



Ross, D., Mackay, D.F. and Bergman, B.P. (2021) Risk factors for mental ill health in UK Army personnel: an overview. *BMJ Military Health*, (doi: [10.1136/bmjmilitary-2020-001679](https://doi.org/10.1136/bmjmilitary-2020-001679))

The material cannot be used for any other purpose without further permission of the publisher and is for private use only.

There may be differences between this version and the published version. You are advised to consult the publisher's version if you wish to cite from it.

<http://eprints.gla.ac.uk/240381/>

Deposited on 04 May 2021

Enlighten – Research publications by members of the University of  
Glasgow

<http://eprints.gla.ac.uk>

# Risk Factors for Mental Ill Health in UK Army Personnel: An Overview

## Abstract

Women in the UK military are more commonly diagnosed with a mental health disorder than men, but the reasons for this difference are not fully understood. This literature review identifies the risk factors for mental ill health in military personnel before serving, during service, and as a veteran. The interaction of risk factors is complex and, in some cases, may be synergistic, such as experiencing adverse events in childhood and exposure to combat. Identification of risk factors allows further research to better understand differences between men and women, and the impact of these risk factors on Army personnel. In turn this will inform better preventive strategies, which could be targeted at the primary, secondary or tertiary levels.

## Key Messages

- **UK military personnel may be at greater risk than civilians of suffering from common mental disorders.**
- **Women appear to have a higher prevalence of common mental disorders than men in the UK military.**
- **Modifiable risk factors for mental ill health exist at all stages of life.**
- **The prevalence and impact of these risk factors in the UK military is not fully understood and requires further research.**

## Introduction

In 2016, the UK Ministry of Defence conducted a review on the health risks to women in ground close combat roles and identified mental ill-health as one of the key risks<sup>1</sup>. Following this review the Government commissioned a series of projects to better understand how to mitigate health risks (including mental health) to Service personnel (not just women). This overview of mental health risks is the first stage of the overall mental health risks project.

By 2020, depression was predicted to be the second most common cause of disability, globally, after ischaemic heart disease<sup>2</sup>. UK military personnel are approximately twice as likely as the general population to suffer from Common Mental Disorders (CMD). The prevalence is higher in women than men; approximately 25% of serving women and 18% of serving men met the criteria for probable CMD in studies conducted between 2004 and 2006<sup>3</sup>. In 2017 to 2018, 3.1% of the UK Armed Forces (UKAF) were newly diagnosed as having a mental health disorder by the MOD's specialist mental health service<sup>4</sup>. This incidence of clinician diagnosed mental ill health (as opposed to self-declared CMD derived from survey data) is lower than the UK general population (4.5%) but direct comparisons between military personnel and civilians may be inappropriate because of occupational requirements for referral. Importantly, there is a gender difference in the UKAF with 2.7% of men and 6.7% of women presenting with symptoms of mental ill health annually<sup>4</sup>.

This review summarises accepted risk factors in the literature that may impair psychosocial function and result in mental ill health when deployed in combat. In particular, this paper has aimed to synthesise all the main risk factors into one paper grouped into pre-, per- and post deployment risks. However, a specific focus of the review was to identify any gender specific risks in the Army population that can be explored further through mixed methods research in the British Army, which is the branch of the UKAF where most women in ground and close combat roles are likely to be serving. The paper does not aim to identify those occupational factors, either negative or positive, that may explain differences in CMD between Army personnel and civilians.

## **Methods**

This literature review was conducted following the principles of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. However, because of the wide ranging and heterogenous nature of the subject this was not a formal systematic review, which is why after screening of abstracts all full text papers were included in this review. The review was undertaken using Medline and PsycINFO databases using the following search terms and Boolean connectors to titles, abstracts and subject headings: ((risk factors) OR (risk W1 factor)) AND ((mental health) OR (mental W1 health)) AND (military OR ("Armed Forces") OR Navy OR Naval OR army OR Soldier\* OR Sailor\* OR ("AirForce") OR (Special Force\*) OR Reservist\* OR Veteran\*) AND (male\*OR female\* OR men OR women). It was limited to studies published in or translated into English. There was a restriction on publication date from 1991 to present, which reflected when UK Armed Forces women started to have a greater role in advanced positions on the battlefield in Operation GRANBY (code name for the UK military deployment in the first Gulf War in 1991). The papers were reviewed manually by title, then abstracts (twice) and finally by full text to identify papers that reported an association of potentially modifiable risk factors and mental ill health, excluding suicide, in military personnel worldwide. Papers that had non-modifiable factors such as genomic or hormonal predictors were excluded. Cross-sectional, prospective cohort, retrospective cohort, and reviews were included. Additionally, "grey" literature was identified through stakeholder engagement such as veterans' associations, military mental health specialists, Google and Google Scholar.

## **Results**

The electronic search initially identified 1,928 titles. Manual review of titles resulted in 419 records being downloaded for abstract review. In light of the large number of papers abstracts were sifted twice before reviewing full texts. Other literature including books, MOD publications and peer reviewed papers totalled 13. A total of 122 papers and texts were fully reviewed in order to identify common risk factors for mental ill health.

Mental ill health can affect individuals at all stages of life and is "through life" i.e. cradle to grave meaning that preventive health needs to be considered on a continuum of care pathway<sup>5</sup>. The findings suggest it is possible to consider risk factors in three main groups – Pre-enlistment; Military Service (Pre-, Per- and Post Deployment); and Post-Service (Veteran). This grouping lends itself to further exploration, through initially a quantitative

survey and later qualitative interviews, of factors where the risk may be mitigated by the Army. It has therefore excluded some of the wider determinants of health (housing, employment etc), particularly post service.

We postulate that this review has identified risk factors that may be influenced by gender (Figure 1) from cradle to grave, and which may also interact synergistically. A table of risk factors and key supporting literature is provided at Table 1 for clarity.

### **Pre-enlistment Risk Factors**

The importance of pre-enlistment factors is their potential for screening (if effective) vulnerable individuals, and therefore the opportunity to mitigate the risk of mental ill health before Service. However, pre-screening needs to be balanced against the possibility that for some individuals, military service may make them more resilient; the “healthy soldier” effect<sup>6</sup>. Emerging evidence suggests that the greatest risk for mental ill health is in early Service leavers<sup>7</sup>.

### **Alcohol and (Substance) Misuse**

Assuming past behaviour reflects future behaviour in similar environments, it is likely that a history of alcohol (or substance) misuse may endure or be exacerbated in the military environment. A 2013/14 study of 1000 British male infantry recruits showed that approximately 50% were consuming hazardous or harmful levels of alcohol pre-enlistment and 60% had used cannabis<sup>8</sup>. Importantly, this raises doubt of an accepted view that military culture is entirely responsible for the higher than societal norm level of alcohol misuse.

### **Childhood Adversity**

Childhood adversity or adverse childhood experiences (ACE), which may include parental physical and mental illness or abuse (emotional, physical or sexual), are predictors of poor health in adult life<sup>9</sup>. Childhood adversity possibly sensitises the nervous system, and after repeated trauma, may result in mental ill health<sup>10</sup>. However, as shown in a study of 36,485 veterans and non-veterans<sup>11</sup>, although women veterans reported a higher prevalence of ACE (7 out of 11 items) their health outcomes were no different to non-veterans. Moreover, it is possible that these women chose to join the military to “escape” from such abuse<sup>12</sup>. Similar studies in male soldiers report high levels of ACE, with over 80% of men in one study experiencing at least one form of ACE<sup>13</sup>. In the UK, men that have served in the Armed Forces are more likely to have experienced ACE than those who have not<sup>14</sup>. Higher rates of CMD in UK Service personnel have also been reported in those suffering ACE<sup>15</sup>. Notwithstanding, the majority of soldiers do not experience mental ill health after combat<sup>16</sup>. There are limitations of these studies in generalisability and recall bias; their cross-sectional nature means that negative outcomes may not yet have become manifest. Childhood adversity may be synergistic with other risk factors, such as combat exposure in predicting combat-related mental ill health (e.g. Post Traumatic Stress Disorder [PTSD])<sup>17</sup>.

## **Educational Attainment**

Low educational attainment is a risk factor for mental ill health, although there is an element of reverse causality in that mental illness in adolescence leads to poor educational attainment<sup>18</sup>. The educational level of male infantry soldiers is generally low with the majority having GCSE grade C or below and 15% not taking any examinations<sup>8</sup>. The importance of ensuring that individuals are not over or under challenged in their military role was extensively observed in the Second World War<sup>19</sup>. This led to a robust selection process, involving psychiatrists, to reduce the risk of mental ill health resulting from inappropriate employment. The UK Army today faces a different challenge in terms of recruiting the required numbers of military personnel, and, therefore, there is a temptation to reduce standards but the lessons of the past remain valid summarised by Fletcher in 1949<sup>20</sup> – *“With regard to M[Mental] and S[Stability], experience in the last war indicates that men of low intelligence adapt themselves poorly to strange and unfamiliar surroundings.”*

It may be that having a lower cognitive ability (a recognised proxy for educational attainment) means that an individual cannot adapt to traumatic stressors, which may result in mental ill health as shown in a study of Vietnam-era twins<sup>21</sup>. In the Israeli Defence Force (IDF) non-specific factors including cognitive ability and educational attainment have been found to be better predictors than behavioural assessment for PTSD<sup>22</sup>. Additionally, IDF personnel with a lower educational attainment and who have low motivation to serve are at a higher risk of PTSD, with lower motivation to serve being the dominant factor<sup>23</sup>.

## **Previous Mental Ill Health**

The UK military undertakes a medical “screen” of all applicants, which is based on a self-reported questionnaire, corroborated, where possible, by an individual’s General Practitioner. A history of specific mental health conditions may be a bar to enlistment. Aside from the sensitivity and specificity of such questionnaires, the GP may be unaware of mental ill health, particularly in young males, who may not attend their GP anyway, when many mental ill health problems first manifest themselves<sup>24</sup>.

## **Military Service Risk Factors**

### **Allostatic Load**

It is recognised that stress can have an impact on physical and mental health. The body responds to stress by adapting to the demands of the environment and maintaining stability. This process is known as allostasis<sup>25</sup>. Allostatic load is the *“long-term cost of repeated stress and wear-and-tear on the body and brain”*. In the military environment, particularly when deployed, the allostatic load may be significant, which can manifest itself through physical and/or mental ill health. A range of factors from genetic to lifestyle choices will define an individual’s allostatic load<sup>26</sup>. Some of these factors may be modifiable.

## Childbirth

Historically, pregnancy was a reason for women to be retired from the UK military. This is no longer the case and many women continue to serve after maternity leave. However, women who then deploy and experience combat may be at a higher risk of depression than those women who have not given birth<sup>27</sup>.

## Deployment and Combat

Rates of mental ill health are generally higher in combat than support or non-deployed personnel<sup>28</sup>, although deployment alone does not predict mental health problems. Lower rank, female sex and divorced or single marital status are independent predictors of mental ill health in deployed personnel<sup>29</sup>. These data are likely to be subject to selection bias (the “healthy warrior” effect<sup>30</sup>) as individuals with poorer psychological health might be less likely to deploy. In a cohort of 40,219 members of the US military Millennium cohort, men and women deployed with combat exposure had the highest rates of new onset depression (5.7% and 15.7% respectively)<sup>31</sup>. This study is the first longitudinal study to report a temporal association between combat exposure and depression.

Pre-existing mental health problems in service may be a risk factor for additional, or an exacerbation of, mental health conditions when exposed to combat. US Marines with a current mental health diagnosis are 3.6 times more likely to develop a post deployment mental health disorder within six months of deployment compared with those who deployed without a mental health problem<sup>32</sup>. However, soldiers may avoid presenting to health care providers with pre-existing mental health conditions prior to deployment. There may also be a gender difference in pre-deployment stressors (such as childcare arrangements), with women having more than men<sup>33</sup>.

Men and women react to combat exposure in different ways but the overall impact is similar; women may report more symptoms of CMD, whilst men may report greater hazardous alcohol use<sup>34</sup>. These data parallel mental ill health patterns in men and women in the general UK population. However, men and women differ in the stimulus for developing a CMD after combat. In men, the development of a CMD is more often driven by whether they felt capable of undertaking the task asked of them in relation to their trade or experience. For women, the development of a CMD depends on whether there was a perception that their life was threatened, or they may be injured<sup>35</sup>. There is some evidence to suggest that shooting at or killing an enemy may be more traumatic than coming under fire<sup>36</sup>. This difference between men and women may also be explained by well-documented coping strategies, which vary by gender, with women internalising their stress resulting in mental health disorders and men externalising their stress leading to higher rates of alcohol and substance misuse<sup>37</sup>.

In recent decades the nature of UK combat has changed and there is often no clear front line meaning that traditional supporting roles may be equally exposed to combat. The shift to the UKAF being involved in more humanitarian missions, such as the UK response to Ebola in Sierra Leone (OP GRITROCK) in 2017 may further add to risk, especially where both humanitarian and combat exposure occur at the same time<sup>38</sup>.

## **Culture, Leadership and Unit Cohesion**

There is evidence to show that good leadership, morale and unit cohesion can have a positive effect on mental health and in combat can reduce CMD and PTSD rates<sup>39</sup>. Elite forces such as the “Special Forces” may have especially strong cohesion, which in turn appears to be protective against mental ill health in combat<sup>40</sup>.

Women often perceive a lower sense of unit cohesion, possibly related to the historical stereotypes of armed forces<sup>41</sup> as well as the generally low number of women in most units. Promoting inclusivity by having women serve in combat roles may not only change the military stereotype but may also produce a better sense of cohesion, assuming men and women’s perception of cohesiveness are the same. This increased inclusivity may protect mental health when facing combat exposure at any level<sup>42</sup>.

## **Domestic Stressors**

Being married and separated from family may not only make an individual perceive more negative consequences from deployment but, because of these additional stressors, such as concern about family members, increase the likelihood of mental ill health<sup>43</sup>. Family stressors may also increase the risk of post-traumatic stress symptoms (PTSS) and be further exacerbated if the stressor has not been resolved by the time of a further deployment<sup>44</sup>.

## **Mental Re-Set Time**

On return from deployment all personnel need a period of recovery. There is debate as to whether length or frequency of deployment, or the time in between deployments, is the key risk factor for mental ill health. Militaries often have different deployment lengths and in the UK there is evidence supporting increased length, rather than frequency, of deployment as being the risk factor for mental ill health<sup>45</sup>. The US use the term “dwell time” to refer to time between deployments and have shown that the shorter the dwell time the greater the rate of mental ill health. This US data is consistent with the stress-exhaustion model which highlights a cumulative effect of multiple deployments and the requirement for a “mental reset” before further deployment<sup>46</sup>.

## **Military Sexual Trauma**

Military Sexual Trauma (MST) is a prominent risk factor for mental ill health. Most of the military data is from the US, and there is little UK military data despite a recognition that sexual harassment is prevalent in Army reports, with one survey suggesting that 90% of personnel had experienced sexual harassment<sup>47</sup>. One US study (n = 13,262) reports that 10.3% of female personnel had experienced MST<sup>48</sup> and women who had experienced combat were twice as likely to report sexual harassment compared with those that had not deployed. Individuals were more likely to experience MST if they were young, recently separated or divorced, had a mental health condition or had experienced a form of sexual harassment/assault in the past. Other US data reports that MST rates may be as high as 15%<sup>49</sup> with women experiencing 20 times the rate of MST than men<sup>50</sup>. Others have suggested that absolute counts of men that have experienced sexual trauma are

comparable to Service women<sup>51</sup>. However, the prevalence rates of MST may vary because of differing methodologies, definitions and samplings<sup>52</sup>. Mental ill health may be associated with MST in military personnel<sup>53</sup> with PTSD being the most commonly reported followed by mood disorder<sup>54</sup>.

It is possible that the combat environment increases the occurrence of MST because perpetrators may be less concerned with the consequences, as they are a lower priority than self-preservation, and they may also be less accountable for their actions<sup>48</sup>. Qualitative work suggests that the prevalence of MST may be underestimated because of low MST reporting due to fears of stigma, blame from peers and managers, and concerns about confidentiality<sup>55</sup>. For victims there may also be consequences on return from deployment such as an increase in risk taking behaviour<sup>56</sup>.

### **Preparedness and Training**

Good training and preparedness mitigate against mental ill health in the combat environment<sup>57</sup>. Airborne and Commando forces usually have a greater emphasis on preparing for combat than other military occupational groups, including the infantry, which may be protective against mental ill health<sup>58</sup>. However, in a male dominated profession, some of the methods used may not necessarily be appropriate for women. There is some evidence that women may feel less prepared and less integrated with their unit when deployed, which may predispose to mental ill health<sup>41</sup>. Women may also feel that they get less support than their male peers in coping with combat stressors<sup>59</sup>. However, Kline et al<sup>41</sup> suggest that allowing women to serve in combat roles may improve “self-efficacy” through common training and preparedness, which in turn may reduce the rate of mental ill health in women.

Being an individual augmentee (IA) (i.e. an individual deployed with a unit other than their own) to a formed unit is not a risk factor for CMD<sup>60</sup> unless that IA is a reservist, who are known to be at a greater risk of mental ill health<sup>61</sup>. However, the ‘adopting’ unit is responsible for the training and preparation of IAs, and therefore those deploying with units that have low deployment preparedness in comparison to those with high preparedness may be at greater risk of mental ill health<sup>57</sup>.

### **Social Support and Relationships**

Lower levels of depressive symptom severity are associated with peer civilian support in both men and women<sup>62</sup>. Social support in the military is also generally considered to be protective against mental ill health<sup>63</sup>, particularly from a spouse<sup>64</sup>, and better social support is a predictor for better overall mental health and less PTSS, alcohol and drug use post deployment<sup>65</sup>. Therefore, those who have strong social support and are involved in intimate relationships may be better able to adapt to stressors, and, therefore, are less likely to develop mental ill health. In the military environment, men and women may differ as to where they predominantly seek support to protect their mental health. Men more often seek support from their military peers, which appears to be associated with lower levels of PTSS<sup>66</sup>.



Although sexual minorities (groups whose sexual identity, orientation or practices differ from the majority of the surrounding society) are now accepted in most militaries, there is some evidence to suggest that, particularly for women, sexual minorities are at a higher risk of poorer physical and mental health than their heterosexual colleagues<sup>24</sup>, and may be at a higher risk of MST<sup>67</sup>. For minority sexual groups childhood adversity may also be a contributing factor<sup>68</sup>.

Post deployment social support and re-integration is also important and, depending on gender, there may be greater risks of mental ill health for women if they had experienced sexual harassment, and for men if there is less social support available<sup>69</sup>. Intimate relationships in the military have shown to be important, particularly for women, with presumed PTSD rates increased for women who perceived a decrease in strength of a relationship following deployment<sup>43</sup>.

### **Societal Role**

Whilst there have been changes over recent decades in the traditional roles of men and women at home, there remains the possibility that women have greater responsibilities over and above their working role in the home, particularly after deployment<sup>31</sup>. In one study, married women were more likely to suffer from depression when deployed and the authors proposed that family separation is a factor<sup>31</sup>. There is some evidence that responsibilities at home may have an impact on workplace role<sup>70</sup>, particularly in health care workers<sup>71</sup>. What is not clear is whether being a serving woman in the military has negative connotations from a societal perspective.

### **Post Service Risk Factors**

#### **Access to Healthcare and Other Support**

UK men access health care less than women, with research suggesting a consultation rate one third less than women, with the greatest sex difference between the ages of 16 and 60 years<sup>72</sup>. Nonetheless, men who are in receipt of anti-depressant therapy are only 8% less likely to consult than women<sup>72</sup>. These data suggest that once men acknowledge a mental health issue, there is little difference from women in their compliance with treatment.

Veteran men tend to delay for prolonged periods before seeking help for mental ill health<sup>73</sup>. Help seeking behaviour by veteran men is complex and is influenced by personal beliefs about their own status and the organisations that they may approach for help<sup>74</sup>. There is some evidence that mental health service use by men and women veterans is similar but there may be gender differences in treatment receipt<sup>75</sup>. Other barriers to accessing health care may include logistics, stigma and confidentiality<sup>76</sup>. Gender specific services may also be important<sup>77</sup>.

### **Strengths and Limitations**

The strengths of this review are that it has focussed on the most operationally important mental health conditions and has grouped risk factors in a through-life approach, as a

preliminary to further work aimed at identifying modifiable factors. Its main limitation is that it is necessarily broad-brush in its approach.

## **Conclusion**

Many studies, particularly from the US, have proposed risk factors that may make military personnel vulnerable to mental ill health. Some of these factors may be exacerbated when deployed or involved in combat. Multiple risk factors and traumatic experiences may also act synergistically to increase the risk of mental ill health, particularly PTSS<sup>78</sup>, although the interaction of risk factors is complex. There are some risk factors to which women may be more susceptible, such as MST, social support and relationships, or greater home life stressors that could explain the observed gender differences in the rates of mental ill health. However, men may have a higher prevalence of other risk factors such as lower educational attainment or higher rates of childhood adversity, which tend to refute the hypothesis that gender differences in mental ill health can be solely explained by differing risk factors. Other factors, including unit preparedness and cohesion, are perceived differently by men and women and may result in better resilience for men. Therefore, evidence is emerging that the currently observed gender differences in the incidence of mental ill health may be explained by the interplay between the different prevalence of risk factors and gender-specific reactions to these factors. This will be explored in ongoing work.

Risk Factor	Summary	Supporting Literature
<b>Alcohol &amp; Substance Misuse</b>	A past/current history of alcohol or substance may not be identified until in Service.	KIERNAN, M. D., ARTHUR, A., REPPER, J., MUKHUTY, S. & FEAR, N. T. 2016. Identifying British Army infantry recruit population characteristics using biographical data. <i>Occup Med (Lond)</i> , 66, 252-4.
<b>Childhood Adversity</b>	Adverse childhood experiences are a predictor of poor adult health.	FELITTI, V. J., ANDA, R. F., NORDENBERG, D., WILLIAMSON, D. F., SPITZ, A. M., EDWARDS, V., KOSS, M. P. & MARKS, J. S. 1998. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. <i>Am J Prev Med</i> , 14, 245-58.
	Childhood adversity possibly sensitises the nervous system, and after repeated trauma, may result in mental ill health.	AVERSA, L. H., LEMMER, J., NUNNINK, S., MCLAY, R. N. & BAKER, D. G. 2014. Impact of childhood maltreatment on physical health-related quality of life in U.S. active duty military personnel and combat veterans. <i>Child Abuse Negl</i> , 38, 1382-8.
	Although women veterans reported a higher prevalence of adverse childhood experiences their health outcomes were no different to non-veterans	MCCAULEY, H. L., BLOSNIICH, J. R. & DICHTER, M. E. 2015. Adverse Childhood Experiences and Adult Health Outcomes Among Veteran and Non-Veteran Women. <i>J Womens Health (Larchmt)</i> , 24, 723-9.
	Women may choose to join the military to “escape” from abuse.	CARROLL, T. D., CURRIER, J. M., MCCORMICK, W. H. & DRESCHER, K. D. 2017. Adverse childhood experiences and risk for suicidal behavior in male Iraq and Afghanistan veterans seeking PTSD treatment. <i>Psychol Trauma</i> , 9, 583-586.
	Majority of soldiers do not experience mental ill health after combat.	IVERSEN, A. C., FEAR, N. T., SIMONOFF, E., HULL, L., HORN, O., GREENBERG, N., HOTOPIF, M., RONA, R. & WESSELY, S. 2007. Influence of childhood adversity on health among male UK military personnel. <i>Br J Psychiatry</i> , 191, 506-11.
	Childhood adversity may be synergistic with other risk factors, such as combat exposure in predicting combat-related mental ill health.	LEMMER, J. A. A. I. U., US 2014. Childhood trauma and combat-related posttraumatic stress disorder in OEF/OIF service members and Veterans.
<b>Educational Attainment</b>	Low educational attainment is a risk factor for mental ill health, although there is an element of reverse causality in that mental illness in adolescence leads to poor educational attainment.	SMITH-OSBORNE, A, 2009. Mental Health Risk and Social Ecological Variables Associated with Educational Attainment for Gulf War Veterans: Implications for Veterans Returning to Civilian Life. <i>Am J Community Psychol</i> 44:327–337
	Important to ensure that individuals are not over or under challenged in their military role.	AHRENFELDT, R. H. 1958. Psychiatry in the British Army in the Second World War.
	Non-specific factors including cognitive ability and educational attainment have been found to be better predictors than	ZOHAR, J., FOSTICK, L., COHEN, A., BLEICH, A., DOLFIN, D., WEISSMAN, Z., DORON, M., KAPLAN, Z., KLEIN, E., SHALEV, A. Y. & ISRAELI CONSORTIUM ON, P. 2009. Risk

	behavioural assessment for PTSD.	factors for the development of posttraumatic stress disorder following combat trauma: a semi-prospective study. <i>J Clin Psychiatry</i> , 70, 1629-35.
	Personnel with a lower educational attainment and who have low motivation to serve are at a higher risk of PTSD, with lower motivation to serve being the dominant factor.	KAPLAN, Z., WEISER, M., REICHENBERG, A., RABINOWITZ, J., CASPI, A., BODNER, E. & ZOHAR, J. 2002. Motivation to serve in the military influences vulnerability to future posttraumatic stress disorder. <i>Psychiatry Res</i> , 109, 45-9.
<b>Previous Mental Ill Health</b>	A GP may be unaware of mental ill health, particularly in young males, who may not attend their GP, when many mental ill health problems first manifest themselves.	BLOSNIICH, J., FOYNES, M. M. & SHIPHERD, J. C. 2013. Health disparities among sexual minority women veterans. <i>J Womens Health (Larchmt)</i> , 22, 631-6.
<b>Allostatic Load</b>	A range of factors from genetic to lifestyle choices will define an individual's allostatic load.	MCEWEN, B. S. & SEEMAN, T. 1999. Protective and damaging effects of mediators of stress. Elaborating and testing the concepts of allostasis and allostatic load. <i>Ann N Y Acad Sci</i> , 896, 30-47.
<b>Childbirth</b>	Women who deploy and experience combat after childbirth may be at a higher risk of depression than those women who have not given birth.	NGUYEN, S., LEARDMANN, C. A., SMITH, B., CONLIN, A. M., SLYMEN, D. J., HOOPER, T. I., RYAN, M. A., SMITH, T. C. & MILLENNIUM COHORT STUDY, T. 2013. Is military deployment a risk factor for maternal depression? <i>J Womens Health (Larchmt)</i> , 22, 9-18.
<b>Deployment &amp; Combat</b>	Lower rank, female sex and divorced or single marital status are independent predictors of mental ill health in deployed personnel.	FIEDLER, N., OZAKINCI, G., HALLMAN, W., WARTENBERG, D., BREWER, N. T., BARRETT, D. H. & KIPEN, H. M. 2006. Military deployment to the Gulf War as a risk factor for psychiatric illness among US troops. <i>Br J Psychiatry</i> , 188, 453-9.
	"Healthy warrior" effect - individuals with poorer psychological health might be less likely to deploy.	WILSON, J., JONES, M., FEAR, N. T., HULL, L., HOTOPF, M., WESSELY, S. & RONA, R. J. 2009. Is previous psychological health associated with the likelihood of Iraq War deployment? An investigation of the "healthy warrior effect". <i>Am J Epidemiol</i> , 169, 1362-9.
	In the US military Millennium cohort, men and women deployed with combat exposure had the highest rates of new onset depression (5.7% and 15.7% respectively).	WELLS, T. S., LEARDMANN, C. A., FORTUNA, S. O., SMITH, B., SMITH, T. C., RYAN, M. A., BOYKO, E. J., BLAZER, D. & MILLENNIUM COHORT STUDY, T. 2010. A prospective study of depression following combat deployment in support of the wars in Iraq and Afghanistan. <i>Am J Public Health</i> , 100, 90-9.
	US Marines with a current mental health diagnosis are 3.6 times more likely to develop a post deployment mental health disorder within six months of deployment compared with those who deployed without a mental	CRAIN, J. A., LARSON, G. E., HIGHFILL-MCROY, R. M. & SCHMIED, E. A. 2011. Postcombat outcomes among Marines with pre-existing mental diagnoses. <i>J Trauma Stress</i> , 24, 671-9.

	health problem.	
	Gender difference in pre-deployment stressors (such as childcare arrangements), with women having more than men.	VOGT, D., VAUGHN, R., GLICKMAN, M. E., SCHULTZ, M., DRAINONI, M. L., ELWY, R. & EISEN, S. 2011. Gender differences in combat-related stressors and their association with postdeployment mental health in a nationally representative sample of U.S. OEF/OIF veterans. <i>J Abnorm Psychol</i> , 120, 797-806.
	Men and women react to combat exposure in different ways, but the overall impact is similar; women may report more symptoms of CMD, whilst men may report greater hazardous alcohol use.	WOODHEAD, C., WESSELY, S., JONES, N., FEAR, N. T. & HATCH, S. L. 2012. Impact of exposure to combat during deployment to Iraq and Afghanistan on mental health by gender. <i>Psychol Med</i> , 42, 1985-96.
	The development of a common mental disorder depends on whether there was a perception that their life was threatened, or they may be injured.	CAWKILL, P., JONES, M., FEAR, N. T., JONES, N., FERTOOUT, M., WESSELY, S. & GREENBERG, N. 2015. Mental health of UK Armed Forces medical personnel post-deployment. <i>Occup Med (Lond)</i> , 65, 157-64.
	Shooting at or killing an enemy may be more traumatic than coming under fire.	MCLAY, R. N., MANTANONA, C., RAM, V., WEBB-MURPHY, J., KLAM, W. & JOHNSTON, S. 2014. Risk of PTSD in service members who were fired upon by the enemy is higher in those who also returned fire. <i>Mil Med</i> , 179, 986-9.
	Women internalise their stress resulting in mental health disorders and men externalise their stress leading to higher rates of alcohol and substance misuse.	CRUM-CIANFLONE, N. F. & JACOBSON, I. 2014. Gender differences of postdeployment post-traumatic stress disorder among service members and veterans of the Iraq and Afghanistan conflicts. <i>Epidemiol Rev</i> , 36, 5-18.
	The shift to the UKAF being involved in more humanitarian missions, such as the UK response to Ebola in Sierra Leone (OP GRITROCK) in 2017 may further add to risk, especially where both humanitarian and combat exposure occur at the same time.	CONNORTON, E., PERRY, M. J., HEMENWAY, D. & MILLER, M. 2011. Occupational trauma and mental illness - combat, peacekeeping, or relief work and the national co-morbidity survey replication. <i>J Occup Environ Med</i> , 53, 1360-3.
<b>Culture, Leadership &amp; Unit Cohesion</b>	Good leadership, morale and unit cohesion can have a positive effect on mental health and in combat can reduce CMD and PTSD rates.	JONES, N., SEDDON, R., FEAR, N. T., MCALLISTER, P., WESSELY, S. & GREENBERG, N. 2012. Leadership, cohesion, morale, and the mental health of UK Armed Forces in Afghanistan. <i>Psychiatry</i> , 75, 49-59.
	Elite forces such as the "Special Forces" may have especially strong cohesion, which in turn appears to be protective against mental ill health in combat.	HANWELLA, R. & DE SILVA, V. 2012. Mental health of Special Forces personnel deployed in battle. <i>Soc Psychiatry Psychiatr Epidemiol</i> , 47, 1343-51.
	Women often perceive a lower sense of unit cohesion, possibly related to the historical stereotypes of armed forces.	KLINE, A., CICCONE, D. S., WEINER, M., INTERIAN, A., ST HILL, L., FALCA-DODSON, M., BLACK, C. M. & LOSONCZY, M. 2013. Gender differences in the risk and protective factors associated with PTSD: a

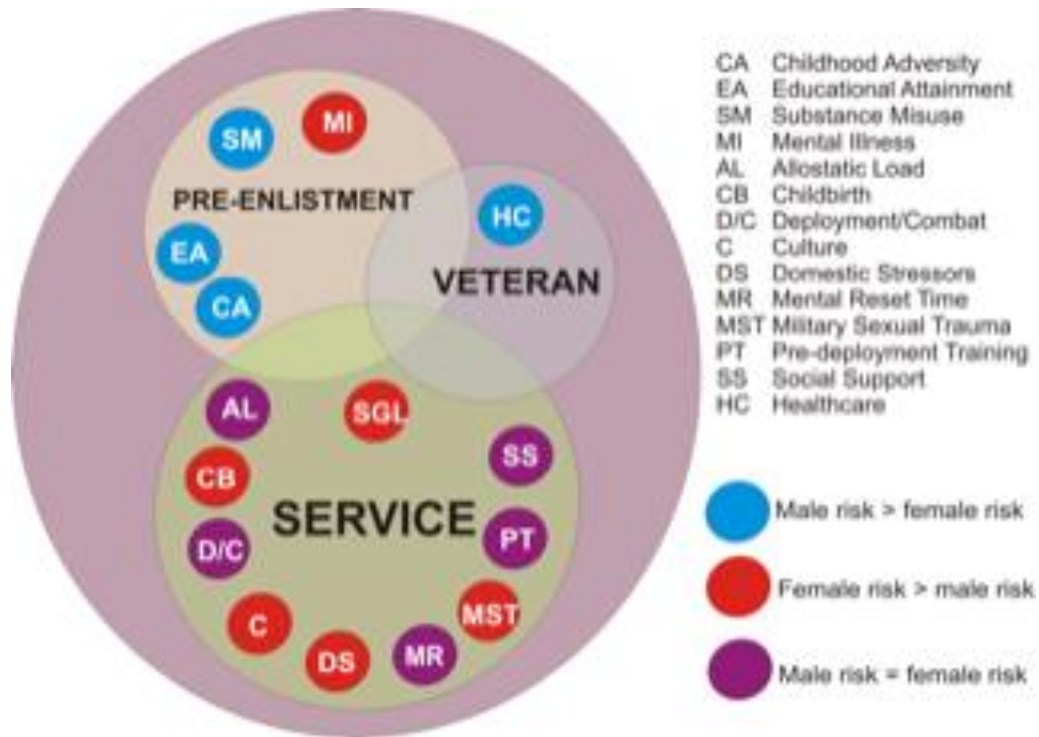
		prospective study of National Guard troops deployed to Iraq. <i>Psychiatry</i> , 76, 256-72.
	Promoting inclusivity by having women serve in combat roles may not only change the military stereotype but may also produce a better sense of cohesion, assuming men and women's perception of cohesiveness are the same. This increased inclusivity may protect mental health when facing combat exposure at any level.	DICKSTEIN, B. D., MCLEAN, C. P., MINTZ, J., CONOSCENTI, L. M., STEENKAMP, M. M., BENSON, T. A., ISLER, W. C., PETERSON, A. L. & LITZ, B. T. 2010. Unit cohesion and PTSD symptom severity in Air Force medical personnel. <i>Mil Med</i> , 175, 482-6.
	Being married and separated from family may not only make an individual perceive more negative consequences from deployment but, because of these additional stressors, such as concern about family members, increase the likelihood of mental ill health.	SKOPP, N. A., REGER, M. A., REGER, G. M., MISHKIND, M. C., RASKIND, M. & GAHM, G. A. 2011. The role of intimate relationships, appraisals of military service, and gender on the development of posttraumatic stress symptoms following Iraq deployment. <i>J Trauma Stress</i> , 24, 277-86.
<b>Domestic Stressors</b>	Family stressors may also increase the risk of post-traumatic stress symptoms (PTSS) and be further exacerbated if the stressor has not been resolved by the time of a further deployment.	INTERIAN, A., KLINE, A., JANAL, M., GLYNN, S. & LOSONCZY, M. 2014. Multiple deployments and combat trauma: do homefront stressors increase the risk for posttraumatic stress symptoms? <i>J Trauma Stress</i> , 27, 90-7.
<b>Mental Reset Time</b>	Militaries often have different deployment lengths and in the UK there is evidence supporting increased length, rather than frequency, of deployment as being the risk factor for mental ill health.	RONA, R. J., FEAR, N. T., HULL, L., GREENBERG, N., EARNSHAW, M., HOTOPI, M. & WESSELY, S. 2007. Mental health consequences of overstretch in the UK armed forces: first phase of a cohort study. <i>BMJ</i> , 335, 603.
	US data is consistent with the stress-exhaustion model which highlights a cumulative effect of multiple deployments and the requirement for a "mental reset" before further deployment.	MACGREGOR, A. J., HELTEMES, K. J., CLOUSER, M. C., HAN, P. P. & GALARNEAU, M. R. 2014. Dwell time and psychological screening outcomes among military service members with multiple combat deployments. <i>Mil Med</i> , 179, 381-7.
<b>Military Sexual Trauma</b>	90% of personnel had experienced sexual harassment in the UK Armed Forces.	GODIER, L. R. & FOSSEY, M. 2018. Addressing the knowledge gap: sexual violence and harassment in the UK Armed Forces. <i>J R Army Med Corps</i> , 164, 362-364.
	One US study (n = 13,262) reports that 10.3% of female personnel had experienced MST.	LEARDMANN, C. A., PIETRUCHA, A., MAGRUDER, K. M., SMITH, B., MURDOCH, M., JACOBSON, I. G., RYAN, M. A., GACKSTETTER, G., SMITH, T. C. & MILLENNIUM COHORT STUDY, T. 2013. Combat deployment is associated with sexual harassment or sexual assault in a large, female military cohort. <i>Womens Health Issues</i> , 23, e215-23.
	MST rates may be as high as 15% in the US.	HASKELL, S. G., GORDON, K. S., MATTOCKS, K., DUGGAL, M., ERDOS, J., JUSTICE, A. & BRANDT, C. A. 2010. Gender differences in

		rates of depression, PTSD, pain, obesity, and military sexual trauma among Connecticut War Veterans of Iraq and Afghanistan. <i>J Womens Health (Larchmt)</i> , 19, 267-71.
	Women experience 20 times the rate of MST than men.	KIMERLING, R., GIMA, K., SMITH, M. W., STREET, A. & FRAYNE, S. 2007. The Veterans Health Administration and military sexual trauma. <i>Am J Public Health</i> , 97, 2160-6.
	Prevalence rates of MST may vary because of differing methodologies, definitions and samplings.	SURIS, A. & LIND, L. 2008. Military sexual trauma: a review of prevalence and associated health consequences in veterans. <i>Trauma Violence Abuse</i> , 9, 250-69.
	Mental ill health may be associated with MST in military personnel.	O'BRIEN, B. S. & SHER, L. 2013. Military sexual trauma as a determinant in the development of mental and physical illness in male and female veterans. <i>Int J Adolesc Med Health</i> , 25, 269-74.
	PTSD is the most commonly reported disorder followed by mood disorder in military sexual trauma.	SEXTON, M. B., RAGGIO, G. A., MCSWEENEY, L. B., AUTHIER, C. C. & RAUCH, S. A. M. 2017. Contrasting Gender and Combat Versus Military Sexual Traumas: Psychiatric Symptom Severity and Morbidities in Treatment-Seeking Veterans. <i>J Womens Health (Larchmt)</i> , 26, 933-940.
	The prevalence of MST may be underestimated because of low MST reporting due to fears of stigma, blame from peers and managers, and concerns about confidentiality.	BURNS, B., GRINDLAY, K., HOLT, K., MANSKI, R. & GROSSMAN, D. 2014. Military sexual trauma among US servicewomen during deployment: a qualitative study. <i>Am J Public Health</i> , 104, 345-9.
<b>Preparedness and Training</b>	Good training and preparedness mitigate against mental ill health in the combat environment.	URSANO, R. J., WANG, J., FULLERTON, C. S., RAMSAWH, H., GIFFORD, R. K., RUSSELL, D., COHEN, G. H., SAMPSON, L. & GALEA, S. 2018. Post-deployment Mental Health in Reserve and National Guard Service Members: Deploying With or Without One's Unit and Deployment Preparedness. <i>Mil Med</i> , 183, e51-e58.
	Airborne and Commando forces usually have a greater emphasis on preparing for combat than other military occupational groups, including the infantry, which may be protective against mental ill health.	SUNDIN, J., JONES, N., GREENBERG, N., RONA, R. J., HOTOPF, M., WESSELY, S. & FEAR, N. T. 2010. Mental health among commando, airborne and other UK infantry personnel. <i>Occup Med (Lond)</i> , 60, 552-9.
	Being an individual augmentee (IA) (i.e. an individual deployed with a unit other than their own) to a formed unit is not a risk factor for CMD.	SUNDIN, J., MULLIGAN, K., HENRY, S., HULL, L., JONES, N., GREENBERG, N., WESSELY, S. & FEAR, N. T. 2012. Impact on mental health of deploying as an individual augmentee in the U.K. Armed Forces. <i>Mil Med</i> , 177, 511-6.
<b>Social Support and Relationships</b>	Lower levels of depressive symptom severity are associated with peer civilian support in both	SMITH, B. N., VAUGHN, R. A., VOGT, D., KING, D. W., KING, L. A. & SHIPHERD, J. C. 2013. Main and interactive effects of social

	men and women.	support in predicting mental health symptoms in men and women following military stressor exposure. <i>Anxiety Stress Coping</i> , 26, 52-69.
	Better social support is a predictor for better overall mental health and less PTSS, alcohol and drug use post deployment.	HOLT-LUNSTAD, J., BIRMINGHAM, W. & JONES, B. Q. 2008. Is there something unique about marriage? The relative impact of marital status, relationship quality, and network social support on ambulatory blood pressure and mental health. <i>Ann Behav Med</i> , 35, 239-44.
	Men more often seek support from their military peers, which appears to be associated with lower levels of PTSS.	EISEN, S. V., SCHULTZ, M. R., GLICKMAN, M. E., VOGT, D., MARTIN, J. A., OSEI-BONSU, P. E., DRAINONI, M. L. & ELWY, A. R. 2014. Post deployment resilience as a predictor of mental health in Operation Enduring Freedom/operation Iraqi Freedom returnees. <i>Am J Prev Med</i> , 47, 754-61.
	Post deployment social support and re-integration is also important and, depending on gender, there may be greater risks of mental ill health for women if they had experienced sexual harassment, and for men if there is less social support available.	SMITH, B. N., WANG, J. M., VAUGHN-COAXUM, R. A., DI LEONE, B. A. & VOGT, D. 2017. The role of postdeployment social factors in linking deployment experiences and current posttraumatic stress disorder symptomatology among male and female veterans. <i>Anxiety Stress Coping</i> , 30, 39-51.
<b>Societal Role</b>	Responsibilities at home may have an impact on workplace role.	GIBBONS, S. W., BARNETT, S. D. & HICKLING, E. J. 2012a. Family stress and posttraumatic stress: the impact of military operations on military health care providers. <i>Arch Psychiatr Nurs</i> , 26, e31-9.
<b>Access to Healthcare and Other Support</b>	UK men access health care less than women, with research suggesting a consultation rate one third less than women, with the greatest sex difference between the ages of 16 and 60 years.	WANG, Y., HUNT, K., NAZARETH, I., FREEMANTLE, N. & PETERSEN, I. 2013. Do men consult less than women? An analysis of routinely collected UK general practice data. <i>BMJ Open</i> , 3, e003320.
	Veteran men tend to delay for prolonged periods before seeking help for mental ill health.	LEHAVOT, K., KATON, J. G., CHEN, J. A., FORTNEY, J. C. & SIMPSON, T. L. 2018. Post-traumatic Stress Disorder by Gender and Veteran Status. <i>Am J Prev Med</i> , 54, e1-e9.
	Help seeking behaviour by veteran men is complex and is influenced by personal beliefs about their own status and the organisations that they may approach for help.	NWORAH, U., SYMES, L., YOUNG, A. & LANGFORD, R. 2014. Afghanistan and Iraq war veterans' health care needs and their underuse of health care resources: implications for psychiatric-mental health nurses. <i>J Psychosoc Nurs Ment Health Serv</i> , 52, 42-9.
	Other barriers to accessing health care may include logistics, stigma and confidentiality.	NEWINS, A. R., WILSON, S. M., HOPKINS, T. A., STRAITS-TROSTER, K., KUDLER, H. & CALHOUN, P. S. 2018. Barriers to the use of Veterans Affairs health care services among female veterans who served in Iraq and



**Table 1 – Summary of Risk Factors & Key References**



**Figure 1 - Common Risk Factors Operating in Army Personnel Through the Lifecourse**



## References

1. Ministry of DEFENCE. 2016. Interim Report on the Health Risks to Women in Ground Close Combat Roles.  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/536381/20160706\\_ADR006101\\_Report\\_Women\\_in\\_Combat\\_WEB-FINAL.PDF](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536381/20160706_ADR006101_Report_Women_in_Combat_WEB-FINAL.PDF)
2. MURRAY, C. J. & LOPEZ, A. D. 1997. Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease Study. *Lancet*, 349, 1498-504.
3. GOODWIN, L., WESSELY, S., HOTOPF, M., JONES, M., GREENBERG, N., RONA, R. J., HULL, L. & FEAR, N. T. 2015. Are common mental disorders more prevalent in the UK serving military compared to the general working population? *Psychol Med*, 45, 1881-91.
4. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/717033/20180621\\_Mental\\_Health\\_Annual\\_Report\\_17-18\\_O.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/717033/20180621_Mental_Health_Annual_Report_17-18_O.pdf)
5. ROSS, D. A. 2012. Preventive medicine in the 21st century -- a population challenge. *J R Army Med Corps*, 158, 77-8.
6. LARSON, G. E., HIGHFILL-MCROY, R. M. & BOOTH-KEWLEY, S. 2008. Psychiatric diagnoses in historic and contemporary military cohorts: combat deployment and the healthy warrior effect. *Am J Epidemiol*, 167, 1269-76.
7. BERGMAN, B. P., MACKAY, D. F., SMITH, D. J. & PELL, J. P. 2016. Long-Term Mental Health Outcomes of Military Service: National Linkage Study of 57,000 Veterans and 173,000 Matched Nonveterans. *J Clin Psychiatry*, 77, 793-8.
8. KIERNAN, M. D., ARTHUR, A., REPPER, J., MUKHUTY, S. & FEAR, N. T. 2016. Identifying British Army infantry recruit population characteristics using biographical data. *Occup Med (Lond)*, 66, 252-4.
9. FELITTI, V. J., ANDA, R. F., NORDENBERG, D., WILLIAMSON, D. F., SPITZ, A. M., EDWARDS, V., KOSS, M. P. & MARKS, J. S. 1998. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*, 14, 245-58.
10. AVERSA, L. H., LEMMER, J., NUNNINK, S., MCLAY, R. N. & BAKER, D. G. 2014. Impact of childhood maltreatment on physical health-related quality of life in U.S. active duty military personnel and combat veterans. *Child Abuse Negl*, 38, 1382-8.
11. MCCAULEY, H. L., BLOSNIICH, J. R. & DICHTER, M. E. 2015. Adverse Childhood Experiences and Adult Health Outcomes Among Veteran and Non-Veteran Women. *J Womens Health (Larchmt)*, 24, 723-9.
12. SADLER, A. G., BOOTH, B. M., NIELSON, D. & DOEBBELING, B. N. 2000. Health-related consequences of physical and sexual violence: women in the military. *Obstet Gynecol*, 96, 473-80.
13. CARROLL, T. D., CURRIER, J. M., MCCORMICK, W. H. & DRESCHER, K. D. 2017. Adverse childhood experiences and risk for suicidal behavior in male Iraq and Afghanistan veterans seeking PTSD treatment. *Psychol Trauma*, 9, 583-586.
14. WOODHEAD, C., RONA, R. J., IVERSEN, A., MACMANUS, D., HOTOPF, M., DEAN, K., MCMANUS, S., MELTZER, H., BRUGHA, T., JENKINS, R., WESSELY, S. & FEAR, N. T. 2011. Mental health and health service use among post-national service veterans: results from the 2007 Adult Psychiatric Morbidity Survey of England. *Psychol Med*, 41, 363-72.
15. GOODWIN, L., WESSELY, S., HOTOPF, M., JONES, M., GREENBERG, N., RONA, R. J., HULL, L. & FEAR, N. T. 2015. Are common mental disorders more prevalent in the UK serving military compared to the general working population? *Psychol Med*, 45, 1881-91.

16. IVERSEN, A. C., FEAR, N. T., SIMONOFF, E., HULL, L., HORN, O., GREENBERG, N., HOTOPF, M., RONA, R. & WESSELY, S. 2007. Influence of childhood adversity on health among male UK military personnel. *Br J Psychiatry*, 191, 506-11.
17. LEMMER, J. A. A. I. U., US 2014. Childhood trauma and combat-related posttraumatic stress disorder in OEF/OIF service members and Veterans.
18. SMITH-OSBORNE, A, 2009. Mental Health Risk and Social Ecological Variables Associated with Educational Attainment for Gulf War Veterans: Implications for Veterans Returning to Civilian Life. *Am J Community Psychol* 44:327–337
19. AHRENFELDT, R. H. 1958. Psychiatry in the British Army in the Second World War.
20. FLETCHER, R. T. 1949. Pulheems, a new system of medical classification. *Br Med J*, 1, 83-8.
21. KREMEN, W. S., KOENEN, K. C., BOAKE, C., PURCELL, S., EISEN, S. A., FRANZ, C. E., TSUANG, M. T. & LYONS, M. J. 2007. Pretrauma cognitive ability and risk for posttraumatic stress disorder: a twin study. *Arch Gen Psychiatry*, 64, 361-8.
22. ZOHAR, J., FOSTICK, L., COHEN, A., BLEICH, A., DOLFIN, D., WEISSMAN, Z., DORON, M., KAPLAN, Z., KLEIN, E., SHALEV, A. Y. & ISRAELI CONSORTIUM ON, P. 2009. Risk factors for the development of posttraumatic stress disorder following combat trauma: a semi-prospective study. *J Clin Psychiatry*, 70, 1629-35.
23. KAPLAN, Z., WEISER, M., REICHENBERG, A., RABINOWITZ, J., CASPI, A., BODNER, E. & ZOHAR, J. 2002. Motivation to serve in the military influences vulnerability to future posttraumatic stress disorder. *Psychiatry Res*, 109, 45-9.
24. BLOSNIICH, J., FOYNES, M. M. & SHIPHERD, J. C. 2013. Health disparities among sexual minority women veterans. *J Womens Health (Larchmt)*, 22, 631-6.
25. MCEWEN, B. S. 2003. Interacting mediators of allostasis and allostatic load: towards an understanding of resilience in aging. *Metabolism*, 52, 10-6.
26. MCEWEN, B. S. & SEEMAN, T. 1999. Protective and damaging effects of mediators of stress. Elaborating and testing the concepts of allostasis and allostatic load. *Ann N Y Acad Sci*, 896, 30-47.
27. NGUYEN, S., LEARDMANN, C. A., SMITH, B., CONLIN, A. M., SLYMEN, D. J., HOOPER, T. I., RYAN, M. A., SMITH, T. C. & MILLENNIUM COHORT STUDY, T. 2013. Is military deployment a risk factor for maternal depression? *J Womens Health (Larchmt)*, 22, 9-18.
28. CRUM-CIANFLONE, N. F., POWELL, T. M., LEARDMANN, C. A., RUSSELL, D. W. & BOYKO, E. J. 2016. Mental Health and Comorbidities in U.S. Military Members. *Mil Med*, 181, 537-45.
29. FIEDLER, N., OZAKINCI, G., HALLMAN, W., WARTENBERG, D., BREWER, N. T., BARRETT, D. H. & KIPEN, H. M. 2006. Military deployment to the Gulf War as a risk factor for psychiatric illness among US troops. *Br J Psychiatry*, 188, 453-9.
30. WILSON, J., JONES, M., FEAR, N. T., HULL, L., HOTOPF, M., WESSELY, S. & RONA, R. J. 2009. Is previous psychological health associated with the likelihood of Iraq War deployment? An investigation of the "healthy warrior effect". *Am J Epidemiol*, 169, 1362-9.
31. WELLS, T. S., LEARDMANN, C. A., FORTUNA, S. O., SMITH, B., SMITH, T. C., RYAN, M. A., BOYKO, E. J., BLAZER, D. & MILLENNIUM COHORT STUDY, T. 2010. A prospective study of depression following combat deployment in support of the wars in Iraq and Afghanistan. *Am J Public Health*, 100, 90-9.
32. CRAIN, J. A., LARSON, G. E., HIGHFILL-MCROY, R. M. & SCHMIED, E. A. 2011. Postcombat outcomes among Marines with pre-existing mental diagnoses. *J Trauma Stress*, 24, 671-9.
33. VOGT, D., VAUGHN, R., GLICKMAN, M. E., SCHULTZ, M., DRAINONI, M. L., ELWY, R. & EISEN, S. 2011. Gender differences in combat-related stressors and their association with

- postdeployment mental health in a nationally representative sample of U.S. OEF/OIF veterans. *J Abnorm Psychol*, 120, 797-806.
34. WOODHEAD, C., WESSELY, S., JONES, N., FEAR, N. T. & HATCH, S. L. 2012. Impact of exposure to combat during deployment to Iraq and Afghanistan on mental health by gender. *Psychol Med*, 42, 1985-96.
35. CAWKILL, P., JONES, M., FEAR, N. T., JONES, N., FERTOOUT, M., WESSELY, S. & GREENBERG, N. 2015. Mental health of UK Armed Forces medical personnel post-deployment. *Occup Med (Lond)*, 65, 157-64.
36. MCLAY, R. N., MANTANONA, C., RAM, V., WEBB-MURPHY, J., KLAM, W. & JOHNSTON, S. 2014. Risk of PTSD in service members who were fired upon by the enemy is higher in those who also returned fire. *Mil Med*, 179, 986-9.
37. CRUM-CIANFLONE, N. F. & JACOBSON, I. 2014. Gender differences of postdeployment post-traumatic stress disorder among service members and veterans of the Iraq and Afghanistan conflicts. *Epidemiol Rev*, 36, 5-18.
38. CONNORTON, E., PERRY, M. J., HEMENWAY, D. & MILLER, M. 2011. Occupational trauma and mental illness--combat, peacekeeping, or relief work and the national co-morbidity survey replication. *J Occup Environ Med*, 53, 1360-3.
39. JONES, N., SEDDON, R., FEAR, N. T., MCALLISTER, P., WESSELY, S. & GREENBERG, N. 2012. Leadership, cohesion, morale, and the mental health of UK Armed Forces in Afghanistan. *Psychiatry*, 75, 49-59.
40. HANWELLA, R. & DE SILVA, V. 2012. Mental health of Special Forces personnel deployed in battle. *Soc Psychiatry Psychiatr Epidemiol*, 47, 1343-51.
41. KLINE, A., CICCONE, D. S., WEINER, M., INTERIAN, A., ST HILL, L., FALCA-DODSON, M., BLACK, C. M. & LOSONCZY, M. 2013. Gender differences in the risk and protective factors associated with PTSD: a prospective study of National Guard troops deployed to Iraq. *Psychiatry*, 76, 256-72.
42. DICKSTEIN, B. D., MCLEAN, C. P., MINTZ, J., CONOSCENTI, L. M., STEENKAMP, M. M., BENSON, T. A., ISLER, W. C., PETERSON, A. L. & LITZ, B. T. 2010. Unit cohesion and PTSD symptom severity in Air Force medical personnel. *Mil Med*, 175, 482-6.
43. SKOPP, N. A., REGER, M. A., REGER, G. M., MISHKIND, M. C., RASKIND, M. & GAHM, G. A. 2011. The role of intimate relationships, appraisals of military service, and gender on the development of posttraumatic stress symptoms following Iraq deployment. *J Trauma Stress*, 24, 277-86.
44. INTERIAN, A., KLINE, A., JANAL, M., GLYNN, S. & LOSONCZY, M. 2014. Multiple deployments and combat trauma: do homefront stressors increase the risk for posttraumatic stress symptoms? *J Trauma Stress*, 27, 90-7.
45. RONA, R. J., FEAR, N. T., HULL, L., GREENBERG, N., EARNSHAW, M., HOTOPF, M. & WESSELY, S. 2007. Mental health consequences of overstretch in the UK armed forces: first phase of a cohort study. *BMJ*, 335, 603.
46. MACGREGOR, A. J., HELTEMES, K. J., CLOUSER, M. C., HAN, P. P. & GALARNEAU, M. R. 2014. Dwell time and psychological screening outcomes among military service members with multiple combat deployments. *Mil Med*, 179, 381-7.
47. GODIER, L. R. & FOSSEY, M. 2018. Addressing the knowledge gap: sexual violence and harassment in the UK Armed Forces. *J R Army Med Corps*, 164, 362-364.
48. LEARDMANN, C. A., PIETRUCHA, A., MAGRUDER, K. M., SMITH, B., MURDOCH, M., JACOBSON, I. G., RYAN, M. A., GACKSTETTER, G., SMITH, T. C. & MILLENNIUM COHORT

- STUDY, T. 2013. Combat deployment is associated with sexual harassment or sexual assault in a large, female military cohort. *Womens Health Issues*, 23, e215-23.
49. HASKELL, S. G., GORDON, K. S., MATTOCKS, K., DUGGAL, M., ERDOS, J., JUSTICE, A. & BRANDT, C. A. 2010. Gender differences in rates of depression, PTSD, pain, obesity, and military sexual trauma among Connecticut War Veterans of Iraq and Afghanistan. *J Womens Health (Larchmt)*, 19, 267-71.
50. KIMERLING, R., GIMA, K., SMITH, M. W., STREET, A. & FRAYNE, S. 2007. The Veterans Health Administration and military sexual trauma. *Am J Public Health*, 97, 2160-6.
51. MILLEGAN, J., WANG, L., LEARDMANN, C. A., MILETICH, D. & STREET, A. E. 2016. Sexual Trauma and Adverse Health and Occupational Outcomes Among Men Serving in the U.S. Military. *J Trauma Stress*, 29, 132-40.
52. SURIS, A. & LIND, L. 2008. Military sexual trauma: a review of prevalence and associated health consequences in veterans. *Trauma Violence Abuse*, 9, 250-69.
53. O'BRIEN, B. S. & SHER, L. 2013. Military sexual trauma as a determinant in the development of mental and physical illness in male and female veterans. *Int J Adolesc Med Health*, 25, 269-74.
54. SEXTON, M. B., RAGGIO, G. A., MCSWEENEY, L. B., AUTHIER, C. C. & RAUCH, S. A. M. 2017. Contrasting Gender and Combat Versus Military Sexual Traumas: Psychiatric Symptom Severity and Morbidities in Treatment-Seeking Veterans. *J Womens Health (Larchmt)*, 26, 933-940.
55. BURNS, B., GRINDLAY, K., HOLT, K., MANSKI, R. & GROSSMAN, D. 2014. Military sexual trauma among US servicewomen during deployment: a qualitative study. *Am J Public Health*, 104, 345-9.
56. FEAR, N. T., IVERSEN, A. C., CHATTERJEE, A., JONES, M., GREENBERG, N., HULL, L., RONA, R. J., HOTOPF, M. & WESSELY, S. 2008. Risky driving among regular armed forces personnel from the United Kingdom. *Am J Prev Med*, 35, 230-6.
57. URSANO, R. J., WANG, J., FULLERTON, C. S., RAMSAWH, H., GIFFORD, R. K., RUSSELL, D., COHEN, G. H., SAMPSON, L. & GALEA, S. 2018. Post-deployment Mental Health in Reserve and National Guard Service Members: Deploying With or Without One's Unit and Deployment Preparedness. *Mil Med*, 183, e51-e58.
58. SUNDIN, J., JONES, N., GREENBERG, N., RONA, R. J., HOTOPF, M., WESSELY, S. & FEAR, N. T. 2010. Mental health among commando, airborne and other UK infantry personnel. *Occup Med (Lond)*, 60, 552-9.
59. STREET, A. E., GRADUS, J. L., GIASSON, H. L., VOGT, D. & RESICK, P. A. 2013. Gender differences among veterans deployed in support of the wars in Afghanistan and Iraq. *J Gen Intern Med*, 28 Suppl 2, S556-62.
60. SUNDIN, J., MULLIGAN, K., HENRY, S., HULL, L., JONES, N., GREENBERG, N., WESSELY, S. & FEAR, N. T. 2012. Impact on mental health of deploying as an individual augmentee in the U.K. Armed Forces. *Mil Med*, 177, 511-6.
61. IVERSEN, A. C., VAN STADEN, L., HUGHES, J. H., BROWNE, T., HULL, L., HALL, J., GREENBERG, N., RONA, R. J., HOTOPF, M., WESSELY, S. & FEAR, N. T. 2009. The prevalence of common mental disorders and PTSD in the UK military: using data from a clinical interview-based study. *BMC Psychiatry*, 9, 68.
62. SMITH, B. N., VAUGHN, R. A., VOGT, D., KING, D. W., KING, L. A. & SHIPHERD, J. C. 2013. Main and interactive effects of social support in predicting mental health symptoms in men and women following military stressor exposure. *Anxiety Stress Coping*, 26, 52-69.

63. JAMES, L. M., VAN KAMPEN, E., MILLER, R. D. & ENGDAHL, B. E. 2013. Risk and protective factors associated with symptoms of post-traumatic stress, depression, and alcohol misuse in OEF/OIF veterans. *Mil Med*, 178, 159-65.
64. AVERILL, L. A., EUBANKS FLEMING, C. J., HOLENS, P. L. & LARSEN, S. E. 2015. Research on PTSD prevalence in OEF/OIF Veterans: expanding investigation of demographic variables. *Eur J Psychotraumatol*, 6, 27322.
65. HOLT-LUNSTAD, J., BIRMINGHAM, W. & JONES, B. Q. 2008. Is there something unique about marriage? The relative impact of marital status, relationship quality, and network social support on ambulatory blood pressure and mental health. *Ann Behav Med*, 35, 239-44.
66. EISEN, S. V., SCHULTZ, M. R., GLICKMAN, M. E., VOGT, D., MARTIN, J. A., OSEI-BONSU, P. E., DRAINONI, M. L. & ELWY, A. R. 2014. Postdeployment resilience as a predictor of mental health in Operation Enduring Freedom/Operation Iraqi Freedom returnees. *Am J Prev Med*, 47, 754-61.
67. SEXTON, M. B., DAVIS, M. T., ANDERSON, R. E., BENNETT, D. C., SPARAPANI, E. & PORTER, K. E. 2018. Relation between sexual and gender minority status and suicide attempts among veterans seeking treatment for military sexual trauma. *Psychol Serv*, 15, 357-362.
68. BLOSNIICH, J. R. & ANDERSEN, J. P. 2015. Thursday's child: the role of adverse childhood experiences in explaining mental health disparities among lesbian, gay, and bisexual U.S. adults. *Soc Psychiatry Psychiatr Epidemiol*, 50, 335-8.
69. SMITH, B. N., WANG, J. M., VAUGHN-COAXUM, R. A., DI LEONE, B. A. & VOGT, D. 2017. The role of postdeployment social factors in linking deployment experiences and current posttraumatic stress disorder symptomatology among male and female veterans. *Anxiety Stress Coping*, 30, 39-51.
70. GIBBONS, S. W., BARNETT, S. D. & HICKLING, E. J. 2012a. Family stress and posttraumatic stress: the impact of military operations on military health care providers. *Arch Psychiatr Nurs*, 26, e31-9.
71. GIBBONS, S. W., BARNETT, S. D., HICKLING, E. J., HERBIG-WALL, P. L. & WATTS, D. D. 2012b. Stress, coping, and mental health-seeking behaviors: gender differences in OEF/OIF health care providers. *J Trauma Stress*, 25, 115-9.
72. WANG, Y., HUNT, K., NAZARETH, I., FREEMANTLE, N. & PETERSEN, I. 2013. Do men consult less than women? An analysis of routinely collected UK general practice data. *BMJ Open*, 3, e003320. <http://dx.doi.org/10.1136/bmjopen-2013-003320>
73. LEHAVOT, K., KATON, J. G., CHEN, J. A., FORTNEY, J. C. & SIMPSON, T. L. 2018. Post-traumatic Stress Disorder by Gender and Veteran Status. *Am J Prev Med*, 54, e1-e9.
74. NWORAH, U., SYMES, L., YOUNG, A. & LANGFORD, R. 2014. Afghanistan and Iraq war veterans' health care needs and their underuse of health care resources: implications for psychiatric-mental health nurses. *J Psychosoc Nurs Ment Health Serv*, 52, 42-9.
75. HOURANI, L., WILLIAMS, J., BRAY, R. M., WILK, J. E. & HOGE, C. W. 2016. Gender Differences in Posttraumatic Stress Disorder and Help Seeking in the U.S. Army. *J Womens Health (Larchmt)*, 25, 22-31.
76. NEWINS, A. R., WILSON, S. M., HOPKINS, T. A., STRAITS-TROSTER, K., KUDLER, H. & CALHOUN, P. S. 2018. Barriers to the use of Veterans Affairs health care services among female veterans who served in Iraq and Afghanistan. *Psychol Serv*.
77. AMARA, J., IVERSON, K. M., KRENGEL, M., POGODA, T. K. & HENDRICKS, A. 2014. Anticipating the traumatic brain injury-related health care needs of women veterans after

the Department of Defense change in combat assignment policy. *Womens Health Issues*, 24, e171-6.

78. COBB SCOTT, J., PIETRZAK, R. H., SOUTHWICK, S. M., JORDAN, J., SILLIKER, N., BRANDT, C. A. & HASKELL, S. G. 2014. Military sexual trauma interacts with combat exposure to increase risk for posttraumatic stress symptomatology in female Iraq and Afghanistan veterans. *J Clin Psychiatry*, 75, 637-43.



**Figure caption**

Figure 1 - *Common Risk Factors Operating in Army Personnel Through the Lifecourse*