

# Prevalence of Past-Year Mental Disorders in the Canadian Armed Forces, 2002-2013

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## Abstract

**Objective:** More than 40,000 Canadian Armed Forces (CAF) personnel have deployed in support of the mission in Afghanistan since 2002. Over the same period, the CAF strengthened its mental health system. This article explores the effect of these events on the prevalence of past-year mental disorders over the period 2002-2013.

**Method:** The data sources were 2 highly comparable population-based mental health surveys of CAF Regular Force personnel done in 2002 and 2013 ( $n = 5155$  and  $6996$ , respectively). Data were collected via in-person interviews with Statistics Canada personnel using the World Health Organization's Composite International Diagnostic Interview to assess past-year disorders.

**Results:** In 2013, 16.5% had 1 or more of the 6 past-year disorders assessed in the survey, with the most common conditions being major depressive episode (MDE), posttraumatic stress disorder (PTSD), and generalized anxiety disorder (GAD), which affected 8.0%, 5.3%, and 4.7%, respectively. The prevalence of PTSD, GAD, and panic disorder has increased significantly since 2002 (adjusted odds ratios from logistic regression models = 2.1, 3.0, and 1.9, respectively), while no change was seen for MDE. The comorbidity of mood and anxiety disorders increased significantly over time, being seen in 27.4% and 41.0% of those with mental disorders in 2002 and 2013, respectively.

**Conclusion:** There has been an increase in the prevalence of PTSD and other anxiety disorders and of the extent of comorbidity of mood and anxiety disorders in CAF personnel over the period 2002-2013.

## Résumé

**Objectif :** Plus de 40 000 membres du personnel des Forces armées canadiennes (FAC) ont été déployés pour soutenir la mission en Afghanistan depuis 2002. Durant la même période, les FAC ont consolidé leur système de santé mentale. Cet article explore l'effet de ces événements sur la prévalence des troubles mentaux de l'année précédente, pour la période de 2002 à 2013.

**Méthode :** Les sources des données étaient deux enquêtes sur la santé mentale dans la population fortement comparables, menées auprès du personnel de la Force régulière des FAC en 2002 et 2013 ( $N = 5155$  et  $6996$ , respectivement). Les données ont été recueillies lors d'entrevues en personne par le personnel de Statistique Canada, à l'aide de l'entrevue diagnostique composite internationale de l'Organisation mondiale de la santé afin d'évaluer les troubles de l'année précédente.

**Résultats :** En 2013, 16,5 % avaient un ou plusieurs des 6 troubles de l'année précédente évalués dans l'enquête, les affections les plus communes étant l'épisode dépressif majeur (EDM), le trouble de stress post-traumatique (TSPT), et le trouble d'anxiété généralisée (TAG), qui touchaient 8,0 %, 5,3 %, et 4,7 %, respectivement. La prévalence du TSPT, du TAG, et du trouble panique a augmenté significativement depuis 2002 (rapports de cotes corrigés des modèles de régression logistique = 2,1; 3,0; et 1,9; respectivement), alors qu'aucun changement n'a été observé pour l'EDM. La comorbidité des troubles de

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l'humeur et anxieux a augmenté significativement avec le temps, étant observée chez 27,4 % et 41,0 % de ceux qui souffraient de troubles mentaux en 2002 et 2013, respectivement.

**Conclusion :** Il y a eu une hausse de la prévalence du TSPT et d'autres troubles anxieux ainsi que de la mesure de la comorbidité des troubles de l'humeur et anxieux chez les membres des FAC, sur la période de 2002 à 2013.

### Keywords

mental disorders/statistics and numerical data, military personnel, prevalence, stress disorders, posttraumatic, epidemiology, comorbidity

### Clinical Implications

- The CAF mental health system must be scaled and resourced to respond to the increase in the burden of mental disorders since 2002.
- Increasing comorbidity of mental disorders in CAF personnel will presumably result in greater treatment requirements and poorer overall prognosis.

### Limitations

- This study did not explore the precise reasons for the changes in the prevalence of mental disorders.
- Survey studies do not apply the diagnostic hierarchy rules used by clinicians and hence likely overestimate the true extent of comorbidity.

Mental disorders are prevalent and impactful in military organizations.<sup>1-3</sup> In addition to service-related disorders, military personnel suffer from common mental disorders for the same reasons as civilians. Indeed, in 2002 at least, little of the overall burden of mental illness in the Canadian Armed Forces (CAF) was attributable to deployment.<sup>4</sup> Non-service-related mental disorders also have similar implications to those of service-related mental disorders with respect to operational readiness, operational effectiveness, and force sustainability.<sup>5</sup>

The last complete and rigorous assessment of mental health in the CAF dates to 2002, in the form of the Canadian Forces Supplement to the Canadian Community Health Survey, Cycle 1.2—Mental Health and Well-Being (CCHS-CFS).<sup>6</sup> At that time, 14.9% of Regular Forces (RegF) personnel had 1 of 6 common past-year mental disorders.<sup>1</sup> Much has changed since then: like the United States and other Western nations, the CAF has contributed many personnel to the conflicts in Southwest Asia; more than 150 CAF personnel lost their lives over the course of the mission.<sup>7</sup> Conflict brings with it the risk of deployment-related mental health problems.<sup>7,8</sup> Indeed, 13.5% of CAF personnel deployed in support of the mission developed an Afghanistan-related mental disorder in the 4 years after their return.<sup>9</sup> US data also confirm substantial numbers of new-onset mental health problems in those deployed, specifically in those with combat experiences.<sup>10,11</sup> A substantial incidence of deployment-related mental disorders as a consequence of the mission in Afghanistan would be expected, all other things

being equal, to lead to an increased prevalence of the mental disorders most commonly triggered by deployment-related trauma, notably posttraumatic stress disorder (PTSD) and major depressive episode (MDE).<sup>9</sup> Changes in the extent of comorbidity may also have occurred.

Over the same decade, other factors that could influence the prevalence of mental disorders in CAF personnel were at play: the CAF has substantially reinforced its clinical mental health system.<sup>12</sup> Initiatives have included the following: 1) establishing 7 regional centres for diagnosis and treatment of deployment-related mental disorders, 2) approximately doubling the numbers of mental health clinicians system-wide, 3) developing a novel peer support program for personnel with service-related mental disorders, and 4) establishing a strategic Directorate of Mental Health.<sup>12</sup> Over the same period, the CAF also developed a mental health education and training program (The Road to Mental Readiness,<sup>13</sup> or R2MR), with the goals being enhanced performance under adversity, improved well-being, and increased mental health literacy. In their totality, these efforts may have had preventive effects, shortened the delay to first care, improved the effectiveness of care, and decreased the relapse rate of mental disorders—factors that would lead to downward pressure on past-year prevalence rates.

Concurrently, in recognition of the substantial risk of medical attrition related to mental disorders, efforts were made in the CAF to improve the retention of those who recover from mental disorders.<sup>5</sup> Initiatives included the following: 1) changes in the approach to management of medical employment limitations, 2) implementation of a return-to-work program, and 3) creating Integrated Personnel Support Centres to facilitate rehabilitation of those with mental and physical health problems. By facilitating retention of those with mental disorders, these initiatives would be expected to increase the prevalence of lifetime mental disorders and, to a lesser extent, past-year disorders as well.

Thus, a variety of factors (some negative, some positive) may have changed the prevalence of past-year mental disorders in the CAF since 2002. Where the precise balance lies is unclear. The purpose of this analysis is therefore to provide an updated picture of past-year mental disorder prevalence and to explore changes in the prevalence of past-year mental disorders in CAF Regular Forces (RegF) Personnel over the period 2002-2013, using highly comparable survey data collected by Statistics Canada. Understanding the current prevalence rates of common mental disorders and how

they have changed over time will help quantify the current level of need and will demonstrate whether the important changes over the past decade had, in the aggregate, a positive or negative effect on mental health.

## Methods

### Study Populations and Data Sources

The study populations were serving CAF RegF personnel in 2002 and 2013. The data sources were the 2002 CCHS-CFS and the 2013 Canadian Forces Mental Health Survey (CFMHS).

### Survey Methods

**Sampling and Data Collection.** The 2 surveys employed stratified random sampling frameworks to ensure the representativeness relative to the CAF RegF as a whole. Data were collected by trained Statistics Canada interviewers using computer-assisted face-to-face interviews. In 2002, 5155 RegF personnel (79.5% response rate) responded. In 2013, 6696 RegF personnel responded (79.6% response rate).

**Survey Instrument and Disorder Algorithms.** The CCHS-CFS used the World Health Organization Composite Diagnostic Interview (WHO-CIDI) version 2.1 to assess the past-year prevalence of the following *DSM-IV* mental disorders: PTSD, MDE, generalized anxiety disorder (GAD), panic disorder (PD), and social phobia. Alcohol dependence was assessed using the CIDI Short Form against *DSM-III-R* criteria, where endorsement of 3 or more symptoms was considered alcohol dependence.<sup>6</sup>

For the CFMHS, past-year prevalence of mental disorders was assessed using the WHO-CIDI version 3.0. Social phobia (which had a past-year prevalence rate of 3.7% in 2002)<sup>14</sup> was not included, and the diagnostic algorithms for GAD and alcohol abuse and dependence differed from the earlier version of the CIDI. For GAD, we applied the version 3.0 algorithm to the 2002 CCHS-CFS data to derive a comparable prevalence. For alcohol use disorders (AUDs), the differences in the survey instruments precluded comparison of rates.<sup>15</sup>

In both surveys, lifetime trauma exposure was assessed using the same 28-item inventory of dichotomous items that is part of the PTSD module of the CIDI.

### Analysis

SAS version 9.3 (SAS Institute, Cary, NC) was used for all analyses. Statistical weights provided by Statistics Canada were applied for all analyses; these weights included adjustments for out-of-scope units and for nonresponse.<sup>15</sup> For the weighted prevalence estimates, the bootstrap method was employed using Statistics Canada's replicate weights for standard error estimation. Statistics Canada changed its approaches to handling missing data since the time of the

2002 survey, so the 2002 prevalence rates reported here differ slightly from those published earlier.<sup>14</sup>

Changes in the prevalence of past-year disorders that were measured comparably in the 2 surveys (PTSD, MDE, GAD, and PD) and the aggregate outcome of at least one of the foregoing (hereafter, "any mood or anxiety disorder") were assessed using 5 binary logistic regression models, one per outcome. Changes in the extent of comorbidity were explored with a separate model, which included only respondents with at least one disorder, using the binary outcome of only one disorder versus more than one disorder. All models were adjusted for age, sex, ethnicity, language, marital status, education, rank, and element (Army, Navy, or Air Force), based on conceptual and empirical considerations. Listwise deletion was used for missing values in the regression models, resulting in elimination of 0.5% to 4.3% of cases. Standard error estimation was done using the bootstrap method with replicate weights provided by Statistics Canada for prevalences; Taylor series linearization was used in the regression analyses.

### Ethical Aspects

Survey participation was voluntary, and respondents provided written informed consent. All aspects of the data collection and microdata access underwent ethical and privacy review by the relevant bodies within Statistics Canada.

## Results

### Characteristics of Respondents, 2002 and 2013

As shown in Table 1, respondents in both 2002 and 2013 were predominantly young and middle-aged, noncommissioned, male personnel. There were, however, some statistically significant differences in their characteristics: respondents in 2013 had a different age distribution and greater educational attainment; they were also more likely to be single (never married), to be senior noncommissioned personnel, and to be in the Army—all relative to 2002 respondents. There were no differences in the proportion that had ever deployed overseas.

### Lifetime Trauma Exposure in Respondents, 2002 and 2013

Fifteen of the 28 lifetime trauma experiences showed statistically significant prevalence differences in 2013 relative to 2002 (Table 2). Most of these differences were small, with an absolute risk difference of less than 4%. The 3 exposures that showed the greatest differences over time were those conceptually related to military duties. In 2013, respondents were more likely to have experienced combat (34.7% vs. 19.2%), were more likely to have ever purposefully killed or injured someone (8.6% vs. 3.9%), and were less likely to have been peacekeepers (33.8% vs. 42.9%). No difference

**Table 1.** Sociodemographic and Military Characteristics of Respondents, 2002 and 2013.

Characteristic	Weighted $n^a/\%$ (95% Confidence Interval)		P Value for $\chi^2$ Test
	2002 (Unweighted, $n = 5155$ )	2013 (Unweighted, $n = 6696$ )	
Sex			
Male	48,360/87.8 (87.5 to 88.0)	55,480/86.2 (85.3 to 87.0)	0.0002
Female	6740/12.2 (12.0 to 12.5)	8920/13.9 (13.0 to 14.7)	
Age group, y			
17-24	5440/9.9 (8.9 to 10.9)	8560/13.3 (13.4 to 14.2)	<0.0001
25-29	7100/12.9 (11.8 to 14.0)	12,640/19.6 (18.6 to 20.7)	
30-34	10,480/19.0 (17.9 to 20.2)	11,580/18.0 (17.0 to 19.0)	
35-39	14,220/25.8 (24.6 to 27.0)	9220/14.3 (13.4 to 15.3)	
40-44	10,940/19.9 (18.7 to 21.0)	8640/13.4 (12.6 to 14.2)	
45-49	4820/8.8 (8.1 to 9.4)	7820/12.1 (11.4 to 12.9)	
50-69	2080/3.8 (3.3 to 4.2)	5940/9.2 (8.5 to 9.9)	
Race/ethnicity			
White	52,540/95.5 (94.9 to 96.2)	57,900/90.1 (89.3 to 90.9)	<0.0001
Nonwhite	2460/4.5 (3.9 to 5.1)	6360/9.9 (9.1 to 10.7)	
Language of interview			
English	39,920/72.5 (71.1 to 73.8)	50,600/78.6 (77.5 to 79.6)	<0.0001
French	15,160/27.5 (26.2 to 28.9)	13,800/21.4 (20.4 to 22.5)	
Region of interview			
Atlantic	12,500/22.7 (21.4 to 24.0)	14,480/22.5 (21.5 to 23.5)	0.0521
Quebec	8300/15.1 (14.0 to 16.1)	9740/15.1 (14.3 to 16.0)	
Ontario/Central	18,940/34.4 (33.0 to 35.8)	23,660/36.7 (35.5 to 38.0)	
West	15,340/27.9 (26.6 to 29.1)	16,540/25.7 (24.5 to 26.8)	
Educational attainment			
Less than secondary school graduate	4040/7.3 (6.5 to 8.2)	2620/4.1 (3.6 to 4.6)	<0.0001
Secondary school graduate, no postsecondary education	18,100/32.9 (31.4 to 34.3)	16,540/25.7 (24.6 to 26.9)	
Some postsecondary education	18,940/34.4 (33.0 to 35.8)	5700/8.9 (8.2 to 9.6)	
Postsecondary certificate/diploma or university degree	15,340/27.9 (26.6 to 29.1)	39,400/61.3 (60.1 to 62.5)	
Household income adequacy <sup>b</sup>			
Low income	400/0.7 (0.4 to 1.0) <sup>e</sup>	460/0.7 (0.5 to 0.9) <sup>e</sup>	0.9313
Middle or high income	54,420/99.3 (98.9 to 99.7)	63,920/99.3 (99.1 to 99.5)	
Marital status			
Single (never married)	10,860/19.7 (18.5 to 21.0)	17,300/26.9 (25.8 to 28.0)	<0.0001
Married/common law	39,520/71.8 (70.4 to 73.2)	42,200/65.6 (64.5 to 66.7)	
Widowed, divorced, or separated	4680/8.5 (7.7 to 9.3)	4840/7.5 (6.9 to 8.2)	
Dependent children <sup>c</sup>			
No	32,880/59.7 (58.2 to 61.2)	43,120/67.0 (65.7 to 68.2)	<0.0001
Yes	22,200/40.3 (38.8 to 41.8)	21,280/33.0 (31.8 to 34.3)	
Rank category			
Junior noncommissioned member <sup>d</sup>	32,460/58.9 (58.6 to 59.2)	35,440/55.0 (54.8 to 55.2)	<0.0001
Senior noncommissioned member <sup>d</sup>	10,560/19.2 (19.0 to 19.3)	15,500/24.1 (23.8 to 24.3)	
Officer	12,060/21.9 (21.6 to 22.2)	13,460/20.9 (20.8 to 21.0)	
Element			
Army	27,640/50.2 (48.7 to 51.8)	34,220/53.1 (51.9 to 54.3)	0.0166
Navy	10,060/18.27 (17.2 to 19.4)	11,100/17.2 (16.3 to 18.2)	
Air Force	17,360/31.5 (30.2 to 32.9)	19,100/29.7 (28.6 to 30.8)	

(continued)

Table 1. (continued)

Characteristic	Weighted n <sup>a</sup> /% (95% Confidence Interval)		P Value for $\chi^2$ Test
	2002 (Unweighted, n = 5155)	2013 (Unweighted, n = 6696)	
Ever deployed <sup>f</sup>			
No	20,820/37.8 (36.3 to 39.3)	24,780/38.5 (37.6 to 39.4)	0.4895
Yes	34,280/62.2 (60.7 to 63.7)	39,600/61.5 (60.6 to 62.4)	

<sup>a</sup>To better protect the identity of respondents, Statistics Canada no longer permits the release of unweighted cell counts; it also requires that the weighted cell counts be rounded to the nearest 20.

<sup>b</sup>Household income adequacy is based on the total household income and the number of people in the household, following the definition used in the Canadian Community Health Survey, Cycle 1.2–Mental Health and Well-Being.

<sup>c</sup>Dependent children: household includes children younger than 12 years.

<sup>d</sup>Senior noncommissioned member includes the rank of sergeant (and equivalents in other environments) through chief warrant officer.

<sup>e</sup>Caution; high levels of error (coefficient of variation >16.5%).

<sup>f</sup>Deployment was assessed slightly differently on the 2 surveys. In 2002, the question defined deployment as meaning “deployed in support of a mission, such as a NATO mission or a UN tour. These deployments must be of at least 3 months duration. Do not include exercises, sea time, individual or collective training courses, TD (temporary duty), aid to civil power activities or Canadian disaster relief activities.” Respondents were then asked, “How many deployments lasting 3 months or more have you had in your career? Include deployments as a Regular or Reserve Canadian Forces member.” Those with 1 or more deployment were considered to have ever deployed. On the 2013 survey, the same definition of deployment was used, but the duration restriction was not applied. Respondents were asked, “Have you ever deployed for any period of time in support of the mission in Afghanistan, since its inception in 2001?” and “Have you ever deployed for any period of time outside of North America in support of any other Canadian Forces operation?” Those answering yes to either question were considered to have ever deployed. Details on Canadian Armed Forces deployments that personnel would have likely had can be found in Zamorski et al.<sup>12</sup>

was seen with respect to exposure to atrocities, another experience often related to military service.

### Prevalence of Past-Year Disorders and Comorbidity, 2002 and 2013

As shown in Table 3, 16.5% of 2013 respondents met criteria for 1 or more of the 6 disorders assessed by the survey. The most prevalent past-year disorders were MDE, PTSD, and GAD, which affected 8.0%, 5.3%, and 4.7%, respectively. The prevalence of any past-year mood or anxiety disorder increased over time, from 10.9% to 13.6%. The prevalence of past-year PTSD increased from 2.8% in 2002 to 5.3% in 2013. GAD and PD also showed significant increases, while no increase was seen for MDE. These differences remained significant after adjustment for potential confounders, with the adjusted odd ratios (aORs) being 1.4, 2.1, 3.0, and 1.9 for any mood or anxiety disorder, PTSD, GAD, and PD, respectively. As noted earlier, AUD cannot be compared across the 2 surveys.

In 2013, 41.0% of those with at least 1 mood or anxiety disorder had more than 1 disorder, a fraction that was significantly greater than in 2002 (27.4%; aOR = 1.8) (Table 4). The fraction with 3 or more disorders also increased significantly, from 0.9% to 2.2%.

## Discussion

### Summary of Key Findings

In 2013, 16.5% of RegF personnel had 1 or more of the 6 past-year disorders assessed by the survey, and 13.6% had 1 or more of the 4 mood and anxiety disorders assessed. The prevalence of several past-year mental disorders has

increased in the RegF since 2002. Specifically, the crude past-year prevalence of PTSD increased significantly, from 2.8% to 5.3%. PD and GAD (using comparable diagnostic algorithms) also showed significant increases. These differences all remained significant after adjustment for the minor differences in the sociodemographic and military characteristics of the 2 survey populations. Notwithstanding these significant changes in the prevalence of anxiety disorders, the prevalence of past-year MDE did not change. Differences in the survey instruments unfortunately precluded formal comparison of the prevalence of alcohol use disorders in 2002 and 2013.

While the prevalence of specific past-year disorders increased over time, the prevalence of the aggregate outcome of “any past-year disorder” measured comparably in both surveys showed less dramatic increases (10.9% in 2002 vs. 13.6% in 2013). However, there was a significant increase in the extent of comorbidity of mood and anxiety disorders in 2013 relative to 2002.

There were few differences in lifetime trauma exposure over time, although the 3 experiences showing substantial changes were all ones with conceptual links to military duties, with differences representing changes in the deployment experiences relative to 2002, including those related to the mission in Afghanistan. Specifically, there was a significant increase in those exposed to combat and in those who had purposefully injured or killed someone else. Conversely, the fraction with peacekeeping exposure decreased over time.

### Comparison with Other Findings

**Absolute Prevalence Rates: CAF Data.** Differences in study populations and methods make it impossible to directly

**Table 2.** Lifetime Trauma Exposure, 2002 and 2013.

	Weighted $n^a/\%$ (95% Confidence Interval)		P Value for Univariate $\chi^2$ Test
	2002 (Unweighted, $n = 5155$ )	2013 (Unweighted, $n = 6696$ )	
Ever seen someone being badly injured or killed, or unexpectedly seen a dead body	24,980/45.4 (43.8 to 46.9)	31,240/48.6 (47.4 to 49.8)	0.0021
Ever had someone very close to you die unexpectedly; for example, they were killed in an accident, murdered, committed suicide, or had a fatal heart attack at a young age	20,720/37.6 (36.1 to 39.1)	26,720/41.5 (40.2 to 42.8)	0.0001
Ever participated in combat, either as a member of a military or as a member of an organized nonmilitary group	10,600/19.2 (18.1 to 20.4)	22,340/34.7 (33.8 to 35.6)	<0.0001
Ever served as a peacekeeper or relief worker in a war zone or in a place where there was ongoing terror of people because of political, ethnic, religious, or other conflicts	23,600/42.9 (41.4 to 44.4)	21,760/33.8 (32.9 to 34.8)	<0.0001
Ever involved in a life-threatening motor vehicle accident	14,080/25.6 (24.2 to 26.9)	16,320/25.4 (24.2 to 26.5)	0.8464
Ever mugged, held up, or threatened with a weapon	11,080/20.1 (18.8 to 21.5)	13,880/21.6 (20.6 to 22.6)	0.0991
Ever in any other life-threatening accident, including on your job	9460/17.2 (16.1 to 18.3)	13,340/20.7 (19.7 to 21.7)	<0.0001
Ever exposed to a toxic chemical or substance that could cause you serious harm	12,660/23.0 (21.7 to 24.2)	12,260/19.1 (18.0 to 20.1)	<0.0001
Ever in a manmade disaster, like a fire started by a cigarette or a bomb explosion	7200/13.1 (12.0 to 14.1)	11,840/18.4 (17.5 to 19.3)	<0.0001
Ever had anyone very close to you have an extremely traumatic experience, like being kidnapped, tortured, or sexually assaulted	8720/15.8 (14.7 to 17.0)	11,800/18.3 (17.3 to 19.4)	0.0019
Ever involved in a major natural disaster, like a devastating flood, hurricane, or earthquake	10,720/19.5 (18.3 to 20.6)	10,640/16.5 (15.7 to 17.4)	0.0002
Ever seen atrocities or massacres such as mutilated bodies or mass killings	8540/15.5 (14.4 to 16.6)	9300/14.5 (13.7 to 15.3)	0.1550
Ever badly beaten up by anyone else	6620/12.0 (11.0 to 13.6)	8740/13.6 (12.7 to 14.5)	0.0321
As a child, ever witnessed serious physical fights at home, like your father beating up your mother	6920/12.6 (11.5 to 13.6)	7640/11.9 (11.0 to 12.7)	0.3260
Ever had anyone touch you against your will in any sexual way	5660/10.3 (9.5 to 11.1)	7020/10.9 (10.1 to 11.7)	0.2918
Ever experienced any other life-threatening event	4340/7.9 (6.8 to 8.9)	6640/10.3 (9.6 to 11.1)	<0.0001
Ever purposely injured, tortured, or killed another person	2120/3.9 (3.2 to 4.5)	5500/8.6 (7.9 to 9.2)	<0.0001
As a child, ever badly beaten by your parents or the people who raised you	3660/6.6 (5.9 to 7.4)	4720/7.3 (6.6 to 8.1)	0.1964
Ever had someone stalk you—that is, followed you or kept track of your activities in a way that made you feel you were in serious danger	2780/5.0 (4.4 to 5.7)	4640/7.2 (6.5 to 7.9)	<0.0001
Ever had a life-threatening illness	4060/7.3 (6.6 to 8.2)	4180/6.5 (5.9 to 7.1)	0.0999
Ever had anyone force or attempt to force you into any unwanted sexual activity, by threatening you, holding you down, or hurting you in some way	2740/5.0 (4.4 to 5.5)	3560/5.5 (4.9 to 6.1)	0.1973
Ever had a son or daughter who had a life-threatening illness or injury	3140/5.7 (5.0 to 6.4)	3240/5.0 (4.5 to 5.6)	0.1278
Ever an unarmed civilian in a place where there was a war, revolution, military coup, or invasion	2680/4.9 (4.2 to 5.5)	2840/4.4 (3.9 to 4.9)	0.2951
Ever lived as a civilian in a place where there was ongoing terror of civilians for political, ethnic, religious, or other reasons	2240/4.1 (3.5 to 4.6)	2800/4.4 (3.8 to 4.9)	0.5274
Ever done something that accidentally led to the serious injury or death of another person	1680/3.1 (2.5 to 3.6)	2660/4.1 (3.6 to 4.6)	0.0078
Ever badly beaten by a spouse or romantic partner	1160/2.1 (1.7 to 2.5)	1500/2.3 (1.9 to 2.7)	0.4847
Ever kidnapped or held captive	1480/2.7 (2.2 to 3.1)	1160/1.8 (1.5 to 2.2)	0.0046
Ever a refugee—that is, did you ever flee from your own home to a foreign country or place to escape danger or persecution?	240/0.4 (0.2 to 0.7) <sup>b</sup>	660/1.0 (0.7 to 1.3) <sup>b</sup>	0.0072

<sup>a</sup>To better protect the identify of respondents, Statistics Canada no longer permits the release of unweighted cell counts; it also requires that the weighted cell counts be rounded to the nearest 20.

<sup>b</sup>Caution; high levels of sampling variability (coefficient of variation >16.5%).

**Table 3.** Prevalence of Past-Year Disorders, 2002 and 2013.

	Weighted $n^a/\%$ (95% CI)		Unadjusted OR (95% CI)	Adjusted OR <sup>b</sup> (95% CI)
	2002 (Unweighted, $n = 5155$ )	2013 (Unweighted, $n = 6696$ )		
Any mental disorder	8340/15.7 (14.6 to 16.8)	10300/16.5 (15.6 – 17.4)	NA	NA
Any mood or anxiety disorder	5840/10.9 (10.1 – 11.8)	8500/13.6 (12.7 – 14.4)	1.28 (1.13 to 1.45)	1.36 (1.19 to 1.55)
Major depressive episode	4380/8.0 (7.2 to 8.8)	5120/8.0 (7.3 to 8.6)	1.00 (0.86 to 1.15)	1.06 (0.90 to 1.24)
PTSD	1540/2.8 (2.3 to 3.3)	3340/5.3 (4.7 to 5.9)	1.92 (1.55 to 2.39)	2.07 (1.63 to 2.6)
GAD	1060/1.9 (1.5 to 2.3)	3000/4.7 (4.2 to 5.2)	2.50 (1.95 to 3.20)	2.97 (2.28 to 3.86)
Panic disorder	1060/2.0 (1.5 to 2.4)	2140/3.4 (2.9 to 3.9)	1.73 (1.32 to 2.26)	1.912 (1.44 to 2.54)
Social phobia	2000/3.7 (3.1 to 4.2)	NA	NA	NA
Alcohol abuse or dependence	NA	2880/4.5 (3.9 to 5.0)	NA	NA
Alcohol dependence	2320/4.2 (3.5 to 4.9)	1260/2.0 (1.6 to 2.3)	NA	NA
Alcohol abuse	NA	1620/2.5 (2.1 to 3.0)	NA	NA

CI, confidence interval; GAD, generalized anxiety disorder; NA, not applicable; OR, odds ratio; PTSD, posttraumatic stress disorder.

<sup>a</sup>To better protect the identify of respondents, Statistics Canada no longer permits the release of unweighted cell counts; it also requires that the weighted cell counts be rounded to the nearest 20.

<sup>b</sup>Adjusted for age, sex, ethnicity, language, education, marital status, rank, and element.

**Table 4.** Comorbidity of Mood and Anxiety Disorders, 2002 and 2013.

	Weighted $n^a/\%$ (95% CI)		Unadjusted OR (95% CI)	Adjusted OR <sup>b</sup> (95% CI)
	2002 (Unweighted, $n = 5155$ )	2013 (Unweighted, $n = 6696$ )		
Number of mood or anxiety disorders				
0	47,520/89.6 (88.5 to 90.6)	54060/86.9 (86.0 to 87.8)	NA	NA
1	3980/7.5 (6.7 to 8.3)	4840/7.8 (7.1 to 8.5)	NA	NA
2	1060/2.0 (1.6 to 2.4)	2000/3.2 (2.8 to 3.7)	NA	NA
3 or more	500/0.9 (0.6 to 1.2) <sup>c</sup>	1340/2.2 (1.8 to 2.5)	NA	NA
Comorbidity (in those with at least 1 disorder)				
No	3980/72.6 (68.2 to 77.1) <sup>d</sup>	4840/59.0 (55.3 to 62.7) <sup>d</sup>	—	—
Yes	1500/27.4 (22.9 to 31.8) <sup>d</sup>	3360/41.0 (37.3 to 44.7) <sup>d</sup>	1.78 (1.37 to 2.31)	1.82 (1.39 to 2.39)

CI, confidence interval; NA, not applicable; OR, odds ratio; —, referent.

<sup>a</sup>To better protect the identify of respondents, Statistics Canada no longer permits the release of unweighted cell counts; it also requires that the weighted cell counts be rounded to the nearest 20.

<sup>b</sup>Adjusted for ethnicity, language, education, and rank.

<sup>c</sup>Caution; high levels of sampling variability (coefficient of variation >16.5%).

<sup>d</sup>Denominator for percentage is those with at least 1 mood or anxiety disorder.

compare the 2013 past-year prevalence rates with CAF research other than the 2002 CCHS-CFS. For example, Boulos and Zamorski<sup>9</sup> reported that the cumulative incidence of diagnosed mental disorders in personnel who deployed in support of the mission in Afghanistan was 19.0% within 4 years after their return. However, this is a cumulative incidence rate, not a past-year prevalence rate; it pertains only to a subset of CAF personnel who deployed on a particular mission, and it used medical records to assess diagnosed disorders as opposed to the survey approach used in the present study. Likewise, Zamorski et al.<sup>8</sup> reported a prevalence of PTSD of 2.8% and of depression of 3.2% in personnel who had deployed in support of the mission in Afghanistan. Those findings reflected point prevalence using paper-and-pencil survey data collected in the context of post-deployment mental health screening—circumstances that make these findings not comparable to those of the present

study. The present findings are, however, consistent with the thrust of past findings: most CAF personnel are in good mental health, but an important minority has a need for care or support to address their mental health needs.<sup>7</sup>

**Absolute Prevalence Rates: Canadian Civilian Findings.** As noted in another article in this supplement,<sup>16</sup> CAF RegF personnel had a higher adjusted prevalence of past-year MDE, GAD, alcohol dependence, and suicidal ideation than highly comparable Canadians in the general population. For unclear reasons, the prevalence of past-year alcohol use disorder was lower in the CAF RegF.

**Absolute Prevalence Rates: International Findings.** The most comparable prevalence rates come from a survey of Australian Defence Force personnel in 2010, at which time the past-year prevalence of PTSD using *ICD-10* criteria was

8.4%.<sup>17</sup> *ICD-10* criteria are, however, substantially less stringent than the *DSM-IV* criteria used in the present article,<sup>18</sup> so it is impossible to know whether the rates using comparable criteria are indeed higher in Australia. While there is a substantial amount of survey data on mental disorder prevalence rate in the US<sup>19,20</sup> and, to a lesser extent, the UK<sup>19,21</sup> armed forces, none of it used substantially comparable methods to be able to make formal prevalence rate comparisons.

**Changes in Prevalence Rates over Time: CAF Findings.** The limited comparable findings on trends in mental disorder prevalence in the CAF over the past decade mirror our findings: data from the CAF's periodic health surveillance survey (the Health and Lifestyle Information Survey, HLIS) in 2000, 2004, and 2008/2009 showed a stable prevalence of past-year depression over that period.<sup>22</sup> The 2004 and 2008/2009 HLIS assessed PTSD as a self-reported chronic condition, and a sizable increase in prevalence from 0.4% in 2004 to 3.0% in 2008/2009 was noted.<sup>22</sup> No other CAF studies have explored changes in the extent of comorbidity over time.

**Changes in Prevalence Rates over Time: Canadian and International Findings.** The 2002<sup>23</sup> and 2012<sup>24</sup> mental health surveys done in Canadian civilians provide limited comparable prevalence rate estimates due to differences in the methods in the 2 surveys. For the 2 disorders that are comparable (major depressive episode and manic episode), there was no meaningful increase in rate.<sup>24</sup> Cross-sectional health surveillance surveys in the US military have, however, shown significant increases in the prevalence of PTSD over the past decade, although no major trends were seen for depression or for generalized anxiety.<sup>25</sup> Nonsurvey methods also suggest an increase in the extent of need for mental health services in the United States.<sup>26,27</sup>

### Limitations

The primary limitations of this analysis relate to the generic limitations of cross-sectional surveys (e.g., nonresponse bias, recall bias, social desirability bias). However, as noted in another article in this issue,<sup>12</sup> the present survey data are particularly solid. We did not assess all potential mental disorders in both surveys, although the most common occupationally relevant disorders in military organizations (PTSD and depression)<sup>9</sup> were covered well. Evolution of the survey instrument and of disorder definitions meant that the rates of alcohol use disorders were not comparable over time. Surveys do not apply *DSM-IV* diagnostic hierarchy rules that clinicians use, meaning that they likely overestimate the true extent of comorbidity.<sup>28</sup> While we adjusted for potential sociodemographic confounders measured in both surveys and there were no substantial differences in nonoccupational trauma exposure in the 2 survey populations, there still may be residual confounding. Finally, the limited comparable data from other military organizations preclude

direct assessment of whether the past-year prevalence rates are, in fact, higher or lower than those of our closest allies, who also contributed heavily to the missions in Afghanistan and Iraq.

### Implications

As in 2002, we have documented that there is an important minority of CAF personnel with common mental disorders. MDE, PTSD, GAD, and alcohol use disorders, as the most prevalent disorders, are the most appealing targets for prevention and control efforts. The CAF's clinical care system needs to be ready to deliver evidence-based psychological and biological therapies for these disorders. As noted above, the CAF has invested heavily over the past decade along those lines. The increased prevalence and the increasing rates of comorbidity since 2002 provide justification for some of the growth of the CAF's mental health system over the past decade.

Conceptually, the change in prevalence rate over time in the CAF reflects the sum total of changes in the determinants of mental health in the CAF over the period in question. Of these determinants, the most obvious factor is the substantial incidence of mental disorders among the more than 40,000 CAF personnel who deployed in support of its mission in Afghanistan.<sup>7,9</sup> Consistent with this effect, other findings from the survey data used in the present analysis confirm that those who deployed in support of the mission in Afghanistan did indeed have a higher risk of PTSD, GAD, panic disorder, and depression.<sup>29</sup> The greater extent of combat exposure that we documented in the present analysis provides additional evidence along these lines. We chose not to control for these differences in the analysis both because of the weaknesses in the trauma inventory items available in the surveys and because doing so would have amounted to controlling for causal factors as opposed to simple confounders. The failure of increases in PTSD and other anxiety disorders to translate into an increase in depression is surprising and should be the subject of future research.

The other key changes in the determinants of mental health since 2002 are those related to the complex renewal of the CAF's mental health system over time.<sup>12</sup> For example, primary prevention efforts, such as the CAF's Road to Mental Readiness (R2MR) program,<sup>13</sup> may have decreased the incidence of mental disorders or suppressed what otherwise would have been an even higher incidence. A broad range of efforts to overcome barriers to care, including destigmatization efforts<sup>30</sup> and postdeployment screening,<sup>8</sup> should lead to a greater fraction of individuals in care and shorter delays to care, both of which should lead to lower past-year prevalence rates. Efforts to shorten delay to care should translate into lower prevalence rates on the basis of shorter episodes of illness, and there is also some emerging evidence that shorter delays to care may lead to better long-term treatment outcomes as well.<sup>31</sup> More effective treatment (notably the use of evidence-based psychotherapy for trauma-related disorders) should lead to higher remission rates and lower



relapse rates, thus exerting downward pressure on past-year prevalence rates. As noted earlier, other changes may have facilitated the retention of those who recover from a mental disorder.<sup>5</sup>

While these effects of mental health services renewal in the CAF on past-year prevalence rates are conceptually sound, their impacts on incidence and prevalence of mental disorders remain largely uncertain. However, encouraging evidence is beginning to emerge: another article in this supplement documented a dramatic increase in perceived need for care and of the perceived sufficiency of care in the CAF RegF since 2002.<sup>32</sup> A recent analysis of outcomes after care using CAF clinical services showed an improvement in occupational outcomes in those diagnosed with mental disorders over the past decade; the same study also confirmed that individuals who sought care early had a better prognosis.<sup>31</sup>

Why did the negative effects of the mission in Afghanistan predominate over the positive effects of mental health services renewal? The intrinsic challenges of prevention of trauma-related disorders clearly play a role: there simply is no reliably effective tool for this purpose.<sup>33</sup> The inherent limitations of even the best available care also contribute: even the best treatments, expertly applied, are not accepted by many patients, and dropout rates are significant.<sup>34</sup> And many of those who do complete treatment fail to achieve full remission.<sup>34</sup> Delay to care also must contribute: not all of those with a disorder have received care and hence have benefitted from the enhancements made since 2002. Further analysis of the CFMHS data and other data sources will be needed to formally explore the contribution of these different factors to mental health in CAF personnel.

## Conclusion

The period of 2002 to 2013 has seen an increase in the prevalence of certain mental disorders in the CAF. This reflects the net effect of changes in the determinants of mental health, especially the well-documented negative effects of the mission in Afghanistan and less-documented but presumably positive effects of mental health services renewal. That the balance of these factors proved negative speaks to the intrinsic challenges of preventing and treating mental disorders in personnel exposed to occupational trauma. In addition to research targeting more effective prevention and treatment, there is a need for research on interventions to shorten delay to care and improve treatment outcomes through better use of the currently available interventions.<sup>35</sup>

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