More Than Just Counting Deaths: The Evolution of Suicide Surveillance in the Canadian Armed Forces

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ABSTRACT Suicide prevention and surveillance are of primary concern to the Canadian Armed Forces (CAF) and to the CAF Health Services (CFHS). Suicide surveillance has been conducted on behalf of the CFHS by the Directorate of Force Health Protection for nearly 30 years. Over time, multiple changes have occurred within CAF: changes in its military role (from a primarily peacekeeping role to one also involving active combat), changes in operational tempo, temporal changes in at-risk subpopulations, as well as increased awareness and concern with suicide and suicide prevention. This has resulted in the annual reporting of CAF suicide rates and the evolution of the report's content to respond to the needs of its end users. More recently, Regular Force Army and Combat Arms males have been identified as being at significantly higher risk of suicide, relative to their counterparts, as well as to the Canadian general population. However, this trend has been fairly stable. To optimize the use of limited epidemiologic resources and to shift the focus from the rates themselves towards a better understanding of what they represent and how they can be modified, the suicide surveillance portfolio is evolving to include complementary data sources and elements. This paper describes the different data sources that constitute the CAF's enhanced suicide surveillance portfolio, the value-added evidence generated by the use of complementary data collection methods and sources, and how this evidence is used by CAF leadership in their efforts to prevent suicide amongst those who serve.

INTRODUCTION

Monitoring suicide rates in the Canadian Armed Forces (CAF) has been a part of the Directorate of Force Health Protection's (D FHP) mandate since the mid-1990s. The cornerstone of this process is a passive surveillance system that collects basic information on suicides involving CAF personnel, both in garrison and on deployment, and both within Canada and abroad. For over two decades, it has captured all CAF suicide deaths and is the main data repository for CAF senior leadership to direct evidence-based suicide prevention policy and clinical action.

Canada's involvement in the Afghanistan mission (2002–2012) corresponds to an increase in both absolute numbers and age-adjusted suicide rates amongst CAF Regular Force males. Although this was not an unexpected effect of active combat in a volatile war zone (and was consistent with the experience reported by Canada's allies, particularly the USA), the increase concerned CAF senior leadership. Evaluating possible underlying drivers of these rate increases requires expanded epidemiological suicide surveillance data at a level of detail beyond what is reported in historical CAF Surgeon General annual suicide reports. These data gaps include deployment, army-specific service, and, within army-specific service, Combat Arms service on Regular Force male suicide rates.

Deployment as a statistically significant risk factor for suicide was never conclusively established.[1] We posit that this may be in part due to the small number of events on which analyses were based. We also suspect that the confounding effects of deployment with age and environmental command are more likely culprits for this. However, Army personnel were found to be at significantly higher risk of death by suicide than their non-Army counterparts. This discordance in risk was even more pronounced in those within the Combat Arms (CA) "Purple Trades" versus those in other trades (everyone else, including non-CA Army personnel).

While overall Regular Force male CAF suicide rates remain above pre-Afghanistan levels, they appear to be fairly stable, as do the high-risk groups. Consequently, this stasis begs the following questions:

a. What are some of the risk (negative) and protective (positive) factors contributing to this equipoise?
b. How can we respond to this (and other related) questions, given the limited focus and statistical power of our surveillance data?
c. Given the relative stability of the rates, is the current level of surveillance warranted, or should some of the resources historically allocated to traditional surveillance be reinvested/re-allocated to respond to questions (a) and (b)?

These questions and, more specifically, their responses evolve organically over time. Through interest and investment into the mental well-being of those who serve, capacity to supplement and enhance the evidence from the surveillance system has gradually expanded. This paper focuses on describing the different data sources and data collection modalities that now

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doi: 10.1093/milmed/usy353

contribute to the Canadian Armed Forces' Health Services (CFHS) Suicide Surveillance Portfolio (SSP).

THE SUICIDE SURVEILLANCE PORTFOLIO

The Directorate of Force Health Protection's epidemiological suicide surveillance system is the most established facet of the SSP and, as such, acts as the keystone for the broader portfolio (Fig. 1).

As the CAF serves the dual role of both employer and health care provider, all CAF member suicides are systematically reported to the Department of National Defence (DND)/CAF. The responsibility to receive suicide notifications and to inform the relevant parties within the organization has changed over time. However, the current process relies upon the Directorate of Casualty Support Management within DND informing the Directorate of Mental Health (DMH) of all deaths. Once these have been confirmed and cross-referenced by DMH with information also captured by DND's Directorate Special Examinations and Injuries, they are then passed onto D FHP for annual analysis and dissemination.

Prior to 2007, annual reporting was on an ad hoc basis; it is now annually (usually in the autumn of the following year). The report content has evolved during this time period but descriptive epidemiological analyses (crude and age-adjusted rates; standardized mortality ratios that compare the observed CAF suicide rate to the Canadian general population) are a consistent part of the report. Because of statistically small numbers, reports describe Regular Force suicides only, but the underlying surveillance system also collects data on females and Reservists.

Durkheim, in his 1897 book "Suicide: A Study in Sociology,"[2] identified suicide as the result of "complex interrelationships among a multiplicity of characteristics".[3] A surveillance system like the pre-SSP one is inadequate if the purpose is to monitor suicides over time and to understand CAF-specific suicide characteristics and how the military environment interacts/contributes to them. This inadequacy stems from a lack of sufficient data elements but is also impeded by issues of statistical power related to the small number of annual events.

Cognizant of the double challenge created by both statistically small numbers and limited data elements, pre-SSP holdings are being supplemented with data from various sources, using different research methods to remedy these liabilities. Broadly, these data enhancements can be classified into five types: (a) Medical Professional Technical Suicide Reviews (MPTSR); (b) survey data; (c) electronic health record (EHR) data; (d) CF Cancer and Mortality Study II (CF CAMS II); and (e) methodological exercises.

The aims of this multifaceted data collection approach are three-fold (Fig. 2):

- To ensure a broad understanding of each and every suicide, including the factors that may put individuals at increased risk. All five SSP data enhancement types contribute to this aim.
- To improve understanding of these same risk factors in the broader CAF population. Survey, EHR and CF CAMS II data also contribute to this aim.
- To improve the statistical power of the findings. CF CAMS II is the only data enhancement type that contributes to this aim.

The specifics of the data types and how they contribute to the SSP's aims are described in more detail below.

MEDICAL PROFESSIONAL TECHNICAL SUICIDE REVIEWS

The MPTSR is an investigation that is conducted following each probable or confirmed suicide reported to CAF. The MPTSR collects information on demographic and risk factors that is used to describe the population captured by the

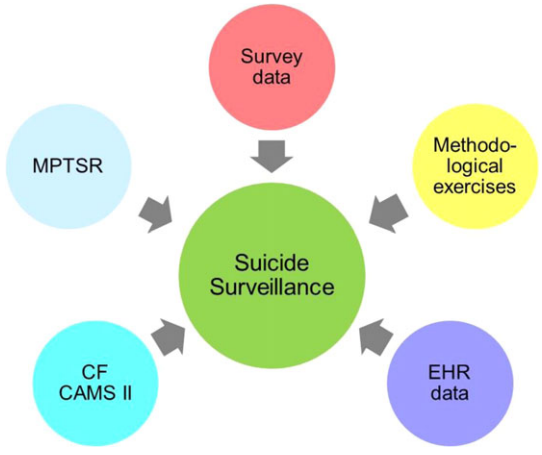

FIGURE 1. Framework and facets of the CFHS suicide surveillance portfolio.

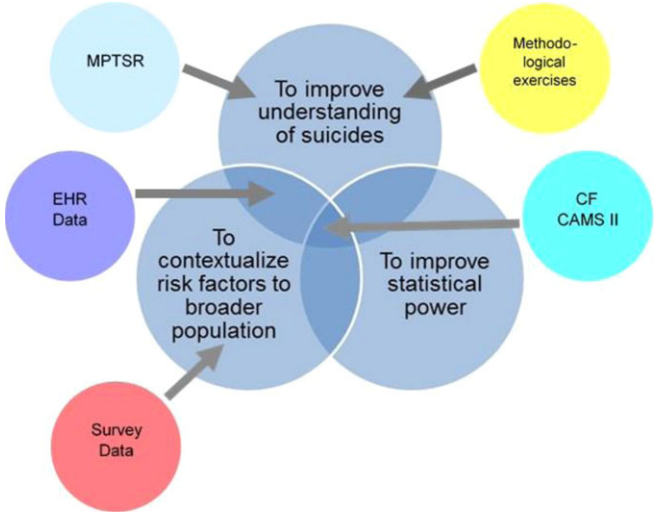

FIGURE 2. Overview of aims addressed by the different data holdings within the CFHS suicide surveillance portfolio.

surveillance system. It is based on the US Department of Defense Suicide Event Report (DoDSER),[4] and was implemented following a recommendation of the DND/CAF 2009 Expert Panel on Suicide Prevention.[5] The data collection and dissemination process is described in more detail elsewhere.[1,6] The MPTSR aims to (1) identify whether any military factors may have contributed to the event; (2) ensure that all suicide prevention-related health protection initiatives are evidence-based; and (3) provide more specific details on each documented event, including prior access to health care, risk factors, and event-specific details (e.g., mechanism of injury).

Medical Professional Technical Suicide Review data have been collected since 2010 and have been included in the annual suicide report since 2014. Unlike the core suicide surveillance data that are age-standardized and aggregated (e.g., 5-year standardized mortality ratios), the MPTSR section of the annual suicide report presents descriptive data on the frequency of a number of relevant factors related to suicide, including access to care prior to death, as well as some information on possible pre-enrollment risk factors. Although the generalizability and the interpretation of these findings are limited by the lack of contextual information, they nonetheless provide additional data to what is commonly collected as part of the core surveillance system. This is their main contribution to the SSP.

They also illustrate the underlying atomistic and ecological fallacies of suicide evidence; namely, that (1) what happens at the individual level does not necessarily represent the suicide experience at the population level (atomistic fallacy) and (2) the aggregate characteristics identified as part of a study may not be contributing factors to the individual act of death by suicide (ecological fallacy). They do serve the purpose of highlighting potential areas of concern, but that must be evaluated against a more comprehensive population-level understanding of these risk factors and their relative importance within a multifactorial suicide risk factor framework.

What they do not provide, however, is context on the prevalence of these factors in the broader CAF population, nor do they positively contribute to the issue of statistical power.

SURVEY DATA

The Suicide Surveillance Portfolio

Primarily through D FHP and DMH, CFHS has conducted, and continues to conduct, a number of surveys. These surveys support the SSP by providing prevalence information on mental health conditions as well as possible risk factors associated with military life, general mental health and general well-being.

Of the suite of surveys administered by CFHS, the ones most pertinent to the SSP are DMH's Canadian Forces Mental Health Survey (CFMHS), D FHP's Health and Lifestyle Information Survey (HLIS) and Recruit Health Questionnaire (RHQ). Their primary value is contextual in nature, providing CAF-wide prevalence data on factors that may put individuals at higher risk of taking their own lives. Unlike the CFMHS and HLIS, the RHQ also contributes individual-level evidence on CAF suicide risk factors. This is described in more detail below.

CFMHS

The CFMHS was conducted by DMH, in collaboration with Statistics Canada (STC) in 2013, focusing on mental health status and mental health service needs of CAF personnel deployed in support of the mission to Afghanistan.[7,8] The CFMHS is a valuable source of evidence on ideation[9] and attempt prevalence.[10] It also provides insight into some of the CAF-specific underlying risk factors[11,12] and, more specifically, the relationship between these risk factors and/or outcomes and mental health care utilization.[13,14] The latter is also useful in the allocation of suicide prevention resources.

HLIS

The HLIS is a cross-sectional population-based survey that is administered every 4–5 years by D FHP to randomly selected members of the CAF. Its focus is broad and includes self-reported information on health and lifestyle factors, including health care utilization and satisfaction. While there is some overlap between the HLIS and the CFMHS, the former's focus is broader than mental health alone. It includes all active CAF members (not just those who were deployed in support of Canada's involvement in Afghanistan) and has been conducted a number of times (2000,[15,16] 2004,[17,18] 2008/2009,[19,20] 2013/2014[21]), supporting temporal trend analyses.

As with CFMHS, HLIS data are anonymized and therefore cannot be linked to specific individuals, but also provide contextual, population-wide prevalence information on risk factors, mental health dimensions, and health care utilization. Furthermore, the HLIS purposely oversamples underrepresented subsets of the CAF (females, individuals who deployed in the last 12 months, male non-commissioned members [NCM]), acting as a source of valuable descriptive and contextual information on CAF members for whom information is traditionally lacking.

In 2018, the HLIS will be replaced by the Canadian Armed Forces Health Survey (CAFHS). Since there is substantial overlap in the content of the two surveys, and the fact that the CAFHS will continue to randomly select and recruit active CAF members as participants, we anticipate the CAFHS will continue to address the data gaps currently mitigated by the HLIS.

RECRUITMENT HEALTH QUESTIONNAIRE (RHQ)

Since 2003, new recruits at the very early stages of basic military training (before they are substantially exposed to military

culture) are administered a questionnaire that documents pre-enrollment information on a number of health status parameters (including self-perceived health, depression, other mental health disorders), psychological disposition (including the "Big Five" personality dimensions), health behaviors (including alcohol use, physical activity, smoking), and social environment parameters (including adverse childhood experiences, exposure to violence, negative life events, and social support).[22] These measures are taken from a number of validated tools and scales; more details on the measures themselves and on their provenance are published elsewhere.[22,23]

The RHQ's high participation rates;[23,24] its focus on the pre-military phase of a CAF member's life course; and the capture of service number, facilitating the linkage of the RHQ with other data sources, all contribute to the RHQ's overall value to the SSP. Preliminary analyses of linked RHQ and pre-SSP data have identified some potential risks worthy of further investigation.[25] This may also serve as a proof of concept that the SSP may be value-added, compared to keeping these complementary data sources in silos.

ELECTRONIC HEALTH RECORD DATA

Since 2010, the CAF has an electronic health record (EHR) system (Canadian Forces Health Information System [CFHIS]) that catalogs all medical and physiotherapist visits (with a diagnosis code); laboratory, X-ray and other diagnostic test results (e.g., mammography, colonoscopy); and medical referrals outside of the military medical system. Since 2016, these holdings have been supplemented with *Mental Health Notes*, used to enhance collaborative mental health care and communication within the CAF health system. The CFHIS also captures all CAF Periodic Health Assessments (frequency: every 5 years for personnel under age 40 and every 2 years for those aged 40 and older). More details on CFHIS and its specific data holdings are provided elsewhere.[26]

The EHR holdings enhance the SSP by providing population-level contextual information on the health needs and challenges of all military members during their career within the CAF. In this respect, it is broader in scope than the HLIS and CFMHS as it captures the full CAF population (rather than a randomized sample), and is the sole source for mental health diagnoses, access to care and treatment data. These same data holdings also allow researchers to include health care-related considerations in their analytic work to identify and quantify the risk factors for suicide in the CAF population.

CF CANCER AND MORTALITY STUDY I/II

One of the main limitations of the pre-SSP was that post-CAF release suicide deaths were not captured. This contributed to the erroneous perception that post-release suicides were of lesser importance to the CAF in service suicides. An additional, but unsubstantiated, concern was that, should a substantial number of suicide deaths occur shortly post-release, the pre-SSP rates would be underestimates of the "true" incidence of suicide in the CAF.

The inability to remedy the division of suicide data according to military status (active vs. Veteran) at the time of death is related to jurisdictional purview. The CAF is legally permitted to receive mortality information (of all causes of death, not just suicide) pertaining to active members as employer and health care provider. This permission terminates once a member releases from the CAF, therefore nullifying CAF's legally sanctioned access to that person's mortality data (or to any other data not explicitly provided by the person in question).

The need to investigate suicide incidence and risk factors from a life course perspective is an argument that is easily made. Events, exposures and risk factors related to an individual's pre-military life course may be relevant in better understanding an adverse health event occurring in the military and post-military life courses. Similarly, outcomes related to the military stage of a military person's life course may not manifest themselves until the post-military stage of their life course.

Until recently, the main obstacle to DND and VAC collaborating this gap has been to find a legal method to access mortality data of both still serving and released personnel and to follow them over time (longitudinally). The solution was the Canadian Forces Cancer and Mortality Study I (CF CAMS I), which was a record linkage study conducted jointly by DND, VAC and STC. The CF CAMS I cohort was built using human resources data on all individuals who had served in the CAF between 1972 and 2006, inclusively. Statistics Canada probabilistically linked this information to the Canadian Vital Statistics Database, allowing DND and VAC to investigate the all-cause and some cause-specific mortality incidence in this 35-year cohort of still serving and released CAF personnel. This research approach successfully removed the artificial information silos between the two departments responsible for the oversight of still-serving and released CAF personnel, and allowed for more in-depth (and more statistically powerful) research into adverse health outcomes (including suicide) relevant across different stages of a person's military life course.[8]

In an effort to maximize the quality and completeness of the data used to create the CF CAMS I cohort, CF CAMS II was initiated in 2016, using compensation data as the cohort file backbone.[27] The results from this study are only beginning to emerge,[28] but planned deliverables include using these data to conduct survival models to identify risk and protective factors associated with suicide both during and post-military release. The very large sample size in the CF CAMS II cohort (>240,000 discrete individuals) contributing a total of nearly 5 million person years of observation support multivariable analyses that can respond to the need for evidence and evidence-based prevention that CAF's traditional suicide surveillance system simply could not address. The dynamic nature of this longitudinal study (whereby additional years of mortality data are appended to

the cohort, as they become available to STC) supports the monitoring of changes in trends over time.

METHODOLOGICAL EXERCISES

Complete and accurate data collection is one of the basic tenets of a surveillance system's success. However, generating evidence from surveillance data requires more than just good data collection. For data to be actionable (from a policy and/or a prevention point of view), they need to be distilled by subject matter experts (SME) for decision-makers (this is the basic precept of knowledge translation). To do so, SMEs need to understand what the data suggest and how the numbers themselves behave (particularly true for temporal trends, rather than short-period incidence and/or prevalence). For example, when comparing suicide rates/evidence between countries, the lack of a uniform definition of suicide needs to be accounted for; this is equally the case between militaries.[29,30] More specifically, some countries (e.g., the UK) include open verdicts, whereas others (e.g., Canada and the USA) do not. Furthermore, some methods are reported more accurately than others (e.g., firearm deaths).[31–33] In situations where different nations with differential ratios of more accurate: less accurate suicide mechanisms are compared, the overall degree of suicide classification accuracy may be different between nations, complicating the interpretation of differences. Other issues include different definitions used at the death certificate level (Is suicide only in the immediate cause of death field, or only the antecedent cause of death field, or in either field?), changes over time in ICD-coding,[34,35] and possible changes in intra-jurisdictional suicide ascertainment over time.[32]

To confidently comment on suicide risk factors and risk groups within the CAF, and to monitor apparent increases of suicide rates within specific subgroups,[1] SMEs must have a secure handle on the complexities and peculiarities of the data that they are working with, so that they can successfully disentangle true changes from artefactual ones. This means that methodological exercises that focus on the behavior of the numbers, rather than the numbers themselves, are needed within an enhanced SSP. In accordance with this, the CAF SSP team have been conducting a number of methodological exercises, including:

a. chairing The Technical Cooperation Panel (TTCP) Special Project investigating the suitability of direct standardization of suicide rates to facilitate inter-military rate comparisons, under the auspices of the TTCP HUM Military Medicine subgroup;
b. engaging in a collaborative project with STC to better understand how changes in suicide ascertainment in the civilian sector influence CAF rates over time.

We expect that as these methodological projects are completed, they will contribute to an enhanced understanding of CAF suicide epidemiology. We also anticipate further methodological questions over time. To continue generating accurate evidence, it is our duty to allocate time and resources to address them.

DISCUSSION

Because suicide has such a far-reaching impact as a cause of death, suicide prevention is one of the CAF's primary areas of concern. Great strides have been made to ensure that CAF prevention and clinical care efforts are responsive to the evolving needs of its population, and that they are evidence-based. A recent stride was the release of the CAF-VAC Joint Suicide Prevention Strategy[36] (JSPS), which is the result of a collaborative effort between CAF and VAC, based on recommendations made by an Expert Panel with both national and international representation.[37]

Quantifying the pre-recommendation burden and measuring the JSPS' success cannot be achieved without a sound and far-reaching suicide surveillance infrastructure. To highlight the CAF-VAC JSPS's Line of Effort #7, an integral part of this strategy's success is dependent on "continuously improv[ing] through research, analysis and incorporation of lessons learned and best practices."[36] The persistence of the SSP is key in supporting the JSPS's pursuit of success and excellence, particularly given its ability to provide evidence from all three stages of a military person's life course.

As the data landscape evolves within CAF (in particular CFHS), we expect that the makeup of the SSP will also evolve in response. Its organic genesis, and its ability to respond to an evolving landscape, both in terms of the epidemiology of suicide within the CAF, but also in terms of its data holdings, make the SSP simple, flexible, acceptable, representative, and timely. This account is therefore only a snapshot of a living, evolving and adaptable surveillance system. The SSP is an illustration of the effort, dedication, expertise and resources that DND and the CAF invest daily in protecting those who serve, and of the organization's ability to quickly adapt to an ever-evolving landscape, in the hopes of "reduc[ing] risks, build[ing] resilience in our CAF and Veteran communities, and prevent[ing] suicide among our military members and Veterans."[36]

PRESENTATION

Rolland-Harris, E. Suicide Surveillance and Epidemiology in the Canadian Armed Forces. Keynote Presentation, 2017 MHSRS, 30 August 2017, Kissimmee, FL (#MHSRS-17–1280).

FUNDING

This supplement was sponsored by the Office of the Secretary of Defense for Health Affairs.

REFERENCES

1. Rolland-Harris E: Report on Suicide Mortality in the Canadian Armed Forces (1995 to 2016). Ottawa (Canada): Department of National Defence; 2017.
2. Durkheim E: Suicide: A Study in Sociology. London, Routledge, 1970.
3. Lazarsfeld PF, Rosenberg M: The Language of Social Research. Glencoe, IL, Free Press, 1955.
4. Pruitt L, Smolenski DJ, Bush N, et al: DoDSER Department of Defense suicide event report: calendar year 2015 annual report. Washington, D. C., DoD, 2016.
5. Zamorski MA: Report of the Canadian Forces Expert Panel on suicide prevention. Ottawa (Canada), Department of National Defence, 2010.
6. Cyr E, Rolland-Harris E, Purdy J: Findings from the Canadian Armed Forces 2010–2015 Medical Professional Technical Suicide Review reports: examining factors that may have contributed to member suicides. Human Factors and Medicine Panel HFM-275: Military Suicide Prevention, Riga, NATO S&T 2017.
7. Zamorski M, Bennett R, Boulos D, Garber B, Jetly R, Sareen J.: The 2013 Canadian Forces mental health survey: background and methods. Can J Psychiatry 2016; 61(1 Suppl): 10S–25S.
8. Pearson C, Zamorski M, Janz T: Mental Health of the Canadian Armed Forces. Ottawa, Minister of Industry, 2014.
9. Richardson J, Thompson A, King L, et al: Insomnia, psychiatric disorders and suicidal ideation in a Nationally Representative Sample of active Canadian Forces members. BMC Psychiatry 2017; 17(1): 211.
10. Sareen J, Afifi TO, Taillieu T, et al: Trends in suicidal behaviour and use of mental health services in Canadian military and civilian populations. CMAJ 2016; 188(11): E261–7.
11. Sareen J, Afifi TO, Taillieu T, et al: Deployment-related traumatic events and suicidal behaviours in a Nationally Representative Sample of Canadian Armed Forces personnel. Can J Psychiatry 2017; 62: 795–804.
12. Taillieu T, Afifi TO, Turner S, et al: Risk factors, clinical presentations, and functional impairments for generalized anxiety disorder in military personnel and the general population in Canada. Can J Psychiatry 2018; 63: 610–9.
13. Boulos D, Zamorski M: Contribution of the mission in Afghanistan to the burden of past-year mental disorders in Canadian Armed Forces personnel, 2013. Can J Psychiatry 2016; 61(Suppl. 1): 64S–76S.
14. Fikretoglu D, Liu A, Zamorski M, Jetly R.: Perceived need for and perceived sufficiency of mental health care in the Canadian Armed Forces: Changes in the past decade and comparisons to the general population. Can J Psychiatry 2016; 61(Suppl. 1): 36S–45S.
15. Decima Research Inc.: CF Health and Lifestyle Information Survey: Regular Force Report. Montreal: Decima Research Inc., 2002.
16. Decima Research Inc.: CF Health and Lifestyle Information Survey: Reserve Force Report. Montreal: Decima Research Inc., 2002.
17. Directorate of Force Health Protection: Canadian Forces Health and Lifestyle Information Survey: Regular Force Report. Ottawa, DND, 2005.
18. Directorate of Force Health Protection: Canadian Forces Health and Lifestyle Information Survey: Reserve Force Report. Ottawa, DND, 2006.
19. Directorate of Force Health Protection: Canadian Forces Health and Lifestyle Information Survey 2008/2009: Reserve Force Report. Ottawa, DND, 2015.
20. Born J, Bogaert L, Payne E, Wiens M: Results from Health and Lifestyle Information Survey of Canadian Forces Personnel 2008/2009: Regular Force Version. Ottawa, DND, 2011.
21. Theriault F, Gabler K, Naicker K: Health and Lifestyle Information Survey of the Canadian Armed Forces Personnel 2013/2014: Regular Force Report. Ottawa, DND, 2016.
22. Lee JEC, Hachey KK: Descriptive Analyses of the Recruit Health Questionnaire: 2007–2009. Ottawa, DRDC, 2011.
23. Lee JEC: Psychometric Properties of Psychological Scales in the Recruit Health Questionnaire: Internal Consistency of Scales. Ottawa, DRDC, 2008.
24. Lee JEC, Whitehead J, Dubiniecki C: Descriptive Analyses of the Recruit Health Questionnaire: 2003–2004. Ottawa, Department of National Defence, 2010.
25. Gottschall S, Weeks M, Rolland-Harris E: Non-Service-Related Risk Factors for Suicide Among Canadian Armed Forces Members: Results of a Nested Case-Control Study Using Recruit Health Questionnaire Data. Human Factors and Medicine Panel HFM-275: Military Suicide Prevention. Riga, NATO S&T, 2017.
26. Hawes RA, Whitehead J: Military Health Informatics to Improve Deployed and In-Garrison Health Surveillance: Epidemiologic Evidence from the Canadian Armed Forces Health Information System. Human Factors and Medicine Panel HFM-251: Military Health Surveillance. Paris, NATO S&T, 2015.
27. Rolland-Harris E, VanTil L, Zamorski MA, et al: The Canadian Forces cancer and mortality study II: a longitudinal record-linkage study protocol. CMAJ Open. In Press.
28. Rolland-Harris E, Weeks M, Simkus, K, VanTil L. Overall mortality of Canadian Armed Forces personnel enrolled 1976–2012. Occ Med 2018; 68(1): 32–37.
29. O'Carroll P, Berman A, Maris R, et al: Beyond the tower of babel a nomenclature for suicidology. Suicide Life Threat Behav 1996; 26(3): 237–52.
30. IOM: Reducing Suicide: A National Imperative. Washington, D.C., IOM, 2002.
31. McIntosh J: Quantitative methods in suicide research: issues associated with official statistics. Arch Suicide Res 2002; 6(1): 41–54.
32. Skinner R, McFaull S, Rhodes AE, et al: Suicide in Canada: Is poisoning misclassification an issue? Can J Psychiatry 2016; 61(7): 405–12.
33. Ajdacic-Gross V, Weiss M, Ring M, et al: Methods of suicide: international suicide patterns derived from the WHO mortality database. Bull WHO 2008; 86(9): 657–736.
34. Janssen F, Kunst A: ICD coding changes and discontinuities in trends in cause-specific mortality in six European countries, 1950–99. Bull WHO 2004; 82(12): 904–13.
35. Stewart C, Crawford P, Simon G: Changing in coding of suicide attempts or self-harm with transition from ICD-9 to ICD-10. Psychiatr Serv 2017; 68(3): 215.
36. Canadian Armed Forces, Veterans Affairs Canada: Joint Suicide Prevention Strategy. Ottawa, Government of Canada, 2017.
37. Sareen J, Holens P, Turner S: Report of the 2016 Mental Health Expert Panel on Suicide Prevention in the Canadian Armed Forces. Ottawa, DND, 2017.