

# Prevalence of Co-occurring Substance Use and Other Mental Disorders in the Canadian Population

Brian Rush, PhD<sup>1</sup>; Karen Urbanoski, MSc<sup>2</sup>; Diego Bassani, PhD<sup>3</sup>; Saulo Castel, MD, PhD<sup>4</sup>;  
T Cameron Wild, PhD<sup>5</sup>; Carol Strike, PhD<sup>6</sup>; Dennis Kimberley, PhD<sup>7</sup>; Julian Somers, PhD<sup>8</sup>

**Objective:** Population health surveys around the world have studied the epidemiology of comorbid substance use disorders (SUDs) and other mental disorders as part of larger efforts to assess needs and direct integrated planning and delivery of services. This study presents the first national assessment in Canada of the prevalence of co-occurring SUDs and other mental disorders, with attention to differences by substance problem severity, sex, age, and region.

**Methods:** This work is a secondary analysis of data from the 2002 Canadian Community Health Survey: Mental Health and Well-Being. The sample was obtained using a multistage stratified cluster design ( $n = 36\,984$ , response rate = 77%).

**Results:** The 12-month population prevalence of co-occurring disorders was 1.7%. The 12-month prevalence of other mental disorders was higher among those with illicit drug, relative to alcohol, problems and among those with dependence, compared with those with less severe problems. Sex and age differences mirrored population differences in pure disorders. Salient regional differences included the higher rate of co-occurring disorders in British Columbia and the lower rates in Quebec.

**Conclusions:** Cross-study comparisons are hampered by methodological differences; however, these Canadian rates are at the lower end of the range reported internationally. This might have resulted from the exclusion of several disorders known to be highly comorbid with SUDs. Nonetheless, prevalence is high in certain subgroups, and efforts under way to improve Canada's substance abuse and mental health services should continue to ensure that adequate attention is directed to the needs of people with co-occurring disorders.

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### Clinical Implications

- Systems planning and policy development for mental health and addiction services and systems at the national, provincial, and territorial levels in Canada should reflect the substantial degree of overlap across mental disorders and SUDs.
- More specific systems planning and policy development for these concurrent disorders must ensure a population focus, addressing age, sex, and perhaps regional differences.
- The prevalence of SUDs and mental disorders is higher among those with both disorders, relative to those without. Clinicians should be vigilant for this comorbidity, especially among certain population subgroups.

### Limitations

- The exclusion of several mental disorders from the survey has most likely resulted in an underestimation of the true prevalence of co-occurring disorders in Canada.
- This underestimation may also be impacted by the exclusion of certain subpopulations of Canada known to be at high risk for co-occurring disorders, such as Aboriginal people living on Reserves.
- Prescription opiates were also not covered in the survey, which is relevant in light of evidence of increasing problems reported in parts of Canada.

**Key Words:** *epidemiology, co-occurring disorders, mental disorders, substance use disorders, Canada, population survey*

Calls for integrated treatment for co-occurring mental and SUDs<sup>1,2</sup> are supported by a large volume of clinical research, system-level assessments of service coordination, financing and administration,<sup>3</sup> and community epidemiologic studies. The Epidemiological Catchment Area study,<sup>4</sup> conducted in the early 1980s in the United States, was the first large survey to demonstrate high rates of co-occurring disorders in the community. Since then, numerous surveys have assessed the epidemiology of comorbidity internationally.<sup>5-17</sup>

Several common themes have emerged from this work. First, relative to those without SUDs, people with SUDs have elevated rates of co-occurring Axis I and II disorders, and vice versa.<sup>4</sup> Methodological differences preclude definitive comparisons across studies; however, a recent review estimates a 7% to 45% overlap between alcohol dependence and mood or anxiety disorders, increasing to 17% to 55% for drug dependence with mood or anxiety disorders.<sup>18</sup> Among people with SUDs, the prevalence of mood and anxiety disorders is generally higher among women, while the prevalence of SUDs among those with mood and anxiety disorders is higher among men.<sup>19</sup> These findings mirror population sex differences in these disorders.<sup>20,21</sup> Co-occurring disorders are also more common among young people.<sup>22</sup> Finally, rates of co-occurring mental disorders tend to be higher among people with drug use disorders, compared with those with alcohol use disorders,<sup>4,18</sup> and among those with dependence as opposed to abuse.<sup>18,23</sup>

Although regional Canadian studies contributed to the literature in the 1980s–1990s,<sup>8,9</sup> only recently have data become available on a pan-Canadian level. In our study, we present the first national assessment of the prevalence of co-occurring SUDs and other mental disorders, with attention to differences by sex, age, region, and substance problem severity.

## Methods

### Subjects

Participants were respondents to the 2002 CCHS 1.2, a cross-sectional population health survey conducted biennially by Statistics Canada. The target population included all noninstitutionalized adults aged 15 years and older living in the 10 Canadian provinces, excluding those on Crown lands (largely Aboriginal Peoples) and military bases. CCHS 1.2

focused on mental health and well-being, and was the first attempt to generate national estimates of the burden of mental illness in Canada. The sample ( $n = 36\,984$ ) was generated using a multistage stratified cluster design (response rate = 77%). Sampling and survey procedures are described in detail elsewhere.<sup>24</sup>

This secondary analysis of the CCHS 1.2 dataset was approved by the Research Ethics Board at the Centre for Addiction and Mental Health.

### Measures

Mental disorders were defined according to a modified version of the WMH-CIDI,<sup>25</sup> which uses categories of the Diagnostic and Statistical Manual of Mental Health Disorders.<sup>26</sup> Diagnostic algorithms were included to assess 12-month prevalence of major depressive episodes, manic episodes, panic disorder, social phobia, and agoraphobia.

Additional items assessed 12-month alcohol and illicit drug use, problems, and dependence. Several illicit drugs were covered, including cannabis, cocaine or crack, amphetamines, ecstasy, hallucinogens, glue or solvents, heroin, and steroids. For this study, respondents who endorsed 3 or more of the alcohol or illicit drug dependence symptoms were classified as exhibiting dependence. The survey did not assess substance abuse; instead, categories describing substance-related problems short of dependence were constructed for the present analysis. Past 12-month drinkers or illicit drug users who reported 1 or 2 dependence symptoms were classified as problem drinkers or problem users without dependence. Three additional items assessed psychosocial consequences of alcohol use. People who endorsed any of these items but did not meet the criteria for dependence were also classified as problem drinkers without dependence. A corresponding set of items for the psychosocial consequences of illicit drug use was not included in the survey. People who had used alcohol or illicit drugs in the past year but did not report any psychosocial consequences or dependence symptoms were classified as nonproblem drinkers or users. People who reported no use of alcohol or illicit drugs in the year prior to the survey were classified as abstainers.

In summary, two 4-level categorical variables were created to represent respondents' 12-month use and problems associated with alcohol and illicit drugs, respectively:

1. Abstainers
2. Nonproblem drinkers or illicit drug users
3. Problem drinkers or illicit drug users without dependence
4. Respondents with alcohol or illicit drug dependence

The final 2 categories are combined in some analyses to ensure reliability of estimates; these are referred to as alcohol

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### Abbreviations used in this article

CCHS 1.2	Canadian Community Health Survey: Mental Health and Well-Being
SUD	substance use disorder
WMH-CIDI	World Mental Health—Composite International Diagnostic Interview

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or illicit drug use problems. In other analyses, these 2 are combined to represent substance use problems.

### Analyses

Prevalence rates of co-occurring disorders are presented in 3 ways: for the total population, among those with substance use problems, and among those with other mental disorders. In accordance with Statistics Canada regulations, estimates identified as having high sampling variability are flagged. These estimates should be interpreted with caution, owing to potential reliability problems.

Multinomial regression was used to assess the strength of the association between co-occurring disorders and level of substance use and problems (reference category: abstinence).<sup>27</sup> Multinomial logistic regression is an extension of binary logistic regression to allow for nominal or ordinal variables. It uses the same estimation procedures (that is, maximum likelihood estimation) and carries the same assumptions of binary logistic regression; however, multiple functions are specified to cover all of the comparisons between the indicator levels of the nominal variable and the selected reference category. Multivariate multinomial regression was also used to calculate the odds of pure and comorbid disorders across regions (reference category: no disorder), controlling for socio-demographic variables associated with comorbidity in bivariate analyses. These included age, sex, marital status, immigrant status, income, employment, social support, and education. Effect coding was used to represent region in the equation, such that the reference category is the weighted national rate.<sup>28</sup>

All estimates were weighted to the Canadian population (an estimated population aged 15 years and older of 24 million). Variance estimates were adjusted for complex survey design by rescaling the population weights by the survey's global design effect (2.3). This method of adjusting variance estimates for sampling design produces conservative estimates of standard error similar to those produced by more sophisticated programs, and has been used in previous population survey analyses.<sup>29,30</sup> Analyses were conducted in Stata 8.0.<sup>31</sup>

### Results

Just under 10% of the Canadian population reported 12-month alcohol use problems, including 2.2% who met criteria for dependence. Three percent of Canadians reported illicit drug use problems, including 1.1% who met criteria for dependence. There were marked sex differences, with rates of alcohol or illicit drug dependence 2 to 3 times higher among men. In addition, 8.4% of Canadians met criteria for another 12-month mental disorder, including 5.2% for mood disorders and 4.7% for anxiety disorders. Rates were uniformly higher in women, with the exception of manic episodes for which an

equal proportion of men and women met criteria. (Table 1 contains estimates of the prevalence and standard errors of all individual disorders considered in the survey).

The 12-month population prevalence of co-occurring substance problems and mood or anxiety disorders was 1.4% for females, 2.1% for males, and 1.7% overall. Projecting to the Canadian population, this represents about 435 000 adults. Prevalence rates decreased with age: from 3.8% of those aged 15 to 24 years, to 2.6% of those aged 25 to 34 years, 2.0% of those aged 35 to 44 years, 1.1% of those aged 45 to 54 years, and 0.2% of those aged 55 years and older.

The 12-month prevalence of alcohol use problems among people with other mental disorders was about twice that of people with no other mental disorders, while the rate of illicit drug problems was 3 times higher (Table 2). For instance, 16.1% of people with a 12-month mental disorder reported a problem related to their alcohol use during this same period, compared with 8.9% of those without a mental disorder. This finding was similar for both men and women; however, again, among those with other mental disorders, men were more than twice as likely as women to report alcohol use problems (that is, 26.2%, compared with 10.0%), and 3 times more likely to report illicit drug use problems (that is, 15.8%, compared with 5.5%). The remainder of Table 2 presents estimates of comorbid substance problems separately by mood and anxiety disorders. The above patterns held across both types of mental disorders.

As with the population prevalence estimates, the prevalence of comorbid substance problems among people with mental disorders decreased with age, from 32.4% of those aged 15 to 24 years, to 26.4% of those aged 25 to 34 years, 20.8% of those aged 35 to 44 years, 13.2% of those aged 45 to 54 years, and 5.1% of those aged 55 years and older.

The 12-month prevalence of other mental disorders among those with substance problems was 2 to 3 times greater than among those without substance problems (Table 3). When illicit drugs are considered separately, the prevalence of co-occurring mental disorders was 3 to 4 times higher relative to those without drug problems. Across all disorders, women were more likely than men to have a co-occurring mental disorder. Most notably, one-third of women with illicit drug use problems met criteria for a mood or anxiety disorder.

The prevalence of comorbid mental disorders among people with substance problems varied from 15.6% of those aged 15 to 24 years or 25 to 34 years, to 15.4% of those aged 35 to 44 years, 15.7% of those aged 45 to 54 years, and 10.0% of those aged 55 years and older.

Table 4 presents the odds of other mental disorders by level of substance use and related problems in the past year,

**Table 1 Twelve-month population prevalence of substance use, problems, and dependence, and other mental disorders**

Substance use, problems, and dependence, and other mental disorders	Men % (SE)	Women % (SE)	Total % (SE)
<b>Substance use and problems</b>			
<b>Alcohol use</b>			
Abstinent	18.1 (0.006)	27.6 (0.007)	23.0 (0.005)
Drinkers without problems	67.5 (0.008)	67.7 (0.008)	67.6 (0.006)
Problem use	11.1 (0.005)	3.5 (0.003)	7.3 (0.003)
Dependence	3.3 (0.003)	1.2 (0.002)	2.2 (0.002)
<b>Illicit drug use</b>			
Abstinent	85.0 (0.006)	91.6 (0.005)	88.4 (0.004)
Users without problems	10.7 (0.005)	6.7 (0.004)	8.6 (0.003)
Problem use	2.8 (0.003)	1.1 (0.002)	1.9 (0.002)
Dependence	1.5 (0.002)	0.7 (0.001)	1.1 (0.001)
<b>Combined substance use<sup>a</sup></b>			
Abstinent	17.9 (0.006)	27.3 (0.007)	22.6 (0.005)
Users without problems	65.8 (0.008)	67.0 (0.008)	66.4 (0.006)
Problem use	12.1 (0.005)	4.1 (0.003)	8.0 (0.003)
Dependence	4.3 (0.003)	1.7 (0.002)	3.0 (0.002)
<b>Other mental disorders</b>			
Any mood or anxiety disorder	6.4 (0.004)	10.3 (0.005)	8.4 (0.003)
Any mood disorder	4.2 (0.003)	6.3 (0.004)	5.2 (0.003)
Major depressive episode	3.7 (0.003)	5.9 (0.004)	4.8 (0.003)
Manic episode	1.0 (0.002)	1.0 (0.002)	1.0 (0.001)
Any anxiety disorder	3.5 (0.003)	5.7 (0.004)	4.7 (0.002)
Agoraphobia	0.4 (0.001) <sup>b</sup>	1.1 (0.002)	0.7 (0.001)
Panic disorder	1.0 (0.002)	2.0 (0.002)	1.5 (0.001)
Social phobia	2.6 (0.003)	3.4 (0.003)	3.0 (0.002)

<sup>a</sup> Includes both alcohol and illicit drug use

<sup>b</sup> Coefficient of variation = 16.6% to 33.3%; high sampling variability; interpret with caution

calculated by multinomial logistic regression. Substance users without problems were no more likely to meet criteria for mood or anxiety disorders than abstainers. People with substance use problems had more than twice the odds of a co-occurring mental disorder. Those with substance dependence had between 5 to 6 times the odds of a co-occurring mental disorder.

The population prevalence of co-occurring alcohol use problems and other mental disorders varied by region, from a low of 1.0% in Quebec, to a high of 1.8% in Atlantic Canada. The population prevalence of co-occurring illicit drug use problems and other mental disorders varied from 0.6% in Quebec, to 1.2% in British Columbia. (Table 5 contains estimates of

the prevalence and standard errors of pure and co-occurring disorders by region).

Among those with other mental disorders, the prevalence of substance use problems was highest in Atlantic Canada (26%) and British Columbia (25%), and lowest in Quebec (15.3%), with Ontario and the Prairie provinces falling in the middle (21.4% and 21%, respectively). The same pattern held regardless of the specific nature of the substance problem (that is, alcohol or illicit drugs) or mental disorder (that is, mood or anxiety disorders).

Among those with substance use problems, regional differences in the prevalence of other mental disorders were less marked. The prevalence of mood and anxiety disorders among those with substance use problems was 16.0% in

**Table 2 Twelve-month prevalence of substance use problems among people with other mental disorders**

Co-occurring disorder	Men		Women		Total	
	Yes, % (SE)	No % (SE)	Yes, % (SE)	No, % (SE)	Yes, % (SE)	No, % (SE)
Respondents with any other mental disorder						
Substance use problems <sup>a</sup>	33.4 (0.031)	15.2 (0.006)	13.2 (0.017)	4.9 (0.004)	20.7 (0.017)	10.1 (0.004)
Alcohol use problems	26.2 (0.029)	13.6 (0.006)	10.0 (0.016)	4.1 (0.003)	16.1 (0.015)	8.9 (0.004)
Drug use problems	15.8 (0.024)	3.5 (0.003)	5.5 (0.012)	1.3 (0.002)	9.4 (0.012)	2.4 (0.002)
Respondents with mood disorder <sup>b</sup>						
Substance use problems <sup>a</sup>	34.3 (0.039)	15.6 (0.006)	14.2 (0.023)	5.2 (0.004)	22.0 (0.021)	10.4 (0.004)
Alcohol use problems	27.6 (0.037)	13.9 (0.006)	10.8 (0.021)	4.3 (0.003)	17.4 (0.020)	9.0 (0.003)
Drug use problems	15.8 (0.030)	3.8 (0.003)	6.4 (0.016) <sup>c</sup>	1.4 (0.002)	10.0 (0.016)	2.6 (0.002)
Respondents with anxiety disorder <sup>d</sup>						
Substance use problems <sup>a</sup>	33.3 (0.042)	15.8 (0.006)	14.0 (0.024)	5.2 (0.004)	21.2 (0.022)	10.5 (0.004)
Alcohol use problems	26.0 (0.040)	14.0 (0.006)	10.2 (0.021)	4.4 (0.003)	16.1 (0.020)	9.1 (0.003)
Drug use problems	15.1 (0.032)	3.9 (0.003)	5.9 (0.016) <sup>c</sup>	1.5 (0.002)	9.3 (0.016)	2.7 (0.002)

<sup>a</sup> Includes both alcohol and illicit drugs  
<sup>b</sup> Includes major depressive and manic episodes  
<sup>c</sup> Coefficient of variation = 16.6% to 33.3%; high sampling variability; interpret with caution  
<sup>d</sup> Includes agoraphobia, panic disorder, and social phobia

Atlantic Canada, 17.2% in British Columbia, and 18.0% in Ontario, with lower levels in Quebec (13.5%) and the Prairies (13.4%).

The significantly elevated rate of co-occurring disorders in British Columbia was confirmed by multivariate multinomial regression (Table 6). Relative to national estimates, British Columbia had significantly elevated odds of pure mental disorders, pure alcohol use problems, and co-occurring disorders. There were also lower odds of both pure and co-occurring alcohol use problems in Quebec. The odds of both pure and co-occurring illicit drug use problems and other mental disorders were similarly higher in British Columbia, relative to national estimates. The odds of co-occurring illicit drug use problems and other mental disorders were lowest in Quebec, although not significantly different from the national rate. This was despite the higher odds of pure illicit drug use problems in that province. Ontario had elevated odds of pure mental disorders, accompanied by lower odds of pure illicit drug use problems.

## Discussion

The objectives of our study were to derive comprehensive national and regional prevalence estimates of comorbidity, and to replicate key findings from other countries in a pan-Canadian context. Overall, 1.7% of Canadian residents,

or about 435 000 people, experienced co-occurring mood or anxiety disorders and substance use problems during the year prior to the survey. Given the exclusion of several mental disorders known to be highly comorbid with SUDs, in particular personality disorders<sup>5</sup> and posttraumatic stress disorder,<sup>32</sup> this prevalence rate is undoubtedly underestimated. Based on available data demonstrating increased health care needs associated with co-occurring disorders,<sup>33,34</sup> co-occurring disorders may present a significant public health concern.

The present findings replicate previous research showing that the rate of other mental disorders is higher among those with substance use problems than without; and, similarly, that the rate of substance use problems is higher among those with other mental disorders than among those without. People with one disorder were 2 to 3 times more likely to meet the criteria for the other, relative to those without the disorder. Reliable cross-study comparisons are hampered by methodological differences; however, these rates are at the lower end of the range of reported estimates.<sup>18</sup> This might have also resulted from the exclusion of several mental disorders from the survey, noted earlier.

The sex differences reported here support those previously found in similar surveys conducted elsewhere<sup>19</sup>; and, on the whole, reflect differences observed for pure disorders. This, and other work showing that women differ from men in terms

**Table 3 Twelve-month prevalence of co-occurrence of other mental disorders among people with substance use problems**

Co-occurring disorder	Men		Women		Total	
	Yes, % (SE)	No, % (SE)	Yes, % (SE)	No, % (SE)	Yes, % (SE)	No, % (SE)
Respondents with substance use problems <sup>a</sup>						
Any other mental disorder	13.0 (0.014)	5.1 (0.004)	23.6 (0.029)	9.5 (0.005)	15.9 (0.013)	7.5 (0.003)
Mood disorder <sup>b</sup>	8.7 (0.012)	3.3 (0.003)	15.5 (0.025)	5.7 (0.004)	10.5 (0.011)	4.6 (0.003)
Anxiety disorder <sup>c</sup>	7.2 (0.011)	2.8 (0.003)	13.9 (0.024)	5.2 (0.004)	9.0 (0.010)	4.1 (0.002)
Respondents with alcohol use problems						
Any other mental disorder	11.6 (0.014)	5.5 (0.004)	22.0 (0.032)	9.7 (0.005)	14.3 (0.013)	7.8 (0.003)
Mood disorder <sup>b</sup>	8.0 (0.012)	3.5 (0.003)	14.4 (0.027)	5.9 (0.004)	9.6 (0.011)	4.8 (0.003)
Anxiety disorder <sup>c</sup>	6.4 (0.011)	3.1 (0.003)	12.4 (0.025)	5.4 (0.004)	7.9 (0.010)	4.3 (0.003)
Respondents with illicit drug use problems						
Any other mental disorder	23.6 (0.035)	5.6 (0.004)	33.0 (0.060)	9.9 (0.005)	26.3 (0.030)	7.8 (0.003)
Mood disorder <sup>b</sup>	15.3 (0.029)	3.7 (0.003)	23.1 (0.054)	6.0 (0.004)	17.6 (0.026)	4.9 (0.003)
Anxiety disorder <sup>c</sup>	12.5 (0.027)	3.1 (0.003)	19.4 (0.050) <sup>d</sup>	5.5 (0.004)	14.5 (0.024)	4.3 (0.002)
<sup>a</sup> Includes both alcohol and illicit drugs						
<sup>b</sup> Includes major depressive episode disorder and mania						
<sup>c</sup> Includes agoraphobia, panic disorder, and social phobia						
<sup>d</sup> Coefficient of variation = 16.6% to 33.3%; high sampling variability; interpret with caution						

of prevalence, course, and treatment outcome,<sup>35</sup> reinforces the notion that clinical and policy work in this area require a gendered perspective. Co-occurring disorders are more common among young people but, importantly, trends are again dominated by the age differences across pure disorders. For instance, other work has demonstrated increased rates of SUDs for young people with mental disorders, and fewer differences across age groups in the rates of mental disorder among people with SUDs.<sup>36,37</sup> These findings also reinforce the need to clearly specify the manner in which rates of comorbidity are calculated.

Our results also replicate other research demonstrating higher rates of co-occurring mental disorders for illicit drugs, compared with alcohol,<sup>4,7,18,23</sup> with increasing odds across the spectrum of use, problems, and dependence.<sup>23</sup> These findings should be taken into account in the development of public health messages targeting prevention of co-occurring disorders, as well as treatment system development. Evidence-based treatments, such as cognitive-behavioural therapy, that are effective for anxiety, mood, and substance use disorders may have particular merit.<sup>38</sup> Services targeted specifically at drug treatment and (or) more severe cases of dependence should be particularly proactive in screening for co-occurring mental disorders and the provision of integrated assessment

and treatment options. Importantly, other work with this sample has suggested that people with co-occurring disorders are more likely to seek services than those with pure substance dependence, and to a lesser extent, pure mood or anxiety disorders.<sup>39</sup>

Our study provides preliminary estimates of regional differences that warrant further exploration. In particular, the apparent trend for lower rates of co-occurring disorders in Quebec leaves open the question of potential protective or moderating factors in this province, particularly in light of the substantially higher rate of pure illicit substance use problems. The higher rate of co-occurring disorders in British Columbia is also cause for some concern and worthy of further investigation. It is notable that these regional patterns were independent of interregional differences in socio-demographic characteristics associated with comorbidity. There are many potential explanations for such regional differences, including interprovincial or other local differences in health status and mortality, lifestyle, health care, social and legal policies, income inequality, or migration patterns. These factors are important areas for further study.

As important as the epidemiologic data are for drawing attention to the overlap between mental disorders and SUD in the general population, it should also be recognized that most

**Table 4 Odds of other co-occurring mental disorders by substance use and related problems<sup>a</sup>**

Co-occurring disorder	Nonproblem substance use		Substance problems		Substance dependence	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Any mood or anxiety disorder	8.4	1.02 (0.84–1.25)	15.9	2.34 (1.89–2.89) <sup>b</sup>	30.8	5.29 (3.90–7.17) <sup>b</sup>
Mood disorder <sup>c</sup>	5.3	1.07 (0.83–1.37)	10.5	2.45 (1.89–3.16) <sup>b</sup>	22.2	5.74 (4.07–8.08) <sup>b</sup>
Anxiety disorder <sup>d</sup>	4.6	0.96 (0.74–1.24)	9.0	2.30 (1.75–3.03) <sup>b</sup>	17.6	4.76 (3.28–6.91) <sup>b</sup>

<sup>a</sup> Includes both alcohol and illicit drugs  
<sup>b</sup> Significant findings ( $P < 0.05$ )  
<sup>c</sup> Includes major depression and mania  
<sup>d</sup> Includes agoraphobia, panic disorder, and social phobia

**Table 5 Twelve-month prevalence of pure and co-occurring substance use problems and other mental disorders by region<sup>a</sup>**

Region	Pure disorders <sup>b</sup>				Co-occurring disorders	
	No disorders	Other mental disorders	Illicit drug use problems	Alcohol use problems	Other mental disorders and illicit drug use problems	Other mental disorders and alcohol use problems
	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)
Canada	82.3 (0.005)	6.7 (0.003)	2.2 (0.002)	8.1 (0.003)	0.8 (0.001)	1.3 (0.001)
Atlantic Canada	81.3 (0.017)	5.8 (0.010)	1.9 <sup>c</sup> (0.006)	9.7 (0.013)	0.9 <sup>c</sup> (0.004)	1.8 <sup>c</sup> (0.006)
Quebec	83.9 (0.009)	6.8 (0.006)	2.7 (0.004)	6.4 (0.006)	0.6 <sup>c</sup> (0.002)	1.0 <sup>c</sup> (0.002)
Ontario	83.1 (0.007)	6.7 (0.005)	1.7 (0.002)	7.4 (0.005)	0.7 (0.002)	1.4 (0.002)
Prairies	79.9 (0.012)	6.7 (0.007)	2.6 (0.005)	10.4 (0.009)	0.8 <sup>c</sup> (0.003)	1.5 (0.004)
British Columbia	80.5 (0.013)	6.7 (0.008)	2.3 (0.005)	9.2 (0.009)	1.2 <sup>c</sup> (0.004)	1.6 <sup>c</sup> (0.004)

<sup>a</sup> Percentages do not sum to 100% across rows because of overlap between alcohol and illicit drug use problems.  
<sup>b</sup> Allows for overlap between alcohol and illicit drug use disorders  
<sup>c</sup> Coefficient of variation = 16.6% to 33.3%; high sampling variability; interpret with caution

people with substance use problems do not have co-occurring mood or anxiety disorders, and vice versa. The significant, but not overwhelming, degree of overlap cautions us to maintain a focus, as appropriate, on the large majority of people presenting with pure disorders. That said, it is also important to note that the rates of overlap in some subgroups are indeed substantial; for example, close to one-third of women with illicit drug use problems met criteria for a co-occurring mood or anxiety disorder. Further, these rates of co-occurring disorders in the general population are much lower than what has been observed in clinical populations.<sup>40–42</sup>

Both population and clinical perspectives need to be brought to bear in establishing the relative priority for policies and programs for people with co-occurring disorders. Our analyses

set the stage for more in-depth Canadian interdisciplinary work on this topic. Recently launched efforts to improve Canada's substance abuse treatment services<sup>43</sup> and the new Mental Health Commission<sup>44</sup> should serve to direct needed attention to the issue of co-occurring disorders. Efforts to integrate primary health care and specialty mental health and substance abuse services should also account for this subpopulation, as help seeking is by no means restricted to the specialist sector.<sup>39,45</sup> The appropriate treatment response for co-occurring disorders depends on the person and the severity of the disorders.<sup>46</sup>

In addition to the exclusion of several mental disorders, noted above, other limitations of the present research should be highlighted. The CCHS 1.2 used a modified version of the

**Table 6 Adjusted odds of pure and co-occurring alcohol and illicit drug use problems and other mental disorders by region<sup>a</sup>**

Problems by region	Pure disorders		Co-occurring disorders
	Other mental disorders OR (99% CI)	Substance use problems OR (99% CI)	OR (99% CI)
<b>Alcohol use problems</b>			
Atlantic Canada	0.85 (0.58–1.23)	1.06 (0.85–1.32)	1.18 (0.65–2.15)
Quebec	0.98 (0.88–1.08)	0.69 (0.64–0.75) <sup>b</sup>	0.64 (0.55–0.75) <sup>b</sup>
Ontario	1.07 (0.97–1.19)	0.94 (0.86–1.04)	1.07 (0.91–1.27)
Prairies	1.00 (0.81–1.24)	1.18 (0.90–1.54)	0.99 (0.76–1.29)
British Columbia	1.13 (1.02–1.25) <sup>b</sup>	1.23 (1.12–1.34) <sup>b</sup>	1.24 (1.05–1.46) <sup>b</sup>
<b>Illicit drug use problems</b>			
Atlantic Canada	0.88 (0.67–1.16)	0.77 (0.59–1.01)	0.98 (0.30–3.27)
Quebec	0.98 (0.91–1.06)	1.24 (1.01–1.53) <sup>b</sup>	0.73 (0.53–1.03)
Ontario	1.08 (1.00–1.16) <sup>b</sup>	0.81 (0.68–0.98) <sup>b</sup>	0.97 (0.69–1.37)
Prairies	0.99 (0.86–1.15)	1.07 (0.49–2.35)	0.88 (0.42–1.84)
British Columbia	1.08 (1.00–1.16) <sup>b</sup>	1.21 (1.00–1.46) <sup>b</sup>	1.61 (1.15–2.26) <sup>b</sup>

<sup>a</sup> Adjusted for age, sex, marital and immigrant status, income, employment, social support, and education. The reference category in the multinomial model was no disorder; the reference category within the regional variable was the weighted national rate.

<sup>b</sup> Significant findings ( $P < 0.05$ )

WMH-CIDI, resulting in data that are not compromised by problems related to skip patterns in the assessment of substance dependence in the original version.<sup>47,48</sup> However, the present version may suffer from as-yet-unknown biases. The survey did not assess dependence separately for each category of illicit drug that the respondent reported using, and it did not allow for an assessment of substance abuse. It also did not cover prescription drug use problems or dependence, a relevant limitation in light of evidence of increasing problems reported in parts of Canada.<sup>49,50</sup> Finally, the exclusion of Aboriginal people living on Reserves is noteworthy as this population is known to experience high levels of co-occurring substance use and other mental disorders.<sup>51,52</sup> This issue warrants more in-depth assessment in the Canadian context. The exclusion of homeless people and those in institutions from the sampling frame is also likely to lower the estimates of co-occurring disorders for similar reasons. However, it should be noted that the impact of small subgroups of the population are unlikely to have a substantive impact on results based on a general population sample of this magnitude.

## Conclusions

Despite these limitations, our study is the first to comprehensively describe the prevalence and distribution of substance use problems and other co-occurring mental disorders in the Canadian population. Our findings contribute to a growing international literature on comorbid mental and substance use

disorders, and the emerging field of population mental health research.

Turning the national prevalence data reported here into policy-relevant information requires careful attention to the perspective brought to the data. For example, focus can be placed on the prevalence and correlates in the general population or on the degree of overlap and correlates among people with a given disorder. These nuances in the methods, and resulting patterns in the data, highlight the importance of additional subgroup analyses to compare the profile of those in need in the general population with those who are accessing or not accessing services for treatment and support. Further work describing sociodemographic correlates of this comorbidity, and associations with problem gambling, is ongoing.

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<sup>1</sup>Senior Scientist and Co-Director, Health Systems Research and Consulting Unit, Centre for Addiction and Mental Health, Toronto, Ontario; Professor, Department of Psychiatry, University of Toronto, Toronto, Ontario.

<sup>2</sup>Project Scientist, Health Systems Research and Consulting Unit, Centre for Addiction and Mental Health, Toronto, Ontario.

<sup>3</sup>Epidemiologist, Centre for Global Health Research, St Michael's Hospital, Toronto, Ontario; Scientist, Keenan Research Centre of the Li Ka Shing Knowledge Institute, St Michael's Hospital, Toronto, Ontario.

<sup>4</sup>Director, Medical Education and Research, Whitby Mental Health Centre, Whitby, Ontario; Assistant Professor, Department of Psychiatry, University of Toronto, Toronto, Ontario.

<sup>5</sup>Director and Associate Professor, Addiction and Mental Health Research Laboratory, School of Public Health, University of Alberta, Edmonton, Alberta.

<sup>6</sup>Research Scientist, Health Systems Research and Consulting Unit, Centre for Addiction and Mental Health, Toronto, Ontario; Associate Professor, Department of Public Health Sciences, University of Toronto, Toronto, Ontario.

<sup>7</sup>Professor, School of Social Work, Memorial University, St John's, Newfoundland and Labrador.

<sup>8</sup>Director and Associate Professor, Centre for Applied Research in Mental Health and Addictions, Simon Fraser University, Vancouver, British Columbia.

*Address for correspondence:* Dr B Rush, Centre for Addiction and Mental Health, T304, 33 Russell Street, Toronto, ON M5S 2S1; Brian\_Rush@camh.net

### **Résumé : La prévalence de l'utilisation de substance et d'autres troubles mentaux co-occurrents dans la population canadienne**

**Objectif :** Les enquêtes sur la santé de la population menées partout au monde ont étudié l'épidémiologie des troubles liés à l'utilisation d'une substance (TUS) et d'autres troubles mentaux comorbides, dans le cadre de projets plus vastes visant à évaluer les besoins et à donner une direction à la planification intégrée et à la prestation des services. Cette étude présente la première évaluation nationale au Canada de la prévalence des TUS et autres troubles mentaux co-occurrents, en mettant l'accent sur les différences selon la gravité du problème lié à la substance, le sexe, l'âge et la région.

**Méthodes :** Cette étude est une analyse secondaire des données de l'Enquête sur la santé dans les collectivités canadiennes, volet Santé mentale et bien-être, de 2002. L'échantillon a été obtenu à l'aide d'une méthode en grappes stratifiées à plusieurs degrés ( $n = 36\,984$ , taux de réponse = 77 %).

**Résultats :** La prévalence sur 12 mois dans la population de troubles co-occurrents était de 1,7 %. La prévalence sur 12 mois d'autres troubles mentaux était plus élevée chez ceux ayant des problèmes avec les drogues illicites et l'alcool et chez ceux qui en étaient dépendants, comparativement à ceux ayant des problèmes moins graves. Le sexe et les différences d'âge reflétaient les différences dans les troubles purs de la population. Parmi les principales différences régionales, le taux plus élevé de troubles co-occurrents a été observé en Colombie-Britannique et les taux plus faibles, au Québec.

**Conclusions :** Les comparaisons transversales sont entravées par les différences méthodologiques; cependant, ces taux canadiens sont à l'extrémité la plus faible de l'échelle déclarée internationalement. Cela peut être attribué à l'exclusion de plusieurs troubles reconnus comme étant fortement comorbides des TUS. Néanmoins, la prévalence est élevée dans certains sous-groupes, et des projets en cours visant à améliorer l'abus de substances et les services de santé mentale au Canada devraient continuer de faire en sorte qu'on porte suffisamment d'attention aux besoins des personnes souffrant de troubles co-occurrents.

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