Life course well-being framework for suicide prevention in Canadian Armed Forces Veterans

James M. Thompson[a,b], Alexandra Heber[c,d], Linda VanTil[a], Kristen Simkus[c], Lina Carrese[e], Jitender Sareen[f] and David Pedlar[b]

ABSTRACT

Introduction: The risks of suicidality (suicidal ideation or behaviour) are higher in Canadian Armed Forces (CAF) Veterans (former members) than in the Canadian general population (CGP). Suicide prevention is everyone's responsibility, but it can be difficult for many to see how they can help. This article proposes an evidence-based theoretical framework for discussing suicide prevention. The framework informed the 2017 joint CAF – Veterans Affairs Canada (VAC) suicide prevention strategy. **Methods:** Evidence for the framework was derived from participation in expert panels conducted by the CAF in 2009 and 2016, a review of findings from epidemiological studies of suicidality in CAF Veterans released since 1976, suicide prevention literature reviews conducted at VAC since 2009, and published theories of suicide. **Results:** Common to all suicide theories is the understanding that suicide causation is multifactorial, complex, and varies individually such that factors interact rather than lie along linear causal chains. **Discussion:** The proposed framework has three core concepts: a composite well-being framework, the life course view, and opportunities for prevention along the suicide pathway from ideation to behaviour. Evidence indicates that Veterans are influenced onto, along, and off the pathway by variable combinations of mental illness, stressful well-being problems and life events, individual factors including suicidal diathesis vulnerability, barriers to well-being supports, acquired lethal capability, imitation, impulsivity, and access to lethal means. The proposed framework can inform discussions about both whole-community participation in prevention, intervention and postvention activities at the individual and population levels, and the development of hypotheses for the increased risk of suicidality in CAF Veterans.

LAY SUMMARY

Suicide prevention is everyone's responsibility, but many wonder "What can I do?" This article proposes a practical framework that can help people and organizations to find roles for themselves. We have based the framework on expert suicide theories and research findings. The framework has three parts: a well-being framework, the life course concept, and opportunities for preventing suicides along pathways from thinking about suicide to attempting suicide.

Key words: attempted suicide, suicide, suicide attempt, suicide prevention, Veteran suicidal ideation, Veteran suicidal thinking, CAF Veterans

RÉSUMÉ

Introduction : Les risques des tendances suicidaires (idée ou comportement suicidaire) sont plus élevés chez les vétéran(e)s des Forces armées canadiennes (FAC) que dans l'ensemble de la population canadienne. La prévention du suicide est l'affaire de tous, mais il peut être difficile de savoir comment aider. Cet article propose un cadre théorique fondé sur des données probantes pour parler de la prévention du suicide. Ce cadre a éclairé la Stratégie de prévention du suicide jointe Forces armées canadiennes et Anciens Combattants Canada **Méthodologie :** Les données utilisées pour créer le cadre proviennent des théories publiées sur le suicide, de la participation à des groupes d'experts qu'a organisés les FAC en 2009 et 2016, d'une analyse des résultats d'études épidémiologiques sur la suicidalité chez les vétéran(e)s des

a Veterans Affairs Canada, Charlottetown
b Queen's University, Kingston
c Veterans Affairs Canada, Ottawa
d University of Ottawa
e Veterans Affairs Canada, Montreal
f University of Manitoba, Winnipeg

Correspondence should be addressed to Jim Thompson at j.thompson@queensu.ca.

FAC publiées depuis 1976 et d'analyses bibliographiques sur la prévention du suicide chez ACC depuis 2009. **Résultats :** Toutes les théories sur le suicide reposent sur une même compréhension : les causes du suicide sont multifactorielles, complexes et varient selon l'individu, si bien que les facteurs sont en interaction et ne dépendent pas de chaînes de causalité linéaires. Le cadre proposé repose sur trois concepts fondamentaux : un cadre de bien-être composite, le point de vue sur le parcours de vie et les occasions de prévention du cheminement suicidaire entre les idées suicidaires et le comportement. Selon les données, les vétéran(e)s sont influencés à emprunter, poursuivre et abandonner un cheminement suicidaire selon diverses combinaisons de troubles de santé mentale, de stress causé par des problèmes liés au bien-être et des événements de la vie, de facteurs individuels comme la vulnérabilité à la diathèse du suicide, d'obstacles au soutien du bien-être, d'acquisition de la capacité de tuer, d'imitation, d'impulsivité et d'accès à des moyens de se donner la mort. **Conclusion :** Le cadre proposé peut éclairer les discussions sur la participation de l'ensemble de la collectivité à des activités de prévention, d'intervention et de postvention pour l'individu et la population, ainsi que la formulation d'hypothèses sur l'accroissement du risque de suicidalité chez les vétéran(e)s des FAC.

RÉSUMÉ VULGARISÉ

La prévention du suicide est la responsabilité de tout un chacun, mais plusieurs se demandent, "que puis-je faire?" Cet article propose un cadre pratique qui peut aider les personnes et les organisations à trouver des rôles pour soi. Nous avons basé ce cadre sur des recherches et théories liées au suicide. Ce cadre se compose de trois parties: un cadre de bien-être, un concept d'en cours de vie, et des opportunités pour prévenir les suicides dans le spectrum qui va de la pensée du suicide à la tentative de suicide.

Mots-clés : Idéation suicidaire, prévention du suicide, suicide, tentative de suicide, vétéran(e)s, Forces armées canadiennes (FAC), pensées suicidaires

INTRODUCTION

The tragedies of suicide run deep: "Deaths by suicide ... leave families, friends, classmates, coworkers, and communities struggling with grief and searching for solutions."[1(p.2)] Prevention of Veteran suicides is a top priority for government. In response to the Prime Minister of Canada's 2015 mandate letter, the Ministers of Canadian Armed Forces (CAF) and Veterans Affairs Canada (VAC) announced the Joint Suicide Prevention Strategy in 2017.[2] The CAF–VAC joint strategy was based on a number of lines of evidence including evaluation of scientific publications[3–5] international expert panels in 2009[3] and 2016,[6] epidemiological studies of CAF serving members[7] and Veterans[8] (former members), and consultations with the Minister of Veterans Affairs' Mental Health Advisory Group. The joint strategy called for the engagement of the whole Canadian community and additional research in the prevention of suicide in CAF serving members and Veterans.

Suicidal ideation and death by suicide occur relatively more often in CAF Veterans than in the Canadian general population (CGP).[9,10] The 2017 Veterans Suicide Mortality Study (VSMS)[10] confirmed the finding of the 2010 Canadian Forces Cancer and Mortality Study (CFCAMS)[11] that the rate of suicide in male Regular Force Veterans was higher than the comparable CGP. The finding of higher suicide risk in Veterans contrasts with a study of CAF serving males who did not have a higher suicide risk than CGP males.[12] Reasons for the higher risk of suicidality in CAF Veterans remain unclear: no single causal factor explains suicide, causes are not linked in a linear way, and no single suicide theory has gained general acceptance.[13–15] Furthermore, evidence for the effectiveness of suicide prevention activities remains incomplete.[15,16]

Suicide prevention is everyone's responsibility, but it is difficult for many to see how they can help. Despite the complexity and gaps in knowledge about suicide causality, there is evidence to inform suicide prevention. This article proposes not a new theory but a practical, evidence-based framework for discussing suicide prevention. The objectives are to (1) summarize the epidemiology of CAF Veteran suicidality, (2) propose a theory- and evidence-based framework for thinking about and preventing CAF Veteran suicides, and (3) discuss implications for Veteran suicide prevention and further research. The goal is to facilitate whole-community discussions about CAF Veteran suicide prevention and research.

METHODS

The proposed framework arose from ongoing literature reviews of suicidality conducted by the VAC Research Directorate beginning in 2009[5] and informed by participation in the 2009 and 2016 CAF expert panels.[3,4,6] We reviewed major suicide theories to search for common and unique aspects that need to be considered in a theoretical framework. Formal systematic analysis of the literature, including strength of evidence assessment, was

impractical owing to both the very large, heterogeneous volume of published scientific evidence and the complexity of the topic. Two forms of violence related to suicide are outside the scope of this article: parasuicide, meaning self-injury without intent to suicide, and violence toward others, including homicide.[15,17,18] Following Patten,[19] we use "risk indicator" and "protective indicator" for characteristics of groups in whom suicidality is more or less common, and reserve "risk factor" and "protective factor" for characteristics with evidence of causality. "Suicidality" in this article means ideation, attempts, and death by suicide, recognizing that ideation and attempts have different correlates and relationships to death by suicide.[20]

RESULTS

Three lines of evidence emerged from the review: the epidemiology of suicidality, published ideas about suicide causes, and the evolution of suicide theories proposed to explain and predict suicide.

Epidemiology of suicidality in CAF Veterans

Findings from CAF Veteran studies in the past decade are consistent with evidence in other populations that many with suicidal ideation do not attempt and many who attempt do not die by suicide. However, it is important to study all types of suicidality because there is evidence that both ideation and attempts are important risk indicators for suicide in all populations, and evidence that suicides can be prevented.

Suicidal ideation and attempts

In the 2010 Life After Service Studies (LASS) survey of CAF Regular Force Veterans who were released in 1998–2009, 5.8% had prior-year suicidal ideation, 17.7% had lifetime ideation, 1.0% had prior-year suicide attempts, and 5.5% had lifetime attempts.[21] In LASS 2016, the prevalence of prior-year suicidal ideation was 7.2% in the 1998–2012 release group and 10.9% in the 2012–15 release group, 2 and 3 times greater, respectively, than in the age-sex-adjusted CGP,[9] and approximately similar to those in Canadian first responders.[22] Although suicidality occurs in all types of Veterans, risk indicators for suicidal ideation included mental health problems, chronic physical health conditions, chronic pain, disability, age 35–49 years, female sex, divorced/widowed/separated, lower education, unemployment, low income, NCM (non-commissioned member) rank, less than 20 years of service, low perceived social support, and weak group identity.[9,21,23–25] Chronic physical health conditions and mental health problems were about 2–3 times more prevalent in CAF Regular Force Veterans than the CGP, and 90% with mental health conditions had physical health conditions or chronic pain.[23,26] The small numbers of females precluded identification of statistically significant risk indicators by sex.

Death by suicide

The 2010 Canadian Forces Cancer and Mortality Study (CFCAMS) linked Canadian mortality data with Department of National Defence records for CAF Regular Force members who enrolled in 1972–2006. The risk of suicide in male Veterans was 1.46 times higher than in comparable males in the CGP.[11] Risk indicators in available data included male sex, non-commissioned member rank, less than 10 years of service, and involuntary release. The 2017 VSMS confirmed the finding of the 2010 CFCAMS that the rate of suicide in male Regular Force Veterans was higher than in the CGP.[10] The VSMS linked 37 years of Canadian mortality data with Department of National Defence (DND) records for CAF Regular Force and Reserve Force Class C service members who were released from the CAF in 1976–2012. The suicide risk was 1.4 times higher in male CAF Veterans and 1.8 times higher in female CAF Veterans than in the age-adjusted male and female CGP, respectively. The Veteran suicide rate generally remained higher and relatively unchanged but declined in the CGP over the study period. The male Veteran suicide rate was about 3.5 times higher compared to female Veterans, similar to the difference between male and female suicide rates in the CGP and other populations.[27,28] Younger males were at higher risk of suicide, particularly those under age 25 years. The finding of higher suicide risk in CAF Veterans contrasts with the finding that CAF serving males did not have a higher suicide risk compared to CGP males in 1995 to 2016.[12]

Suicide causes

Suicide is a behaviour that occurs during a suicidal state of mind.[13,29,30] Suicide causation in military and other populations is still not fully understood.[16,29,31,32,33] Suicide occurs in all types of people, and not all risk indicators are causal risk factors.[32,33] Researchers have for more than a century documented a variety of theories and suicide risk indicators, however the literature often reports correlational associations without additional criteria for causality.[33] A 50-year meta-analysis of suicide risk factor findings found that researchers tended to focus only a few risk factor categories, and none, including depression, stood out as strong.[32] By the 1970s, the search

for causal explanations to inform suicide prevention had begun to move away from simple lists of risk and protective factors to integrative pathway models.[13,32–35] The shift from lists of risk and protective factors to algorithms produced by machine learning offers promise in predicting suicide risk.[33,36]

Suicide causation is understood to be multifactorial, complex, varying individually, and due to interacting factors rather than linear causal chains.[13,14,16,29,33,35,37–39] No reliable interview or biological method has been found to accurately predict which individual is going to attempt suicide, although there is hopeful progress.[16,32,36,40] Suicidal behaviour is not solely the result of a mental disorder.[14,16,33,39,41] Most with psychological distress or mental illness do not attempt suicide,[37,38,42-44] and it is not clear that all who die by suicide have mental illness.[37,40,43,44,45] It is not yet fully understood why mental illness (especially depression) commonly has been associated with suicide on a statistical basis.[13,15,16,23] In the 50-year metanalysis of longitudinal studies, even depression was not a strong predictor of suicidal behaviour in individuals, although the authors cautioned about methodological limitations in the literature.[20,32]

As evidenced by many of the suicide theories (Table 1), while poor mental health and mental illness, particularly hopelessness and depression, are common in final pathways to suicide, it is important to understand and address existential determinants of mental health in addition to treating mental illness with psychotherapy and pharmacology.[33,41,53,55] People vary widely in how they respond to disappointment and loss, which might help to explain why some people become suicidal, and others do not, even among those living with depression.[29,53] Researchers have hypothesized causal roles for stresses related to socioeconomic influences, identity challenges in transitions, physical health problems, chronic pain, and addictions in the development of depression, hopelessness and suicidality[14,23,41,53,55–61]

Gender

The elevated suicide risks for female and male CAF Veterans remain to be explained. There is evidence that gender-specific cultural factors play important roles in suicidality.[62] There is qualitative and quantitative evidence that strong military conformity to masculine gender norms can affect the well-being of all genders during and after service, in both positive and negative ways.[63,64] Researchers have hypothesized that the dominant "male" quality of military culture plays roles in the way men and women adapt to military and post-military life.[65,66] However, other unidentified biopsychosocial factors are likely at play,[40] including the different ways that men and women might experience depression.[62] Military culture tends to be dominated by masculine gender norms, but there is now evidence for a variety of masculinities, femininities, and other genders in military populations.[64,65,67] Much less is known about suicidality among Veterans in minority gender-preference groups that have higher rates of stress and suicidality in general population studies.[68]

In the VSMS, female CAF Veterans were 1.8 times more likely to die by suicide than CGP females.[10] Much less is known about suicidality in female than male Veterans because females are a statistical minority.[69] Military women have unique identity challenges both in service and adapting to life after service.[70] Hypotheses for the increased risk include acquisition of male-like factors that influence suicidality during adaptation to military life; the importance of challenges to sense of place and belonging in the psychological well-being of female military personnel; exclusion and other negative gendered experiences including sexual assault; effects of balancing competing military and civilian "home" demands; and transition challenges for women who, having adapted to the male norms of military culture, must readapt to civilian social norms after release.[64,66,70] Female United States (US) Veterans who continued to identify strongly with the military were more likely to obtain health care in Veterans Health Administration facilities than those who did not.[70] Substance use disorders are associated with suicide to a greater degree in female US Veterans.[71] Female CAF Veterans who released since 1998 were found to have lower post-service income than males,[72] suggesting that relatively more women might experience socioeconomic disadvantages.

In the VSMS, male CAF Veterans were 3.5 times more likely to die of suicide than female Veterans and 1.4 times more likely to die by suicide than CGP males.[10] Although the 3.5 male to female ratio is typical of many populations,[43] the findings taken together suggest unique influences in male military Veterans. Military service is hypothesized to reinforce the stoicism and self-reliance of male-gendered norms that might play roles in influencing suicidality in life after service, including deterring help-seeking and follow-up for mental health problems.[63] Male Veterans who have experienced developmental abuse and neglect and acquired a sense of special identity in the military might

Table 1. Suicide theories and frameworks

Reference	Description
Durkheim (1897)[46]	Sociological theory. Suicidal behaviour results from interactions with social groups disrupted by events like enslavement. Involvement in social structure plays a role: altruistic suicide (martyrdom, self-sacrifice) through over-involvement, or egoistic suicide through inadequate involvement resulting from poor social integration.
Freud (1920),[47] Menninger (1938),[48] Klein (1935)[49]	Psychodynamic theories. Suicide represents internalization of an aggression object, turning external death wish inward against one's own ego. Suicide is an inverted homicide; suicidal triad of wish to kill (murder), wish to be killed (guilt), and wish to die (depression) as punishment for thoughts of destroying others. Suicide is caused by unbearable guilt over aggressive fantasies toward objects; the ego intends to destroy its bad internal or external objects and aims to preserve its loved objects.
Shulman (1978)[36]	Permissive model of suicide. Congenital or acquired vulnerability in genetics or adverse childhood experiences combine with isolating social factors such as relationship loss. Accounts for mutual effect of physical illness and affective disorder which may occur independently, arise from giving up, or be causally related. Resultant depression leads to suicidal ideation which—combined with availability of lethal method and lack of suicidal inhibition, social support, and intervention—leads to suicide and parasuicide.
Schotte and Clum (1987)[50]	Diathesis-stress theory. Suicidal behaviour is learned from others. In times of stress, deficits in flexible thinking limit effective problem solving, rendering the person vulnerable to hopelessness and suicidal ideation. The person views suicide as a viable alternative.
Baumeister (1990)[37]	Escape from self. Six steps to suicidality: severe perceived discrepancy between expectations and reality, interpreting failure as self-blame, unforgiving comparison of self to unachieved standards, painful negative emotions, failed escape into numb cognitive deconstruction, and reduced inhibition to suicidal behaviour, overcoming fear of pain through death.
Beck et al. (1990)[51]	Comprehensive cognitive model. Hopelessness (negative expectations) correlated with suicide more than depression alone. Hopelessness disrupts beliefs about self, others, and the future.
Clarke (1993)[14]	"Wedding cake model." Aging person with occult unfinished conflicts is unable to adapt to life stressors and has a narcissistic crisis, often complicating major depression or substance use disorder, and then has a suicidal crisis on encountering a final ordinary life stressor related to loss of ability.
Linehan (1993)[52]	Biological deficits, exposure to psychological trauma, failure to acquire adaptive ways of handing negative emotion and progressive emotional dysregulation lead to self-injury in effort to regulate emotions.
Apter et al. (1993),[17] Plutchik (1995)[18]	Two-stage diathesis-stress-hopelessness model, where the diathesis is limited problem solving in the face of life stress when depressed and feeling hopeless. First, there is a triggering of impulse aggression and second, the object of aggression is identified (self or others). Suicide and violence are expressions of underlying aggressive impulse while other variables determine the direction of aggression.
Shneidman (1993)[42]	Theory of psychache. Saw suicide as a problem-solving behaviour: "never a suicide without some keen need." Suicide is caused by psychache, an intense, intolerable emotional pain different from depression and hopelessness, which leads to seeking relief until there is no solution except death. The psychache is caused by frustration through failure, rejection, and loss of the psychological needs essential for life, including love and belonging, sense of control, positive self-image, and meaningful relationships. Rooted in psychodynamic theory in which self-destruction may be intended to achieve a goal.
Williams (1997)[53]	Cry of pain arrested flight model. Views suicide as cry of pain in response to intense feelings of entrapment from perceived defeat, humiliation, or rejection. Psychosocial stress in response to social environment factors is critical in triggering biological changes leading to failure to find alternative solutions, poor problem solving, memory biases that impair recall of reasons for living or hope, and attention biases leading to selective processing of stimuli.
Joiner (2005)[43]	Interpersonal theory of suicide. Attempts suicide when acquires desire to die (perceived burdensomeness and thwarted belongingness) and capability to act (fearlessness of pain, injury, and death). Distinguishes those with ideation who do not attempt.

(Continued)

Table 1. (Continued)

Reference	Description
Rudd 2006[54]	Fluid vulnerability theory. Acute suicidal mode is a cognitive process triggered by internal or external precipitants, in which the person interprets internal and external stimuli through combinations of a suicidal belief system, physiological-affective symptoms, and autonomic motivational behaviours. Suicidal episodes are time-limited, with fluid severity and duration. Suicide vulnerability is related to cognitive, biological, and behavioural susceptibilities.
Wenzel and Beck (2008)[38]	Cognitive diathesis-stress model grounded in risk factor research. Suicidal crisis arises during interaction of sufficiently stressful life situations, long-standing dispositional vulnerability factors, and maladaptive cognitive processes associated with both psychiatric disturbance and suicidal acts, to increase the likelihood of psychiatric disturbance schemas that bias information processing. Non-impulsive attempts are characterized by chronic hopelessness; impulsive attempts by acute perceptions of unbearability.
Mann (2002),[29] Mann et al. (2005),[35] van Heeringen and Mann (2014)[40]	Stress-diathesis suicide susceptibility. Interaction of state stressors and trait susceptibility. Genetic mechanisms and adverse childhood experiences predispose to later life psychiatric illness which serves as a stressor that leads to suicide when combined with a vulnerability. Neurocognitive impairments manifest as impaired cognitive mood control, reactive aggression, impaired problem solving, over-reactivity to social difficulties, excessive emotional pain, and suicidal ideation leading to suicidal behaviour.
Heisel and Flett (2016)[41]	Biopsychosocial risk factors confer vulnerability to suicidal ideation mediated through precipitating life stressors, transitions, or losses. The pathway to suicide can be mitigated by resiliency factors including acquiring existential meaning in life.
O'Connor (2018)[39]	Three-phase motivational-volitional model. Interplay of background premotivational phase (diathesis vulnerability, environment, stressful events), motivational phase (suicidal ideation derives from entrapment triggered by defeat and humiliation exacerbated by poor coping, poor problem solving, and attribution biases) and volitional phase (suicidal behaviour derives from factors that lead to acting on the ideation, different from factors leading to ideation).

be particularly prone to wounded sense of self-worth and viewing post-military life as an absence of purpose (personal communication with John Whelan, Whelan Associates, September 2018), similar to the suicidal identity crisis described by Clarke for older men.[14] Men and women whose sense of meaning in life derives from work, which is not uncommon in the military, could be more at risk of developing suicidality after leaving service.[41]

Suicide theories

Multiple theories have been proposed for suicide since the nineteenth century, beginning with Durkheim's 1897 sociological theory[46] and the psychodynamic theories of the early 1900s (Table 1).[47,48,49] No single suicide theory has gained general acceptance,[15] indicating that suicide research remains in a pre-paradigm phase of development.[33] There are, however, common themes. Today's ecological theories and models are combining new discoveries in genetics, prior life experiences, social influences, epigenetics, life stressors, identity, and neurobiology.[14,15,17,18,29,36-43,46,47,49–54] Prevailing theories are based on evidence for ecological stress-diathesis concepts, where suicidality is seen to occur in response to interactions of (1) responses to life stressors, and (2) a diathesis, meaning a mind-body state leading to suicidal behaviour that arises from biological and psychological predispositions.[14-17,29,33,40,41,44,73] Mann highlighted the importance of distinguishing between "the neurobiological changes associated with a primary psychiatric disorder, such as major depression or psychosis, the neurobiological abnormalities related to the diathesis for suicidal behaviour, and the neurobiological manifestations of excessive stress".[29(p.306)] There is evidence that suicidality occurs episodically, waxing, and waning in response to internal and external factors that vary from person to person, sometimes with long latency, and sometimes precipitously after ideation onset.[39,43] There is evidence for heterogeneity in suicide trajectories rather than a single stereotype,[13,36] which could explain in part why suicide risk prediction schemes have met with very limited success.[20,32]

DISCUSSION

There is a need for a readily understood, actionable framework to aid agencies and community members in finding in suicide prevention roles.[15,16,35] There are suicide prevention roles for the whole Canadian community beyond health care providers, including the public and private sectors, Veterans, their families and their

communities.[1,2,4,5,28] However, the complexity of suicide and lack of experience that people outside and even inside healthcare systems have with suicide can prevent them from finding answers to the question, "What can we do?"

Suicide prevention theoretical framework

The evidence leads us to propose a theoretical framework with three core concepts: a well-being framework, the life course view, and pathways from ideation to behaviour (attempts and death by suicide). Although identification and effective treatment of mental illness and suicidality are important in suicide prevention,[13,35,44] there is evidence that factors in many areas of life play roles in influencing people along suicidal pathways.[15-17,33,41,55,57,74–76] Suicide can be viewed as a mental health-related behaviour at the end of a pathway influenced by life course, well-being problems.[13,14,16,29,30,41,44,55,57] Experts emphasize the importance of multiple factors in addition to mental illness in both explanatory theories and suicide prevention schemes. There is evidence that socioeconomic factors across the life course, challenges with physical health problems, and personal predispositions variously play roles in the onset of poor mental health, mental illness, and suicidality.[13,16,33,40,41,76,77]

Core concept 1: well-being

The first core concept is the composite, superordinate type of well-being framework developed at VAC for defining the successful transition to post-military life.[78] The framework (Figure 1) views well-being subjectively and objectively across seven domains: health, employment or other meaningful activity, finances, life skills/preparedness for challenges such as transition to post-military life, social integration, housing/physical environment, and cultural/social environment. The latter includes societal attitudes, policies, programs, and services. The framework is composite because it includes all other well-being frameworks; for example, subjective psychological measures of happiness and objective measures used by economists. The framework is superordinate because it views health as one of the seven well-being domains rather than synonymous with well-being. In this well-being framework, health is described as the individual's functioning physically, mentally, socially, and spiritually. The well-being framework accommodates causal bidirectionality. For example, psychological well-being in the health domain can be influenced by economic well-being in the financial domain. Conversely, well-being in the financial domain can be influenced by psychological well-being, such as when a person with mental illness has difficulty finding or keeping employment. The seven domains capture suspected risk and protective indicators and factors for both mental illness and suicide.

Core concept 2: life course view

The second core concept, the life course view, states that biopsychosocial well-being influences encountered earlier in life independently, interactively, and cumulatively affect well-being later in life (Figure 1 and Figure 2).[79,80] The life course view organizes risk and protective factors into temporally organized, interacting causal patterns of exposures and outcomes to encourage

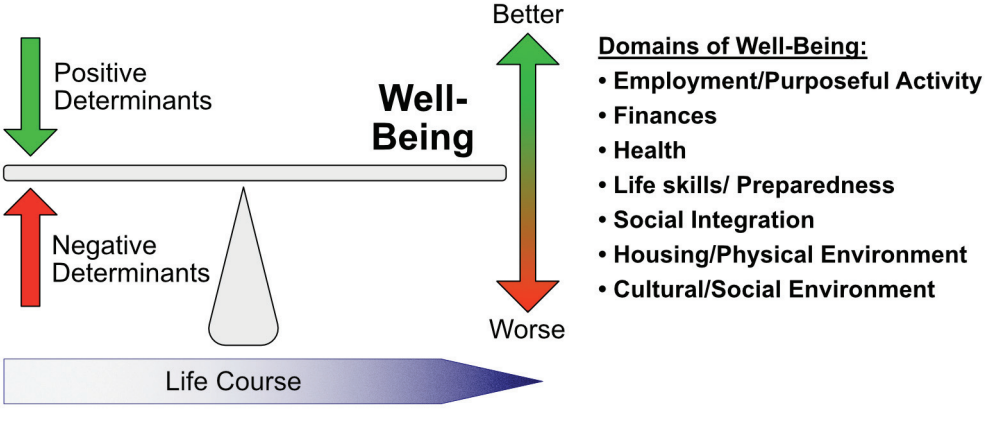

Figure 1. Well-being in any one domain fluctuates during the life course in response to prior and current determinants from all the domains

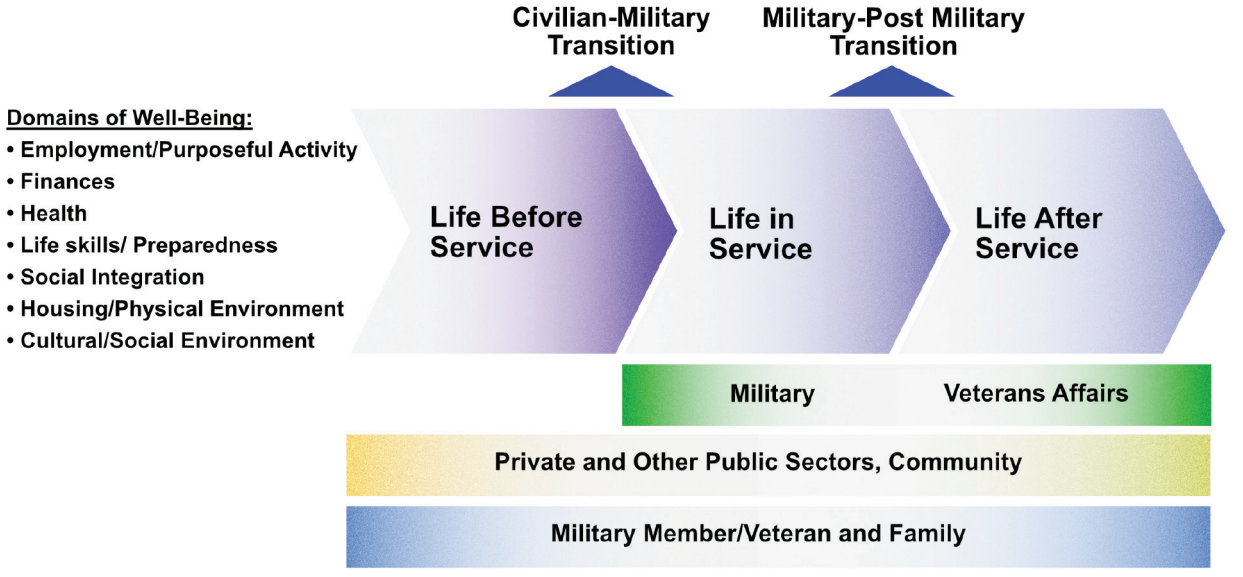

Figure 2. Well-being, major transitions, and roles of well-being influencers in the life courses of military Veterans

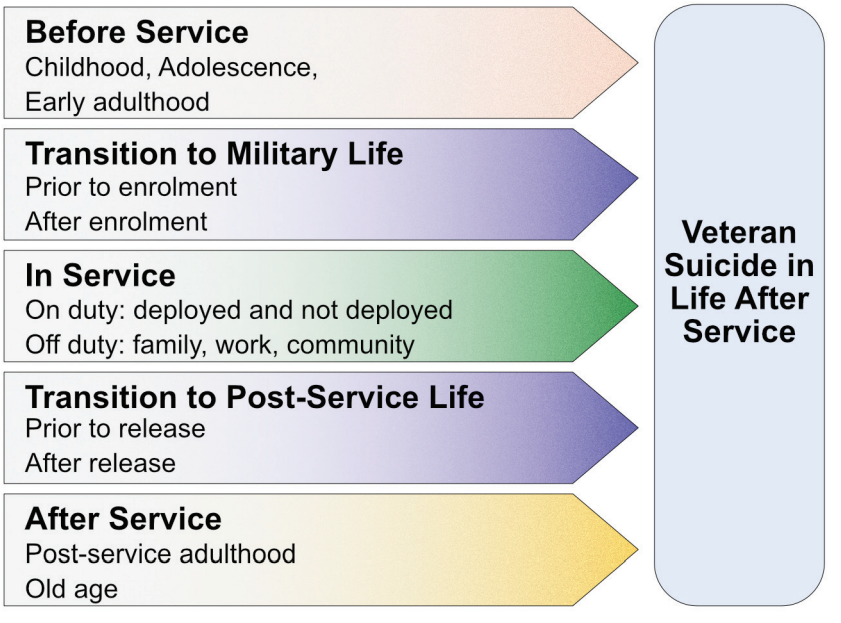

Figure 3. Suicide determinants originate across the life course

interdisciplinary and interagency solutions.[79] In life course theory, transitions from one environment to another are times of both opportunity and vulnerability requiring management of relationships, social identity, and cultural adjustments.[41,56,58,81] Factors across the life course are thought to play roles in the development of suicidality later in life (Figure 3).[40,41,57] There are two particularly significant transitions in the life courses of military Veterans: civilian to military life and military to post-military life.[44,82]

Pre-service life

Researchers hypothesize that genetic predispositions and epigenetic changes caused by adverse childhood experiences play roles in the diathesis that combines with life stressors later in life to produce suicidality in some but

not all individuals.[14,16,36,40] Adverse childhood experiences were more prevalent in CAF serving members than the CGP and have been associated with mental illness and suicidal ideation, plans, and attempts.[76,77] Family history of suicide introduces the possibility of suicide to vulnerable family members.[16,43] Coping styles can be established early in life. There is evidence that many with suicidal thoughts later in life have them for the first time in their early twenties.[16] In the United States, suicidal ideation, plans, and attempts in military personnel commonly had pre-enlistment onset.[83]

Civilian-military transition and life in service

Adjustment to military life and the development of military identity is rigorously managed during recruit training through controlled acculturation. Recruit training creates an identity crisis (challenge) intended to help the recruit become an integral part of military culture.[44,67,84] Some researchers have theorized that military life attracts individuals with adverse family backgrounds, providing them with social supports and a way of life better than at home.[77,85] However, there is evidence that adverse childhood experiences could render some Veterans vulnerable to mental health and well-being problems after release from the military.[56,57,77] Some military members who are released prematurely when they are unable to adapt to military life face the disappointment of failure and other well-being challenges.[85,86]

Well-being supports provided by the CAF to serving members are designed to mitigate problems in all the well-being domains. Supports include physical and mental fitness promotion, health care and rehabilitation services, employment, sense of purpose, income, housing, family supports, chain of command hierarchy, and training through programs such as the CAF's Road to Mental Readiness.[7] Members form military identities that provide the social capital needed for success in military life.[16,67,87] Military life is characterized by the formation of intensely strong relationships, especially in shared training and operational experiences.[44,56,88,89] These cultural protective factors could explain the finding that CAF members in service, although having higher rates of adverse childhood experiences, are not at a higher risk for suicide relative to the CGP.[12]

Military service factors that might influence vulnerable members toward suicide during and after service life include male cultural factors valuing invulnerability; problems adjusting to home life following deployment; the influence of shared identity felt when a colleague from the unit dies by suicide; formation of a strong military identity that is challenged in the culture shock after release; acquisition of service-related chronic physical or mental health problems; neurobiological changes acquired during prolonged stress or after traumatic brain injury; acquired capability for suicide following exposure to lethality and pain; family problems related to prolonged absences for training and operations; and lack of support or understanding from civilian society.[12,16,30,31,44,56,59,58,64,65,67,70,88,89] Serving personnel can acquire off-duty risk and protective factors shared by civilians.[16] In CAF Veterans, deployment was not associated statistically with suicidal ideation when adjusting for mental and physical health problems,[23] meaning that suicidality occurs in both deployed and non-deployed Veterans who acquire health problems. This finding is consistent with studies in the US military.[33,86,90]

Military-civilian transition (MCT) and post-military life

Military to civilian transition (MCT) is a time of challenge and increased vulnerability to well-being stressors, particularly during the earlier months and years after release. MCT often occurs without the planned cultural indoctrination that occurs during civilian-military transition.[30,56,59,84,86,91] All members adjusting to post-military life are challenged to some degree in various well-being domains.[26,92] Stress during MCT leads to distress that usually is normal but can be pathological for some Veterans.[58,89] Varying degrees of culture shock, social identity challenge, and emotional paradoxes or dilemmas are common among releasing military members as they transition from military to civilian cultures.[44,56–58,67,86,91,93,94] For some Veterans, there can be a profound loss of sense of purpose, social status, social integration, and social support.[59,89,93,95]

Most releasing CAF members enter the competitive civilian workforce rather than retire.[26,92] On average, incomes decrease for a time after release.[72] Incomes of some subgroups of CAF Veterans, including the medically released, women, and those with shorter lengths of service tend not to recover to pre-release levels as quickly. As many as 10% of CAF Regular Force Veterans divorce in the first 3 years after release.[71] Chronic physical health conditions, chronic pain, and the common mental health conditions (depression, anxiety, and posttraumatic stress disorder) are more prevalent in CAF Regular Force and Class C Reserve Force Veterans

released since 1998 than in the CGP and appear to be more prevalent than in the serving population.[8,30] Service-related chronic physical or mental health problems challenge Veterans in multiple well-being domains and can contribute to identity crises during transition.[82] Support services in multiple well-being domains, particularly health care and rehabilitation, are hypothesized to be less accessible after release than during military service.[12]

The same social integration, physical health, material loss and other well-being problems that affect the well-being of civilians also challenge Veterans after they release from service.[57,59] A file review of CAF Veterans participating in VAC programs who had suicidal ideation, attempts or death by suicide identified problems with physical and mental health, role disability, social integration, employment, finances, legal issues, housing, addiction, stigma, and care avoidance.[96]

The predominance of influencing factors varies with age. In Ontario, the youngest CAF and Royal Canadian Mounted Police Veterans were more likely to use hospital emergency departments for mental health problems.[97] In the United States, young adults have been more likely in recent years to report depression and suicidality than in earlier eras.[57] In a large US study, suicides in younger Veterans were more often preceded by relationship and legal problems, elevated blood alcohol, and substance abuse, while suicides in older Veterans were less likely to be preceded by a mental health diagnosis and more likely preceded by physical health problems, although all precedents occurred at all ages.[55] In middle age, chronic physical health conditions arise that challenge identity and well-being through role participation restriction. In old age, social disconnectedness, death of partners, health problems, loss of accustomed homes, and lost purpose seem to predominate.[14,55,74,96]

Core concept 3: opportunities for suicide prevention along the suicide pathway

The third core concept in the framework uses Rothman's causal pie[98] to summarize theories (Table 1) about

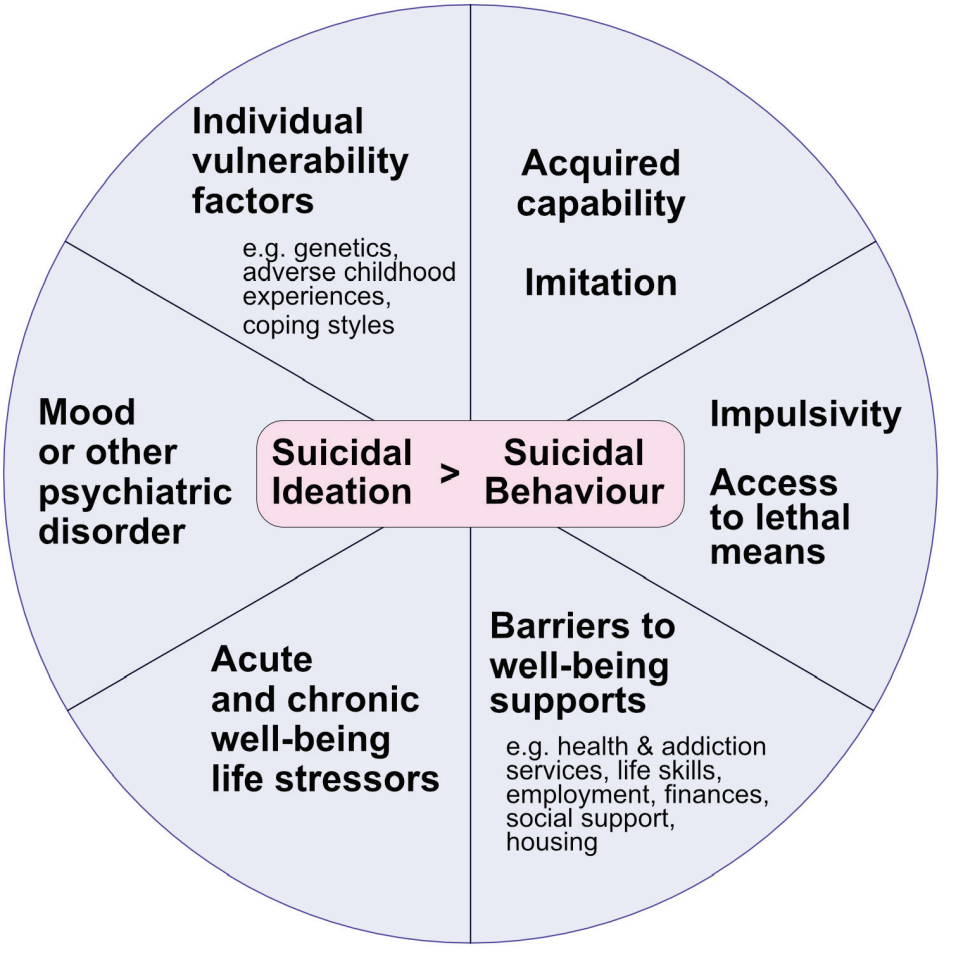

Figure 4. Opportunities for suicide prevention: interacting factors that influence people onto, along, or off pathways to suicide

factors thought to influence vulnerable people onto and along pathways to suicide throughout the life course (Figure 4).[14–16,33,34,41,43] Figure 4 accounts for all suspected suicide risk factors, but does not attempt to reflect either the complexity of causal inter-relationships between the factors or the strength of evidence for the relative importance of factors in ideation, attempts or death by suicide. This pathway concept was used in the CAF–VAC joint suicide prevention strategy[2] and is based on models developed for serving CAF members[3,4] and CAF Veterans[5] that in turn had been based on a model evolving since the 1970s.[16,29,34,35,41] The concept is grounded in the suicide theories shown in Table 1, and is consistent with empiric evidence from studies in CAF Veterans.[5,8,9,10,11,21,23–25,96]

Mental health and mental illness

Mental health and mental illness are two distinct continua.[99] Both poor mental health and mental illness, particularly certain forms of depression, are statistically associated with suicide.[73,74] Good mental health is thought to confer resilience to life's challenges,[100] decreasing the likelihood of following a suicidal pathway. While the defining features and causes of the suicidal diathesis continue to be explored, there is evidence that the promotion of good mental health and treatment for mental illness can help to prevent suicides.[33,35,44,52] Researchers are investigating treatments specifically designed to treat suicidal states of mind and related states, such as constricted decision-making capacity.[16,101]

There is evidence that MCT can challenge one's identity, which can have both clinical and subclinical mental health impacts.[8,9,41,56,89,93] Australian researchers found in longitudinal research that simply encouraging people with depression to join and identify with social groups can induce remissions and reduce relapses,[60] an approach that might help manage the social identity-related stresses of MCT, thereby preventing suicides in Veterans adapting to post-military life. In Canada, a longitudinal study found evidence for promoting meaning-finding to prevent suicidality.[41]

Well-being stressors

Suicides typically are preceded by one or more life stressors arising from any of the well-being domains, including problems with social integration and support, the legal system, employment, finances, physical health, disability, addiction, housing, and social identity.[8,16,54,74,82,102] Good mental health derives in part from resilience to and living well with challenges in all the well-being domains, so mitigating life stressors is thought to be important in suicide prevention.[16] Physical health problems and chronic pain are common in CAF Veterans and are associated with suicidality and suicide,[8,23,61,103] as are substance use disorders.[71] Well-being stressors implicated in mental health and suicidality also include cultural and social background factors (for example, adverse childhood experiences, traumatic service experiences and civilian misunderstanding of military identities).[16,56] As reviewed above, stressors unique to gender groups have been implicated in the development of poor mental health and suicidality.[44] Financial supports can improve well-being when they are not disincentives to participating in appropriate well-being behaviours such as treatment-seeking.[104] Transition to post-military life is a time of particular vulnerability to well-being stressors.[84,94] More work is required to sort out the relative strengths of the many stressors, likely varying person to person.

Individual vulnerability factors

Research indicates that some individuals are vulnerable to suicide, while others in similar circumstances seem to be resilient.[29,35,41] Several suicide theories propose that cognitive functioning, including problem solving and decision making, tends to be restricted in suicidal people in the face of life stressors (Table 1).[16] As reviewed above, individual vulnerability factors such as genetic and epigenetic predisposition, experiences across the life course, psychological traits, sense of meaning and purpose, social connectedness, and social identification (acquisition of values and norms) are all thought to play roles in the suicide pathway by conferring vulnerability to the development of a suicidal diathesis. Awareness of these vulnerability factors could help to prevent suicides.

Barriers to access to well-being support services

Authors have long commented on the importance of addressing well-being support barriers in people with suicidality, including Veterans.[13,34,41,55,103] Since effective mental health care has been shown to prevent suicides, then facilitating access to effective diagnosis and care for mental health problems, addiction, and suicidality is a high priority in suicide prevention recommendations.[35] Common suicide prevention activities such as maintenance of crisis lines and education typically are intended to facilitate access to mental health care, but can be

broadened to address the well-being life stressors that influence suicidality.[41]

Suicide prevention guidelines cite roles for informed gatekeepers who can identify persons at risk of suicide and facilitate access to help.[35,99] Stigma inhibits access to care for intervention, prevention, and support for survivors in postvention.[16] There is evidence from general population studies that, while mental health literacy is improving, attitudes toward people with mental illness might not have improved, and stigma reduction has not been effective for those who need it most.[105,106] The CAF has made strides in reducing mental health stigma during service,[7] but it remains unclear how the gain in stigma reduction translates to help-seeking for suicidality, particularly after release from service. In CAF Regular Force Veterans who were released in 1998–2011, 35% did not seek help for suicidal ideation,[21] consistent with US studies.[74] Avoidance is common in ideators.[104] In the United Kingdom, contact with specialist mental health services was lowest in the youngest Veterans who died by suicide, the age group with the highest risk in the United Kingdom[107] and Canada.[10] Records of elderly Veterans with suicidality tended not to mention mental health issues.[8,54]

Physical health problems, chronic pain, and related role disability are more prevalent in CAF Veterans released since 1998 than the CGP[8,108] and are known precedents to suicide.[16] Little is known about the extent of addictions in CAF Veterans. VAC facilitates access to health care, addiction, and rehabilitation services for service-related conditions in Veterans seeking VAC services, but little is known about CAF Veterans' access to public and private health care systems after release from service.[97]

VAC's programs and services address all the domains of well-being throughout the life course after release from service, but no one agency can be solely responsible: suicide prevention requires a whole-of-community approach, including the development of Veteran-friendly communities and campuses.[2,3,5,28,44,109–111] About a quarter of CAF Veterans live in rural Canada, and rurality confers special challenges and strengths in managing mental health and other well-being dimensions.[112]

Society has a role in promoting the achievement of healthy post-military identities that confer access to resources, restore a sense of meaning and purpose, and promote good mental health.[82] Vulnerable military Veterans can feel socially isolated and lack meaning or purpose after release from service.[57,74,95,111,113] Some researchers have argued that military personnel should be provided with the kind of cultural adaptation on release that they received in recruit training.[84,91] While most transitioning military members do not need therapeutic treatment for normal stress reactions during post-military acculturation and identity adaptation, many could benefit from counselling to help them adapt.[58,89] There is also evidence for the role of positive peer support mechanisms in promoting psychosocial well-being during the transition to post-military life.[41,82]

Imitation, acquired capability, impulsivity, and access to lethal means

Researchers argue that suicide is a learned, not innate, behaviour.[43] Suicide can occur in clusters after death by suicide by a celebrity or in a family, community, or military unit.[3,5,35] Military Veterans often have strong shared identities,[44,70,88,93] and shared identity is hypothesized to influence suicide in clusters. For example, the risk of suicide attempt was higher in US Army units that had more past-year attempts.[88] There has been considerable interest in the effects of professional and social media on Veteran suicides. It is important to find a balance in media activities between preventing imitation and more open discussion about suicide.[16,114]

Joiner argued that acquisition of the ability to lethally injure oneself could play a role.[43] Researchers have suggested that attempts by military personnel are more likely to be lethal owing to familiarity with lethal violence.[83] There is evidence that restricting access to lethal means can prevent suicides at both population and individual levels.[102] Loss of impulse inhibition emotionally or through alcohol and other drugs might be a preventable factor in some suicides.[55] Suicidality tends to occur episodically or during disinhibition, so if suicidal people are not able to act on suicidal impulses or access lethal means, then they are less likely to attempt, affording intervention opportunities. Firearms were more often used in suicide by US Veterans than non-Veterans[55,115] In CAF serving members and Veterans, hanging was predominant, followed by firearms, then a variety of methods including asphyxiation other than hanging, motor vehicle crash, and overdose.[96,102]

Implications

The framework proposed in this article organizes theories and evidence about suicide to facilitate planning for suicide prevention activities and research.

Suicide prevention

The framework can be used to assist in developing a whole-of-community, life course approach to suicide prevention by pointing out multiple opportunities for suicide prevention. The framework promotes discussion about suicide prevention organized both as *prevention*, *intervention*, and *postvention*,[13,40] and in terms of target groups: *universal* (whole populations), *selective* (vulnerable sub-populations), and *indicated* (individuals with ideation or attempts).[28] The framework emphasizes that suicide prevention requires a dual approach: (1) on the one hand, effective recognition, diagnosis and treatment of mental illness and acute suicidality, and (2) on the other hand, promotion of good mental health through supports in all the well-being domains.

Research

The proposed framework provides a systematic, high-level approach to assessing knowledge gaps and planning research. The framework is informing VSMS analyses that will help to clarify risk and protective indicators to develop hypotheses about causality. New advances in machine learning that shift focus from risk factors to multifactorial algorithms could lead to more effective screening to identify people on suicidal pathways and predicting who with ideation will proceed to attempts.[33,36,39] Research is needed to understand how experiences earlier in life influence suicidality later in life.[40] Much remains to be learned about the efficacy, safety and cost-effectiveness of suicide prevention, intervention, and postvention activities.[6,101] Finally, evolving suicide research evidence will test the proposed framework's relevance and utility.

Conclusion

The framework proposed in this article fulfills the need for an evidence-based, comprehensive, and practical way to think about Veteran suicide prevention activities and research. Evidence indicates that Veterans are influenced onto, along, and off suicide pathways by variable combinations of mental illness, stressful life events in multiple areas of well-being, individual vulnerability to suicidal diathesis formation, access to well-being supports, acquired capacity, impulsivity, imitation, and access to lethal means. More remains to be understood about reasons for the higher risk of suicide in CAF Veterans and approaches to effective suicide prevention. The framework is consistent with proposed theories and empiric evidence but is not expected to preclude new findings about suicide causes and prevention. In the meantime, the framework should help people from all walks of life to identify how they can help with suicide prevention.

REFERENCES

1. Public Health Agency of Canada. Working together to prevent suicide in Canada: the federal framework for suicide prevention. Ottawa: Health Canada. Catalogue number HP35-61/2015E-PDF. 2015. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/suicide-prevention-framework.html.
2. Canadian Armed Forces and Veterans Affairs Canada. Joint Suicide Prevention Strategy. Ottawa: Government of Canada. ISBN 978-0-660-20443-7. 2017. Available from: https://www.canada.ca/en/department-national-defence/corporate/reports-publications/caf-vac-joint-suicide-prevention-strategy.html.
3. Zamorski MA. Report of the Canadian Forces Expert Panel on Suicide Prevention. Ottawa: Canadian Forces Health Services. 2010. Available from: http://www.rcaf-arc.forces.gc.ca/assets/FORCES_Internet/docs/en/about-reports-pubs-health/expert-panel-suicide-prevention.pdf.
4. Zamorski MA. Suicide prevention in military organizations. Int Rev Psychiatry. 2011;23(2):173–180. https://doi.org/10.3109/09540261.2011.562186. Medline:21521087
5. Thompson JM, Pranger T, Ross D, et al. Suicide prevention at Veterans Affairs Canada: framework. Charlottetown, PE, Canada: Suicide Prevention Approach Working Group, Veterans Affairs Canada. National Mental Health Directorate Technical Report; 2010.
6. Sareen J, Holens P, Turner S, et al. Report of the 2016 mental health expert panel on suicide prevention in the Canadian Armed Forces. J Mil Vet Fam Health. 2018;4(1):70–89. https://doi.org/10.3138/jmvfh.2017-0043.
7. Zamorski MA, Bennett RE, Boulos D, et al. The 2013 Canadian Forces Mental Health Survey: background and methods. Can J Psychiatry. 2016;61(1 Suppl): 10S–25S. https://doi.org/10.1177/0706743716632731. Medline:27270738
8. Thompson JM, VanTil L, Zamorski MA, et al. Mental health of Canadian Armed Forces Veterans: review of population studies. J Mil Vet Fam Health. 2016;2(1):70–86. https://doi.org/10.3138/jmvfh.3258.
9. Thompson JM, Dursun S, VanTil L, et al. Group identity, difficult adjustment to civilian life, and suicidal ideation in Canadian Armed Forces Veterans: Life After Service Studies 2016. J Mil Vet Fam Health. Forthcoming 2019.

10. Simkus K, VanTil L, Pedlar D. 2017 Veteran suicide mortality study 1976 to 2012. Charlottetown, PE: Research Directorate, Veterans Affairs Canada. Technical Report. Catalogue #: V32-346/2017E-PDF. 2017. Available from: http://publications.gc.ca/pub?id=9.847961&sl=0.
11. Statistics Canada. Canadian Forces cancer and mortality study: causes of death. Ottawa: Statistics Canada, Catalogue no. 82-584-X. 2011. Available from: https://www150.statcan.gc.ca/n1/en/catalogue/82-584-X
12. Rolland-Harris E, Weeks M, Simkus K, et al. Overall mortality of Canadian Armed Forces personnel enrolled 1976–2012. Occup Med. 2018;68(1):32–7. https://doi.org/10.1093/occmed/kqx182. Medline:29361061
13. Health Canada. Suicide in Canada: report of the national task force on suicide in Canada. Ottawa: Mental Health Division, Health Services and Promotion Branch, Health and Welfare Canada; 1987.
14. Clark DC. Narcissistic crises of aging and suicidal despair. Suicide Life Threat Behav. 1993;23(1):21–6. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1943-278X.1993.tb00275.x.
15. Barzilay S, Apter A. Psychological models of suicide. Arch Suicide Res. 2014;18(4):295–312. https://doi.org/10.1080/13811118.2013.824825. Medline:24568371
16. Nock MK, Deming CA, Fullerton CS, et al. Suicide among soldiers: a review of psychosocial risk and protective factors. Psychiatry. 2013;76(2):97–125. https://doi.org/10.1521/psyc.2013.76.2.97. Medline:23631542
17. Apter A, Plutchik R, van Praag HM. Anxiety, impulsivity and depressed mood in relation to suicidal and violent behavior. Acta Psychiatr Scand. 1993;87(1):1–5. https://doi.org/10.1111/j.1600-0447.1993.tb03321.x.
18. Plutchik, R. (1995). Outward and inward directed aggressiveness: the interaction between violence and suicidality. Pharmacopsychology. 1995;28(Suppl 2):47–57. https://doi.org/10.1055/s-2007-979620. Medline:8614701
19. Patten S. Epidemiology for Canadian students: principles, methods and critical appraisal. 1st ed. Edmonton: Brush Education Ltd; 2015.
20. Ribeiro JD, Huang X, Fox KR, et al. Depression and hopelessness as risk factors for suicide ideation, attempts and death: meta-analysis of longitudinal studies. Br J Pscyhiatry. 2018;212(5):279–86. https://doi.org/10.1192/bjp.2018.27. Medline:29587888
21. Thompson JM, Sweet J, Poirier A, et al. Suicide ideation and attempt findings in the Survey on Transition to Civilian Life: descriptive analysis. Charlottetown, PE: Veterans Affairs Canada. Research Directorate Technical Report; 2011. Available from: http://publications.gc.ca/pub?id=9.861869&sl=0.
22. Carleton RN, Afifi TO, Turner S, et al. Suicidal ideation, plans, and attempts among public safety personnel in Canada. Can Psychol. 2018;59(3):220–31. http://doi.org/10.1037/cap0000136.
23. Thompson JM, Zamorski MA, Sweet J, et al. Roles of physical and mental health in suicidal ideation in Canadian Armed Forces Regular Force Veterans. Can J Public Health. 2014;105(2):e109–15. https://doi.org/10.17269/cjph.105.4217.
24. Thompson JM, Van Til L, Sweet J, et al. Canadian Armed Forces Veterans: mental health findings from the 2013 Life After Service Survey. Charlottetown, PE: Veterans Affairs Canada Veterans Affairs Canada. Research Directorate Technical Report; 2015. Available from: http://publications.gc.ca/pub?id=9.808501&sl=0
25. Thompson JM, Sweet J, VanTil L, et al. Correlates of Mental Health Problems in Canadian Armed Forces Veterans – 2013 Life After Service Survey. Charlottetown PE: Research Directorate, Veterans Affairs Canada. Research Directorate Technical Report. Charlottetown; 14 September 2016. Available from: http://publications.gc.ca/pub?id=9.857307&sl=0.
26. Thompson JM, Van Til L, Poirier A, et al. Health and well-being of Canadian Armed Forces Veterans: Findings from the 2013 Life After Service Study. Charlottetown, PE: Veterans Affairs Canada. Research Directorate Technical Report; 2014. Available from: http://publications.gc.ca/pub?id=9.818364&sl=0.
27. Navaneelan T. Suicide rates: an overview. Ottawa: Statistics Canada. Health at a Glance. Catalogue no. 82-624-X; 2012. Available from: https://www150.statcan.gc.ca/n1/pub/82-624-x/2012001/article/11696-eng.htm.
28. World Health Organization. Preventing suicide: a global imperative. Geneva: World Health Organization; 2014. Available from: https://www.who.int/mental_health/suicide-prevention/world_report_2014/en/.
29. Mann JJ. A current perspective of suicide and attempted suicide. Ann Intern Med. 2002;136(4):302–11. https://doi.org/10.7326/0003-4819-136-4-200202190-00010. Medline:11848728
30. Castro CA, Kintzle S. Suicides in the military: the post-modern combat Veteran and the Hemingway effect. Curr Psychiatry Rep. 2014;16(8):460. https://doi.org/10.1007/s11920-014-0460-1. Medline:24930521
31. Naifeh JA, Nock MK, Ursano RJ. Armed Forces. In: Koslow SH, Ruiz P, Nemeroff CB, editors. A concise guide to understanding suicide: epidemiology,

pathophysiology and prevention. London: Cambridge University Press; 2014. p.191–200.
32. Franklin JC, Ribeiro JD, Fox KR, et al. Risk factors for suicidal thoughts and behaviours: a meta-analysis of 50 years of research. Psychol Bull. 2017;143(2):187–232. https://doi.org/10.1037/bul0000084. Medline:27841450
33. Herberman Mash HB, Naifeh JA, Fullerton CS, et al. Suicidal behaviors in military and Veteran populations: risk factors and strategies for prevention and intervention. In: Roberts LW, Warner CH, editors. Military and Veteran mental health. New York: Springer; 2018. p. 401–19. https://doi.org/10.1007/978-1-4939-7438-2_24.
34. Shulman K. Suicide and parasuicide in old age: a review. Age Ageing. 1978;7(4):201–9. https://doi.org/10.1093/ageing/7.4.201.
35. Mann JJ, Apter A, Bertolote J, et al. Suicide prevention strategies: a systematic review. JAMA. 2005;294(16):2064–74. https://doi.org/10.1001/jama.294.16.2064. Medline:16249421
36. Naifeh JA, Mash HB, Stein MB, et al. The Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS): progress toward understanding suicide among soldiers. Mol Psychiatry. 2019;24(1):34–48. https://doi.org/10.1038/s41380-018-0197-z. Medline:30104726
37. Baumeister RF. Suicide as escape from self. Psychol Rev. 1990;97(1):90–113. https://doi.org/10.1037//0033-295x.97.1.90. Medline:2408091
38. Wenzel A, Beck AT. A cognitive model of suicidal behavior: theory and treatment. Appl Prev Psychol. 2008;12(4):189–201. https://doi.org/10.1016/j.appsy.2008.05.001.
39. O'Connor RC, Kirtley OJ. The integrated motivational-volitional model of suicide behaviour. Phil Trans R Soc Lond B Biol Sci. 2018;373(1754):pii 20170268. https://doi.org/10.1098/rstb.2017.0268. Medline:30012735
40. Van Heeringen K, Mann JJ. The neurobiology of suicide. Lancet Psychiatry. 2014;1(1):63–72. http://doi.org/10.1016/S2215-0366(14)70220-2. Medline:26360403
41. Heisel MJ, Flett GL. Does recognition of meaning in life confer resiliency to suicide ideation among community-residing older adults? A longitudinal investigation. Am J Geriatr Psychiatry. 2016;24(6):455–66. https://doi.org/10.1016/j.jagp.2015.08.007. Medline:26880611
42. Shneidman ES. A possible classification of suicidal acts based on Murray's need system. Suicide Life Threat Behav. 1980;10(3):175–81. https://doi.org/10.1111/j.1943-278x.1980.tb00777.x. Medline:7210104
43. Joiner TE. Why people die by suicide. Cambridge, MA: Harvard University Press; 2005.
44. North Atlantic Treaty Organization (NATO). Military suicide prevention: report prepared for NATO leadership. Final report of Research Task Group 218. Neuilly-sur-Seine Cedex, FR: NATO Science and Technology Organization; 2018 Jun. STO Technical Report TR-HFM-218. 2017. Available from: https://www.sto.nato.int/publications/STO%20Technical%20Reports/STO-TR-HFM-218/$$TR-HFM-218-ALL.pdf
45. Phillips MR. Rethinking the role of mental illness in suicide. Am J Psychiatry. 2010;167(7):731–3. https://doi.org/10.1176/appi.ajp.2010.10040589. Medline:20595422
46. Durkheim E. Suicide: a study in sociology (First published in 1897). New York: Free Press; 1951.
47. Freud S. Beyond the pleasure principle. Hubback CJM, translator. Overland Park, KS: Digireads.com Publishing. Ebook ISBN 13:978-1-4209-3634-6; 1920. p. 12–13.
48. Menninger KA. Man against himself. Oxford: Harcourt, Brace; 1938.
49. Klein, M. A contribution to the psychogenesis of manic-depressive states. Int J Psychoanal. 1935;16:145–74.
50. Schotte DE, Clum GA. Problem-solving skills in suicidal psychiatric patients. J Consult Clin Psychol. 1987;55(1):49–54. https://doi.org/10.1037//0022-006x.55.1.49.
51. Beck AT, Brown G, Berchick RJ, et al. Relationship between hopelessness and ultimate suicide: a replication with psychiatric outpatients. Am J Psychiatry. 1990;147(2):190–5. https://doi.org/10.1176/ajp.147.2.190. Medline:2278535
52. Linehan MM. Cognitive-behavioral treatment of borderline personality disorder. New York: Guilford Press; 1993.
53. Williams JMG. Cry of pain: understanding suicide and self-harm. London: Penguin Books; 1997.
54. Rudd MD. Fluid vulnerability theory: a cognitive approach to understanding the process of acute and chronic suicide risk. In: Ellis TE, editor. Cognition and suicide: theory, research, and therapy. Washington, DC: American Psychological Association; 2006. p. 355–68. http://doi.org/10.1037/11377-016.
55. Kaplan MS, McFarland BH, Huguet N, et al. Suicide risk and precipitating circumstances among young, middle-aged and older male Veterans. Am J Public Health. 2012;102(Suppl 1):S131–7. https://doi.org/10.2105/ajph.2011.300445. Medline:22390587
56. Smith RT, True G. Warring identities, identity conflict and the mental distress of American

Veterans of the Wars in Iraq and Afghanistan. Soc Ment Health. 2014;4(2):147–61. https://doi.org/10.1177/2156869313512212.
57. Griffith J, Bryan CJ. Suicides in the U.S. Military: birth cohort vulnerability and the all-volunteer force. Armed Forces Soc. 2016;42(3):1–18. Epub 2015 Nov 18 [cited 2017]. http://doi.org/10.1177/0095327X15614552.
58. Castro CA, Kintzle S, Hassan AM. The combat Veteran paradox: paradoxes and dilemmas encountered with reintegrating combat Veterans and the agencies that support them. Traumatology. 2015;21(4):299–310. https://doi.org/10.1037/trm0000049.
59. Pease JL, Billera M, Gerard G. Military culture and the transition to civilian life: suicide risk and other considerations. Soc Work. 2016;61(1):83–6. https://doi.org/10.1093/sw/swv050. Medline:26898003
60. Haslam C, Cruwys T, Haslam SA, et al. Groups 4 Health: evidence that a social-identity intervention that builds and strengthens social group membership improves mental health. J Affect Disord. 2016;194:188–95. https://doi.org/10.1016/j.jad.2016.01.010. Medline:26828756
61. El-Gabalawy R, Asmundson DJG, Sareen J. Suicide and chronic pain. In: Berman AL, Pompili M, editors. Medical conditions associated with suicide risk. Washington, DC: Amr Assoc Suicid; 2011. p. 75–86.
62. Canetto SS, Sakinofsky I. The gender paradox in suicide. Suicide Life Threat Behav. 1998;28(1):1–23. Medline:9560163
63. Seidler ZE, Dawes AJ, Rice SM, et al. The role of masculinity in men's help-seeking for depression: a systematic review. Clin Psychol Rev. 2016;49:106–18. https://doi.org/10.1016/j.cpr.2016.09.002. Medline:27664823
64. Taber N. After Deschamps: men, masculinities, and the Canadian Armed Forces. J Mil Vet Fam Health. 2018;4(1):100–7. https://doi.org/10.3138/jmvfh.2017-0005.
65. Eichler M. Add female Veterans and stir? A feminist perspective on gendering Veterans research. Armed Forces Soc. 2017;43(4):1–21. Epub 2016 Dec 19 [cited 2017]. https://doi.org/10.1177/0095327x16682785.
66. Mota NP, Medved M, Hiebert-Murphy D, et al. Negotiating home base: narratives of psychological well-being among female military members. Health Place. 2018;50:105–11. https://doi.org/10.1016/j.healthplace.2018.01.005. Medline:29414421
67. Cooper L, Caddick N, Godier L, et al. Transition from the military into civilian life: an exploration of cultural competence. Armed Forces Soc. 2018;44(1):156–77. Epub 2016 Dec 12 [cited 2017]. https://doi.org/10.1177/0095327x16675965.
68. Testa RJ, Michaels MS, Bliss W, et al. Suicidal ideation in transgender people: gender minority stress and interpersonal theory factors. J Abnorm Psychol. 2017;126(1):125–36. https://doi.org/10.1037/abn0000234. Medline:27831708
69. Ramchand R, Ayer L, Kotzias V, et al. Suicide risk among women Veterans in distress: perspectives of responders on the Veterans' crisis line. Womens Health Issues. 2016;26(6):667–73. https://doi.org/10.1016/j.whi.2016.07.005. Medline:27576006
70. Di Leone BA, Wang JM, Kressin N, et al. Women's Veteran identity and utilization of VA Health Services. Psychol Serv. 2016;13(1):60–8. https://doi.org/10.1037/ser0000021. Medline:25729892
71. Bohnert KM, Ilgen MA, Louzon S, et al. Substance use disorders and the risk of suicide mortality among men and women in the US Veterans Health Administration. Addiction. 2017 Jul;112(7):1193–201. https://doi.org/10.1111/add.13774. Medline:28301070
72. MacLean MB, Van Til L, Poirier A, et al. Pre- and post-release income of regular force Veterans: Life After Service Studies 2016. Charlottetown, PE: Veterans Affairs Canada. Research Directorate Technical Report; 2017.
73. Posner K, Buchanan J, Amira L, et al. Identification and screening of suicide risk. In: Koslow SH, Ruiz P, Nemeroff CB, editors. A concise guide to understanding suicide – epidemiology, pathophysiology and prevention. Cambridge, UK: Cambridge University Press; 2014. p. 17–32.
74. Fanning JR, Pietrzak RH. Suicidality among older male Veterans in the United States: results from the National Health and Resilience in Veterans Study. J Psychiatr Res. 2013;47(11):1766–75. https://doi.org/10.1016/j.jpsychires.2013.07.015. Medline:23992768
75. Ketcheson F, King L, Richardson D. Association between social support and mental health conditions in treatment-seeking Veterans and Canadian Forces personnel. J Mil Vet Fam Health. 2017;4(1):20–32. https://doi.org/10.3138/jmvfh.2017-0001.
76. Sareen J, Henriksen CA, Bolton SL, et al. Adverse childhood experiences in relation to mood and anxiety disorders in a population-based sample of active military personnel. Psychol Med. 2013;43(1):73–84. https://doi.org/10.1017/s003329171200102x. Medline:22608015
77. Afifi TO, Tallieau T, Zamorski MA, et al. Association of child abuse exposure with suicidal ideation, suicide plans, and suicide attempts in military personnel and the general population in Canada. JAMA Psychiatry. 2016;73(3):229–38. https://doi.org/10.1001/jamapsychiatry.2015.2732. Medline:26817953

78. Thompson JM, MacLean MB, Roach MB, et al. Charlottetown PE: Veterans Affairs Canada: a well-being construct for Veterans' policy, programming and research. Research Directorate Technical Report; 2016. Available from: http://publications.gc.ca/site/eng/9.857304/publication.html.
79. Hertzman C, Power C. Health and human development: understandings from life-course research. Dev Neuropsychol. 2003;24(2–3):719–44. https://doi.org/10.1080/87565641.2003.9651917. Medline:14561568
80. Kuh D, Ben-Shlomo Y, Lynch J, et al. Life course epidemiology. J Epidemiol Community Health. 2003 Oct 1;57:778–83. https://doi.org/10.1136/jech.57.10.778. Erratum in: J Epidemiol Commun H. 2003 Nov 1. Corrected at: http://dx.doi.org/10.1136/jech.57.11.914-a.
81. Sayer NA, Frazier P, Orazem RJ, et al. Military to civilian questionnaire: a measure of postdeployment community reintegration difficulty among Veterans using Department of Veterans Affairs medical care. J Trauma Stress. 2011 Dec;24(6):660–70. https://doi.org/10.1002/jts.20706. Medline:22162082
82. Thompson JM, Lockhart W, Roach MB, et al. Veterans' identities and well-being in transition to civilian life – a resource for policy analysts, program designers, service providers and researchers. Report of the Veterans' Identities Research Theme Working Group, Canadian Institute for Military and Veteran Health Research Forum 2016. Charlottetown PE: Veterans Affairs Canada. Research Directorate Technical Report; 2017. Available from: https://cimvhr.ca/documents/Thompson%202017%20Veterans%20Identities%20Technical%20Report.pdf.
83. Nock MK, Stein MB, Heeringa SG, et al. Prevalence and correlates of suicidal behavior among soldiers: results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). JAMA Psychiatry. 2014;71(5):514–22. https://doi.org/10.1001/jamapsychiatry.2014.30. Medline:24590178
84. Blackburn D. Transitioning from military to civilian life: examining the final step in a military career. Can Mil J. 2016;16(4):53–61.
85. Iversen A, Nikolaou V, Greenberg N, et al. What happens to British Veterans when they leave the armed forces? Eur J Public Health. 2005;15(2):175–84. https://doi.org/10.1093/eurpub/cki128. Medline:15755777
86. Reger MA, Smolenski DJ, Skopp NA, et al. Risk of suicide among US military service members following Operation Enduring Freedom or Operation Iraqi Freedom deployment and separation from the US military. JAMA Psychiatry. 2015;72(6):561–9. https://doi.org/10.1001/jamapsychiatry.2014.3195. Medline:25830941
87. Atuel HR, Castro CC. Military cultural competence. Clin Soc Work J. 2018;46(3):74–82. https://doi.org/10.1007/s10615-018-0651-z.
88. Ursano RJ, Kessler RC, Naifeh JA, et al. Risk of suicide attempt among soldiers in army units with a history of suicide attempts. JAMA Psychiatry. 2017;74(9):924–31. http://doi.org/10.1001/jamapsychiatry.2017.1925. Medline:28746705
89. Keeling M. Stories of transition: narratives of US Veterans' military to civilian transition. J Mil Vet Fam Health. 2018;4(2):28–36. https://doi.org/10.3138/jmvfh.2017-0009
90. LeardMann CA, Powell TM, Smith TC, et al. Risk factors associated with suicide in current and former US military personnel. JAMA. 2013;310(5):496–506. https://doi.org/10.1001/jama.2013.65164. Medline:23925620. Erratum in: JAMA. 2013;310(10):1076. Corrected at: https://doi.org/10.1001/jama.2013.276547.
91. Bergman BP, Burdett HJ, Greenberg N. Service life and beyond – institution or culture? RUSI J. 2014;159(5):60–8. https://doi.org/10.1080/03071847.2014.969946.
92. VanTil LD, Sweet J, Poirier A, et al. Well-being of Canadian Regular Force Veterans, findings from LASS 2016 survey. Charlottetown, PE: Veterans Affairs Canada. Research Directorate Technical Report; 2017. Available from: http://publications.gc.ca/pub?id=9.839366&sl=0.
93. Orazem RJ, Frazier PA, Schnurr PP, et al. Identity adjustment among Afghanistan and Iraq War Veterans with reintegration difficulty. Psychol Trauma. 2017:9(Suppl 1):4–11. Epub 2016 Nov 28 [cited 2017]. http://doi.org/10.1037/tra0000225. Medline:27893267
94. Robinson J, Littlefield P, Schleuning A. Transforming Veterans' experiences during military-to-civilian transition: gaps and opportunities. Washington, DC: VA Center for Innovation, U.S. Veterans Administration; 2017.
95. Hatch SL, Harvey SB, Dandeker C, et al. Life in and after the Armed Forces: social networks and mental health in the UK military. Sociol Health Illn. 2013;35(7):1045–64. https://doi.org/10.1111/1467-9566.12022. Medline:23356827
96. Thompson JM, Carter K. Findings from the 2014 suicidality file review. Charlottetown, PE: Veterans Affairs Canada. Research Directorate Technical Report; 2014.
97. Mahar AL, Aiken AB, Cramm H, et al. Mental health service use trends in Canadian Veterans: a population-based retrospective cohort study in

Ontario. Can J Psychiatry. 2018;63(6):378–86. https://doi.org/10.1177/0706743717730826. Medline:28903578
98. Rothman KJ, Greenland S. Causation and causal inference in epidemiology. Am J Public Health. 2005;95(S1):S144–50. https://doi.org/10.2105/ajph.2004.059204. Medline:16030331
99. Keyes KM, Nicholson R, Kinley J, et al. Age, period, and cohort effects in psychological distress in the United States and Canada. Am J Epidemiol. 2014;179(10):1216–27. https://doi.org/10.1093/aje/kwu029. Medline:24692432
100. McCreary DR, Fikretoglu D. Psychological resilience. In: Ivey G, Sudom K, Dean WH, Tremblay M, editors. The human dimensions of operations – a personnel research perspective. Ottawa: Canadian Defence Academy Press; 2014. p. 55–70.
101. Zalsman G, Hawton K, Wasserman D, et al. Suicide prevention strategies revisited: 10-year systematic review. Lancet Psychiatry. 2016;3(7):646–59. http://doi.org/10.1016/S2215-0366(16)30030-X.
102. Collins R, Matheson H, Sedge P, et al. Medical professional technical suicide review report. Ottawa: Canadian Armed Forces Health Services Group; 2013.
103. Pietrzak E, Pullman S, Cotea C, et al. Effects of deployment on mental health in modern military forces: a review of longitudinal studies. J Mil Veterans Health. 2012;20(3):24–36.
104. Tsai J, Rosenheck RA. Examination of Veterans Affairs disability compensation as a disincentive for employment in a population-based sample of Veterans under age 65. J Occup Rehabil. 2013;23(4):504–12. https://doi.org/10.1007/s10926-013-9419-z. Medline:23358807
105. MacKenzie CS, Erickson J, Deane FP, et al. Changes in attitudes toward seeking mental health services: a 40-year cross-temporal meta-analysis. Clin Psychol Rev. 2014;34(2):99–106. https://doi.org/10.1016/j.cpr.2013.12.001. Medline:24486521
106. Schomerus G, Schwahn C, Holzinger A, et al. Evolution of public attitudes about mental illness: a systematic review and meta-analysis. Acta Psychiatr Scand. 2012;125(6):440–52. https://doi.org/10.1111/j.1600-0447.2012.01826.x. Medline:22242976
107. Kapur N, While D, Blatchley N, et al. Suicide after leaving the UK armed forces – a cohort study. PLoS Med. 2009;6(3):e26. https://doi.org/10.1371/journal.pmed.1000026. Medline:19260757
108. Thompson JM, Pranger T, Sweet J, et al. Disability correlates in Canadian Armed Forces Regular Force Veterans. Disabil Rehabil. 2015;37(10):884–91. https://doi.org/10.3109/09638288.2014.947441. Medline:25203768
109. Boerstler JW. Resilient cities: how community-based military transition programs accelerate impact. Presentation at the 2017 Forum of the Canadian Institute for Military and Veteran Health Research, Toronto, Ontario.
110. Lokken JM, Pfeffer DS, McAuley J, et al. A statewide approach to creating Veteran-friendly campuses. New Dir Stud Serv. 2009;126:45–54. https://doi.org/10.1002/ss.315.
111. Demers AL. When Veterans return: the role of community in reintegration. J Loss Trauma. 2011;16(2):160–79. https://doi.org/10.1080/15325024.2010.519281.
112. Kirchner JE, Farmer MS, Shue VM, et al. Partnering with communities to address the mental health needs of rural Veterans. J Rural Health. 2011;27(4):416–24. https://doi.org/10.1111/j.1748-0361.2011.00362.x. Medline:21967386
113. Rogers CR. Psychological adjustments of discharged service personnel. Psychol Bull. 1944;41(10):689–96. https://doi.org/10.1037/h0058355.
114. Sinyor M, Pirkis J, Picard A, et al. Towards a shared understanding: perspectives from Toronto's first media forum for suicide prevention. Can J Public Health. 2016;107(3):e330–2. https://doi.org/10.17269/cjph.107.5437. Medline:27763851
115. Kang HK, Bullman TA, Smolenski DJ, et al. Suicide risk among 1.3 million Veterans who were on active duty during the Iraq and Afghanistan wars. Ann Epidemiol. 2015;25(2):96–100. https://doi.org/10.1016/j.annepidem.2014.11.020. Medline:25533155

AUTHOR INFORMATION

Jim Thompson, MD, was the Research Medical Advisor at Veterans Affairs Canada until March 2019. He served in the CAF Reserve Force prior to medicine and has over 100 scientific publications. He is Adjunct Associate Professor, Department of Public Health Sciences, at Queen's University. His research focus is Veterans' well-being, including physical and mental health, functioning, and quality of life.

LCol (Ret'd) Alexandra Heber, MD, is Chief Psychiatrist of Veterans Affairs Canada and Assistant Professor of Psychiatry at University of Ottawa. She was Head Psychiatrist for the Canadian Forces Health Services Support Unit, Afghanistan (2009), and has authored reports on PTSD and Operational Stress Injury.

Linda VanTil, DVM, MSc (Epi), is the senior epidemiologist in the Research Directorate at Veterans Affairs Canada. She is Principal Investigator for the Life

After Service program of research and oversees population health research.

Kristen Simkus, MPH, is an epidemiologist in the Research Directorate at Veterans Affairs Canada. She is seconded to the Department of National Defence where she contributes to the Canadian Forces Cancer and Mortality Study II and has a lead role on the Veteran Suicide Mortality Study.

Lina Carrese, MPs, Doctoral Candidate, is a clinical psychologist who leads mental health strategy development and implementation within Veterans Affairs Canada's Directorate of Mental Health.

Jitender Sareen, MD, is the Head of the Department of Psychiatry at the University of Manitoba and Professor in the Departments of Psychiatry, Psychology, and Community Health Sciences. Dr. Sareen has published more than 300 peer-reviewed publications in the areas of traumatic stress, anxiety disorders, Indigenous suicide, neuroimaging, and military mental health.

David Pedlar, PhD, is the Scientific Director of the Canadian Institute of Military and Veteran Health Research, and Professor at the School of Rehabilitation Therapy, Queen's University in Kingston, Ontario. Formerly the Director of Research, Veterans Affairs, he has dedicated his career to advancing the care and well-being of Canadian Armed Forces personnel, Veterans, and their families.

COMPETING INTERESTS

None declared.

This article has been peer reviewed.

CONTRIBUTORS

Jim Thompson, Alexandra Heber, and Linda VanTil conceived the article. All authors conducted literature searches and contributed to the design of the framework. Jim Thompson drafted the manuscript. All authors reviewed drafts and approved the final version submitted for publication.

FUNDING

None declared.