | 25.18 (23.29 to 27.17) | 23.92 (21.43 to 26.61) | 25.00 (23.87 to 26.18) | 26.87 (25.53 to 28.25) | 28.43 (26.45 to 30.50) | 27.32 (24.59 to 30.23) | 28.72 (26.93 to 30.57) | 27.92 (25.49 to 30.49) |
| 65+ years | 17.22 (17.22 to 17.22) | 18.13 (18.13 to 18.13) | 13.17 (13.17 to 13.17) | 17.76 (17.76 to 17.76) | 17.24 (17.24 to 17.24) | 16.91 (16.91 to 16.91) | 18.38 (18.38 to 18.38) | 19.47 (19.47 to 19.47) | 18.92 (18.92 to 18.92) | 19.80 (19.80 to 19.80) | 18.75 (18.75 to 18.75) |
| Marital status | | | | | | | | | | | |
| Married/common law | 60.09 (59.12 to 61.02) | 60.85 (58.49 to 63.17) | 60.50 (57.98 to 62.96) | 62.49 (59.57 to 65.32) | 63.26 (60.23 to 66.19) | 59.11 (57.48 to 60.73) | 59.29 (57.03 to 61.51) | 63.58 (61.03 to 66.06) | 62.37 (59.10 to 65.53) | 61.99 (59.36 to 64.55) | 67.08 (64.15 to 69.88) |
| Separated/divorced/widowed | 12.91 (12.29 to 13.57) | 13.38 (11.79 to 15.15) | 12.45 (10.69 to 14.45) | 11.56 (9.94 to 13.40) | 11.22 (9.57 to 13.11) | 13.01 (11.86 to 14.26) | 13.33 (12.00 to 14.78) | 11.73 (10.40 to 13.22) | 11.73 (9.88 to 13.88) | 12.98 (11.40 to 14.74) | 11.59 (9.90 to 13.52) |
| Single/never married | 27.00 (26.29 to 27.71) | 25.77 (24.02 to 27.60) | 27.06 (25.33 to 28.86) | 25.95 (23.85 to 28.17) | 25.52 (23.38 to 27.78) | 27.88 (26.61 to 29.18) | 27.38 (25.70 to 29.13) | 24.68 (22.68 to 26.80) | 25.90 (23.32 to 28.66) | 25.03 (23.19 to 26.97) | 21.33 (19.40 to 23.40) |
| Income | | | | | | | | | | | |
| ≤29,999 | 17.01 (16.23 to 17.81) | 18.57 (16.55 to 20.77) | 10.57 (8.96 to 12.44) | 17.90 (15.47 to 20.62) | 14.05 (12.12 to 16.23) | 15.34 (14.03 to 16.75) | 21.04 (19.03 to 23.20) | 21.28 (18.93 to 23.83) | 19.19 (15.93 to 22.94) | 20.82 (18.38 to 23.50) | 20.91 (18.03 to 24.11) |
| 30,000 to 49,999 | 18.15 (17.32 to 19.01) | 17.59 (15.61 to 19.75) | 14.14 (12.27 to 16.25) | 15.97 (13.92 to 18.25) | 19.88 (17.28 to 22.77) | 17.89 (16.46 to 19.41) | 19.91 (18.07 to 21.88) | 21.08 (18.94 to 23.39) | 22.89 (19.69 to 26.44) | 21.94 (19.66 to 24.40) | 18.98 (16.78 to 21.40) |
| 50,000 to 79,999 | 24.80 (23.82 to 25.80) | 23.68 (21.56 to 25.94) | 21.87 (19.50 to 24.44) | 21.52 (19.26 to 23.96) | 25.41 (22.23 to 28.87) | 25.78 (24.11 to 27.52) | 25.46 (23.25 to 27.80) | 26.76 (23.72 to 30.05) | 28.87 (25.22 to 32.82) | 25.51 (22.89 to 28.32) | 19.65 (16.91 to 22.71) |
| 80,000+ | 40.05 (38.84 to 41.27) | 40.16 (37.10 to 43.30) | 53.42 (50.16 to 56.64) | 44.62 (40.75 to 48.55) | 40.66 (36.67 to 44.77) | 40.99 (38.84 to 43.18) | 33.59 (30.93 to 36.37) | 30.88 (27.44 to 34.54) | 29.04 (24.72 to 33.79) | 31.73 (28.28 to 35.38) | 40.46 (35.95 to 45.14) |
| Education | | | | | | | | | | | |
| Less than high school | 18.05 (17.30 to 18.83) | 13.58 (12.08 to 15.25) | 17.10 (15.19 to 19.19) | 18.90 (16.52 to 21.53) | 18.84 (16.45 to 21.50) | 18.26 (16.89 to 19.71) | 19.87 (18.05 to 21.81) | 20.59 (18.20 to 23.22) | 18.92 (15.57 to 22.79) | 18.52 (16.55 to 20.67) | 22.84 (19.98 to 25.97) |
| High school, no postsecondary | 15.78 (15.05 to 16.55) | 16.15 (14.41 to 18.05) | 19.34 (17.21 to 21.65) | 23.17 (20.58 to 25.98) | 17.66 (15.19 to 20.43) | 16.22 (14.89 to 17.64) | 11.71 (10.36 to 13.20) | 21.05 (18.46 to 23.90) | 14.39 (11.92 to 17.26) | 15.65 (13.59 to 17.96) | 13.85 (11.17 to 17.05) |
| Some postsecondary | 7.12 (6.57 to 7.71) | 8.05 (6.75 to 9.58) | 4.72 (3.62 to 6.14) | 5.27 (3.74 to 7.39) | 8.07 (6.39 to 10.13) | 6.72 (5.83 to 7.74) | 9.15 (7.81 to 10.70) | 4.24 (3.14 to 5.70) | 6.92 (5.23 to 9.12) | 4.77 (3.72 to 6.11) | 4.78 (3.66 to 6.23) |
| Trade college | 36.39 (35.34 to 37.45) | 38.59 (36.05 to 41.20) | 39.92 (36.85 to 43.06) | 33.87 (31.01 to 36.85) | 33.96 (30.65 to 37.44) | 34.15 (32.26 to 36.10) | 36.69 (34.50 to 38.94) | 37.32 (34.30 to 40.44) | 43.23 (39.07 to 47.48) | 40.60 (37.74 to 43.53) | 43.77 (40.25 to 47.37) |
| University degree | 22.65 (21.68 to 23.66) | 23.62 (21.34 to 26.06) | 18.93 (16.42 to 21.72) | 18.79 (15.79 to 22.20) | 21.48 (18.43 to 24.87) | 24.65 (22.83 to 26.56) | 22.58 (20.41 to 24.92) | 16.80 (14.14 to 19.84) | 16.54 (13.12 to 20.65) | 20.45 (17.70 to 23.51) | 14.75 (12.04 to 17.95) |
| Race | | | | | | | | | | | |
| White | 76.90 (75.68 to 78.09) | 67.01 (63.10 to 70.69) | 73.96 (70.46 to 77.17) | 81.52 (78.26 to 84.39) | 71.77 (67.15 to 75.98) | 72.48 (70.07 to 74.76) | 87.20 (85.33 to 88.86) | 94.39 (92.28 to 95.95) | 95.61 (93.42 to 97.09) | 90.30 (87.98 to 92.22) | 88.49 (84.88 to 91.32) |
| Other[a] | 23.10 (21.91 to 24.32) | 32.99 (29.31 to 36.90) | 26.04 (22.83 to 29.54) | 18.48 (15.61 to 21.74) | 28.23 (24.02 to 32. 85) | 27.52 (25.24 to 29.93) | 12.80 (11.14 to 14.67) | 5.61 (4.05 to 7.72) | 4.39 (2.91 to 6.58) | 9.70 (7.78 to 12.02) | 11.51 (8.68 to 15.12) |
| Country of Birth | | | | | | | | | | | |
| Canada | 74.14 (72.81 to 75.43) | 65.04 (61.47 to 68.44) | 74.08 (70.77 to 77.13) | 89.48 (86.92 to 91.58) | 78.11 (74.59 to 81.27) | 67.24 (64.88 to 69.51) | 82.53 (79.72 to 85.03) | 93.91 (91.82 to 95.49) | 91.90 (89.07 to 94.05) | 92.33 (90.03 to 94.13) | 97.49 (96.25 to 98.32) |
| Other | 25.86 (24.57 to 27.19) | 34.96 (31.56 to 38.53) | 25.92 (22.87 to 29.23) | 10.52 (8.42 to 13.08) | 21.89 (18.73 to 25.41) | 32.76 (30.49 to 35.12) | 17.47 (14.97 to 20.28) | 6.09 (4.51 to 8.18) | 8.10 (5.95 to 10.93) | 7.67 (5.87 to 9.97) | 2.51 (1.68 to 3.75) |
| Urban/rural living | | | | | | | | | | | |
| Urban | 82.47 (80.93 to 83.91) | 90.35 (87.07 to 92.87) | 89.60 (85.83 to 92.45) | 77.69 (71.58 to 82.79) | 83.66 (78.20 to 87.97) | 84.93 (82.06 to 87.42) | 77.77 (73.93 to 81.20) | 62.35 (56.50 to 67.86) | 59.08 (50.08 to 67.51) | 57.62 (50.64 to 64.30) | 57.79 (50.22 to 65.01) |
| Rural | 17.53 (16.09 to 19.07) | 9.65 (7.13 to 12.93) | 10.40 (7.55 to 14.17) | 22.31 (17.21 to 28.42) | 16.34 (12.03 to 21.80) | 15.07 (12.58 to 17.94) | 22.23 (18.80 to 26.07) | 37.65 (32.14 to 43.50) | 40.92 (32.49 to 49.92) | 42.38 (35.70 to 49.36) | 42.21 (34.99 to 49.78) |

BC, British Columbia; AB, Alberta; SK, Saskatchewan; MB, Manitoba; ON, Ontario; QC, Quebec; NB, New Brunswick; PEI, Prince Edward Island; NS, Nova Scotia; NFLD, Newfoundland; CI, confidence interval.
[a]Those who identified as Aboriginal (including First Nations, Métis, and Inuit), South Asian only, Chinese only, Black only, Filipino only, Latin American only, Arab only, Southeast Asian only, West Asian only, Korean only, Japanese only, "other racial or cultural origin only," and "multiple racial or cultural origins" were coded as "Other" in terms of race.
*$P \leq 0.05$. **$P \leq 0.01$. ***$P \leq 0.001$.

**Table 2.** Distribution of Mental Disorders and Suicidal Ideation, Plans, and Attempts across Provinces in Canada, % (95% Confidence Interval).

| Mental disorders and suicidality | Canada | BC | AB | SK | MB | ON | QC | NB | PEI | NS | NFLD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Any mental disorder | 9.59 (9.03 to 10.18) | 10.08 (8.60 to 11.77) | 10.41 (8.86 to 12.20) | 10.51 (8.37 to 13.11) | 13.63 (11.26 to 16.40) | 9.17 (8.18 to 10.28) | 8.54 (7.50 to 9.72) | 10.91 (9.18 to 12.91) | 7.66 (5.60 to 10.40) | 12.51 (10.31 to 15.11) | 9.02 (6.98 to 11.58) |
| Major depressive disorder | 4.72 (4.33 to 5.15) | 4.62 (3.79 to 5.62) | 4.54 (3.62 to 5.69) | 3.74 (2.76 to 5.05) | 7.01 (5.06 to 9.63) | 4.85 (4.13 to 5.68) | 4.41 (3.70 to 5.25) | 4.57 (3.43 to 6.07) | 2.96 (2.05 to 4.26) | 5.60 (4.22 to 7.40) | 4.50 (3.05 to 6.59) |
| Bipolar disorder | 1.51 (1.29 to 1.76) | 1.42 (1.00 to 2.01) | 1.66 (1.04 to 2.63) | 1.32 (0.74 to 2.33) | 1.38 (0.93 to 2.05) | 1.76 (1.33 to 2.32) | 1.10 (0.75 to 1.61) | 1.47 (0.92 to 2.36) | 1.09 (0.54 to 2.18) | 1.48 (0.87 to 2.50) | 1.85 (0.85 to 3.97) |
| Generalized anxiety disorder | 2.57 (2.30 to 2.87) | 2.63 (2.01 to 3.43) | 2.48 (1.67 to 3.64) | 3.18 (1.98 to 5.08) | 3.51 (2.27 to 5.38) | 2.52 (2.06 to 3.08) | 2.25 (1.75 to 2.90) | 3.41 (2.414 to 4.79) | 2.33 (1.42 to 3.81) | 3.09 (2.14 to 4.79) | 3.70 (2.18 to 6.21) |
| Alcohol use disorder | 2.22 (1.94 to 2.55) | 2.59 (1.78 to 3.74) | 2.69 (1.88 to 3.83) | 2.59 (1.69 to 3.96) | 3.83 (2.64 to 5.52) | 1.87 (1.46 to 2.40) | 2.11 (1.59 to 2.80) | 2.46 (1.75 to 3.43) | 2.10 (1.27 to 3.44) | 2.29 (1.52 to 3.46) | 1.63 (0.92 to 2.89) |
| Substance use disorder | 1.78 (1.57 to 2.02) | 1.77 (1.33 to 2.37) | 1.82 (1.27 to 2.60) | 2.18 (1.27 to 3.71) | 2.34 (1.53 to 3.56) | 1.68 (1.32 to 2.13) | 1.71 (1.19 to 2.27) | 1.85 (1.23 to 2.78) | 0.95 (0.47 to 1.92) | 2.89 (2.05 to 4.07) | 1.27 (0.68 to 2.36) |
| Suicidal ideation | 3.34 (3.02 to 3.71) | 3.42 (2.69 to 4.33) | 2.99 (2.16 to 4.14) | 3.88 (2.76 to 5.44) | 5.12 (3.73 to 7.00) | 3.60 (2.96 to 4.38) | 2.74 (2.23 to 3.36) | 2.95 (2.17 to 3.99) | 2.22 (1.32 to 3.70) | 4.12 (3.01 to 5.61) | 2.34 (1.72 to 3.18) |
| Suicidal plans | 1.14 (0.92 to 1.41) | 1.38 (0.95 to 2.01) | 0.90 (0.54 to 1.49) | 0.64 (0.37 to 1.10) | 1.42 (0.76 to 2.62) | 1.28 (0.83 to 1.97) | 1.04 (0.75 to 1.44) | 0.63 (0.30 to 1.34) | 0.80 (0.44 to 1.44) | 0.73 (0.36 to 1.48) | 0.49 (0.23 to 1.03) |
| Suicide attempt(s) | 0.53 (0.36 to 0.76) | 0.53 (0.27 to 1.05) | 0.27 (0.13 to 0.55) | 0.57 (0.25 to 1.31) | 0.46 (0.22 to 0.97) | 0.69 (0.37 to 1.31) | 0.41 (0.21 to 0.79) | 0.34 (0.14 to 0.84) | 0.25 (0.09 to 0.69) | 0.43 (0.17 to 1.07) | 0.40 (0.15 to 1.09) |

BC, British Columbia; AB, Alberta; SK, Saskatchewan; MB, Manitoba; ON, Ontario; QC, Quebec; NB, New Brunswick; PEI, Prince Edward Island; NS, Nova Scotia; NFLD, Newfoundland; CI, confidence interval.

components of suicidality measured demonstrated significant provincial differences. Provincial differences were most notable for the any mental disorder category, as Ontario, Quebec, New Brunswick, PEI, and Newfoundland all demonstrated significantly lower past-year prevalence compared to Manitoba, which had the highest prevalence in the country (13.63%; 95% CI, 11.26 to 16.40). Quebec and PEI exhibited significantly lower rates of any mental disorder compared to British Columbia, Alberta, Manitoba, New Brunswick, and Nova Scotia.

With regard to specific mental disorders, past-year prevalence of MDD was roughly half as prevalent in PEI compared to British Columbia, Alberta, Manitoba, Ontario, Quebec, New Brunswick, and Nova Scotia. Quebec and Saskatchewan also demonstrated significantly lower MDD prevalence than Manitoba. Quebec exhibited significantly lower prevalence of past-year bipolar disorder than Ontario. Past-year prevalence of alcohol use disorder in Ontario, Quebec, New Brunswick, PEI, Nova Scotia, and Newfoundland were significantly lower than that of Manitoba. Nova Scotia exhibited significantly higher prevalence of substance use disorder than British Columbia, Alberta, Ontario, Quebec, PEI, and Newfoundland.

Interprovincial differences were also found for suicidality. British Columbia and Saskatchewan exhibited a 1.5 times higher past-year prevalence of suicidal ideation than Newfoundland; Nova Scotia exhibited significantly higher suicidal ideation prevalence than both PEI and Newfoundland; Ontario exhibited significantly higher prevalence than Quebec, PEI, and Newfoundland; and finally, Manitoba exhibited significantly higher prevalence than Alberta, Quebec, New Brunswick, PEI, and Newfoundland. British Columbia and Ontario both exhibited significantly higher prevalence of suicidal planning than Saskatchewan and Newfoundland. The only significant difference in suicide attempt(s) was Ontario, exhibiting a higher prevalence than PEI.

## Discussion

Our study adds to a growing body of evidence related to national mental health care planning in Canada by providing an interprovincial overview of the prevalence of selected mental disorders and suicide-related thoughts and behaviors. To our knowledge, this is the first study to use the 2012 CCHS-MH data to compare the prevalence of mental disorders and suicidality at a provincial level, an area of importance due to our provincially led model of health-care service delivery. Using these large and nationally representative survey data, we found that there were significant differences in the prevalence of mental disorders and suicidality between the provinces that are not accounted for by variations in age, sex, race, marital status, education, or urban–rural living.

Several groupings of provincial morbidity emerged in analysis of the results. British Columbia, Manitoba, Ontario,

**Table 3.** Associations between Province and Past-Year Mental Disorders and Suicidality in Canada (Unadjusted Models).[a]

| | Mental Disorders | | | | | | Suicidality | | |
|---|---|---|---|---|---|---|---|---|---|
| | Any Mental Disorder | Major Depressive Disorder | Bipolar Disorder | Generalized Anxiety Disorder | Alcohol Use Disorder | Substance Use Disorder | Suicidal Ideation | Suicidal Plans | Suicide Attempt(s) |
| Province | *OR* (95% CI) | *OR* (95% CI) | *OR* (95%CI) | *OR* (95% CI) | *OR* (95% CI) | *OR* (95% CI) | *OR* (95% CI) | *OR* (95% CI) | *OR* (95% CI) |
| BC | 0.71 (0.53 to 0.94)* | 0.64 (0.42 to 0.98)* | 1.03 (0.59 to 1.81) | 0.74 (0.43 to 1.28) | 0.67 (0.38 to 1.17) | 0.75 (0.45 to 1.26) | 0.66 (0.43 to 0.99)* | 0.97 (0.45 to 2.12) | 1.15 (0.39 to 3.38) |
| AB | 0.74 (0.55 to 0.98)* | 0.63 (0.41 to 0.98)* | 1.21 (0.65 to 2.24) | 0.70 (0.38 to 1.29) | 0.69 (0.40 to 1.20) | 0.77 (0.43 to 1.38) | 0.57 (0.35 to 0.93)* | 0.63 (0.27 to 1.48) | 0.57 (0.19 to 1.67) |
| SK | 0.74 (0.53 to 1.04) | 0.52 (0.32 to 0.83)** | 0.95 (0.45 to 2.00) | 0.90 (0.46 to 1.79) | 0.67 (0.36 to 1.23) | 0.93 (0.45 to 1.91) | 0.75 (0.45 to 1.24) | 0.45 (0.18 to 1.09) | 1.22 (0.36 to 4.20) |
| MB | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ON | 0.64 (0.49 to 0.83)*** | 0.68 (0.45 to 1.02) | 1.28 (0.77 to 2.12) | 0.71 (0.43 to 1.16) | 0.49 (0.30 to 0.76)** | 0.71 (0.43 to 1.18) | 0.69 (0.47 to 1.03) | 0.90 (0.41 to 1.97) | 1.50 (0.53 to 4.24) |
| QC | 0.59 (0.45 to 0.77)*** | 0.61 (0.40 to 0.94)* | 0.80 (0.46 to 1.39) | 0.63 (0.37 to 1.07) | 0.54 (0.34 to 0.88)* | 0.73 (0.43 to 1.24) | 0.52 (0.35 to 0.78)*** | 0.73 (0.36 to 1.50) | 0.89 (0.30 to 2.60) |
| NB | 0.78 (0.57 to 1.05) | 0.64 (0.39 to 1.03) | 1.07 (0.56 to 2.05) | 0.97 (0.54 to 1.74) | 0.63 (0.37 to 1.07) | 0.79 (0.42 to 1.49) | 0.56 (0.35 to 0.90)* | 0.44 (0.15 to 1.30) | 0.74 (0.20 to 2.69) |
| PEI | 0.53 (0.35 to 0.79)** | 0.40 (0.23 to 0.70)*** | 0.79 (0.34 to 1.82) | 0.66 (0.32 to 1.33) | 0.54 (0.28 to 1.03) | 0.40 (0.17 to 0.95)* | 0.42 (0.22 to 0.81)** | 0.56 (0.22 to 1.40) | 0.54 (0.13 to 2.28) |
| NS | 0.91 (0.66 to 1.24) | 0.79 (0.48 to 1.28) | 1.07 (0.56 to 2.05) | 0.88 (0.48 to 1.61) | 0.59 (0.34 to 1.03) | 1.24 (0.71 to 2.19) | 0.80 (0.50 to 1.26) | 0.51 (0.18 to 1.48) | 0.92 (0.21 to 3.93) |
| NFLD | 0.63 (0.44 to 0.90)* | 0.62 (0.36 to 1.09) | 1.34 (0.48 to 3.77) | 1.06 (0.50 to 2.24) | 0.42 (0.20 to 0.87)* | 0.54 (0.24 to 1.22) | 0.44 (0.28 to 0.71)*** | 0.34 (0.11 to 1.01) | 0.87 (0.19 to 3.92) |
| Significant differences between provinces at $P \leq 0.05$ | **MB** > BC, AB, ON, QC, PEI, NFLD **NB** > QC, PEI **NS** > ON, QC, PEI, NFLD | **MB** > BC, AB, SK, QC, PEI **AB** > PEI **BC** > PEI **ON** > PEI **NS** > PEI | No differences | No differences | **MB** > ON, QC, NFLD | **MB** > PEI **NS** > BC, ON, QC, PEI, NFLD | **MB** > BC, AB, QC, NB, PEI, NFLD **SK** > NFLD **ON** > NFLD **NS** > QC, PEI, NFLD | **BC** > SK, NFLD **ON** > NFLD | No differences |
| Significant differences between provinces at $P \leq 0.01$ | **MB** > ON, QC, PEI **NS** > ON QC, PEI | **MB** > SK, PEI **NS** > PEI | No differences | No differences | **MB** > ON | **NS** > PEI | **MB** > QC, PEI, NFLD | No differences | No differences |

BC, British Columbia; AB, Alberta; SK, Saskatchewan; MB, Manitoba; ON, Ontario; QC, Quebec; NB, New Brunswick; PEI, Prince Edward Island; NS, Nova Scotia; NFLD, Newfoundland; CI, confidence interval; OR, odds ratio.

[a]Differences across the provinces tested using logistic regression. Bold type signifies the significantly larger province.

*$P \leq 0.05$. **$P \leq 0.01$. ***$P \leq 0.001$.

**Table 4.** Association between Province and Past-Year Mental Disorders and Suicidality in Canada (Socioeconomic-Adjusted Models).[a]

| | Mental Disorders | | | | | | Suicidality | | |
|---|---|---|---|---|---|---|---|---|---|
| | Any Mental Disorder | Major Depressive Disorder | Bipolar Disorder | Generalized Anxiety Disorder | Alcohol Use Disorder | Substance Use Disorder | Suicidal Ideation | Suicidal Plans | Suicide Attempt(s) |
| Province | AOR (95% CI) | AOR (95% CI) | AOR (95% CI) | AOR (95% CI) | AOR (95% CI) | AOR (95% CI) | AOR (95% CI) | AOR (95% CI) | AOR (95% CI) |
| BC | 0.74 (0.55 to 1.01) | 0.67 (0.43 to 1.06) | 1.00 (0.56 to 1.76) | 0.79 (0.45 to 1.38) | 0.75 (0.41 to 1.38) | 0.78 (0.45 to 1.36) | 0.67 (0.44 to 1.02) | 0.90 (0.40 to 2.02) | 1.16 (0.38 to 3.58) |
| AB | 0.74 (0.55 to 1.01) | 0.68 (0.44 to 1.06) | 1.26 (0.66 to 2.40) | 0.82 (0.44 to 1.52) | 0.63 (0.35 to 1.11) | 0.71 (0.38 to 1.31) | 0.61 (0.37 to 0.99)* | 0.68 (0.29 to 1.60) | 0.65 (0.21 to 2.04) |
| SK | 0.71 (0.50 to 1.02) | 0.51 (0.31 to 0.85)** | 0.92 (0.45 to 1.90) | 0.97 (0.49 to 1.93) | 0.58 (0.31 to 1.08) | 0.88 (0.42 to 1.87) | 0.69 (0.41 to 1.16) | 0.41 (0.16 to 1.03) | 1.18 (0.32 to 4.39) |
| MB | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ON | 0.67 (0.51 to 0.89)*** | 0.73 (0.48 to 1.12) | 1.32 (0.77 to 2.26) | 0.81 (0.49 to 1.33) | 0.50 (0.30 to 0.82)** | 0.76 (0.44 to 1.33) | 0.71 (0.48 to 1.07) | 0.90 (0.41 to 1.99) | 1.56 (0.53 to 4.62) |
| QC | 0.55 (0.42 to 0.73)*** | 0.59 (0.38 to 0.93)* | 0.80 (0.44 to 1.45) | 0.61 (0.36 to 1.05) | 0.49 (0.29 to 0.96)** | 0.74 (0.41 to 1.35) | 0.49 (0.32 to 0.74)*** | 0.65 (0.30 to 1.39) | 0.91 (0.28 to 2.93) |
| NB | 0.72 (0.52 to 0.99)* | 0.61 (0.37 to 1.01) | 1.07 (0.54 to 2.12) | 0.88 (0.49 to 1.59) | 0.54 (0.31 to 0.96)* | 0.86 (0.42 to 1.75) | 0.52 (0.32 to 0.86)** | 0.42 (0.14 to 1.30) | 0.85 (0.21 to 3.40) |
| PEI | 0.47 (0.31 to 0.71)*** | 0.37 (0.21 to 0.67)*** | 0.80 (0.34 to 1.89) | 0.57 (0.27 to 1.20) | 0.47 (0.24 to 0.92)* | 0.43 (0.18 to 1.04) | 0.38 (0.19 to 0.74)** | 0.47 (0.18 to 1.24) | 0.36 (0.08 to 1.74) |
| NS | 0.86 (0.61 to 1.20) | 0.76 (0.45 to 1.27) | 1.07 (0.54 to 2.13) | 0.79 (0.42 to 1.46) | 0.53 (0.29 to 0.96)* | 1.45 (0.76 to 2.76) | 0.72 (0.44 to 1.18) | 0.48 (0.16 to 1.43) | 1.00 (0.23 to 4.34) |
| NFLD | 0.59 (0.41 to 0.85)** | 0.61 (0.35 to 1.08) | 1.36 (0.49 to 3.74) | 1.00 (0.47 to 2.13) | 0.36 (0.17 to 0.78)** | 0.57 (0.23 to 1.37) | 0.41 (0.25 to 0.68)*** | 0.33 (0.10 to 1.02) | 0.98 (0.20 to 4.81) |
| Significant differences between provinces at $P \leq 0.05$ | **MB** > ON, QC, NB, PEI, NFLD<br>**AB** > QC, PEI<br>**BC** > QC, PEI<br>**ON** > QC<br>**NB** > QC, PEI<br>**NS** > QC, PEI, NFLD | **MB** > SK, QC, PEI<br>**AB** > PEI<br>**BC** > PEI<br>**ON** > PEI<br>**QC** > PEI<br>**NB** > PEI<br>**NS** > PEI | **ON** > QC | No differences | **MB** > ON, QC, NB, PEI, NS, NFLD | **NS** > BC, AB, ON, QC, PEI, NFLD | **MB** > AB, QC, NB, PEI, NFLD<br>**SK** > NFLD<br>**BC** > NFLD<br>**ON** > QC, PEI, NFLD<br>**NS** > PEI, NFLD | **BC** > SK, NFLD<br>**ON** > SK, NFLD | **ON** > PEI |
| Significant differences between provinces at $P \leq 0.01$ | **MB** > ON, QC, PEI, NFLD<br>**NS** > PEI | **MB** > SK, PEI<br>**AB** > PEI<br>**BC** > PEI<br>**ON** > PEI<br>**NS** > PEI | No differences | No differences | **MB** > ON, QC, NFLD | **NS** > AB, ON, QC, PEI | **MB** > QC, NB, PEI, NFLD<br>**ON** > NFLD | No differences | No differences |

BC, British Columbia; AB, Alberta; SK, Saskatchewan; MB, Manitoba; ON, Ontario; QC, Quebec; NB, New Brunswick; PEI, Prince Edward Island; NS, Nova Scotia; NFLD, Newfoundland; AOR, adjusted odds ratio; CI, confidence interval.

[a]AOR for sex, age, income, race, education, marital status, Canadian born, and urban/rural living location. Differences across the provinces tested using logistic regression and adjusting for all covariates. Bold type signifies the significantly larger province.

*$P \leq 0.05$. **$P \leq 0.01$. ***$P \leq 0.001$.

and Nova Scotia appeared to demonstrate consistently higher morbidity across several categories. For Nova Scotia, the main driver appeared to be a high prevalence of substance use disorder. British Columbia and Ontario exhibited average-to-high prevalence of mental disorders but disproportionately high prevalence of suicidality. Manitoba exhibited high prevalence of both MDD and alcohol use disorder, as well as suicidal ideation; however, these findings did not translate to significantly higher prevalence of suicidal planning or attempts. Quebec and PEI demonstrated the lowest morbidity across numerous categories.

Differences in provincial prevalence were not attributable to sociodemographic variance included in our analysis. Examination of other possible contributing factors such as support systems, job losses, trends in financial mobility, or migration between provinces were beyond the scope of this study. Provinces may have differences in per capita mental health funding and/or invest their funds in different geographic or clinical areas such as addiction treatment centers, youth interventions, or crisis services. There may also be differences in the prevalence of risk factors for mental disorders such as violent crime or childhood traumatic events.[14] Perhaps suicide rates themselves should also be considered. In 2015, Statistics Canada indicated the highest rates to be in New Brunswick and Alberta (16.2 suicides per 100,000 population; age-standardized) and the lowest to be in PEI (4.8 suicides per 100,000 population; age-standardized).[15]

Our study did not support the finding of a higher prevalence of suicide attempts in Manitoba from last year's CARMHA report.[9] In our analysis of the CCHS data, Manitoba exhibited a prevalence of suicidal ideation that was significantly higher than Alberta, Quebec, New Brunswick, PEI, and Newfoundland; however, this difference was not carried through to suicidal planning or attempt(s). The prevalence of suicide attempts reported across the provinces in the CARMHA study is lower than that reported here. Differences in methodology between the CCHS and the CARMHA report may account for some of these differences. The CARMHA report analyzed prevalence of suicide attempts using hospital administrative data for patients presenting with a mental health or addiction issue, while the CCHS drew from in-person interviews with individuals with or without mental health or addictions issues. Around half of people presenting to emergency departments with suicide attempts are not hospitalized and therefore do not appear in the hospital administrative data; and there may be differences in recording these across provinces.[16] As a result, the CARMHA reports only a portion of total population suicide attempts and may have captured individuals with higher morbidity who may be less likely to participate in a Statistics Canada interview.

Our results must be considered in the context of several limitations. As previously indicated, the CCHS excluded specific subgroups, and though these groups represent less than 3% of the Canadian population, they are distributed unevenly across Canada and likely exhibit different prevalence of mental disorders and suicidality than the general population surveyed. The CCHS did not include individuals living in the three Canadian territories. The CCHS interviews were conducted by laypersons and assessed only for the presence of specific mental disorders; they are unlikely to be as accurate as clinical diagnostic interviews performed by trained mental health professionals. Last, though this is the most recent nationally representative survey data available, it is more than 7 years old at the time of this writing. Some provinces, such as Alberta, have already undergone extensive restructuring of their entire health system and/or experienced significant occurrences such as the oil and gas market crisis in the interim. That being said, these data are the most up-to-date available and provide at least some evidence on which to base our understanding of interprovincial differences in mental health morbidity. Capacity that would enable repeated and more timely analysis of mental health-related survey data in Canada is needed.

## Conclusions

This study provides an interprovincial overview of the prevalence of selected mental disorders and suicidality, showing significant differences across the Canadian provinces. Further research is necessary to better understand the factors underlying these observed interprovincial differences in prevalence. Comparisons of these results to more recent administrative data could also be meaningful. It is also important to acknowledge that successful targeting and implementation of mental health and addictions services is more complex than understanding the prevalence of mental disorders alone. There is also a need to evaluate other potential interprovincial differences such as the availability and utilization of existing services in order to help inform national funding decisions and local service provision.

### Authors' Note

Although the research and analyses are based on data from Statistics Canada, the opinions expressed do not represent the views of Statistics Canada or the Canadian Research Data Centre Network (CRDCN).

### Data Access

The data used in this study are available to researchers through application to the Canadian Research Data Centre Network.

### Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: SNV and JS receive royalties from UpToDate Inc. for authorship of materials related to Psychiatry. CA was on contract to the Mental Health Commission of Canada as the quantitative research lead. All other authors declare that there is no conflict of interest.

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