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What work-related exposures are associated with post-traumatic stress disorder? A systematic review with meta-analysis

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Abstract

Objectives: Although there is evidence that work-related exposures cause post-traumatic stress disorder (PTSD), there are few quantitative studies assessing the degree to which these factors contribute to PTSD. This systematic review with meta-analysis identified work-related exposures associated with PTSD, and quantified their contribution to this disorder.

Methods: We searched Medline, PsycINFO, Embase, PILOTS and Web of Science (2005 to 10-09-2019) for longitudinal studies on work-related exposures and PTSD. We described included articles, and conducted meta-analyses for exposures with sufficient homogeneous information. We performed subgroup analyses for risk of bias, study design and PTSD ascertainment. We assessed evidence quality using GRADE, and estimated population attributable fractions.

Results: After screening 8,590 records, we selected 33 studies (n=5,719,236). From what was moderate quality evidence at best, we identified various work-related exposures that were associated with PTSD, mainly involving individuals in the military and first responder (e.g., police or fire brigade) occupations. These exposures included the number of army deployments (odds ratio: 1.15 [1.14 1.16]), combat exposure (1.89 [1.46 2.45]), army deployment (1.79 [1.45 2.21]) and confrontation with death (1.63 [1.41 1.90]). Effects were robust across subgroups and exposures attributed modestly (7%-34%) to PTSD. We identified additional exposures in other occupations, including life threats, being present during an attack, and hearing about a colleague's trauma.

Conclusions: We identified various work-related exposures associated with PTSD and quantified their contribution. While exposure assessment, PTSD ascertainment, and inconsistency may have biased our findings, our data are of importance for development of preventive interventions and occupational health guidelines.

Key words: Post traumatic stress disorder; occupational health; occupational diseases; systematic review; meta-analysis

Strengths and limitation of this study

- Post-traumatic stress disorder (PTSD) is particularly prevalent among certain occupational groups, e.g., first responder (such as police or fire brigade) and military personnel.
- However, the association of work-related exposures with PTSD has not previously been quantified in a meta-analysis.
- We identified 33 studies (with n=5,719,236 participants) in which various work-related exposures were found to be associated with PTSD, based on moderate quality evidence at best.
- These findings can be used to support the development of preventive interventions, and as an aid to the assessment of occupational PTSD in occupational medicine guidelines.

Background

Post-traumatic stress disorder (PTSD) can be triggered when individuals experience or witness traumatic events. PTSD has been a clinical diagnosis since 1980, when the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) was published[1]. The most recent DSM-5[2] states that PTSD results from exposure to severely traumatic event(s), while exhibiting a pattern of symptoms characterised by intrusion, avoidance, negative moods and cognitions, arousal, and reactivity. A diagnosis of PTSD also involves duration and functional impairment criteria, and the patient's symptoms should be exclusive (i.e., not caused by drugs or other illnesses). Estimates of PTSD prevalence among the general population differ widely. For example, lifetime PTSD prevalence ranged from 6% to 9% in United States (US) and Canadian samples, while prevalence rates in Australian samples range from 1% to 2%[3]. The substantial differences between individual studies could result from different ways in which PTSD was ascertained, varying from any type of clinical diagnosis, to self-reports of DSM-5 criteria and PTSD symptoms assessed as *probable PTSD*.

PTSD can have a major impact on individuals and society as a whole, as it is associated with mental comorbidities[4], substance abuse[5] and suicide[6]. PTSD is particularly prevalent among certain occupational groups, such as police officers, firefighters, medical workers and military personnel, all of whom can experience events that might trigger PTSD[7 8]. One particular systematic review showed that the prevalence of PTSD in military veterans and other high-risk occupational groups can be almost twice as high as among the general population[8]. Another more recent review identified a number of occupational groups, including healthcare workers, police officers, prison workers, and emergency personnel, with an increased risk of PTSD[9]. Also, various specific work-related exposures (i.e., exposures to situations or conditions at work that may have an effect on PTSD) and their association with PTSD have been reported[7]. This included traumatic events experienced by military personnel and first responders (e.g., police officers or fire fighters). The latter review also identified journalists, healthcare workers or individuals in other occupations who are exposed to traumatic events or the aftermath thereof[7].

Despite this evidence, the association of work-related exposures with PTSD has not yet been quantified in a meta-analysis. Such knowledge is of importance to answer questions regarding work-related causation and prevention, as a prelude to developing interventions. With regard to prevention, we need to quantify the contribution of work-related exposures in the onset of PTSD[10]. Such data could be used to formulate clinically relevant exposure threshold limits, as has been done with other disorders[11 12]. It could also be of use in occupational health guidelines, as many countries provide financial compensation for individuals diagnosed with an occupational disease.

In this study, our aim was to 1) identify the work-related exposures associated with the onset of PTSD, and 2) quantify the extent to which such exposures contribute to this disorder. Evidence on the contribution of work-related factors to PTSD could be used to facilitate decisions in reporting schemes. It could also help to identify and prioritise preventive interventions against those exposures with the strongest effect, in terms of triggering PTSD.

Methods

The protocol for this systematic review with meta-analysis was registered in PROSPERO[13] a-priori. The review itself was conducted in accordance with the PRISMA statement guidelines[14].

Searches

The Medline, PsycINFO, Embase, PILOTS and Web of Science databases were systematically searched for material published from 2005 (January) to 2019 (September 10). This was an arbitrarily chosen period on the basis of changes in people's exposure to work-related traumatic events and changes in the definition of PTSD over time[2]. The search strategy consisted of a combination of controlled search terms (e.g., Medical Subject Headings/MeSH) and free-text words used to specify search terms related to: 1) PTSD 2) exposure, and 3) work. A methodological filter was used to select longitudinal studies (prospective, retrospective or case-control), studies published in English, and those involving human participants only. The search strategy used is described in detail in supplementary file 1. We validated this search with various key references, to avoid term bias. In addition to the database search, we conducted snowball searches for additional studies. These were based on citation tracking (forwards and backwards) from the articles and reviews retrieved in our electronic search. We also conducted scoping searches for key researchers on this topic, and used ResearchGate profiles to identify relevant records and projects (including unpublished projects). Outcome articles were compared to potential protocol papers, to assess selective reporting.

Inclusion and exclusion criteria

Two reviewers, working independently of one another, used Rayyan (an online tool: https://rayyan.qcri.org/) to screen for eligible references. The full texts of any such references (whose eligibility was based on the screening title and abstract) were retrieved for further screening. Any conflicts were resolved during a consensus meeting. We included studies on the association between any work-related exposure and the onset of PTSD (acute or delayed) in paid workers of working age (aged 18-65). Any studies that described work-related exposures in terms of work demands or other occupational factors were eligible for inclusion. However, studies in which exposures were related to job title or work title only were excluded. Studies were included if there was an actual diagnosis of PTSD (either using checklists with defined cut-off values or clinical criteria, e.g., using DSM criteria[2] and/or coded according to the International Classification of Disorders -ICD-9-CM 309.81-). Studies in which PTSD was assessed by means of self-reports only (not using any criteria) were excluded. We excluded any studies into the persistence or growth of PTSD. Those studies in which the exposure-outcome association was quantified, e.g., in terms of effect sizes such as a hazard ratio (HR), relative risk (RR) or odds ratio (OR), were included. We restricted ourselves to original articles, in English or Dutch, published in peer-reviewed scientific journals from 2005 onwards. Studies with a prospective, retrospective or case-control longitudinal design were included, while cross-sectional studies were excluded, to be able to monitor the time sequence between exposure and the PTSD onset, in which the assessments of exposure precede the actual onset of the disorder. The above-mentioned set of criteria were finalised after a pilot screening of 300 references.

Data extraction and risk of bias assessment

Two reviewers, working independently of one another, extracted data and assessed risk of bias from each of the eligible articles. Any conflicts were resolved during a consensus meeting. We extracted first author and year of publication, study name and design, sample (country, occupational group,

age and sex), exposure assessment, PTSD ascertainment, and effect size. Where it was not possible to retrieve sufficient information from the published articles, additional data were requested from study researchers.

Risk of bias was assessed using the 'Quality in Prognosis Studies' tool[15], with criteria related to study participation, attrition, prognostic factor (i.e., exposure) measurements, outcomes, confounding, and statistical analysis. Here, we attributed a low risk of bias regarding attrition to studies with a >80% participant retention.

Data analysis

The included articles were described in terms of extracted data and risk of bias. Work-related exposures were categorised according to the DSM-5 criteria for PTSD stressors[2]: 1) direct exposure to the trauma, 2) witnessing a trauma, 3) hearing about a colleague/co-workers (adapted to work context) was/were exposed to a trauma, or 4) indirect exposure to aversive details of a trauma (e.g., first responders and medics).

Where sufficient clinically and methodologically homogeneous information were available, a quantitative meta-analysis was conducted to determine a pooled effect size for the association of each exposure with PTSD. Review Manager (RevMan 5) was used for the meta-analyses, and to generate forest and funnel plots. The latter were used to assess publication bias, through visual inspection. According to the Cochrane collaboration handbook, funnel plots were only generated for exposures with effect sizes from ≥10 studies[16]. Most of the exposure-outcome associations featured statistical heterogeneity (I^2>75%), so random-effects estimates were adopted for statistical pooling. We assumed that the interpretation of effect estimates (e.g., HR and OR) was consistent, and we estimated pooled OR with 95% confidence interval (95%CI). We adopted the OR, as this was the most frequently reported effect size in the articles found (being reported in 32 articles, whereas two articles reported HRs and three articles reported RRs).

When more than one article reported on the same study, information from just one of these articles was used for analyses, using effect sizes from the article with the shortest follow-up duration (with a latency time of at least four weeks) to ensure that the work-related exposure of interest is indeed the most likely cause of PTSD. Wherever possible, we used information from fully adjusted models and we did not consider subgroups (e.g., sex differences). Population attributable fractions (PAFs) were estimated[17] to assess the extent to which work-related exposures contributed to the development of PTSD. Here, the proportion of workers exposed to the exposure of interest (P_e) were multiplied by the attributable proportion in the exposed workers: $P_e(OR-1)/(1+P_e(OR-1))$.

In line with our registered protocol[13], subgroup analyses were based on the risk of bias (with a cut-off score of 60% for the risk of bias scale summary score, to obtain two subgroups), on the study design (prospective vs retrospective) and on PTSD ascertainment (clinically diagnosed PTSD vs probable PTSD). In contrast to the protocol that we registered a-priori,[13] we were unable to compare other characteristics of PTSD (i.e., acute vs delayed) due to limited available data. Any information that could not be qualitatively analysed was described narratively.

Strength of evidence

The strength of the evidence was assessed using the GRADE (Grades of Recommendations, Assessment, Development and Evaluation) framework[18]. Four quality levels were distinguished: high, moderate, low, and very low. Our starting point for evidence grading was 'moderate', which has previously been proposed for use in the assessment of prognostic factors[19]. Various study limitations

could have detracted from the strength of the evidence (if the majority of the studies scored <60% on the risk of bias scale), as could inconsistency (I^2>50%), indirectness, imprecision (95%CI boundaries are <1 and >2), and publication bias (based on the funnel plots). Study findings with moderate or large effect sizes (i.e., lower limit of 95%CI OR>2.0) or an exposure-response gradient could boost the quality of the evidence.

Patient and public involvement

There was no patient or public involvement in designing and conducting this study.

Results

Study selection

The study selection procedure is described in Figure 1. We identified 14,529 records during database searches. After discarding duplicates, we screened the remaining 8,590 records on title and abstract. Of these, we assessed 107 full text articles and excluded 65 for various reasons (see Supplementary file 2 for more details). As no additional articles were found during snowball and scoping searches, 42 articles from 33 studies were described in this review[20-61].

Study description and methodological quality/risk of bias

Supplementary file 3 contains the extracted data, and risk of bias assessment is shown in supplementary file 4-5. The 33 included studies provided data on n=5,719,236 participants, ranging from n=19 to n=2,549,949 participants per study. Eighteen studies were from the US, four were from the United Kingdom, two were from Denmark, and two others from Japan. There was one study from each of the following countries: Israel, The Netherlands, Germany, Portugal, Italy, Norway and Korea. The majority of the studies (N=21) involved participants from armed forces. Five studies featured first responders who had attended the scene of a disaster, three focused on healthcare workers, two on employers at the scene of a disaster, one on bank workers and one on public transport workers.

Four studies reported no details of sex, five studies only used male participants, and 17 used samples in which the majority of participants were male (≤20% females). In only seven studies, did female participants make up a reasonable proportion (>20%) of the study sample. Twenty-eight studies reported exposures obtained from self-reports, 12 studies used deployment administration databases, and two studies were based on a combination of these two measurements. Baseline exposure assessment was carried out for the period 1983-2012. Twenty-five articles assessed PTSD (by clinical diagnosis) while the remaining 17 articles assessed probable PTSD/PTSD symptoms (by self-reports using pre-defined (e.g., DSM-5) criteria). The weighted average for PTSD prevalence during in the follow-up periods was 7.3%, while individual study prevalence ranged from 1.0% to 70.5%. The average prevalence for diagnosed cases of PTSD was slightly higher (7.3%) than for probable PTSD (6.4%).

Twenty-five studies were prospective studies and eight were retrospective studies. On average, methodological quality was 62% (SD:19%), ranging from 25% to 100%. Most articles showed a low risk of bias on analysis/reporting (N=37) and confounding (N=25). Less than half of the articles showed a low risk of bias on participation selection (N=11), attrition (N=9), prognostic factor (exposure) assessment (N=9) and outcome (PTSD) ascertainment (N=13).

Work-related exposures

Each of the exposure-outcome associations presented have been described and categorised according to the DSM-5 criteria for PTSD stressors[2]: 1) direct exposure, 2) witnessing a trauma, 3) hearing that a colleague or co-worker was exposed to a trauma, or 4) indirect exposure to aversive details of a trauma. An overview of qualitative and quantitative analyses of all exposure-outcome associations is shown in Table 1. Figures 2 and 3 depict quantitative analyses, while Table 2 contains an overview of any exposure-outcome associations that could not be statistically pooled.

Direct exposure

The exposure-outcome associations for direct exposures were quantitatively analysed for: number of army deployments (OR[95%CI]: 1.15[1.14 1.16], I^2=0%, n=333,024, Figure 2), combat exposure

(OR[95%CI]: 1.89[1.46 2.45], I^2=89%, n=28,304, Figure 2) and army deployment (OR[95%CI]: 1.79 [1.45 2.21], I^2=0%, n=11,023, Figure 3). The PAFs for these exposures were 7%, 14% and 34%, respectively. Evidence for these exposure-outcome associations was moderate, very low, and low quality, respectively. In some cases, the evidence was downgraded due to high risk of bias and inconsistency. There was some evidence for publication bias, although it was only possible to assess that for the 'combat exposure' variable (Supplementary file 6). Subgroup analyses based on risk of bias (Supplementary file 7-9), study design (Supplementary file 11-13) and PTSD ascertainment (Supplementary file 15-17) showed no statistically significant differences between effects for those subgroups.

In our qualitative analyses of exposures that could not be statistically pooled, we found exposure-outcome associations for exposures related to undergoing a traumatic event, cumulative exposure and the severity of exposure (Table 2). With regard to undergoing a traumatic event, the effect sizes ranged from OR[95%CI]: 0.86[0.32 2.28] (physical contacts with thieves)[34] to OR[95%CI]: 5.65[3.27 9.74] (workers fleeing from a tsunami)[42]. Cumulative exposure was e.g. expressed in length of deployment[37] (OR[95%CI]: 0.97[0.92 1.03]) and high frequency of violence (compared to no violence)[55] (OR[95%CI]: 6.5[1.6 25.6]). The effect sizes for exposure severity ranged from OR[95%CI]: 1.01[0.67 1.35] (severity of battles)[45] to OR[95%CI]: 6.5[1.6 26.0] (severe compared to no violence)[55]

Witnessing a trauma

With regard to the DSM-5 criterion 'witnessing a trauma', there was insufficient homogeneous data to pool studies statistically (Table 2). In five studies (with n=4,876 participants), effect sizes ranged from OR[95%CI]: 1.01[0.63 1.64] ('perceiving a life threat')[56] to OR[95%CI]: 9.3[6.1 14.2] ('being present during an attack')[38].

A colleague or co-worker was exposed to a trauma

Only one study (n=980) reported on effect sizes regarding 'colleague or co-worker exposed to a trauma'. This study, among public transport workers, found that 'hearing that a close colleague had suffered a person under train experience' was not significantly association with PTSD (OR[95%CI]: 0.55[0.12 2.47])[46]

Indirect exposure to aversive details

Regarding indirect exposure to adverse events, we statistically pooled the effect sizes from seven studies (n=75,902 participants) with moderate-quality evidence for an association between confrontation with death and PTSD (Figure 3; OR[95%CI]: 1.63[1.41 1.90]). Subgroup analyses regarding risk of bias (Supplementary file 10), study design (Supplementary file 14) and PSTD ascertainment (Supplementary file 18) showed no statistically significant differences between any of those subgroups.

Additional evidence from four studies (n=14,085 participants), which could not be statistically pooled, showed effect sizes ranging from OR[95%CI]: 1.03[1.00 1.06] (being exposed to the aftermath of a battle)[37] to OR[95%CI]: 4.0[2.5 6.6] (being present during the morning of the 9/11 attacks)[27].

Other exposures

We found additional evidence that could not be categorised into any of the DSM-5 criteria. An increased risk of PTSD was associated with experiencing stress, with evidence ranging from

OR[95%CI]: 1.01[0.98 1.04] (deployment concerns)[28] to OR[95%CI]: 3.52[2.94 4.21] (high deployment stress)[21]. Also, the time that has passed since a given traumatic event seems to be associated with PTSD. This factor can either reduce the PTSD risk (OR[95%CI]: 0.47[0.32 0.70] with a longer dwell time between deployments)[48] or increase it (OR[95%CI]: 1.89[0.99 3.60] if the period since the return from deployment exceeds 6.5 years)[32]. Other exposures included experiencing discrimination at work (OR[95%CI]: 5.72[3.37 9.71])[42] and having to perform duties that involved a risk of radiation exposure (OR[95%CI]: 1.08[0.97 1.20])[53].

Discussion

In this systematic review with meta-analysis and evidence grading, we found various associations, albeit based on moderate-quality evidence at best, showing that several work-related exposures are associated with PTSD development. This includes exposures such as the number of army deployments, combat exposure, army deployment and confrontation with death. The corresponding effect sizes ranged from 1.15[1.14 1.16] to 1.89[1.46 2.45] and PAFs varied from 7% (for the number of army deployments) to 34% (for army deployment). The latter values indicate the proportion of PTSD cases that could potentially be avoided in a working population, if the exposure in question were to be totally eliminated. The data suggests that there could be an only moderate relationship between PTSD and work situations. However, they could also indicate that PTSD cannot be attributed to a single work-related exposure and that it is multi-factorial in nature and/or is mediated by other factors. This could, perhaps, also account for the relatively low ORs found for some of the effects.

Only a limited data, which could not be statistically pooled, was available concerning exposures that corresponded to the DSM-5 criteria 'witnessing a trauma' and 'hearing that a colleague/co-worker was exposed to a trauma'. These exposures include 'perceiving a life threat', 'being present during an attack', and 'hearing that a close colleague had suffered a person under train experience'. The additional exposures that could not be categorised according to DSM-5 criteria include 'military deployment', 'deployment stress', and 'time since return from deployment'. In future, it may be worth considering exposures of this kind when diagnosing work-related PTSD.

The details uncovered by this review are key to a better understanding of work-related causes of PTSD, to the selection or development of preventive interventions, and to the identification of thresholds for occupational health guidelines. This review has updated earlier work[7 9] and we are the first to quantify the association between work-related exposures and PTSD. This update identifies occupational groups and exposures that do not feature in previous reviews, such as public transport workers[46] and bank workers (being exposed to robberies)[34]. The exposures described in this review typically lead to an increased risk of PTSD, however, other work-related factors can actually reduce the risk of PTSD. For instance, among highly exposed occupational groups, a high level of preparedness (OR[95%CI]: 0.6[0.4 0.9])[62], unit support (OR[95%CI]: 0.5[0.3 0.8])[62], post-deployment support (OR[95%CI]: 0.3[0.2 0.4]) [62] and social support (OR[95%CI]: 0.96[0.93 0.98])[37] were all found to be associated with a reduced risk of PTSD. These elements can be used in the development of interventions, especially for those in occupations that involve high PTSD risks.

Methodological strengths and limitations

The strengths of this review are the systematic methods used plus a protocol that was registered a-priori, the systematic review with meta-analysis, and the assessment of evidential quality using GRADE[18]. The findings appear to be quite robust, since subgroup analyses based on risk of bias, study design and PTSD ascertainment produced results that did not differ between any of those subgroups. Moreover, the PAFs estimated in our study provide insight into the extent to which the identified exposures were occupationally related to PTSD.

We deviated from our a-prior registered protocol[13] in that we were unable to compare different PTSD diagnoses (acute vs delayed). In our meta-analysis, we used effect sizes from the article with the shortest follow-up duration (with a latency time of at least four weeks). There were, however, also data available from few studies measuring both the short-term and long-term effects of exposure and their association with PTSD. For example, 'being present during a terrorist attack' was strongly associated with PTSD in the acute phase (after 10 months; OR[95%CI]: 9.3[6.1 14.2]), but this

association was even stronger in the long term (after 34 months; OR[95%CI]: 10.0[5.4 18.6])[38]. Regarding 'being exposed to combat', the opposite was true. Stronger effects were seen in short term (OR[95%CI]: 2.91[1.34 6.31]) than long term (OR[95%CI]: 2.42[1.04 5.62])[39]. This is in line with another review indicating that, following exposure, the risk of PTSD attenuates over time[7].

Another potential source of heterogeneity stems from the method used to ascertain PTSD. In 25 articles, PTSD was assessed by clinical diagnosis while 17 articles assessed probable PTSD/PTSD symptoms, based on self-reports using pre-defined (e.g., DSM-5) criteria. We found that the average prevalence was slightly higher for diagnosed PTSD (7.3%) than for probable PTSD (6.4%). This is in line with a study of disaster workers, following the 9/11 attacks, in which 2-9% had probable self-reported PTSD, respectively[31]. However, 6-15% of these workers were diagnosed with PTSD. Nevertheless, our pooled effect sizes were robust across different methods for ascertaining PTSD. While ascertaining PTSD by clinical diagnosis may be more valid, this source of heterogeneity is unlikely to have substantially affected the findings presented. We have only assessed incidence of PTSD. Accordingly, this review does not address the persistence or growth of PTSD. Future studies should, therefore, focus on different types of PTSD diagnoses. They should also assess the work-relatedness of PTSD persistence and growth, as an aid to the development of occupational health guidelines.

One limitation of our study is that the majority of the studies in this review were based on participants from armed forces (N=21) and first responders (N=5). There was limited information on other occupations, such as public transport workers, bank employees and healthcare workers. Furthermore, most studies of the armed forces and of first responders tend to be male dominated and from Western countries. Future research should address these issues, by assessing previously unexplored occupational sectors and groups, as well as data from other countries. In this review we only included longitudinal studies in which the exposure would proceed the outcome, as a result of which a better inference of causality can be provided than with cross-sectional studies only. Moreover, we focussed in our review on articles published from 2005 onwards. This cut-off was based on changes in people's exposure to work-related traumatic events and changes to the definition of PTSD over time[2].

Although methodological quality of the included studies was of an acceptable level (62%, on average), the quality of the evidence was rated moderate at best. More than half of the articles showed a risk of bias with regard to participation (i.e., selection bias), attrition (with <80% of the participants being retained during the follow-up period), and misclassification due to a limited assessment of the prognostic factors (i.e., exposure) and the outcome of interest. As mentioned above, the ascertainment of PTSD is unlikely to have caused a substantial bias in our findings. However, exposures were often measured by means of self-reports, which may well have biased our findings. In addition, the quality of the evidence was downgraded due to inconsistency for some of the exposures. Our assessment of publication bias was limited to just one of the pooled exposures, which did not indicate a strong risk of such bias. It appeared, however, that none of the studies had published or registered their protocol, which could have caused publication bias.

Conclusion

In this systematic review with meta-analysis of 33 studies (with n=5,719,236 participants), based on moderate quality evidence at best, we identified a number of work-related exposures (mainly involving individuals in the armed forces and in first responder occupations) that increase the risk of PTSD (by 15% to 189%). These exposures include 'number of army deployments', 'combat exposure', 'army deployment' and 'confrontation with death', for which we found a moderate contribution to the development of PTSD. We identified additional exposures in other occupations, such as bank workers, public transport workers, and medics. These included 'life threats', 'being present during an attack' and 'hearing about a colleague's trauma'. Although exposure assessment, PTSD ascertainment and inconsistency may have biased our findings, the results of this review are quite robust and are of importance for the development of preventive interventions and occupational health guidelines.

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Author contribution
Both authors (PC and HvdM) designed the study and reviewed the manuscript for important intellectual content. Both authors identified relevant articles and conducted data extraction and analyses together. PC drafter the first version of the manuscript. HvdM is the study guarantor.

Data sharing
All data relevant to the study are included in the article and supplementary documents.

Study ethics
Not applicable as this study is a systematic review

Competing interests
The authors declare no competing interests

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Data sharing
Additional data is provided in the supplementary files.

Ethical approval
As this is a systematic review, no ethical approval is required

Patient consent
As this is a systematic review, no patient consent is required

Table 1. Overview of the evidence from both qualitative and quantitative analyses, with exposures categorised according to DSM-5 criteria. For exposures for which quantitative analyses could be performed (Figure 2 and 3), quality of the evidence for the relationship between work-related exposures and PTSD according to the GRADE framework is shown. Other exposures are described qualitatively (Table 2).

DSM-5 criterion	Exposure	N	n	Limit[1]	Incons[2]	Indirect[3]	Imprec[4]	Pub bias[5]	OR [95%CI][6]	Grad[7]	GRADE	PAF	Reference
Direct exposure	Number of army deployments[8]	3	333,024	No	0%	No	No	N/A	1.15 [1.14 1.16]	No	Moderate	7%	Figure 2
	Combat exposure	11	28,304	Yes	89%	No	No	Yes	1.89 [1.46 2.45]	No	Very low	14%	Figure 2
	Army deployment[9]	4	11,023	Yes	0%	No	No	N/A	1.79 [1.45 2.21]	No	Low	34%	Figure 3
	Undergoing a traumatic event	13	1,703,107	-	-	-	-	-	Min: 0.86 [0.32 2.28] Max: 5.65 [3.27 9.74]	-	-		Table 2
	Cumulative exposure	8	1,749,762	-	-	-	-	-	Min: 0.97 [0.92 1.03] Max: 6.5 [1.6 25.8]	-	-		Table 2
	Exposure severity	3	2,558	-	-	-	-	-	Min: 1.01 [0.67 1.35] Max: 6.5 [1.6 26.0]	-	-		Table 2
Witnessing trauma	-	5	4,876	-	-	-	-	-	Min: 1.01 [0.63 1.64] Max: 9.3 [6.1 14.2]	-	-		Table 2
Colleague exposed[10]	-	1	980	-	-	-	-	-	0.55 [0.12 2.47]	-	-		Table 2
Indirect exposure	Confrontation with death	7	75,902	No	46%	No	No	N/A	1.63 [1.41 1.90]	No	Moderate	15%	Figure 3
		4	14,085	-	-	-	-	-	Min: 1.03 [1.00 1.06] Max: 4.0 [2.5 6.4]	-	-		Table 2
Other exposures	Stress	4	1,390,641	-	-	-	-	-	Min: 1.01 [0.98 1.04] Max: 3.52 [2.94 4.21]	-	-		Table 2
	Time since event	3	1,358,468	-	-	-	-	-	Min: 0.47 [0.32 0.70] Max: 1.89 [0.99 3.60]	-	-		Table 2
	Other	3	69,176	-	-	-	-	-	Min: 1.08 [0.97 1.20] Max: 5.72 [3.37 9.71]	-	-		Table 2

n= number of participants; N = number of studies; OR = Odds ratio; 95%CI = 95% confidence interval; PAF = population attributable fractions
[1] Limitation: downgraded if the majority of studies score lower than 60% on the risk of bias scale. [2] Inconsistency: downgrade if $I^2 \geq 50\%$.
[3] Indirectness: downgrade if indirectness is present. [4] Imprecision: downgrade if the 95% confidence interval is <1 and >2.
[5] Publication bias: downgraded if publication bias is present (based on the funnel plots). [6] Effect size: upgrade if the lower limit of the 95% confidence interval is >2.0.
[7] Gradient: upgraded if there is a dose-response gradient available.
[8] Depicting the effect of being deployed more than once, as compared to being deployed once.
[9] Depicting the effect of being deployed, as compared to not being deployed.
[10] For this study on occupational exposures, the DSM-5 criterion 'relative/friend' was adapted to 'colleague or co-worker'.

Table 2. Overview of all exposure-outcome effect sizes from qualitative analyses, with exposures categorised according to DSM-5 criteria. Odds ratios (OR) with 95% confidence intervals (95%CI) are shown.

DSM-5 criterion	Exposure category	Exposure	Effect size (OR [95%CI])
Direct exposure	Undergoing an event	Work-related threats[20]	1.10 [1.04 1.15]
		Work-related violence[20]	1.02 [0.98 1.06]
		Previous disaster experience[23]	1.4 [1.2 1.6]
		One injury sustained during the 9/11 attacks[29]	1.1 [0.6 2.0]
		Two or more injuries sustained during the 9/11 attacks[29]	1.4 [0.6 3.4]
		Participation in abusive violence[33]	3.32 [1.81 6.08]
		Robberies during working life[34]	1.18 [0.97 1.44]
		Physical contacts with robbers[34]	0.86 [0.32 2.28]
		Scuffle [taking part or being present][34]	1.92 [0.63 5.79]
		Being injured during the robbery[34]	1.28 [0.31 5.21]
		Discharged weapon on deployment[36]	1.48 [0.61 3.60]
		Experience of life-threatening danger[42]	4.32 [2.89 6.48]
		Major property loss[42]	3.45 [2.28 5.23]
		Escape from tsunami[42]	5.65 [3.27 9.74]
		Life threatening war[45]	1.91 [1.07 3.24]
		Conflict with passengers[46]	3.21 [1.14 9.03]
		Felt in great danger of being killed[48]	3.44 [2.50 4.72]
		Exposure to blast[50]	4.72 [2.9 7.7]
		Encountering explosive devices[54]	1.26 [0.95 1.66]
	Cumulative exposure	Prolonged work at the WTC site[23]	2.0 [1.7 2.3]
		Length of deployment[37]	0.97 [0.92 1.03]
		≥5 critical cases per call for traumatic surgeons[43]	7 [1.1 8]
		≥7 call duties a month for traumatic surgeons[43]	3.8 [0.9 7.2]
		≥15 operative cases per month[43]	2.8 [0.4 3.2]
		Cumulative years deployed in navy[47]	2.04 [1.93 2.15]
		Cumulative years deployed in army[47]	1.74 [1.71 1.76]
		No. of Combat Exposures[48]	1.62 [1.46 1.79]
		Two combat exposure deployment[48]	1.37 [1.17 1.61]
		Three combat exposure deployment[48]	1.30 [0.94 1.82]
		Two deployments[48]	1.00 [1.00 1.01]
		Three deployments[48]	1.00 [0.99 1.01]
		One exposure (compared to no exposure)[50]	4.67 [3.1 7.1]
		Two or more deployments (compared to no exposure)[50]	6.15 [4.4 8.7]
		Deployment length 1–3 months[53]	1.53 [1.37 1.70]
		Deployment length ≥3 months[53]	2.64 [2.33 2.99]
		Low frequency of violence (compared to no violence)[55]	4.0 [1.0 16.3]
		Medium frequency of violence (compared to no violence)[55]	5.9 [1.4 24.2]
		High frequency of violence (compared to no violence)[55]	6.5 [1.6 25.6]
	Exposure severity	Combat exposure scale[33]	1.98 [1.50 2.62]
		Severity of battles[45]	1.01 [0.67 1.35]
		Max. mild violence (compared to no violence)[55]	3.8 [0.3 46.2]
		Max. threats of violence (compared to no violence)[55]	5.4 [1.2 24.2]
		Max. moderate violence (compared to no violence)[55]	2.6 [0.6 10.8]
		Max. severe violence (compared to no violence)[55]	6.5 [1.6 26.0]
Witnessing the trauma		Perceived life threat[56]	1.01 [0.63 1.64]
		Observation of abusive violence[33]	8.36 [4.56 15.35]
		Presence during attack[38]	9.3 [6.1 14.2]
		Witnessing of plant explosions[42]	2.09 [1.43 3.06]
		Person under train experience[46]	1.54 [0.52 4.55]
		One person under train experiences[46]	1.77 [0.31 4.47]
		Two or more person under train experiences[46]	2.36 [0.57 9.70]
		Sudden train stop[46]	3.66 [0.82 16.4]
		Near train accident[46]	8.81 [1.96 39.3]

		Damage to train[46]	1.71 [0.48 6.14]
Colleague exposed		Person under train experience of colleague[46]	0.55 [0.12 2.47]
Indirect exposure to aversive details		Aftermath of battle[37]	1.03 [1.00 1.06]
		morning of 9/11 (compared to >3 days)[27]	4.0 [2.5 6.6]
		afternoon of 9/11 (compared to >3 days)[27]	2.1 [1.3 3.3]
		day 2 (compared to >3 days)[27]	1.4 [0.9 2.4]
		Morning of 9/11 (compared to >3 days)[23]	2.0 [1.3 2.9]
		Afternoon of 9/11 (compared to >3 days)[23]	1.1 [0.8 1.5]
		Exposure to aftermath of battle[56]	1.81 [1.08 3.06]
Other exposures	Stress	High deployment stress[21]	3.52 [2.94 4.21]
		Deployment concerns summary score[28]	1.01 [0.98 1.04]
		Worried by other issues related to robbery[34]	2.64 [0.95 7.36]
		Unit cumulative high deployment stress rate (marine)[47]	1.04 [1.03 1.05]
		Unit cumulative high deployment stress rate (army)[47]	1.05 [1.04 1.06]
	Time since event	Months since most recent deployment[28]	1.00 [0.98 1.02]
		Time since return from deployment (up to 2 years)[32]	1.18 [0.75 1.86]
		Time since return from deployment (up to 3 years)[32]	1.80 [1.05 3.10]
		Time since return from deployment (up to 4 years)[32]	1.88 [0.98 3.62]
		Time since return from deployment (up to 5 years)[32]	1.53 [0.92 2.55]
		Time since return from deployment (up to 6.5 years)[32]	1.89 [0.99 3.60]
		Dwell to deployment ratio (1:1 versus <1:1)[48]	0.83 [0.60 1.13]
		Dwell to deployment ratio (2:1 versus <1:1)[48]	0.47 [0.32 0.70]
	Other	Supervising responsibilities[23]	2.2 [1.7 2.9]
		Discrimination/slurs[42]	5.72 [3.37 9.71]
		Duties with radiation exposure risk[53]	1.08 [0.97 1.20]

Figure caption

Figure 1. Flow chart depicting the search for literature.

Figure 2. Study findings (i.e., effect sizes) for articles reporting on the association of number of army deployments (depicting the effect of being deployed more than once, as compared to being deployed once; upper panel) and combat exposure (lower panel) with PTSD. Individual study as well as pooled effects are presented. SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure 3. Study findings (i.e., effect sizes) for articles reporting on the association of deployments status (depicting the effect of being deployed, as compared to not being deployed; upper panel) and confrontation with death (lower panel) with PTSD. Individual study as well as pooled effects are presented. SE = standard error; CI = confidence interval; IV = Inverse variance.

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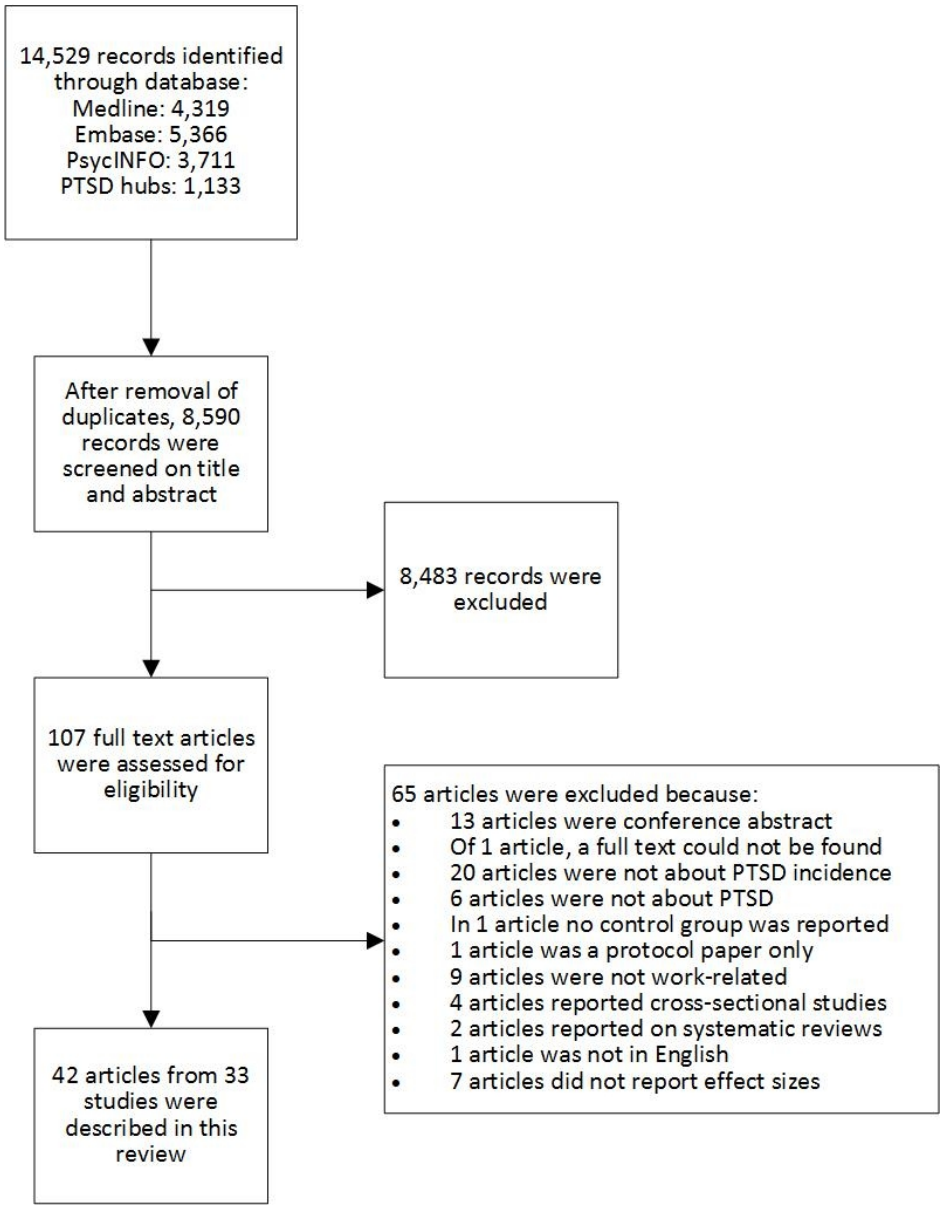
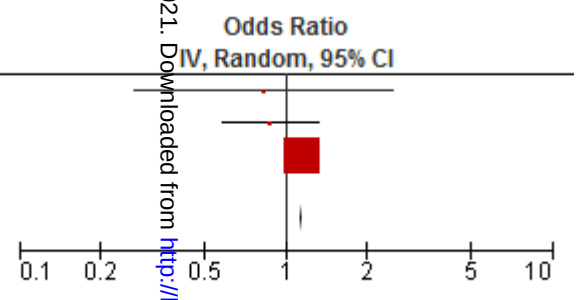


Flow chart depicting the search for literature.

101x130mm (200 x 200 DPI)

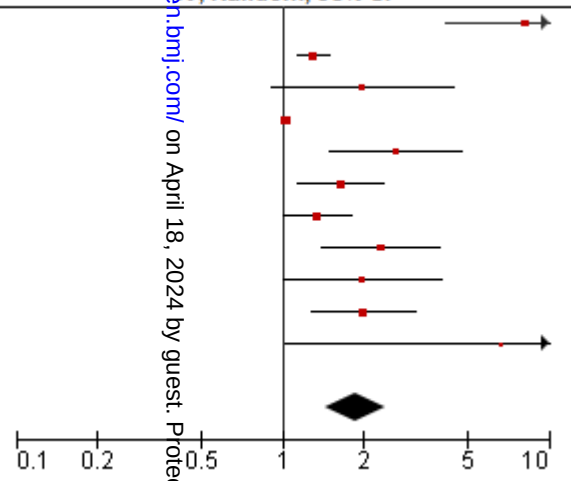
Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Random, 95% CI
Ciarleglio, 2018	-0.19	0.57	0.0%	0.83 [0.27, 2.53]
Fear, 2010	-0.13	0.21	0.0%	0.88 [0.58, 1.33]
Maguen, 2010	0.14	0.004	100.0%	1.15 [1.14, 1.16]
Total (95% CI)			**100.0%**	**1.15 [1.14, 1.16]**

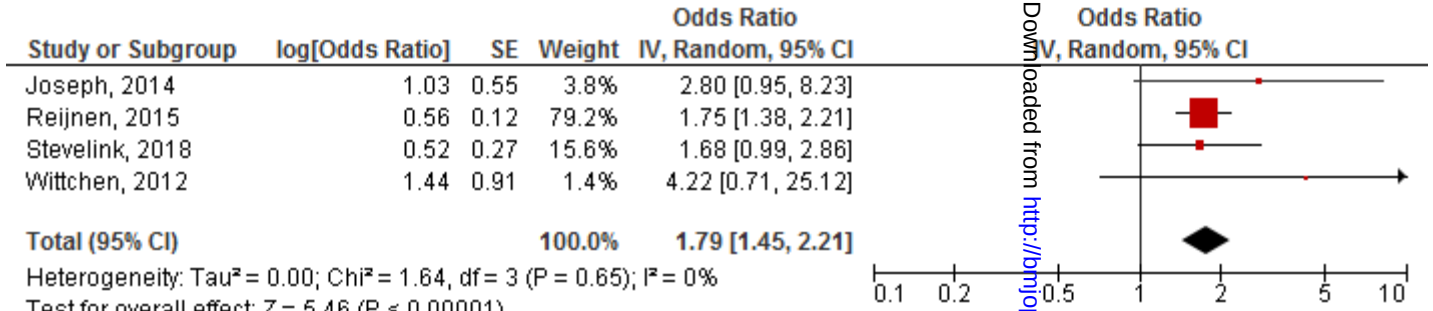
Heterogeneity: Tau² = 0.00; Chi² = 1.99, df = 2 (P = 0.37); I² = 0%
Test for overall effect: Z = 34.98 (P < 0.00001)

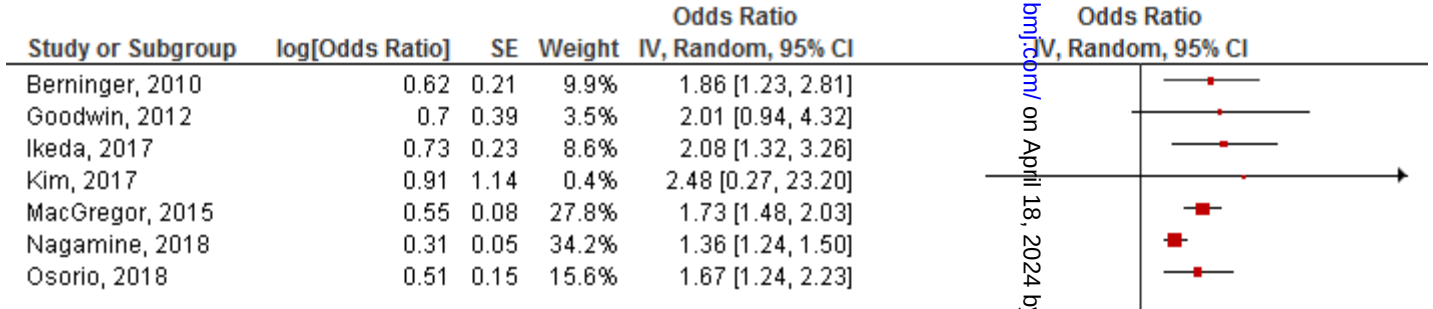


Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Random, 95% CI
Connorton, 2011	2.1	0.35	7.1%	8.17 [4.11, 16.22]
Cukor, 2011	0.27	0.07	13.6%	1.31 [1.14, 1.50]
Goodwin, 2012	0.69	0.4	6.2%	1.99 [0.91, 4.37]
Green, 2016	0.03	0.02	14.0%	1.03 [0.99, 1.07]
Harvey, 2012	0.98	0.29	8.4%	2.66 [1.51, 4.70]
MacGregor, 2015	0.51	0.19	10.9%	1.67 [1.15, 2.42]
Osorio, 2018	0.3	0.15	11.9%	1.35 [1.01, 1.81]
Polusny, 2011	0.85	0.26	9.1%	2.34 [1.41, 3.89]
Shea, 2013	0.69	0.35	7.1%	1.99 [1.00, 3.96]
Stevelink, 2018	0.7	0.23	9.9%	2.01 [1.28, 3.16]
Wittchen, 2012	1.89	0.95	1.7%	6.62 [1.03, 42.60]
Total (95% CI)			**100.0%**	**1.89 [1.46, 2.45]**

Heterogeneity: Tau² = 0.12; Chi² = 88.86, df = 10 (P < 0.00001); I² = 89%
Test for overall effect: Z = 4.79 (P < 0.00001)







Supplementary file 1.

	Ovid MEDLINE(R) ALL <1946 to September 09, 2019>. Search date: 10 September 2019	
#	**Search**	**Results**
1	stress disorders, post-traumatic/ or stress disorders, traumatic, acute/	30925
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or traumatic stress).ab,kf,ti,sh.	42697
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,kf,ti. [trauma screening zoals de Harvard Trauma Screening Questionnaire - htsq]	160
4	or/1-3 [ptsd]	51153
5	exp Occupations/ or Workload/ or exp Work/ or Workplace/ or exp Occupational Diseases/ or Rehabilitation, Vocational/ or Occupational Health/ or Sick Leave/ or Absenteeism/ or Retirement/ or workers' compensation/ or exp Employment/ or exp Occupational Exposure/ or Volunteers/	361332
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,kf,ti.	2038626
7	exp "personnel, hospital"/ or exp emergency responders/	100417
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,kf,ti.	147998
9	or/5-8 [work]	2360997
10	Epidemiologic studies/	8073
11	exp case control studies/	1016792
12	exp cohort studies/	1894888
13	Case control.tw.	118051
14	(cohort adj (study or studies)).tw.	183886
15	Cohort analy$.tw.	7241
16	(Follow up adj (study or studies)).tw.	47481
17	(observational adj (study or studies)).tw.	95892
18	Longitudinal.tw.	227916
19	or/10-17 [observationele- en longitudinale studies]	2269321
20	(risk or predict*).mp.	3563653
21	19 or 20	4936872
22	and/4,9,21	6387
23	limit 22 to yr="2010-current"	4319

	Ovid Embase Classic+Embase <1947 to 2019 September 09>. Search date: 10 September 2019	
#	**Search**	**Results**
1	*posttraumatic stress disorder/ or *acute stress disorder/	30071
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or	56167

	traumatic stress).ab,kw,ti.	
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,kw,ti.	199
4	or/1-3 [ptsd]	60673
5	exp *Occupation/ or exp *occupational health/ or exp *work/ or *Volunteer/ or exp *named groups by occupation/	907358
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,kw,ti.	3266921
7	exp *hospital personnel/ or rescue personnel/	46527
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,kw,ti.	195059
9	or/5-8 [work]	3981638
10	*Clinical study/	56379
11	*Case control study/	6905
12	*Family study/	2834
13	*Longitudinal study/	7151
14	*Retrospective study/	19751
15	*Prospective study/	21494
16	Randomized controlled trials/	168154
17	15 not 16	21378
18	*Cohort analysis/	26124
19	(Cohort adj (study or studies)).mp.	275760
20	(Case control adj (study or studies)).tw.	126673
21	(follow up adj (study or studies)).tw.	66352
22	(observational adj (study or studies)).tw.	151582
23	(epidemiologic$ adj (study or studies)).tw.	106051
24	or/10-15,17-23	799536
25	(risk or predict*).mp.	5152294
26	24 or 25	5545704
27	and/4,9,26	7053
28	limit 27 to yr="2010-current"	5366

	Ovid PsycINFO <1806 to September Week 1 2019>. Search date: 10 September 2019	
#	**Search**	**Results**
1	posttraumatic stress disorder/ or acute stress disorder/	31361
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or traumatic stress).ab,id,ti.	49013
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,id,ti,tm.	292
4	or/1-3 [ptsd]	50242

5	exp occupations/ or exp occupational health/ or occupational status/	59891
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,id,ti.	866191
7	exp medical personnel/ or exp emergency personnel/	89105
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,id,ti.	68300
9	or/5-8 [work]	972972
10	(Clinical stud* or Case control stud* or Longitudinal stud* or Retrospective stud* or (Prospective stud* not (Randomized controlled trials or rct)) or Cohort analysis or (Cohort adj (study or studies)) or (Case control adj (study or studies)) or (follow up adj (study or studies)) or (observational adj (study or studies)) or (epidemiologic$ adj (study or studies))).ab,id,ti.	136663
11	(risk or predict*).mp.	730689
12	10 or 11	808563
13	and/4,9,12	5417
14	limit 13 to yr="2010-current"	3711

	ProQuest PTSDhubs. Search date: 10 September 2019	
#	**Search**	**Results**
1	(su((worka* OR worke* OR workg* OR worki* OR workl* OR workp* OR work capacity OR work disabilit* OR work abilit* OR at work OR work exposure OR work related OR workers OR job* OR employee OR staff OR personnel OR occupation OR occupations OR occupational OR outdoor work* OR day shift* OR night shift* OR shift work* OR vocational rehabilitation OR sick leave OR absenteeism OR sickness absen* OR absente* OR presente* OR "return to work" OR vocational reintegration OR retirement OR pension OR employment OR unemployed OR unemployment OR work status OR industries OR industrial sector OR volunteer* OR voluntary worker* OR repetitive work)) OR su((residents OR emergency responder? OR first responder? OR firefighter? OR fire fighter? OR Police officer? OR emergency medicals OR Armed forces OR paramedics OR veterans OR Journalist?))) AND (su(risk OR predict*) OR su((Clinical stud* OR Case control stud* OR Longitudinal stud* OR Retrospective stud* OR (Prospective stud* NOT (Randomized controlled trials OR rct)) OR Cohort analysis OR Cohort stud* OR Case control stud* OR follow up stud* OR observational stud* OR epidemiologic stud*)))	1849
2	Limit 1 to publication date = 2010-01-01 / 2019-09-10	1133

Supplementary file 2. Excluded articles

Article	Reason for exclusion	No papers
1. Amiri T. Occupational posttraumatic stress disorder: Latent structure and risk pathways. 2019, Dissertation Abstracts International, 80(4).	Conference abstract	1
2. Chin WS, Shiao JSC, Liao SC, Kuo CY, Chen CC, Guo YL. Psychiatric diseases at six years after occupational injuries. 2016. Occupational and Environmental Medicine, 73: A175.	Conference abstract	2
3. Connorton E, Miller M, Perry MJ, Hemenway D. Mental health and combat, peacekeeping, or relief work: Results from the National Comorbidity Survey Replication. 2011. Comprehensive Psychiatry, 52: E4.	Conference abstract	3
4. Geronazzo AL, Shen S, Duarte CS, Wu P, Lord E, Amsel L, Musa GJ, Wicks J, Yip J, Fan B, Guffanti G, Hoven CW. Cumulative exposure to work-related incidents and current posttraumatic stress disorder in new york city's first responders. 2013. European Psychiatry Conference.	Conference abstract	4
5. Goldmann E, Tamburrino M, Liberzon I, Slembarski R, Prescott MR, Calabrese J Galea S. Pre-, peri-, and post-deployment characteristics and risk of posttraumatic stress disorder among ohio national guard soldiers. 2010. American Journal of Epidemiology, 11: S90.	Conference abstract	5
6. Goodwin L, Jones M, Sundin J, Wessely S, Rona RJ, Fear NT. Prevalence and predictors of delayed onset PTSD in military personnel: Is there evidence for this disorder? Results of a prospective UK cohort study. 2011. Occupational and Environmental Medicine,1351-0711,1,A100.	Conference abstract	6
7. Herrell R, Wilk J, Bliese P, Hoge C. Combat intensity, psychopathology, and suicidal ideation in a population of soldiers after deployment to Iraq. 2011. Comprehensive Psychiatry, 52: E8.	Conference abstract	7
8. Herrell RK, Bliese PA, Hoge CW. Effect of combat intensity, depression, alcohol misuse, and family history of depression and alcohol misuse on PTSD in a sample of post-deployment US Soldiers. 2013. Comprehensive Psychiatry, 54: E4-E5.	Conference abstract	8
9. Herrell RK, Bliese PB, Hoge CW. Number of deployments and total months of deployment as predictors of post-traumatic stress disorder in active duty soldiers. 2011. American Journal of Epidemiology, 11: S289.	Conference abstract	9
10. Horesh D, Solomon Z, Ein-Dor T. Delayed-onset PTSD following combat: The role of social resources. 2013. Comprehensive Psychiatry, 54: e24.	Conference abstract	10
11. Kim AR, Sung JH, Cho SW, Jeong KS, Ahn YS. The relationship between the post-traumatic stress syndrome and the occupational stress among the firefighters in Korea. 2018. Occupational and Environmental Medicine, 75: A380.	Conference abstract	11
12. Pierce MD, Wood MD, Reddy M, Sevin E, Shea MT. A prospective examination of posttraumatic stress and alcohol use disorders among returning veterans. 2012. Alcoholism: Clinical and Experimental Research, 1: 303A.	Conference abstract	12
13. Subramaney U. Personality, trauma exposure, PTSD and depression in a cohort of SA metro policemen: A longitudinal study. 2010. South African Journal of Psychiatry, 16: 97-98.	Conference abstract	13
14. Huang, D, Wang X, Kung WW. The impact of job loss on posttraumatic stress disorder among Asian Americans: 11-12 years after the World Trade Center attack. 2019. Traumatology,1085-9373.	Full text could not be found	1
15. Andersen SB, Karstoft KI, Bertelsen M, Madsen T. Latent trajectories of trauma symptoms and resilience: the 3-year longitudinal prospective USPER study of Danish veterans deployed in Afghanistan. 2014. Journal of Clinical Psychiatry, 75(9): 1001-1008.	No PTSD incidence	1
16. Armstrong D, Shakespeare-Finch J, Shochet I. Predicting post-traumatic growth and post-traumatic stress in firefighters. 2014. Australian Journal of Psychology, 66(1): 38-46.	No PTSD incidence	2
17. Boasso AM, Steenkamp MM, Nash, WP, Larson JL, Litz BT. The relationship between course of PTSD symptoms in deployed U.S. Marines and degree of combat exposure. 2015. Journal of Traumatic Stress, 28(1): 73-78.	No PTSD incidence	3
18. Bowler RM, Harris M, Li J, Gocheva V, Stellman SD, Wilson K, Alper H, Schwarzer R,	No PTSD	4

	Cone JE.Longitudinal mental health impact among police responders to the 9/11 terrorist attack. 2012. American Journal of Industrial Medicine, 55(4): 297-312.	incidence	
19.	Chin WD, Shiao JS, Liao SC, Kuo CY, Chen CC, Guo YL. Depressive, anxiety and post-traumatic stress disorders at six years after occupational injuries. 2017. European Archives of Psychiatry & Clinical Neuroscience, 267(6): 507-516.	No PTSD incidence	5
20.	Eriksson CB, Lopes Cardozo B, Foy DW, Sabin M, Ager A, Snider L, Scholte WF, Kaiser R, Olff M, Rijnen B, Crawford CG, Zhu J, Simon W. Predeployment mental health and trauma exposure of expatriate humanitarian aid workers: Risk and resilience factors. 2013. Traumatology, 19(1): 41-48.	No PTSD incidence	6
21.	Garcia FE, Vazquez C, Inostroza C. Predictors of post-traumatic stress symptoms following occupational accidents: A longitudinal study. 2019. Anxiety, Stress, & Coping, 32(2): 168-178.	No PTSD incidence	7
22.	Hartley TA, Violanti JM, Sarkisian K, Andrew ME, Burchfiel CM. PTSD symptoms among police officers: associations with frequency, recency, and types of traumatic events. 2013. International Journal of Emergency Mental Health, 15(4): 241-253.	No PTSD incidence	8
23.	Huang H, Kashubeck-West S. Exposure, agency, perceived threat, and guilt as predictors of posttraumatic stress disorder in veterans. 2015. Journal of Counseling & Development, 93(1): 3-13.	No PTSD incidence	9
24.	Jaegers LA, Matthieu MM, Vaughn MG, Werth P, Katz IM, Ahmad SO. Posttraumatic Stress Disorder and Job Burnout Among Jail Officers. 2019. Journal of Occupational & Environmental Medicine, 61(6): 505-510.	No PTSD incidence	10
25.	Mac Donald CL, Johnson AM, Wierzechowski L, Kassner E, Stewart T, Nelson EC, Werner NJ, Zonies D, Oh J, Fang R, Brody DL. Prospectively assessed clinical outcomes in concussive blast vs nonblast traumatic brain injury among evacuated US military personnel. 2014. JAMA Neurology, 71(8): 994-1002.	No PTSD incidence	11
26.	Magruder KM, Goldberg J, Forsberg CW, Friedman MJ, Litz BT, Vaccarino V, Heagerty PJ, Gleason TC, Huang GD, Smith NL. Long-Term Trajectories of PTSD in Vietnam-Era Veterans: The Course and Consequences of PTSD in Twins. 2016. Journal of Traumatic Stress, 29(1): 5-16.	No PTSD incidence	12
27.	Marchand A, Nadeau C, Beaulieu-Prevost D, Boyer R, Martin M. Predictors of posttraumatic stress disorder among police officers: A prospective study. 2015. Psychological Trauma:Theory, Pesearch, Practice and Policy, 7(3): 212-221.	No PTSD incidence	13
28.	Nash WP, Boasso AM, Steenkamp MM, Larson JL, Lubin RE, Litz BT. Posttraumatic stress in deployed marines: Prospective trajectories of early adaptation. 2015. Journal of Abnormal Psychology, 124(1): 155-171.	No PTSD incidence	14
29.	Polusny MA, Kumpula MJ, Meis LA, Erbes CR, Arbisi PA, Murdoch M, Thuras P, Kehle-Forbes SM, Johnson AK. Gender differences in the effects of deployment-related stressors and pre-deployment risk factors on the development of PTSD symptoms in National Guard Soldiers deployed to Iraq and Afghanistan. 2014. Journal of Psychiatric Research, 49(1): 1-9.	No PTSD incidence	15
30.	Rona RJ, Jones M, Sundin J, Goodwin L, Hull L, Wessely S, Fear NT. Predicting persistent posttraumatic stress disorder (PTSD) in UK military personnel who served in Iraq: a longitudinal study. 2012. Journal of Psychiatric Research, 46(9): 1191-1198.	No PTSD incidence	16
31.	Ryan-Gonzalez C, Kimbrel N, Meyer EC, Gordon EM, DeBeer BB, Gulliver SB, Elliott TR, Mosissette S. Differences in PTSD symptoms among post-9/11 veterans with blast- and non-blast mild TBI. 2019. Journal of Neurotrauma, 0897-7151.	No PTSD incidence	17
32.	Steenkamp MM, Schlenger WE, Corry N, Henn-Haase C, Qian M, Li M, Horesh D, Karstoft KI, Williams C, Ho CL, Shalev A, Kulka R, Marmar C. Predictors of PTSD 40 years after combat: Findings from the National Vietnam Veterans longitudinal study. 2017. Depression & Anxiety, 34(8): 711-722.	No PTSD incidence	18
33.	Wolf E, Mitchell K, Koenen K, Miller M. Combat exposure severity as a moderator of genetic and environmental liability to post-traumatic stress disorder. 2014. Psychological Medicine, 44(7): 1499-1509.	No PTSD incidence	19
34.	Yuan C, Wang Z, Inslicht SS, McCaslin SE, Metzler TJ, Henn-Haase C, Apfel BA, Tong H, Neylan TC, Fang Y, Marmar CR. Protective factors for posttraumatic stress disorder symptoms in a prospective study of police officers. 2011. Psychiatry Research, 188(1): 45-50.	No PTSD incidence	20

35. Amster ED, Fertig SS, Green M, Carel R. Occupational exposures and psychological symptoms among fire fighters and police during a major wildfire: The carmel cohort study. 2018. Occupational and Environmental Medicine, 75: A590-A591	Not about PTSD	1
36. Cavanaugh CE, Campbell JC, Messing JT. A longitudinal study of the impact of cumulative violence victimization on comorbid posttraumatic stress and depression among female nurses and nursing personnel. 2014. Workplace Health and Safety, 62 (6): 224-232.	Not about PTSD	2
37. Han M, Park S, Park JH, Hwang SS, Kim I. Do police officers and firefighters have a higher risk of disease than other public officers? A 13-year nationwide cohort study in South Korea. 2018, BMJ Open; 8(1):e019987.	Not about PTSD	3
38. Jacobson IG, Horton JL, Leardmann CA, Ryan MA, Boyko EJ, Wells TS, Smith B, Smith TC. Posttraumatic stress disorder and depression among U.S. military health care professionals deployed in support of operations in Iraq and Afghanistan. 2012, J Trauma Stress;25(6):616-23.	Not about PTSD	4
39. Tvaryanas AP, Maupin GM. Risk of incident mental health conditions among critical care air transport team members. 2014. Aviation Space & Environmental Medicine, 85(1): 30-38.	Not about PTSD	5
40. Vasterling JJ, Brailey K, Proctor SP, Kane RL, Heeren T, Franz, Molly R. Neuropsychological outcomes of mild traumatic brain injury, post-traumatic stress disorder and depression in Iraq-deployed US Army soldiers. 2012. British Journal of Psychiatry, 201(3): 186-192.	Not about PTSD	6
41. Bandelow BB, Koch M, Zimmermann P, Biesold KH, Wedekind D, Falkai P. Posttraumatic stress disorder (PTSD) in the German Armed Forces: a retrospective study in inpatients of a German army hospital. 2012. European Archives of Psychiatry & Clinical Neuroscience, 262(6): 459-467.	No control group	1
42. Aslan M, Concato J, Peduzzi PN, Proctor SP, Schnurr PP, Marx BP, McFall ME, Gleason TC, Huang GD, Vasterling JJ. Design of 'Neuropsychological and mental health outcomes of Operation Iraqi Freedom: a longitudinal cohort study'. 2013. Journal of Investigative Medicine, 61(3):569-577.	Protocol paper only	1
43. Dinenberg RE, McCaslin SE, Bates MN, Cohen BE. Social support may protect against development of posttraumatic stress disorder: findings from the Heart and Soul Study. 2014. American Journal of Health Promotion, 28(5): 294-297.	Not work-related	1
44. Erbes CR, Polusny MA, Arbisi PA, Koffel E. PTSD symptoms in a cohort of National Guard soldiers deployed to Iraq: Evidence for nonspecific and specific components. 2012. Journal of Affective Disorders, 142(1): 269-274.	Not work-related	2
45. Eskridge SL, Macera CA, Galarneau MR, Holbrook TL, Woodruff SI, MacGregor AJ, Morton DJ, Shaffer RA. Influence of combat blast-related mild traumatic brain injury acute symptoms on mental health and service discharge outcomes. 2013. Journal of Neurotrauma, 30(16): 1391-1397.	Not work-related	3
46. Eskridge SL, Macera CA, Galarneau MR, Holbrook, TL, Woodruff SI, Macgregor AJ, Morton DJ, Shaffer RA. Combat blast injuries: Injury severity and posttraumatic stress disorder interaction on career outcomes in male servicemembers. 2013. Journal of Rehabilitation Research and Development, 50(1): 7-16.	Not work-related	4
47. Fink DS, Gradus JL, Keyes KM, Calabrese JR, Liberzon I, Tamburrino MB, Cohen GH, Sampson L, Galea S. Subthreshold PTSD and PTSD in a prospective-longitudinal cohort of military personnel: Potential targets for preventive interventions. 2018. Depression & Anxiety, 35(11): 1048-1055.	Not work-related	5
48. Fitch TJ, Yu X, Chien LC, Karim MM, Alamgir H. Traumatic life events and development of post-traumatic stress disorder among female factory workers in a developing country. 2018. International Journal of Social Psychiatry, 64(4): 351-358.	Not work-related	6
49. Gilbertson MW, McFarlane AC, Weathers FW, Keane TM, Yehuda R, Shalev AY, Lasko NB, Goetz JM, Pitman RK, Harvard VA. Is trauma a causal agent of psychopathologic symptoms in posttraumatic stress disorder? Findings from identical twins discordant for combat exposure. 2010. Journal of Clinical Psychiatry, 71(10): 1324-1330.	Not work-related	7
50. Horesh D, Solomon Z, Keinan G, Ein-Dor T. The clinical picture of late-onset PTSD: a 20-year longitudinal study of Israeli war veterans. 2013. Psychiatry Research, 208(3): 265-273.	Not work-related	8

51.	Goldmann E, Calabrese JR, Prescott MR, Tamburrino M, Liberzon I, Slembarski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano MB, Sizemore J, Galea S. Potentially modifiable pre-, peri-, and postdeployment characteristics associated with deployment-related posttraumatic stress disorder among ohio army national guard soldiers. Ann Epidemiol. 2012;22(2): 71-78.	No work-related exposure	1
52.	Banducci AN, McCaughey VK, Gradus JL, Street AE. The associations between deployment experiences, PTSD, and alcohol use among male and female veterans. 2019. Addictive Behaviors, 98: 106032,	Cross-sectional	1
53.	Huang, J. and Liu, Q. and Li, J. and Li, X. and You, J. and Zhang, L. and Tian, C. and Luan, R. Post-traumatic stress disorder status in a rescue group after the Wenchuan earthquake relief. 2013. Neural Regeneration Research, 8(20): 1898-1906.	Cross-sectional	2
54.	Jones M, Sundin J, Goodwin G, Hull L, Fear NT, Wessely S, Rona RJ. 2013. What Explains Post-Traumatic Stress Disorder (PTSD) in UK Service Personnel: Deployment or Something Else? Psychological Medicine, 43(8):1703-12.	Cross-sectional	3
55.	Rybojad B, Aftyka A, Baran M, Rzonca P. Risk Factors for Posttraumatic Stress Disorder in Polish Paramedics: A Pilot Study. 2016. Journal of Emergency Medicine, 50(2): 270-276.	Cross-sectional	4
56.	Liu B, Tarigan LH, Bromet EJ, Kim H. World Trade Center disaster exposure-related probable posttraumatic stress disorder among responders and civilians: a meta-analysis. 2014. PLoS ONE, 9(7): e101491.	Systematic review	1
57.	Schutte N, Bar O, Weiss U, Heuft G. Prediction of PTSD in police officers after six months--a prospective study. 2012. Spanish Journal of Psychology, 15(3): 1339-1348.	Systematic review	2
58.	Milosavljevic M, Drakulic B, Crnobaric C, Perunicic I, Tosevski DL. Risk factor assessment for posttraumatic stress disorder in war veterans in former Yugoslavia. 2011. Psihijatrija Danas, 43(2): 141-153.	Not in English	1
59.	Giupponi G, Thoma H, Lamis D, Forte A, Pompili M, Kapfhammer HP. Posttraumatic stress reactions of underground drivers after suicides by jumping to arriving trains; feasibility of an early stepped care outpatient intervention. J Trauma Dissociation. 2019; 20(5):495-510.	No effect sizes	1
60.	Osofsky HJ, Osofsky JD, Arey J, Kronenberg ME, Hansel TC, Many MM. Hurricane Katrina's first responders: the struggle to protect and serve in the aftermath of the disaster. 2011. Disaster Medicine and Public Health Preparedness, 5: S214-S219.	No effect sizes	2
61.	Rosenblatt AS, Li R, Fortier C, Liu X, Fonda JR, Villalon A, McGlinchey RE, Jorge RE. Latent factor structure of PTSD symptoms in veterans with a history of mild traumatic brain injury and close-range blast exposure. 2018. Psychological Trauma: Theory, Research, Practice, and Policy, 442-450.	No effect sizes	3
62.	Sheffler JL, Rushing NC, Stanley IH, Sachs-Ericsson NJ. The long-term impact of combat exposure on health, interpersonal, and economic domains of functioning. 2016. Aging and Mental Health, 20(11): 1202-1212.	No effect sizes	4
63.	Solberg O, Birkeland MS, Blix I, Hansen MB, Heir T. Towards an exposure-dependent model of post-traumatic stress: longitudinal course of post-traumatic stress symptomatology and functional impairment after the 2011 Oslo bombing. 2016. Psychological Medicine, 46(15): 3241-3254.	No effect sizes	5
64.	Taymur I, Sargin AE, Ozdel K, Turkcapar HM, Calisgan L, Zamki E, Demirel B. Possible Risk Factors for Acute Stress Disorder and Post-Traumatic Stress Disorder After an Industrial Explosion. 2014. Noropsikiyatri Arsivi, 51(1): 23-29.	No effect sizes	6
65.	Wisnivesky JP, Teitelbaum S, Todd AC, Boffetta P, Crane M, Crowley L, De la Hoz RE, Dellenbaugh C, Harrison DJ, Herbert R, Kim H, Jeon Y, Kaplan J, Katz CL, Levin SM, Luft BJ, Markowitz S, Moline JM, Ozbay F, Pietrzak RH, Shapiro M, Sharma V, Skloot G, Southwick SM, Stevenson LA, Udasin IG, Wallenstein S, Landrigan PJ. Persistence of multiple illnesses in World Trade Center rescue and recovery workers: a cohort study. 2011. Lancet, 378(9794): 888-897.	No effect sizes	7

Supplementary file 3. Data extraction of included studies.

First author, Year;	Study (name, design and follow-up period)	Sample description (n, Country, Type of job/company, relevant inclusion/exclusion criteria, %Female, Age)	Description of exposure to screen work (way and year of baseline exposure assessment and description of categories)	Description of outcome (type of symptoms, way of assessment, and incidence over the follow-up period)	Adjustment	Effect estimates (e.g., HR, RR or OR with 95% confidence interval). Super scripts refer to the models specified in the 'adjustment' column
1. Armed Forces Health Surveillance Center, 2011 [21]	Name: Armed forces health surveillance Design: Prospective longitudinal Follow-up period: 12 months post deployment	n=1,344,668 Country=USA %Female= 11% Age= The majority was <25, with lower numbers of participants in the 25-29 and 30+ categories. Type of job/company= Active components of the forces (on Afghanistan and Iran missions). Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: between Oct 2001 and Dec 2010 Exposure categories: % PTSD diagnosis were compared between deployment number, gender, age group, military occupation (combat, health care and other) and 'dwelling time' between employments.	Type of symptoms: PTSD Way of assessment: Mental disorders assessed with ICD-9-CM (309.81), reported in military or civilian hospitals Incidence: -	No	PTSD incidence was in general higher after the second, third and fourth deployment, compared to the first and fifth. PTSD incidence was in general higher among males, those in lowest age group, health care workers and those with longer dwelling time between the deployments. No effect estimates were reported (only incidences).
2. Andersen, 2019 [19]	Name: - Design: Prospective longitudinal (with cross-sectional and longitudinal analyses) Follow-up period: 4 years	n= 2,678 Country= Denmark %Female= 66% Age= 45.1(10.1) years Type of job/company= Employees working in psychiatric wards, in the	Exposure assessment: Self-reported Year of assessment: 2011 Exposure categories: Work-related violence and threats on a 5 point likert scale with 0=never to 4=almost daily, with	Type of symptoms: PTSD Way of assessment: Self-reported with the Impact of Event Scale-Revised Incidence:14% (2 incidences)	Unadjusted (model 1), adjusted for gender, age, bullying, sexual harassment, conflicts at work, negative acts, private traumas and sector (model 2), additionally adjusted for	**Work-related threats** All four sectors PTSD at 2011 OR: 1.11 [1.07 1.14][1] OR: 1.10 [1.05 1.15][2] PTSD at 2015 OR: 1.10 [1.07 1.13][1] OR: 1.11 [1.07 1.5][2] OR: 1.10 [1.04 1.15][3] Elder care

		elder sector, at special schools and in the prison and probation service. Inclusion/exclusion=-	summary scores 0-24 and 0-44, respectively.		baseline PTSD (model 3)	PTSD at 2011 OR: 0.99 [0.88 1.23][1] OR: 0.98 [0.82 1.18][2] PTSD at 2015 OR: 1.12 [1.00 1.25][1] OR: 1.12 [0.94 1.33][2] OR: 1.22 [0.95 1.56][3] Prison and probation service PTSD at 2011 OR: 1.21 [1.14 1.28][1] OR: 1.18 [1.08 1.27][2] PTSD at 2015 OR: 1.73 [1.20 1.35][1] OR: 1.25 [1.17 1.34][2] OR: 1.22 [1.13 1.31][3] Psychiatry PTSD at 2011 OR: 1.14 [1.06 1.12][1] OR: 1.19 [1.09 1.32][2] PTSD at 2015 OR: 1.06 [0.99 1.13][1] OR: 1.06 [0.97 1.17][2] OR: 0.94 [0.83 1.07][3] Special schools PTSD at 2011 OR: 1.01 [0.93 1.09][1] OR: 0.95 [0.85 1.05][2] PTSD at 2015 OR: 1.08 [1.01 1.15][1] OR: 1.06 [0.98 1.14][2] OR: 1.07 [0.95 1.12][3] PTSD at 2011 Males

						OR: 1.19 [1.12 1.26][2] Females OR: 1.04 [0.99 1.09][2] PTSD at 2015 Males OR: 1.18 [1.09 1.26][3] Females OR: 1.02 [0.96 1.09][3] **Work-related violence** All four sectors PTSD at 2011 OR: 1.05 [1.03 1.08][1] OR: 1.05 [1.01 1.08][2] PTSD at 2015 OR: 1.02 [0.98 1.04][1] OR: 1.03 [1.00 1.06][2] OR: 1.02 [0.98 1.06][3] Elder care PTSD at 2011 OR: 1.04 [0.95 1.12][1] OR: 1.03 [0.94 1.13][2] PTSD at 2015 OR: 1.07 [0.97 1.15][1] OR: 1.03 [0.93 1.14][2] OR: 1.02 [0.90 1.16][3] Prison and probation service PTSD at 2011 OR: 1.29 [1.15 1.49][1] OR: 1.26 [1.09 1.46][2] PTSD at 2015 OR: 1.50 [1.31 1.73][1] OR: 1.42 [1.22 1.65][2] OR: 1.36 [1.36 1.60][3]

						Psychiatry PTSD at 2011 OR: 1.08 [1.01 1.15][1] OR: 1.13 [1.03 1.24][2] PTSD at 2015 OR: 1.04 [0.98 1.10][1] OR: 1.05 [0.96 1.14][2] OR: 0.98 [0.88 1.10][3] Special schools PTSD at 2011 OR: 1.04 [0.98 1.09][1] OR: 1.03 [0.97 1.10][2] PTSD at 2015 OR: 1.02 [0.97 1.07][1] OR: 1.02 [0.97 1.07][2] OR: 1.01 [0.42 1.08][3] PTSD at 2011 Males OR: 1.06 [0.99 1.12][2] Females OR: 1.03 [0.99 1.07][2] PTSD at 2015 Males OR: 1.07 [0.99 1.14][3] Females OR: 0.99 [0.95 1.05][3]
3. Anderson, 2019 [20]	Name: Army STARRS study Design: Prospective longitudinal (with baseline measurements 1-2 months before	n=4,645 Country=USA %Female=5% Age=26.9(0.2) years Type of job/company=	Exposure assessment: Self-reported Year of assessment: 2012 Exposure categories: Unit cohesion, stressful employment	Type of symptoms: PTSD (30 days) Way of assessment: Composite International Diagnostic Interview screening scales (CIDI-SC) and a six-item	Models were adjusted for all other exposures (model 1) and for lifetime PTSD at baseline (model 2).	**Age** OR: 1.00 [0.99 1.02][1] OR: 1.00 [0.99 1.02][2] **Sex** Female OR: Ref OR: Ref Male

	the deployment) Follow-up period: 9 months post-employment	Soldiers from three combat teams employed in Afghanistan Inclusion/exclusion= -	characteristics and sociodemographic were assessed	screening version of the PTSD Checklist (PCL) to assess lifetime DSM-4 mental disorders Incidence: 11.9% (lifetime)		OR: 0.73 [0.46 1.14][1] OR: 0.88 [0.51 1.51][2] **Race** White OR: Ref OR: Ref Black OR: 0.99 [0.67 1.48][1] OR: 1.04 [0.72 1.49][2] Asian OR: 1.28 [0.77 2.12][1] OR: 1.38 [0.80 2.39][2] Other OR: 1.49 [1.04 2.15][1] OR: 1.25 [0.86 1.82][2] **Ethnicity** Non-Hispanic OR: Ref OR: Ref Hispanic OR: 1.15 [0.83 1.59][1] OR: 1.22 [0.87 1.73][2] **Brigade Combat Team** Fort #1 OR: Ref OR: Ref Fort #2 OR: 1.15 [0.90 1.47][1] OR: 1.31 [0.97 1.77][2] Fort #3 OR: 1.00 [0.80 1.24][1] OR: 1.09 [0.82 1.45][2] **Number of deployments**

						Zero OR: Ref OR: Ref One OR: 1.09 [0.84 1.42][1] OR: 0.96 [0.73 1.27][2] ≥Two OR: 1.12 [0.87 1.43][1] OR: 0.92 [0.71 1.19][2] **Time in unit** >6months OR: Ref OR: Ref <1month OR: 1.51 [1.12 2.05][1] OR: 1.81 [1.24 2.63][2] 1–6 months OR: 0.75 [0.58 0.96][1] OR: 0.77 [0.64 0.94][2] **Lifetime PTSD at baseline** OR: 3.06 [2.24 4.17][1] **30-day PTSD at baseline** OR: 2.28 [1.36 3.82][1] **Deployment stress** Low/moderate OR: Ref OR: Ref High OR: 3.21 [2.75 3.74][1] OR: 3.52 [2.94 4.21][2] **Unit cohesion at baseline** OR: 0.82 [0.73 0.91][1]

						OR: 0.74 [0.65 0.84][2]
4. Berninger, 2010 [22]	Name: FDNY-WTC-MMP Design: Prospective longitudinal with baseline measurement within 6 months from the disaster. Follow-up period: 2.9 years	n=5,656 Country= USA %Female= 0% Age= - Type of job/company= New York fire department rescue workers who were involved in the 9/11 WTC disaster Inclusion/exclusion= Fire fighters who retired during the study, who arrived at the disaster site >14 days after the recue, and females; firefighters	Exposure assessment: Demographic and retirement from employee databases, all other information from self-reports. Year of assessment: 2001 Exposure categories: -	Type of symptoms: Probable PTSD Way of assessment: Self-reported using PTSD checklist (PCL-m) Incidence:16%	Univariate (model 1) and multivariate adjusting for all other exposures that contributed statistically significant in the univariate model (model 2).	**Age** 20-29 years OR: Ref 30-39 years OR: 1.0 [0.8 1.3][1] 40-49 years OR: 1.0 [0.8 1.3][1] 50-59 years OR: 0.6 [0.4 1.1][1] 60+ years OR: - Continuous OR: 0.98 [0.97 1.00][2] **Education** High School OR: Ref Some College OR: 1.1 [0.9 1.3][1] College OR: 1.1 [0.9 1.3][1] Post-College OR: 1.2 [0.8 1.8][1] **Living with a partner** Yes OR: Ref No OR: 1.06 [0.89 1.27][1] **Arrival Group** Morning of 9/11 OR: 4.8 [3.0 7.5][1] OR: 2.0 [1.3 2.9][2] Afternoon of 9/11 OR: 2.3 [1.5 3.5][1]

						OR: 1.1 [0.8 1.5][2] Day 2 OR: 1.4 [0.8 2.3][1] Days 3-14 OR: Ref **Prolonged work at the WTC site** ≥4 months OR: 2.0 [1.7 2.3][1] <4 months OR: Ref **Rank** Firefighter OR: Ref Line officer OR: 1.1 [0.95 1.30][1] Chiefs OR: 0.96 [0.70 1.32][1] **Number of deaths in firehouse** 0 deaths OR: Ref 1-3 deaths OR: 1.5 [1.2 1.9][1] 4+ deaths OR: 2.3 [1.8 2.9][1] **Supervising responsibilities** Yes OR: 2.2 [1.7 2.9][1] No OR: Ref **Previous disaster experience**

						Yes OR: 1.4 [1.2 1.6][1] No OR: Ref **Duration of work at WTC site (per month)** OR: 1.1 [1.1 1.2][2] **Reported increase in alcohol** OR: 1.3 [1.0 1.7][2] **Baseline probable PTSD** OR: 5.6 [4.4 7.0][2]
5. Brownlow, 2018 [23]	Name: Army STARSS study Design: Retrospective longitudinal Follow-up period: -	n= 14,254 for AAS and 25,629 for NSS. Country= USA %Female= 12% for AAS and 17% for NSS Age= 29.0(0.1) for AAS and 21.0(0.0) for NSS Type of job/company= Soldiers at all stages of their activity (AAS sub-study) and new recruits (NSS sub-study) Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2011-2013 Exposure categories: Deployment-related and lifetime stress were assessed (the former only for the AAS cohort).	Type of symptoms: Probable PTSD (lifetime and past 30-day prevalence) was assessed using the PTSD Checklist (PCL) using DSM-4 criteria Way of assessment: Self-reported Incidence:-	-	**Diversity of Deployment-Related Traumatic Stress Score [0-15]** *30-day PTSD* OR: 1.15 [1.13 1.16] (AAS) *Lifetime PTSD* OR: 1.17 [1.16 1.18] (AAS) **Cumulative Deployment-Related Traumatic Stress Score [0 60]** *30-day PTSD* OR: 1.03 [1.03 1.04] (AAS) *Lifetime PTSD* OR: 1.00 [0.99 1.00] (AAS) **Diversity of Lifetime Traumatic Stress Score** *30-day PTSD* OR: 1.14 [1.13 1.16] (AAS) OR: 1.34 [1.30 1.38] (NSS) *Lifetime PTSD* OR: 1.16 [1.15 1.17] (AAS) OR: 1.34 [1.31 1.38] (NSS)

						Cumulative Lifetime Traumatic Stress Score *30-day PTSD* OR: 1.02 [1.02 1.03] (AAS) OR: 0.99 [0.98 1.01] (NSS) *Lifetime PTSD* OR: 1.02 [1.01 1.02] (AAS) OR: 1.00 [0.99 1.01] (NSS)
6. Brundage, 2015 [24]	Name: Defense Medical Surveillance System (DMSS) Design: Prospective longitudinal Follow-up period: 36 months post-deployment.	n= 2,020,340 (Iraq/Afghanistan) and 529,609 (Korea/Japan) Country= USA %Female= - Age= - Type of job/company= Individuals who served in army, air force, navy and marine. Those who were deployed in Iraq and Afghanistan were compared with a reference group who returned from assignments in Korea and Japan. Inclusion/exclusion= -	Exposure assessment: Deployment administration Year of assessment: 2003-2014 Exposure categories: Iraq/Afghanistan vs Korea/Japan, and occupation. Also other factors were assessed but where not considered for this review.	Type of symptoms: PTSD Way of assessment: Diagnosis using ICD-9 criteria. Incidence: -	-	There were 4.85 diagnoses per 100 deployments among those who served in Iraq/Afghanistan, this was 1.04 among those who went to Japan/Korea (with a 4.66 ratio between the two groups). Diagnosis per 100 deployments were highest among combat specific (5.62) and health care (8.52) occupations who went to Iraq/Afghanistan, compared to others (4.17).
7. Cameron, 2019 [25]	Name: Defence Manpower Data Center (DMDC) Database and Defense Medical	n= 1.35 million Country = USA %Female= 12%	Exposure assessment: Deployment administration Year of assessment:	Type of symptoms: PTSD Way of assessment: Data from the	Unadjusted (model 1) and adjusted for all other exposures (model 2).	**Sex** Female RR: 1.65 [1.54 1.77][1] RR: 1.92 [1.84 2.00][2] Male

	Surveillance System (DMSS) Design: Retrospective longitudinal Follow-up period: -	Age= - Type of job/company = Active duty service members between 1999 and 2008. Inclusion/exclusion= -	1999-2008 Exposure categories: Rank and service type.	Defence Medical Surveillance System (DMSS), with ICD-9-CM coded diagnoses, were used. Incidence: 52,771 incident cases (~4%)		RR: Ref. RR: Ref. **Age** < 20 RR: Ref. RR: Ref. 20–24 RR: 1.41 [1.25 1.60][1] RR: 1.36 [1.27 1.46][2] 25–29 RR: 1.36 [1.20 1.54][1] RR: 1.52 [1.41 1.65][2] 30–34 RR: 1.00 [0.87 1.15][1] RR: 1.37 [1.25 1.50][2] 35–39 RR: 0.88 [0.76 1.02][1] RR: 1.37 [1.24 1.52][2] > 39 RR: 0.93 [0.80 1.08][1] RR: 1.68 [1.51 1.87][2] **Race** Black RR: Ref. RR: Ref. Other RR: 1.32 [1.18 1.47][1] RR: 1.45 [1.36 1.54][2] White RR: 1.35 [1.25 1.47][1] RR: 1.58 [1.51 1.66][2] **Marital Status** Married RR: 1.13 [1.06 1.20][1]

						RR: 1.38 [1.32 1.44][2] Other RR: 1.59 [1.40 1.80][1] RR: 1.72 [1.59 1.86][2] Single RR: Ref. RR: Ref. **Rank** E1-E4 RR: 3.90 [3.19 4.77][1] RR: 4.93 [4.31 5.63][2] E5-E9 RR: 3.02 [2.47 3.70][1] RR: 3.42 [3.02 3.89][2] O1-O3 RR: 1.08 [0.84 1.38][1] RR: 1.17 [1.00 1.36][2] O4-O9 RR: Ref. RR: Ref. **Service** Air Force RR: Ref. RR: Ref. Army RR: 3.80 [3.50 4.12][1] RR: 3.80 [3.59 4.02][2] Marines RR: 2.90 [2.63 3.19][1] RR: 2.92 [2.73 3.12][2] Navy RR: 1.38 [1.25 1.52][1] RR: 1.51 [1.41 1.61][2]
8. Chiu, 2011 [26]	Name: FDNY pension database	n= 1,915	Exposure assessment: Deployment	Type of symptoms: PTSD symptoms	Unadjusted (model 1) and adjusted for	**Exposure group** morning of 9/11

	Design: Prospective longitudinal Follow-up period: 4 years post-attack.	Country= USA %Female= 0% Age= 47.0 (6.9) years Type of job/company= New York fire department firefighters who were involved in the 9/11 WTC attacks. Inclusion/exclusion= Fire marshals, females, those who retired due to mental health disability and those who did not first arrive at the disaster site were excluded.	administration Year of assessment: 2001 Exposure categories: Retirement status, rank, and exposure.	Way of assessment: Self-reported using the PTSD checklist (PCL-17) , using a cut-off >= 39 (range 17-85). Incidence: 22%	all remaining exposures in the model (model 2).	OR: 4.9 [3.0 7.9][1] OR: 4.0 [2.5 6.6][2] afternoon of 9/11 OR: 2.4 [1.5 3.7][1] OR: 2.1 [1.3 3.3][2] day 2 OR: 1.7 [1.0 2.8][1] OR: 1.4 [0.9 2.4][2] day 3 to day 14 OR: Ref. OR: Ref. **Retirement status** Disability OR: 1.9 [1.5 2.4][1] OR: 1.7 [1.4 2.2][2] Non-disability OR: Ref. OR: Ref. **AUDIT score** ≥8 OR: 2.0 [1.5 2.5][1] OR: 1.9 [1.5 2.4][2] <8 OR: Ref. OR: Ref. **Age on 9/11 [in years]** <55 OR: 2.0 [1.4 3.0][1] OR: 1.5 [1.0 3.0][2] ≥55 OR: Ref. OR: Ref. **Age on 9/11 - in years**

						Continuous OR: 1.0 [1.0 1.0][1] **Marital status** Married OR: 0.8 [0.6 1.2][1] Living with a partner OR: 1.1 [0.6 2.1][1] Never married OR: 0.9 [0.5 1.6][1] Separated/widowed/divorced OR: Ref. **Marital status change since 9/11** Status change OR: 1.3 [0.9 1.9][1] No change OR: Ref. **Previous profession** No other profession OR: 1.2 [0.9 1.4][1] Other professions OR: Ref. **Rank** Chiefs OR: 0.5 [0.3 0.9][1] Captains and lieutenants OR: 0.8 [0.6 1.0][1] Firefighters OR: Ref.
9. Ciarleglio, 2018 [27]	Name: VU Cooperative Studies Program Study, combined	n= 375 Country= USA	Exposure assessment: Self-reported Year of assessment:	Type of symptoms: PTSD Way of assessment:	Multivariate models adjusting for all other exposures.	**Age in years** OR: 1.04 [0.99 1.09] **Gender**

	with data from Neurocognition Deployment Health Study (NDHS). Design: Retrospective longitudinal Follow-up period: Between 5.7 months (baseline) and 7.5 months post-deployment (long-term follow-up).	%Female= 5% Age= 35.1 (5.9) years Type of job/company= Army soldiers who were deployed in Iraq Inclusion/exclusion= -	2003-2005 Exposure categories: Deployment history and stress exposure.	Using a clinically administered PTSD scale. Incidence: 24% (prevalence)		Male OR: Ref. Female OR: 0.31 [0.07 1.53] **Number of deployments** Single deployment OR: Ref. Multiple deployments OR: 0.83 [0.27 2.57] **Months since most recent deployment** OR: 1.00 [0.98 1.02] **Composite emotional health factor post-deployment** OR: 1.09 [0.79 1.50] **Mental health treatment received post-deployment** No OR: Ref. Yes OR: 4.12 [2.18 7.80] **Early life events summary score** OR: 0.92 [0.84 1.00] **Combat and post-battle experiences** OR: 0.99 [0.95 1.03] **Deployment concerns summary score** OR: 1.01 [0.98 1.04]

						Life and family concerns OR: 0.99 [0.94 1.03] **Post-deployment life events summary score** OR: 1.07 [0.96 1.19] **Post-war-zone social support** OR: 0.92 [0.89 0.95]
10. Cone, 2015 [28]	Name: World Trade Center Health Registry Design: Prospective longitudinal Follow-up period: 10 years	n= 2,204 Country= USA %Female= 13% Age= 38 (median) Type of job/company= Police responders to the 9/11 WTC attacks Inclusion/exclusion= Those with at least one shift at the disaster site, those without pre-9/11 PTSD and with follow-up measurements.	Exposure assessment: Self-reported Year of assessment: 2001 Exposure categories: Demographic, injury, stressors, life threatening event, support.	Type of symptoms: Probable PTSD Way of assessment: Self-reported using a combination of the PCL checklist and DSM-4 criteria. Incidence: 11% (prevalence)	Adjusting for all other exposures.	**Age group at 9/11** 18-44 OR: Ref. 45-69 OR: 0.6 [0.3 1.3] **Gender** Male OR: Ref. Female OR: 1.3 [0.7 2.5] **Hispanic** No OR: Ref. Yes OR: 1.2 [0.7 2.0] **Household gross income at wave 3** ≥75K OR: Ref. <75K OR: 2.0 [1.2 3.4] **Having social support** All of the time

						OR: Ref. Most OR: 3.5 [2.0 6.1] Some OR: 3.6 [1.9 6.9] Little or none OR: 2.6 [1.04 6.5] **Current employment status at wave 3** Employed OR: Ref. Unable to work because of health OR: 3.7 [1.9 7.3] Retired OR: 1.3 [0.8 2.2] Other OR: 2.9 [0.8 10.1] **Number of life stressors in last 12 months** None OR: Ref. 1 to 2 OR: 1.7 [1.0 2.7] ≥3 OR: 3.2 [1.2 8.5] **Number of events threatened your life since 9/11** None OR: Ref. 1 to 2 OR: 1.0 [0.5 1.9] ≥3

						OR: 3.3 [1.9 5.6] **Number of injuries sustained during the 9/11 attacks** None OR: Ref. One OR: 1.1 [0.6 2.0] Two or more OR: 1.4 [0.6 3.4] **Report of unmet mental health care needs at wave 3** No OR: Ref. Yes OR: 9.5 [5.3 16.9]
11. Connorton, 2011 [29]	Name: National Comorbidity Survey Replication (NCS-R) Design: Retrospective longitudinal Follow-up period: -	n= 217 exposed and 2,110 unexposed. Country=USA %Female= 0% Age= 55.0(0.9) for exposed workers, 43.8 (0.9) for non-exposed workers Type of job/company= Participants employed in combat or service as peacekeeper or relief worker. Inclusion/exclusion= Females were excluded	Exposure assessment: Self-reported Year of assessment: 2001-2002 Exposure categories: Participants who were exposed to combat and peacekeeping/relieve work or combat only vs non-exposed participants.	Type of symptoms: PTSD (according to DSM-4 criteria) Way of assessment: Self-reported (no specific questionnaire mentioned) Incidence: 29/(217+2110)=1%	Univariate and multivariate analyses adjusting for age of exposure, age of onset diagnosis, race	**Exposure** No exposure OR: Ref Exposure to peacekeeping/relieve work and combat OR: 11.2 [2.9 43.2] Exposure to combat only OR: 7.3 [3.3 15.8] According to the authors the results remained the same in multivariate analyses (data not reported)

12. Cukor, 2011 [30]	Name: Weill Cornell 9/11 Screening Program Design: Prospective longitudinal Follow-up period: Up to 4 years.	n= 2,960 Country= USA %Female= - Age= - Type of job/company= 9/11 WTC disaster recovery workers. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2002-2004 Exposure categories: Occupational exposure	Type of symptoms: PTSD Way of assessment: Using the CAPS standardized clinical interview and using the PCL-C questionnaire using DSM-4 criteria. CAPS data were used for exposure-outcome assessment. Incidence: 9%, 5% and 2% had probable self-reported PTSD at T1, T2 and T3, respectively. 15%, 8% and 6% had diagnosed PTSD at T1, T2 and T3, respectively.	Adjusting for baseline PTSD and demographic variables	**Occupational exposure** No OR: Ref. Yes OR: 1.31 [1.13 1.51]
13. Fear, 2010 [31]	Name: HERRICK cohort (and other samples) Design: Prospective longitudinal Follow-up period: -	n= 3600 Country= UK %Female= - Age= - Type of job/company= Armed forces who were deployed in Iraq and Afghanistan, who were compared to armed forces who were not deployed.	Exposure assessment: Deployment administration Year of assessment: 2003 Exposure categories: Deployment, rank, number of deployments and time since deployment.	Type of symptoms: PTSD symptoms Way of assessment: Self-reporting using the PCL-C questionnaire. Incidence: 4%	Unadjusted (model 1) and adjusted for age, sex, marital status, education and rank (model 2)	**Deployment** Not deployed OR: Ref. OR: Ref. Regulars OR: 1.03 [0.79 1.36][1] OR: 1.13 [0.82 1.54][2] Reservists OR: 2.90 [1.37 6.12][1] OR: 2.83 [1.23 6.51][2] **Location of deployment** Not deployed in Iraq/Afghanistan OR: Ref.

		Inclusion/exclusion= -				Deployed in Iraq OR: 1.20 [0.87 1.67][2] Deployed in Afghanistan OR: 0.93 [0.54 1.59][2] Deployed in Iraq and Afghanistan OR: 0.92 [0.58 1.46][2] **Role of deployment** Combat service report OR: Ref. OR: Ref. Combat OR: 1.99 [1.42 2.78][1] OR: 1.87 [1.26 2.78][2] Service support OR: 0.58 [0.28 1.19][1] OR: 0.67 [0.32 1.41][2] **Number of deployments** One deployment OR: Ref. OR: Ref. Two deployments OR: 0.83 [0.51 1.36][1] OR: 0.96 [0.58 1.57][2] More than three deployments OR: 0.61 [0.29 1.26][1] OR: 0.72 [0.34 1.50][2] **Time since return from deployment** Up to 1 year OR: Ref. OR: Ref. Up to 2 years

						OR: 1.19 [0.76 1.86][1] OR: 1.18 [0.75 1.86][2] Up to 3 years OR: 1.95 [1.16 3.27][1] OR: 1.80 [1.05 3.10][2] Up to 4 years OR: 1.98 [1.08 3.65][1] OR: 1.88 [0.98 3.62][2] Up to 5 years OR: 1.59 [0.99 2.57][1] OR: 1.53 [0.92 2.55][2] Up to 6.5 years OR: 1.79 [0.98 3.26][1] OR: 1.89 [0.99 3.60][2]
14. Ferrajao, 2016 [32]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 120 Country= Portugal %Female= 0% Age= 64 [59-72] Type of job/company= Colonial war veterans Inclusion/exclusion= Participants who received psychiatric and psychological treatment during the last 5 years, and no history of traumatic brain injury, neurological disorders or physical disability were included.	Exposure assessment: Self-reported. Year of assessment: - Exposure categories: Combat exposure, abusive violence, sense of coherence.	Type of symptoms: PTSD symptoms Way of assessment: Self-reported using the Impact of Event Scale Revised (with a cut-off score: >=33) Incidence: 41% (prevalence)	Unadjusted	**Combat exposure scale [1 5]** OR: 1.98 [1.50, 2,62] **Sense of coherence** OR: -5.08 [-3.32, -7.78] **Observation of abusive violence** No OR: Ref. Yes OR: 8.36 [4.56, 15.35] **Participation in abusive violence** No OR: Ref. Yes OR: 3.32 [1.81, 6.08]
15. Fichera,	Name: -	n= 383	Exposure assessment:	Type of symptoms:	Adjusting for all	**Number of robberies during**

2015 [33]	Design: Prospective longitudinal, with baseline 7-15 days post-robbery Follow-up period: 45 days after the first session	Country= Italy %Female= 52% Age= 43 (9) years Type of job/company= Employees of a large bank who were victims of robberies. Inclusion/exclusion= Participants who had voluntarily joined and employer sponsored post-robbery support program.	Self-reported (questionnaires and interviews) Year of assessment: 2010-2012 Exposure categories: Personal characteristics and characteristics of the robberies	PTSD Way of assessment: Self-reported using the Impact of Events Scale (IES). Incidence: 14%	other exposures (model 1), when additionally adjusting for baseline PTSD (model 2), and the latter two models in which random intercepts were adopted (model 3 and 4).	**working life** OR: 1.25 [1.07 1.44][1] OR: 1.15 [0.97 1.36][2] OR: 1.27 [1.07 1.51][3] OR: 1.18 [0.97 1.44][4] **Gender** Males OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Females OR: 0.63 [0.31 1.29][1] OR: 0.72 [0.33 1.58][2] OR: 0.77 [0.34 1.78][3] OR: 0.85 [0.33 2.13][4] **Being cashier** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 0.52 [0.22 122][1] OR: 0.94 [0.36 2.42][2] OR: 0.40 [0.14 1.07][3] OR: 0.76 [0.25 2.25][4] **Physical contacts with robbers** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4]

						Yes OR: 1.21 [0.58 2.54][1] OR: 0.83 [0.36 1.87][2] OR: 1.23 [0.50 2.98][3] OR: 0.86 [0.32 2.28][4] **Scuffle [taking part or being present]** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.41 [0.61 3.27][1] OR: 1.64 [0.64 4.20][2] OR: 1.72 [0.62 4.78][3] OR: 1.92 [0.63 5.79][4] **Being injured during the robbery** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.69 [0.58 4.89][1] OR: 1.44 [0.44 4.73][2] OR: 1.81 [0.49 6.61][3] OR: 1.28 [0.31 5.21][4] **Worried by other issues related to robbery** No OR: Ref[1] OR: Ref[2]

						OR: Ref[3] OR: Ref[4] Yes OR: 2.47 [1.16 5.27][1] OR: 2.11 [0.91 4.91][2] OR: 2.88 [1.16 7.19][3] OR: 2.64 [0.95 7.36][4] **Feeling terror and hopelessness** True OR: 6.96 [2.25 21.53][1] OR: 1.19 [0.32 4.36][2] OR: 8.64 [2.19 34.10][3] OR: 1.59 [0.33 7.58][4] Partly true OR: 2.82 [0.98 8.10][1] OR: 1.10 [0.33 3.65][2] OR: 3.48 [1.00 12.12][3] OR: 1.45 [0.35 6.02][4] **Post-session individual interview requested** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.09 [0.29 4.09][1] OR: 0.41 [0.09 1.81][2] OR: 0.75 [0.14 4.07][3] OR: 0.35 [0.06 2.07][4] **PTSD at T1** No OR: Ref[1]

						OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: – OR: 1.11 [1.07 1.15][2] OR: – OR: 1.11 [1.07 1.16][4]
16. Fink, 2016 [34]	Name: Reserve and National Guard (RNG) study. Design: Prospective longitudinal Follow-up period: 4 years	n= 2,003 Country= USA %Female= 18% Age= - Type of job/company= Army reservists Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2010 Exposure categories: Personal characteristics, deployment history and rank.	Type of symptoms: PTSD Way of assessment: Self-reported using the PCL-C checklist, based on DSM-4 criteria. Criteria that sensitive and specific were used leading to two different PTSD definitions. Incidence: 4.7 and 2.9 per 100 person-year for sensitive and specific definition, respectively.	Univariate models using the sensitive (model 1) and specific (model 2) outcome definition.	Effects in incidence rate (IR) per 100/per-years **Age** 18–24 years IR: 4.8 [3.0–7.5][1] IR: 1.9 [0.8–4.3][2] 25–34 years IR: 4.4 [3.2–6.1][1] IR: 2.9 [1.9–4.4][2] >35 years IR: 4.9 [3.8–6.3][1] IR: 3.4 [2.5–4.7][2] **Sex** Male IR: 4.6 [3.8–5.7][1] IR: 3.2 [2.5–4.2][2] Female IR: 4.9 [3.2–7.4][1] IR: 1.4 [0.7–2.8][2] **Race/ethnicity** Non-Hispanic, white IR: 4.3 [3.4–5.3][1] IR: 2.4 [1.8–3.3][2] Non-Hispanic, black IR: 6.4 [4.0–10.2][1] IR: 4.6 [2.6–8.2][2]

						Hispanic IR: 5.5 [3.3–9.1][1] IR: 4.3 [2.4–7.6][2] Other IR: 5.3 [3.0–9.1][1] IR: 3.8 [2.0–7.2][2] **Education** < High school IR: 4.2 [1.0–16.6][1] IR: 7.9 [2.1–29.1][2] High school IR: 6.1 [3.9–9.4][1] IR: 3.6 [2.0–6.4][2] Some college IR: 4.8 [3.7–6.2][1] IR: 2.8 [2.0–3.8][2] > College IR: 3.5 [2.6–4.8][1] IR: 2.3 [1.6–3.4][2] **Marital status** Never married IR: 3.9 [2.7–5.7][1] IR: 2.3 [1.3–4.0][2] Married IR: 4.9 [3.8–6.2][1] IR: 2.9 [2.1–4.0][2] Previously married IR: 6.1 [3.9–9.5][1] IR: 4.8 [3.0–7.6][2] **Rank** Junior enlisted IR: 4.4 [2.2–8.8][1] IR: 1.2 [0.4–3.4][2] Non-Commissioned Officers

						IR: 5.1 [4.1–6.2][1] IR: 3.4 [2.6–4.4][2] Officer IR: 3.0 [2.0–4.5][1] IR: 1.4 [0.8–2.5][2] **Number of baseline deployments** Zero IR: 3.9 [2.5–5.9][1] IR: 1.4 [0.7–2.5][2] One IR: 4.8 [3.4–6.7][1] IR: 3.9 [2.6–5.9][2] Two IR: 5.1 [3.7–7.0][1] IR: 3.5 [2.4–5.0][2] More than three IR: 5.5 [3.6–8.3][1] IR: 2.9 [1.6–5.4][2] **Past-year deployment** Yes IR: 7.2 [4.6–11.2][1] IR: 3.0 [1.4–6.3][2] No IR: 5.3 [4.4–6.5][1] IR: 3.6 [2.8–4.6][2] **Past-year deployment trauma** Yes IR: 5.3 [3.2–8.7][1] IR: 2.0 [0.9–4.4][2] No IR: 4.6 [3.7–5.6][1] IR: 3.1 [2.4–4.0][2]

						Past-year civilian trauma Yes IR: 6.5 [5.2–8.1][1] IR: 4.2 [3.1–5.6][2] No IR: 2.9 [2.1–4.0][1] IR: 1.6 [1.0–2.5][2] **Component** Reserve IR: 4.0 [3.0–5.3][1] IR: 3.0 [2.1–4.2][2] National Guard IR: 5.3 [4.2–6.8][1] IR: 2.8 [2.0–4.0][2] **Branch** Air Force Reserve IR: 2.7 [1.3–5.6][1] IR: 1.1 [0.3–3.5][2] Army Reserve IR: 4.2 [2.8–6.3][1] IR: 4.2 [2.7–6.6][2] Marine Reserve IR: 5.3 [3.0–9.7][1] IR: 2.5 [1.1–5.5][2] Navy Reserve IR: 4.0 [2.2–7.2][1] IR: 1.9 [0.9–4.0][2] Air National Guard IR: 3.4 [1.9–6.1][1] IR: 0.4 [0.1–1.4][2] Army National Guard IR: 5.9 [4.5–7.7][1] IR: 3.6 [2.4–5.0][2]
17. Goodwin,	Name: -	n= 1,397	Exposure assessment:	Type of symptoms:	Univariate (model	**Sex**

2012 [35]	Design: Prospective longitudinal. Follow-up period: 40.3 months (median)	Country= UK %Female= 11% Age= - Type of job/company= Military personnel that were and were not deployed in the Iraq war. Inclusion/exclusion= -	Self-reported. Year of assessment: 2004-2006. Exposure categories: Personal characteristics, service, rank and deployment history.	PTSD symptoms (delayed onset) Way of assessment: Self-reported using the PCL-C checklist. Incidence: 3.5%	1) and multivariate (model 2) adjusting for service, rank, deployment characteristics, depression, anxiety, panic disorder, childhood adversity and general health, alcohol misuse, common mental disorders, and subthreshold PTSD all at phase 1.	Male OR: Ref. Female OR: 1.46 [0.64 3.36][1] **Age** <35 OR: Ref. ≥35 OR: 0.71 [0.38 1.34][1] **Marital status** In a relationship OR: Ref. Single, divorced, separated, widowed OR: 0.92 [0.39 2.14][1] **Service** Naval services OR: 0.40 [0.14 1.19][1] OR: 0.45 [0.16 1.28][2] Army OR: Ref. OR: Ref. Royal Air Force OR: 0.23 [0.07 0.81][1] OR: 0.53 [0.15 1.87][2] **Rank** Officer OR: 0.17 [0.05 0.57][1] OR: 0.21 [0.06 0.72][2] Other rank OR: Ref. OR: Ref.

						Deployment Regular OR: Ref. Reservist OR: 0.83 [0.42 1.68][1] **In a combat role on deployment** No OR: Ref. OR: Ref. Yes OR: 3.00 [1.57 5.75][1] OR: 2.61 [1.20 5.68][2] **Thought might be killed** No OR: Ref. OR: Ref. Yes OR: 3.69 [1.61 8.45][1] OR: 2.38 [1.03 5.46][2] **Discharged weapon on deployment** No OR: Ref. Yes OR: 1.48 [0.61 3.60][1] **Handled bodies on deployment** No OR: Ref. Yes OR: 2.01 [0.93 4.35][1]

						History of depression No OR: Ref. OR: Ref. Yes OR: 4.31 [2.19 8.49][1] OR: 3.67 [1.75 7.67][2] **History of anxiety/panic disorder** No OR: Ref. OR: Ref. Yes OR: 4.77 [1.92 11.82][1] OR: 2.85 [0.87 9.30][2] **Childhood adversity, antisocial behavior** No OR: Ref. OR: Ref. Yes OR: 3.26 [1.66 6.40][1] OR: 1.58 [0.73 3.43][2] **Childhood adversity, family relationship** 0 adversities OR: Ref. OR: Ref. 1 adversity OR: 1.36 [0.53 3.48][1] OR: 1.29 [0.46 3.63][2] 2 or more adversities OR: 2.92 [1.41 6.04][1] OR: 2.18 [0.99 4.77][2]

						General health status Fair/ poor OR: 3.05 [1.49 6.23][1] OR: 1.84 [0.79 4.28][2] Excellent/ good OR: Ref. OR: Ref. **Common mental disorder** Non-case OR: Ref. OR: Ref. Case OR: 5.58 [2.94 10.58][1] OR: 2.47 [1.12 5.46][2] **Multiple physical symptoms** Non-case OR: Ref. OR: Ref. Case OR: 7.32 [3.81 14.07][1] OR: 3.40 [1.54 7.47][2] **Alcohol misuse** Non-case OR: Ref. Case OR: 2.18 [1.00 4.75][1] **Subthreshold PTSD reported at phase 1** No OR: Ref. OR: Ref. Yes

						OR: 9.96 [4.67 21.20][1] OR: 4.87 [2.05 11.58][2] **Cumulative physical/psychological morbidity at phase 1** 0 reports OR: Ref. OR: Ref. 1 report OR: 4.40 [1.88 10.33][1] OR: 3.37 [1.30 8.73][2] 2 reports OR: 10.72 [4.09 28.08][1] OR: 6.56 [2.29 8.73][2] 3-4 reports OR: 17.14 [6.84 42.97][1] OR: 8.14 [2.81 23.57][2] **Relationship status** No change OR: Ref. In a new relationship since phase 1 OR: 1.17 [0.39 3.52][1] End of a relationship since phase 1 OR: 2.18 [0.84 5.62][1] **Serving status** In service phases 1 and 2 OR: Ref. OR: Ref. Not in service phases 1 and 2 OR: 1.51 [0.58 3.89][1] OR: 1.14 [0.40 3.29][2] Left service

						OR: 2.24 [1.13 4.42][1] OR: 1.46 [0.66 3.23][2] **General health status** Good health stable OR: Ref. OR: Ref. Poor health stable OR: 7.83 [3.33 18.44][1] OR: 3.72 [1.19 11.65][2] Decline in health since phase 1 OR: 6.44 [2.89 14.35][1] OR: 3.74 [1.41 9.91][2] Improvement in health since phase 1 OR: 1.71 [0.47 6.24][1] OR: 0.88 [0.24 3.24][2] **Alcohol misuse** No change [no misuse] OR: Ref. OR: Ref. No change [misuse] OR: 3.84 [1.37 10.77][1] OR: 1.29 [0.40 4.18][2] Deterioration change since phase 1 OR: 6.10 [2.45 15.17][1] OR: 6.15 [2.05 18.48][2] Improvement change since phase 1 OR: 1.60 [0.47 5.47][1] OR: 0.76 [0.21 2.71][2] **Common mental disorders** No change or positive change

						OR: Ref. OR: Ref. Negative change since phase 1 OR: 6.29 [3.24 12.21][1] OR: 7.12 [3.07 16.52][2] **Multiple physical symptoms** No change or improvement OR: Ref. OR: Ref. Decline in health since phase 1 OR: 9.73 [4.56 20.76][1] OR: 7.85 [2.86 21.52][2]
18. Green, 2016 [36]	Name: Project VALOR Design: Retrospective longitudinal Follow-up period: -	n= 738 Country= USA %Female= 51% Age= 37.7 (9.9) years. Type of job/company= Iraq and Afghanistan army and marine corps veterans. Inclusion/exclusion= Participants who had undergone mental health evaluation at a veterans facility were included. Participants with probable PTSD and females were oversampled to get a	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Deployment risk and resilience.	Type of symptoms: PTSD Way of assessment: Using a structured clinical interview with DSM-4 criteria. Incidence: 73% and 68% for females and males, respectively.	Unadjusted	**Age** OR: 1.01 [0.81 1.03] **Race** White OR: Ref. Black OR: 1.83 [0.76 4.41] Other OR: 0.46 [0.19 1.11] **Combat experiences** OR: 1.03 [1.00 1.07] **Aftermath of battle** OR: 1.03 [1.00 1.06] **Social support** OR: 0.96 [0.93 0.98] **Length of deployment** OR: 0.97 [0.92 1.03]

		good representation of these groups in the final sample. Only participants with one deployment were included.				**Deployment phase** Insurgency OR: Ref. Invasion OR: 0.38 [0.16 0.91] Surge OR: 0.44 [0.21 0.93]
19. Hansen, 2017[37]	Name: Mental Health and Work Environment Factors in the Aftermath of the Oslo Terrorist Attack Design: Prospective longitudinal Follow-up period: 10, 22 and 34 months after the attack	n= 1,933 Country= Norway %Female= 58% Age= 45.4(10.9) years Type of job/company= Employees of the ministries at the moment of the Oslo terrorist attack. Inclusion/exclusion= -	Exposure assessment: Deployment administration Year of assessment: 2011 Exposure categories: Mental health, exposure, work, perceived safety and psychosocial variables.	Type of symptoms: PTS symptoms Way of assessment: Self-reported using a Norwegian version of the Posttraumatic Stress Disorder Checklist – Specific (PCL-C), using DSM-4 criteria. Incidence: 6%, 4%, and 4% during the three follow-up periods, respectively.	Unadjusted (model 1) and multivariate (model 2) with age and gender and traumatic experiences, education level and leadership position.	**Presence during attack** Not present during attack *10 months* OR: Ref.[1] OR: Ref.[2] *22 months* OR: Ref.[1] OR: Ref.[2] *34 months* OR: Ref.[1] OR: Ref.[2] Present during attack *10 months* OR: 8.4 [5.6 12.6][1] OR: 9.3 [6.1 14.2][2] *22 months* OR: 6.9 [4.3 11.2][1] OR: 8.9 [5.2 15.3][2] *34 months* OR: 8.8 [5.2 15.1][1] OR: 10.0 [5.4 18.6][2]
20. Harvey, 2012 [38]	Name: - Design: Prospective longitudinal	n= 552 in combat group, 391 in control group Country= UK %Female= 17% in	Exposure assessment: Deployment administration Year of assessment: 2003	Type of symptoms: PTSD symptoms (using a cut-off >=50) Way of assessment: 17-item National	Univariate (model 1) and adjusted for gender, age, rank and service (model 2).	**Combat status** Control group *Short-term* OR: Ref OR: Ref *Long-term*

	Follow-up period: 16 months and 4.8 year post-deployment	combat group, 19% in control group Age= 39.4(7.9) in combat group, 42.0(8.9) in control group Type of job/company= Military personnel that were and were not deployed in the Iraq war Inclusion/exclusion= -	Exposure categories: Combat versus control group	Centre for PTSD Checklist (PCL-C) Incidence: Short term: 2.2% in control group and 6.3% in the combat group. Long-term: 2.0% in the control group and 5.1 in the combat group.		OR: Ref OR: Ref Combat group *Short-term* OR: 3.01 [1.36 6.64][1] OR: 2.91 [1.34 6.31][2] *Long-term* OR: 2.62 [1.12 6.16][1] OR: 2.42 [1.04 5.62][2]
21. Horesh, 2011 [39]	Name: - Design: Prospective longitudinal Follow-up period: 1, 2 and 20 years post-war	n= 675 Country= Israel %Female= - Age= - Type of job/company= War veterans from the Lebanon war Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 1983 Exposure categories: Combat exposure was self-reported.	Type of symptoms: PTSD, grouped into four groups: no-PTSD, 1983 PTSD, 1984 delayed onset PTSD and 2002 delayed onset PTSD. Way of assessment: Self-reported using the PTSD inventory, using DSM-3 criteria. Incidence: 16.5%	-	64.5% of the participants in the 1983 PTSD group reported extreme exposure to danger, compared to 24.5% of the no-PTSD group, 35.8% of the 2002 delayed onset PTSD group and 41.4% of the 1984 delayed onset PTSD group. Whereas 27.9% of the participants in the no-PTSD group reported extreme battles severity, 48.2% of the participants in the 1983 PTSD group reported extreme battles severity. In comparison, 39.6% of the participants in the 2002 delayed onset PTSD group and 34.5% of the participants in the 1984 delayed onset PTSD group reported extreme battles severity.
22. Hourani,	Name: -	n= 2116	Exposure assessment:	Type of symptoms:	-	Those with PTSD symptoms

2012 [40]	Design: Prospective longitudinal Follow-up period: 6 months	Country= USA %Female= - Age= - Type of job/company= Marines Inclusion/exclusion= Participants who transitioned from active military duty to civilian life were for a minimum of 2 months were included.	Self-reported Year of assessment: 2010 Exposure categories: Exposures like number of deployments and stress were used.	PTSD symptoms Way of assessment: Self-reported using the National Centre for PTSD Checklist (PCL-C) of the Department of Veterans Affairs – Civilian Version. Incidence: Baseline prevalence 28%, follow-up incidence 10%		also were more likely to report a previous trauma during their lifetime at baseline. High combat exposure scale scores were associated with PTSD. Baseline social support was associated with PTSD.
23. Ikeda, 2017 [41]	Name: Fukushima Nuclear Energy Worker's Support (NEWS) Project. Design: Prospective longitudinal Follow-up period: Baseline at 2-3 months post-disaster, with follow-up 3 years after that.	n= 1,417 Country= Japan %Female= 5% Age= 39.3 years Type of job/company= Employers of the Tokyo Electric Power Company in Fukushima. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2011 Exposure categories: Sociodemographic, disaster-related experiences and psychological distress.	Type of symptoms: PTSD symptoms (using a cut-off >=25) Way of assessment: Self-reported using the Japanese version of the Impact of Event Scale-Revisited (IES-R), using DSM-4 criteria. Incidence: 26%	Adjusted for age, gender and job location	**Experience of life-threatening danger** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 4.32 [2.89 6.48] (2011) OR: 3.47 [2.43 4.95] (2012) OR: 2.78 [1.87 4.14] (2013) OR: 2.23 [1.34 3.72] (2014) **Major property loss** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes

						OR: 3.45 [2.28 5.23] (2011) OR: 2.55 [1.77 3.66] (2012) OR: 1.88 [1.25 2.84] (2013) OR: 1.39 [0.81 2.37] (2014) **Discrimination/slurs** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 5.72 [3.37 9.71] (2011) OR: 4.47 [2.83 7.08] (2012) OR: 3.50 [2.10 5.84] (2013) OR: 2.74 [1.42 5.30] (2014) **Escape from tsunami** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 5.65 [3.27 9.74] (2011) OR: 3.72 [2.30 6.02] (2012) OR: 2.45 [1.40 4.27] (2013) OR: 1.61 [0.78 3.35] (2014) **Witnessing of plant explosions** No OR: Ref. (2011) Yes OR: 2.09 [1.43 3.06] (2011) **Family member deaths**

						No OR: Ref. (2011) Yes OR: 1.60 [0.80 3.19] (2011) **Colleague deaths** No OR: Ref. (2011) Yes OR: 2.08 [1.33 3.26] (2011) **Home evacuation** No OR: Ref. (2011) Yes OR: 1.49 [1.03 2.15] (2011)
24. Joseph, 2014 [42]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 453 Country= USA %Female= 24% Age= - Type of job/company= Traumatic surgeons Inclusion/exclusion = --	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Personal characteristics, and exposure at work.	Type of symptoms: PTSD (symptoms and diagnosed PTSD - only diagnosed PTSD was extracted for this review) Way of assessment: Self-reported using the PCL checklist (with a cut-off score >=44). Incidence: 15% (prevalence)	Univariate (model 1) and adjusting for all other exposure (model 2).	**Age** <51 years OR: Ref.[1] OR: Ref.[2] ≥51 years OR: 1.8 [0.7 3.4][1] **Gender** Female OR: Ref.[1] OR: Ref.[2] Male OR: 2.1 [1.4 4.6][1] OR: 1.8 [0.9 5.3][2] **Marital status** Other OR: Ref.[1] Single OR: 1.2 [0.4 2.8][1]

						Race Other OR: Ref.[1] White OR: 1.1 [0.8 2.6][1] **Comorbidities** No OR: Ref.[1] Yes OR: 2.4 [0.6 4.1][1] **Urban hospital** No OR: Ref.[1] Yes OR: 1.6 [0.5 2.4][1] **Academic facility** No OR: Ref.[1] Yes OR: 3.6 [0.9 7.8][1] **24-h resident coverage** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.8 [1.1 3.2][1] OR: 1.4 [0.8 4.2][2] **≥5 critical cases per call** No OR: Ref.[1] OR: Ref.[2] Yes

						OR: 2.4 [1.6 9.4][1] OR: 7 [1.1 8][2] **≥7 call duties a month** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.6 [2.1 14.6][1] OR: 3.8 [0.9 7.2][2] **≥15 operative cases per month** No OR: Ref.[1] OR: Ref.[2] Yes OR: 3.1 [1.1 7.2][1] OR: 2.8 [0.4 3.2][2] **≥4-h relaxation per day** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.6 [1.8 11.5][1] OR: 3.1 [0.9 6.7][2] **≥2-wk vacation per year** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.1 [0.9 6.8][1] OR: 1.4 [0.6 4.1][2] **Military experience**

						<u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 1.4 [0.8 5.6][1] OR: 1.1 [0.7 3.8][2] **War deployment** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 4.2 [2.8 14.1][1] OR: 2.8 [0.9 7.9][2] **Smoking** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 1.2 [0.8 3.1][1] **Alcohol** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 1.1 [0.5 2.3][1] **Annual income >$300,000** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 3.6 [0.9 8.4][1]
25. Karstoft, 2013 [43]	<u>Name:</u> - <u>Design:</u> Prospective longitdinal	<u>n</u>= 675 (369 who were diagnosed with a combat stress reaction and 306 without)	<u>Exposure assessment</u>: Self-reported <u>Year of assessment</u>: 1983	<u>Type of symptoms</u>: PTSD <u>Way of assessment</u>: Self-reported using	-	**Severity of battles** OR: 0.96 [0.63 1.48] (combat stress reaction) OR: 0.87 [0.55 1.36] (no combat stress reaction)

	Follow-up period: 1, 2 and 20 years post-war.	Country= Israel %Female= 0% Age= 25.8(4.7) Type of job/company= Combat veterans who were on active duty in the Lebanon war. Inclusion/exclusion= -	Exposure categories: Exposures such as the severity of battles, life threatening war, unit atmosphere and social support were assessed.	the PTSD inventory, using DSM-3 criteria. Latent growth modelling was used to identify PTSD subgroups. For the current review we only assessed the 'delayed onset' PTSD group, as this reflects incidence of PTSD. Incidence: -		**Life threatening war** OR: 1.90 [1.08 3.35] (combat stress reaction) OR: 0.95 [0.64 1.43] (no combat stress reaction) **Unit atmosphere** OR: 1.08 [1.00 1.17] (combat stress reaction) OR: 1.02 [0.96 1.09] (no combat stress reaction) **Social support** OR: 0.58 [0.25 1.31] (combat stress reaction) OR: 0.66 [0.29 1.53] (no combat stress reaction)
26. Karstoft, 2015 [44]	Name: - Design: Prospective longitudinal Follow-up period: 1, 2 and 20 years post-war.	n= 675 (369 who were diagnosed with a combat stress reaction and 306 without) Country= Israel %Female= 0% Age= 25.8(4.7) Type of job/company= Combat veterans who were on active duty in the Lebanon war. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 1983 Exposure categories: Exposures such as the severity of battles, life threatening war, coping were assessed.	Type of symptoms: PTSD Way of assessment: Self-reported using the PTSD inventory, using DSM-3 criteria. Latent growth modelling was used to identify PTSD subgroups. For the current review we only assessed the 'delayed onset' PTSD group, as this reflects incidence of PTSD. Incidence: -	-	**Severity of battles** OR: 1.01 [0.67 1.35] (combat stress reaction) OR: 0.87 [0.57 1.32] (no combat stress reaction) **Life threatening war** OR: 1.91 [1.07 3.24] (combat stress reaction) OR: 1.01 [0.68 1.50] (no combat stress reaction) **Locus of control** OR: 1.12 [0.93 1.35] (combat stress reaction) OR: 0.88 [0.73 1.05] (no combat stress reaction) **Problem-focused coping**

						OR: 1.72 [0.80 3.73] (combat stress reaction) OR: 3.11 [1.16 8.38] (no combat stress reaction) **Emotion-focused coping** OR: 0.60 [0.26–1.35] (combat stress reaction) OR: 0.28 [0.09–0.93] (no combat stress reaction)
27. Kim, 2014 [45]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 980 Country= Korea %Female= 0% Age= Most participants were in their 40s. Type of job/company= Subway drivers employed by a public company in Seoul Inclusion/exclusion= Participants currently on sick leave and female drivers were excluded.	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Person under train experiences and other work-related exposures were assessed.	Type of symptoms: PTSD (1 year and lifetime prevalence). Way of assessment: The Korean version of the Composite International Diagnostic Interview (K-CIDI) was administered to diagnose PTSD, using DSM-4 criteria. Incidence: 1.6% (one year prevalence)	Multi-variate analyses with all other exposures and age. For 1 year prevalence (model 1) and lifetime prevalence (model 2).	**Person under train experience** No OR: Ref OR: Ref Yes OR: 1.54 [0.52 4.55][1] OR: 2.06 [0.94 4.55][2] **Number of person under train experiences** 0 experiences OR: Ref OR: Ref 1 experience OR: 1.77 [0.31 4.47][1] OR: 1.45 [0.55 3.85][2] ≥2 experiences OR: 2.36 [0.57 9.70][1] OR: 3.57 [1.32 3.65][2] **Severity of victim's injury** Alive OR: Ref OR: Ref Death OR: 2.49 [0.27 23.27][1]

						OR: 1.39 [0.40 4.82][2] **Person under train experience** <u>>5 years ago</u> OR: Ref OR: Ref <u>≤5 years</u> OR: 1.01 [0.11 9.06][1] OR: 0.33 [0.03 2.63][2] **Conflict with passengers** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 3.21 [1.14 9.03][1] OR: 3.32 [1.55 7.12][2] **Sudden stop** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 3.66 [0.82 16.4][1] OR: 7.53 [1.77 32.02][2] **Near accident** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 8.81 [1.96 39.3][1] OR: 6.36 [2.40 16.90][2] **Breakdown** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u>

						OR: 1.71 [0.48 6.14][1] OR: 1.89 [0.75 4.75][2] **Person under train experience of colleague** No OR: Ref.[1] OR: Ref.[2] Yes OR: 0.55 [0.12 2.47][2] OR: 2.84 [1.32 6.12][2]
28. Levin-Rector, 2018 [46]	Name: Defence Manpower Data Center (DMDC), Career History and Archival Medical Personnel System (CHAMPS), and the Expeditionary Medical Encounter Database (EMED) Design: Prospective longitudinal Follow-up period: 35-43 months.	n= 332,093 (marine) and 773,359 (army) Country= USA %Female= 7% (marine) and 17% (army) Age= 20.0 (3.9) (marine) and 21.7 (2.1) (army) Type of job/company= All service members who went into the army or navy between 2001 and 2011. Inclusion/exclusion= -	Exposure assessment: Military databases Year of assessment: 2001-2011 Exposure categories: Personal and deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed PTSD obtained from military records. Incidence: 4.3% (marine); 7.6% (army).	Adjusting for clustering within units.	**Sex** Female HR: Ref. (marine) HR: Ref. (army) Male HR: 0.40 [0.36 0.44] (marine) HR: 0.57 [0.55 0.59] (army) **Age at accession** HR: 0.99 [0.98 1.00] (marine) HR: 1.01 [1.00 1.01] (army) **Race** White HR: Ref. (marine) HR: Ref. (army) Non-white HR: 0.95 [0.91 1.00] (marine) HR: 0.96 [0.94 0.98] (army) **Ethnicity** Non-Hispanic HR: Ref. (marine) HR: Ref. (army) Hispanic HR: 0.80 [0.75 0.84] (marine) HR: 0.86 [0.84 0.89] (army)

						Prior substance abuse disorder diagnosis HR: 3.10 [2.92 3.30] (marine) HR: 2.05 [2.00 2.10] (army) **Waiver status** No waiver HR: Ref. (marine) HR: Ref. (army) Received medical waiver HR: 1.13 [1.07 1.20] (marine) HR: 1.02 [0.99 1.05] (army) Received other waiver HR: 1.12 [1.08 1.16] (marine) HR: 1.12 [1.10 1.15] (army) **Marital status** Single HR: Ref. (marine) HR: Ref. (army) Divorced/widowed HR: 1.21 [1.06 1.39] (marine) HR: 1.18 [1.12 1.24] (army) Married HR: 1.31 [1.24 1.38] (marine) HR: 1.20 [1.18 1.23] (army) **Rank** Enlisted HR: Ref. (marine) HR: Ref. (army) Officer HR: 0.16 [0.13 0.21] (marine) HR: 0.20 [0.15 0.26] (army) **Occupation**

						Combat specialist HR: Ref. (marine) HR: Ref. (army) Communications/intelligence HR: 0.54 [0.48 0.62] (marine) HR: 0.73 [0.70 0.77] (army) Craft/repair specialist HR: 0.46 [0.40 0.54] (marine) HR: 0.62 [0.60 0.65] (army) Functional support/other HR: 0.46 [0.41 0.51] (marine) HR: 0.56 [0.53 0.59] (army) Service and supply HR: 0.77 [0.68 0.87] (marine) HR: 0.84 [0.80 0.88] (army) Healthcare specialist HR: 1.03 [0.98 1.08] (army) **Cumulative years deployed** HR: 2.04 [1.93 2.15] (marine) HR: 1.74 [1.71 1.76] (army) **Unit cumulative high deployment stress rate (per 100)** HR: 1.04 [1.03 1.05] (marine) HR: 1.05 [1.04 1.06] (army) **Unit stability** HR: 1.11 [0.92 1.33] (marine) HR: 0.69 [0.64 0.74] (army)
29. MacGregor, 2015 [47]	Name: Defence Manpower Data Center (DMDC) Design: Prospective	n= 8,064 (3,416 health care profession, 4,648 no health care profession) Country= USA	Exposure assessment: Self-reported. Year of assessment: 2001-2008	Type of symptoms: PTSD Way of assessment: Diagnosed, according to ICD-9-CM criteria,	Univariate (model 1) and multivariate (model 2) adjusting for all remaining exposures	**Health Care Occupation** No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes

	longitudinal Follow-up period: Up to 60 days.	%Female= 0% Age= Ranging from 27.9 (5.7) to 30.2 (7.0) in various participating groups. Type of job/company= Navy personnel with one, two or three deployments in Iraq and/or Afghanistan. Inclusion/exclusion= Participants who completed a health assessment within 60 days post-deployment were included. Women were excluded	Exposure categories: military occupation, combat rank, deployment specific variables	from inpatient and outpatient databased. Incidence: Ranging from 1.9% to 17.9% for various participating groups.		OR: 2.02 [1.45 2.80][1] (1 deployment) OR: 2.27 [1.26 4.08][1] (2 deployments) OR: 4.37 [1.25 15.28][1] (3 deployments) **Age** OR: 0.97 [0.94 0.99][1] (1 deployment) OR: 0.97 [0.93 1.02][1] (2 deployments) OR: 0.94 [0.86 1.03][1] (3 deployments) **Rank** Enlisted OR: Ref. OR: Ref. Officer OR: 0.35 [0.18 0.65][1] (1 deployment) OR: 0.54 [0.12 2.47][1] (2 deployments) **Married** No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes OR: 0.93 [0.67 1.30][1] (1 deployment) OR: 0.54 [0.32 0.89][1] (2 deployments) OR: 0.96 [0.36 2.56][1] (3 deployments)

						Some College No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes OR: 1.61 [0.97 2.68][1] (1 deployment) OR: 0.66 [0.22 1.97][1] (2 deployments) OR: 0.41 [0.04 3.92][1] (3 deployments) **Medical utilization** Low OR: Ref. OR: Ref. OR: Ref. Moderate OR: 6.64 [3.50 12.60][1] (1 deployment) OR: 3.40 [1.64 7.06][1] (2 deployments) OR: 13.84 [1.69 113.49][1] (3 deployments) High OR: 34.52 [19.35 61.59][1] (1 deployment) OR: 15.25 [7.89 29.49][1] (2 deployments) OR: 46.96 [5.98 368.58][1] (3 deployments) **Deployment location** Afghanistan/Iraq OR: Ref.

						OR: Ref. OR: Ref. Kuwait OR: 0.78 [0.55 1.10][1] (1 deployment) OR: 0.81 [0.44 1.48][1] (2 deployments) OR: 1.32 [0.94 1.82][1] (3 deployments) **Number of combat exposures** OR: 1.62 [1.46 1.79][1] (1 deployment) OR: 1.37 [1.17 1.61][1] (2 deployments) OR: 1.30 [0.94 1.82][1] (3 deployments) **Current Deployment Time** OR: 1.00 [1.00 1.01][1] (1 deployment) OR: 1.00 [1.00 1.01][1] (2 deployments) OR: 1.00 [0.99 1.01][1] (3 deployments) **Previous deployment time** OR: 1.00 [1.00 1.01][1] (2 deployments) OR: 1.00 [0.99 1.01][1] (3 deployments) **Previous dwell time** OR: 1.00 [1.00 1.00][1] (2 deployments) OR: 1.00 [1.00 1.00][1] (3

						deployments) *Only health care occupation below* **Felt in great danger of being killed** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.14 [3.13 5.46][1] OR: 3.44 [2.50 4.72][2] **Engaged in direct combat and discharged weapon** No OR: Ref.[1] OR: Ref.[2] Yes OR: 3.43 [2.42 4.87][1] OR: 1.67 [1.15 2.44][2] **Exposed to wounded/dead civilians** No OR: Ref.[1] Yes OR: 1.51 [1.16 1.96][1] **Exposed to wounded/dead friendly forces** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.99 [1.52 2.60][1] OR: 1.53 [1.13 2.07][2]

						Exposed to wounded/dead enemy No OR: Ref.[1] Yes OR: 1.79 [1.38 2.34][1]
30. MacGregor, 2012 [48]	Name: Defence Manpower Data Center (DMDC) Design: Prospective longitudinal Follow-up period: 4 years	n=65,704 Country= USA %Female= - Age= 22 (19-53) Type of job/company= Marine corps personnel deployed to Iraq or Kuwait. Inclusion/exclusion= Deployments between 4 and 8 months were considered. Special forces and participants with earlier mental health issues were excluded. Only those with more than one deployment were analysed.	Exposure assessment: Deployment adminstration Year of assessment: 2003-2007 Exposure categories: Dwell-to-deployment ratios were categorised into <1:1, 1:1 and 2:1.	Type of symptoms: PTSD Way of assessment: Diagnosed PTSD with ICD-9-CM criteria were obtained from impatient and outpatient registers Incidence: 1.5%	Adjustment for age and military rank	**Dwell to deployment ratio** <1:1 OR: Ref. 1:1 OR: 0.83 [0.60 1.13] 2:1 OR: 0.47 [0.32 0.70]
31. Maguen, 2012 [49]	Name: Department of Veterans Affairs (VA) database	n= 968 Country= USA %Female= 12%	Exposure assessment: Department of Veterans Affairs administrative data (including self-reports)	Type of symptoms: PTSD Way of assessment: Using the self-	Univariate (model 1) and multivariate (model 2), adjusting for age, sex, race, marital status, unit,	**Number of exposures** None OR: Ref. OR: Ref. One

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	Design: Retrospective longitudinal Follow-up period: 11 days	Age= 30.3(8.4) years Type of job/company= War veterans who have been deployed in Iran and Afghanistan. Inclusion/exclusion= Participants with either no head injury or a head injury with traumatic brain injury were included, but not those with head injury without brain damage.	Year of assessment: 2007-2010 Exposure categories: Exposure to traumatic brain injury mechanisms	reported Primary Care PTSD Screen (PC-PTSD) screening instrument Incidence: -	branch of service, rank and number of deployments.	OR: 4.93 [3.3 7.3][1] OR: 4.67 [3.1 7.1][2] Two + OR: 6.96 [5.1 9.6][1] OR: 6.15 [4.4 8.7][2] **Type of exposure** None OR: Ref. OR: Ref. Blast only OR: 5.13 [3.2 8.2][1] OR: 4.72 [2.9 7.7][2] Blast plus OR: 7.45 [5.4 10.3][1] OR: 6.52 [4.6 9.3][2] 1 Non blast OR: 4.53 [2.4 8.6][1] OR: 4.60 [2.4 8.8][2] 2+ Non blast OR: 2.94 [1.17 7.4][1] OR: 3.36 [1.32 8.6][2]
32. Maguen, 2010 [50]	Name: Department of Veterans Affairs (VA) database Design: Retrospective longitudinal Follow-up period: -	n= 329,049 Country= USA %Female= 12% Age= 31.2(9.0) Type of job/company= War veterans who have been deployed in Iran and Afghanistan. Inclusion/exclusion= -	Exposure assessment: Deployment data Year of assessment: 2001 Exposure categories: Demographic and military service data.	Type of symptoms: PTSD Way of assessment: PTSD obtained from medical health records of those who visited veteran facilities from 2002 to 2008. Diagnosis was done with ICD-9-CM criteria. Incidence: 17% among females, 22% among	Univariate models were conducted for females (model 1) and males (model 2) separately.	**Age** 16–24 RR: Ref. RR: Ref. 25–29 RR: 1.05 [0.99 1.11][1] RR: 0.96 [0.94 0.97][2] 30–39 RR: 1.24 [1.17 1.32][1] RR: 0.98 [0.96 0.99][2] 40–71 RR: 1.21 [1.13 1.30][1] RR: 0.79 [0.77 0.81][2] **Race/Ethnicity**

				males.		White RR: Ref. RR: Ref. Black RR: 0.95 [0.86 0.98][1] RR: 0.98 [0.96 1.00][2] Hispanic RR: 0.95 [0.88 1.01][1] RR: 0.89 [0.88 0.92][2] Other RR: 0.97 [0.86 1.10][1] RR: 1.02 [0.98 1.07][2] **Marital status** Married RR: Ref. RR: Ref. Never married RR: 0.97 [0.92 1.02][1] RR: 0.82 [0.80 0.83][2] Divorced/separated/widowed RR: 1.15 [1.08 1.22][1] RR: 1.08 [1.06 1.10][2] **Component type** Active duty RR: Ref. RR: Ref. Reserve/National Guard RR: 0.90 [0.86 0.94][1] RR: 0.74 [0.73 0.75][2] **Branch of service** Army RR: Ref. RR: Ref. Marine

						RR: 0.94 [0.85 1.05][1] RR: 0.95 [0.93 0.97][2] Navy RR: 0.45 [0.41 0.49][1] RR: 0.33 [0.32 0.34][2] Air Force RR: 0.45 [0.41 0.49][1] RR: 0.26 [0.25 0.27][2] **Rank** Enlisted RR: Ref. RR: Ref. Officer RR: 0.69 [0.63 0.77][1] RR: 0.51 [0.49 0.54][2] **Number of deployments** One RR: Ref. RR: Ref. More than one RR: 1.14 [1.09 1.19][1] RR: 1.15 [1.13 1.16][2]
33. Martindale, 2018 [51]	Name: - Design: Prospective longitudinal Follow-up period: Between 6 and 9 years.	n= 19 Country= USA %Female= 16% Age= 39.0(9.4) years. Type of job/company= Military personnel deployed in Afghanistan or Iraq	Exposure assessment: Self-reported Year of assessment: 2007-2010 Exposure categories: Blast exposure, traumatic brain injury and re-deployment were assessed.	Type of symptoms: PTSD Way of assessment: Via a structured interview, the Structured Clinical Interview for DSM-4 Axis I Disorders (SCID Incidence: 6/19 and 5/19 had current PTSD at T1 and T2,	-	Only individual participant data were presented, showing associations between the exposures and PTSD.

		Inclusion/exclusion= Participants with a history in traumatic brain injury or other neurological or mental disorders were excluded.		respectively.		
34. Nagamine, 2018 [52]	Name: - Design: Prospective longitudinal, with baseline measurements one month post-deployment. Follow-up period: 6 and 12 months post-deployment.	n= 56,753 Country= Japan %Female= 3% Age=- Type of job/company= Members of the ground defence force at 2011 Great East Japan Earthquake. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Information on personal attributes and mission duties.	Type of symptoms: PTSD symptoms (using a cut-off: >- 25) Way of assessment: Self-reported with the Impact of Event Scale-Revised (IES-R). Incidence: 2283/56753=4%	Multivariate model	**Age** OR: 1.39 [1.27 1.52] **Sex** Male OR: Ref. Female OR: 1.61 [1.29 2.00] **Rank** Enlisted/private OR: Ref. Officer OR: 0.77 [0.67 0.88] Administrative official OR: 1.24 [0.82 1.87] **Deployment length** < 1 month OR: Ref. 1–3 months OR: 1.53 [1.37 1.70] ≥ 3 months OR: 2.64 [2.33 2.99] **Personally affected** No OR: Ref. Yes OR: 2.19 [1.95 2.44]

						Body recovery duties No OR: Ref. Yes OR: 1.37 [1.25 1.51] **Duties with radiation exposure risk** No OR: Ref. Yes OR: 1.08 [0.97 1.20] **Timing of post-deployment leave** Within two weeks OR: Ref. Over two weeks OR: 1.34 [1.22 1.47] No leave taken OR: 1.50 [1.29 1.75] **Post-deployment overwork** No OR: Ref. Yes: < 3 months OR: 1.39 [1.26 1.53] Yes: ≥ 3 months OR: 2.02 [1.78 2.29] **Post-deployment relocation** No OR: Ref. Yes OR: 1.12 [0.98 1.28]
35. Osorio, 2018 [53]	Name: Secondary analyses on the	n= 1,635	Exposure assessment: Self-reported	Type of symptoms: PTSD symptoms (re-	Nine different models	**Violent combat** No

	Battlemind RCT. Design: Prospective longitudinal Follow-up period: 4-6 months post deployment.	Country= UK %Female= 2% Age= 39% was younger than 25 years. Type of job/company= Members of three branches of the army forces, returning from deployment in Afghanistan. Inclusion/exclusion= -	Year of assessment: 2009 Exposure categories: Violent combat situations, proximity to wounding or death and encountering explosive devices.	experience is extracted for this review - in the paper also: avoidance, numbing, arousal and anxious is reported) Way of assessment: Using the National Center for Posttraumatic Stress Disorders Checklist – Civilian Version (PCL-C). PTSD in general, but also avoiding, numbing and arousal behaviour were reported. For this review we only extracted PTSD. Incidence: 34%	Model 1: Unadjusted Model 2: Adjusted Model 3: Adjusted for proximity to wounding or death. Model 4: Adjusted for encountering explosive devices. Model 5: adjusted for PTSD re-experiencing, avoidance, numbing, or arousal. Model 6: Adjusted for distress. Model 7: Adjusted for alcohol. Model 8: Ranks, deployment and gender. Model 9: Adjusted for violent combat, proximity to wounding or death, encountering explosive devices, PTSD re-experiencing, avoidance, numbing, arousal, distress, alcohol consumption, rank, gender, reserves, deployment.	RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 2.43 [1.95 3.02][1] RR: —[2] RR: 1.56 [1.21 2.01][3] RR: 2.04 [1.62 2.58][4] RR: 1.81 [1.43 2.29][5] RR: 2.63 [2.10 3.31][6] RR: 2.32 [1.85 2.89][7] RR: 2.36 [1.89 2.95][8] RR: 1.35 [1.01 1.81][9] **Proximity to wounding or death** No RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 3.01 [2.42 3.74][1] RR: 2.42 [1.89 3.11][2] RR: —[3] RR: 2.62 [2.08 3.31][4]

						RR: 2.02 [1.59 2.56][5] RR: 3.03 [2.42 3.80][6] RR: 2.94 [2.36 3.67][7] RR: 3.01 [2.41 3.75][8] RR: 1.67 [1.25 2.23][9] **Encountering explosive devices** No RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 2.14 [1.71 2.67][1] RR: 1.66 [1.30 2.10][2] RR: 1.54 [1.21 1.95][3] RR: —[4] RR: 1.70 [1.33 2.16][5] RR: 2.17 [1.72 2.73][6] RR: 2.01 [1.60 2.52][7] RR: 2.06 [1.65 2.59][8] RR: 1.26 [0.95 1.66][9]
36. Pihl-Thingvad, 2019 [54]	Name: Everyday violence project Design: Prospective longitudinal Follow-up period: 12 months	n= 1,763 Country= Denmark %Female= 78% Age= 48.7 (9.4) years. Type of job/company=	Exposure assessment: Self-reported. Year of assessment: 2016-2017 Exposure categories: Patient-initiated violence.	Type of symptoms: PTSD Way of assessment: Self-reported using the International Trauma Questionnaire, with ICD-11 criteria.	Crude model adjusting for age and gender (model 1), additionally adjusting for BMI, alcohol, years of experience, critical incidents outside of work, posttraumatic	**Frequency of violence** No violence OR: Ref. OR: Ref. OR: Ref. Low frequency OR: 4.4 [1.3 14.8][1] OR: 3.0 [0.90 10.4][2] OR: 4.0 [1.0 16.3][3]

		Social educators working with disabled adults. Inclusion/exclusion= Participants in leadership position and with PTSD at baseline were excluded.		Incidence: 3.5%	stress disorder symptom level at baseline, trauma coping self-efficacy, workplace social capital linking, and training (model 2). In model 3, additional for frequency and severity of violence was done.	Medium frequency OR: 6.3 [1.8 22.9][1] OR: 3.7 [1.0 13.8][2] OR: 5.9 [1.4 24.2][3] High frequency OR: 10.2 [2.9 36.3][1] OR: 4.2 [1.1 15.9][2] OR: 6.5 [1.6 25.6][3] **Severity of violence** No violence OR: Ref. OR: Ref. OR: Ref. Max. mild violence OR: 2.3 [0.2 22.8][1] OR: 2.3 [0.2 24.4][2] OR: 3.8 [0.3 46.2][3] Max. threats of violence OR: 5.1 [1.5 17.5][1] OR: 3.6 [1.0 12.4][2] OR: 5.4 [1.2 24.2][3] Max. moderate violence OR: 4.1 [1.1 14.5][1] OR: 2.1 [0.6 8.1][2] OR: 2.6 [0.6 10.8][3] Max. severe violence OR: 13.7 [3.1 37.1][1] OR: 5.3 [1.5 19.5][2] OR: 6.5 [1.6 26.0][3]
37. Polusny, 2011 [55]	Name: Readiness and Resilience in National Guard Soldiers. Design: Prospective	n= 426 Country= USA %Female= 12% Age= Mostly younger	Exposure assessment: Self-reported Year of assessment: 2006 Exposure categories:	Type of symptoms: Probable PTSD (new onset) Way of assessment: Self-reported using the PCL checklist, with	Adjusting for all other pre-deployment factors (model 2), additionally adjusting for deployment	**Baseline PTSD symptoms** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 0.73 [0.34 1.58][1]

	longitudinal Follow-up period: 2 months	than 30. Type of job/company= National Guard soldiers Inclusion/exclusion= Those with PTSD at baseline were excluded.	Psychosocial risk, protective factors and deployment exposures.	DSM-4 criteria. Incidence: 14%	exposures (model 2) and additionally adjusting for post-deployment factors (model 3).	OR: 0.79 [0.34 1.85][2] OR: 0.69 [0.27 1.79][3] **Military preparedness** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 0.58 [0.39 0.87][1] OR: 0.62 [0.40 0.95][2] OR: 0.77 [0.48 1.25][3] **Concerns about life/family disruptions** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 1.38 [0.97 1.97][1] OR: 1.31 [0.88 1.95][2] OR: 1.12 [0.71 1.77][3] **Unit support** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 1.43 [0.95 2.15][1] OR: 1.15 [0.73 1.79][2] OR: 1.15 [0.70 1.89][3] **Combat experiences** No OR: Ref.[2]

						OR: Ref.[3] Yes OR: 2.19 [1.40 3.41][2] OR: 2.35 [1.41 3.92][3] **Exposure to aftermath of battle** No OR: Ref.[2] OR: Ref.[3] Yes OR: 1.62 [1.04 2.53][2] OR: 1.81 [1.08 3.06][3] **Perceived life threat** No OR: Ref.[2] OR: Ref.[3] Yes OR: 1.21 [0.81 1.81][2] OR: 1.01 [0.63 1.64][3] **Post-deployment social support** No OR: Ref.[3] Yes OR: 0.31 [0.19 0.50][3] **Post-deployment life stressors** No OR: Ref.[3] Yes OR: 1.96 [1.17 3.28][3]
38. Reijnen, 2015 [56]	Name: -	n= 994	Exposure assessment: Self-reported	Type of symptoms: PTSD symptoms	-	**Deployment** Pre-deployment

	Design: Prospective longitudinal with baseline measurements 1 month prior to deployment Follow-up period: 2 years post deployment.	Country= Netherlands %Female= 9% Age= 28.5 (9.0) Type of job/company= Dutch military personnel who were deployed to Afghanistan Inclusion/exclusion=-	Year of assessment: 2005-2008 Exposure categories: Different categories of time since deployment (compared to pre-deployment)	Way of assessment: Self-reported with the Dutch Self-Rating Inventory for PTSD, using DSM-4 cut-off values Incidence: 8.9%		OR: Ref 1 month post-deployment OR: 2.12 [1.4 3.3] 6 months post-deployment OR: 2.18 [1.4 3.4] 1 year post-deployment OR: 1.62 [1.0 2.6] 2 years post-deployment OR: 1.33 [2.8 5.8]
39. Shea, 2013 [57]	Name: - Design: Prospective longitudinal Follow-up period: 6 months post deployment.	n= 238 Country= USA %Female= 8% Age= 33.5 (9.5) years. Type of job/company= Members of the National Guard units recently returned from deployment to Iraq and Afghanistan. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2006-2009 Exposure categories: Personal characteristics, pre-deployment and deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed during a CAPS structured interview. Incidence: 13%	Adjusting for demographics (model 1), additionally adjusting for pre-deployment characteristics (model 2), additionally adjusting for deployment-related variables (model 3), and additionally adjusting for post-deployment characteristics (model 4).	It is unclear what the reference group is for the below associations **Gender** OR: 1.03 [0.12 8.89][1] OR: 0.46 [0.04 5.14][2] OR: 0.94 [0.03 28.56][3] OR: 1.12 [0.03 38.70][4] **Ethnicity** OR: 0.33 [0.04 2.64][1] OR: 0.17 [0.02 1.61][2] OR: 0.08 [0.00 1.45][3] OR: 0.07 [0.00 1.18][4] **Age** OR: 1.09 [0.69 1.72][1] OR: 1.01 [0.60 1.72][2] OR: 0.7 [0.34 1.41][3] OR: 1.12 [0.31 1.45][4] **Negative temperament** OR: 2.95 [1.66 5.23][2] OR: 2.23 [1.18 4.22][3]

						OR: 1.46 [0.69 3.09][4] **Pre-deployment life events** OR: 1.92 [1.19 3.10][2] OR: 1.78 [1.00 3.19][3] OR: 1.1 [0.56 2.18][4] **Preparation and training** OR: 0.89 [0.52 1.55][2] OR: 1.41 [0.68 2.91][3] OR: 1.99 [0.83 4.62][4] **Life and family concerns** OR: 2.77 [1.34 5.75][3] OR: 2.77 [1.28 6.01][4] **Deployment environment** OR: 1.44 [0.68 3.05][3] OR: 1.31 [0.58 2.99][4] **Unit support** OR: 1.03 [0.56 1.90][3] OR: 1.15 [0.58 2.30][4] **Combat exposure** OR: 1.88 [1.01 3.50][3] OR: 2.00 [1.01 3.97][4] **Post-deployment support** OR: 0.36 [0.15 0.87][4] **Post-deployment life events** OR: 1.82 [0.98 3.39][4]
40. Soo, 2011 [58]	Name: FDNY-WTC-MMP Design:	n= 11,006 Country= USA	Exposure assessment: Demographics and work status and number of colleagues who died	Type of symptoms: Probable PTSD Way of assessment:	Univariate (model 1 & 3) and adjusted for all other exposures (model 2	**Arrival group** Group 3 and 4 HR: Ref[1] HR: Ref[2]

	Prospective longitudinal Follow-up period: 9 years, with follow-up measurements every 18 months.	%Female= 0% Age= 39.5 (7.4) years Type of job/company= New York firefighters involved in the 9/11 WTC attacks. Inclusion/exclusion= Firefighters who arrived at the site more than 14 days before the close of the WTC site were included. Women were excluded.	were obtained from databases. Other variables were self-reported. Year of assessment: 2002 Exposure categories: Exposure to the WTC sites	Self-reported using the PCL-C checklist. Incidence: 8% (after the first follow-up).	& 4), for those with PTSD at baseline (model 1 & 2) and without (model 3 & 4).	HR: Ref[3] HR: Ref[4] Group 1 HR: 0.76 [0.58-1.00][1] HR: 0.74 [0.56-0.99][2] HR: 2.21 [1.80-2.70][3] HR: 1.38 [1.12-1.70][4] Group 2 HR: 0.97 [0.75-1.25][1] HR: 0.85 [0.66-1.11][2] HR: 1.16 [0.98-1.39][3] HR: 0.90 [0.75-1.08][4] **≥1 death at firehouse on 9/11** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.84 [0.71-1.00][1] HR: 0.87 [0.73-1.04][2] HR: 1.31 [1.12-1.54][3] HR: 1.11 [0.95-1.31][4] **Received counselling during year 1** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.89 [0.76-1.04][1] HR: 0.98 [0.83-1.15][2] HR: 2.02 [1.74-2.35][3]

						HR: 1.59 [1.36-1.85][4] **Each concurrent aerodigestive symptom** <u>No</u> HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] <u>Yes</u> HR: 0.87 [0.84-0.90][1] HR: 0.89 [0.86-0.93][2] HR: 1.62 [1.56-1.67][3] HR: 1.45 [1.40-1.51][4] **Concurrent alcohol intake** <u>No increase since 9/11</u> <u>Increased since 9/11</u> HR: 0.77 [0.53-1.12][1] HR: 0.83 [0.56-1.22][2] HR: 5.85 [4.56-7.52][3] HR: 3.43 [2.67-4.43][4] <u>Increased since 9/11, now back to pre-9/11 levels</u> HR: 0.95 [0.76-1.18][1] HR: 1.01 [0.81-1.27][2] HR: 2.95 [2.46-3.55][3] HR: 2.06 [1.71-2.47][4] **Concurrent exercise** <u>No change since last questionnaire</u> <u>Decreased since last questionnaire</u> HR: 0.74 [0.62-0.88][1] HR: 0.76 [0.63-0.92][2] HR: 2.65 [2.27-3.09][3]

						HR: 1.69 [1.44-1.97][4] Decreased since last questionnaire for health reasons HR: 0.38 [0.28-0.52][1] HR: 0.56 [0.41-0.78][2] HR: 4.20 [3.53-4.99][3] HR: 3.19 [2.64-3.86][4] Increased since last questionnaire HR: 0.95 [0.77-1.18][1] HR: 0.92 [0.74-1.14][2] HR: 1.13 [0.91-1.41][3] HR: 0.92 [0.74-1.14][4] **Concurrent smoking status** Never Current HR: 1.03 [0.81-1.32][1] HR: 1.04 [0.81-1.33][2] HR: 1.13 [0.90-1.42][3] HR: 1.07 [0.85-1.35][4] Former HR: 0.91 [0.76-1.08][1] HR: 0.95 [0.79-1.15][2] HR: 1.24 [1.07-1.43][3] HR: 1.23 [1.06-1.42][4] **Experience with prior disaster** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.82 [0.69-0.96][1]

						HR: 0.86 [0.73-1.02][2] HR: 1.29 [1.13-1.48][3] HR: 1.11 [0.96-1.27][4] **Non-white race/ethnicity** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.98 [0.70-1.36][1] HR: 1.05 [0.75-1.46][2] HR: 1.20 [0.94-1.54][3] HR: 1.37 [1.07-1.75][4] **Age on 9/11** HR: 1.02 [1.01-1.04][2] HR: 1.00 [0.99-1.01][4]
41. Stevelink, 2018 [59]	Name: HERRICK cohort Design: Retrospective longitudinal Follow-up period: -	n=8,093 Country= UK %Female= 13% and 8% for those who were deployed and not Age= 40.0 (13.0) and 40.2 (9.4) for those who were not and were deployed, respectively. Type of job/company= Military personnel that were and were not deployed in Iraq.	Exposure assessment: Deployment administration Year of assessment: 2014-2016 Exposure categories: Deployment and service status.	Type of symptoms: Probable PTSD Way of assessment: Self-reported with the PCL-C checklist. Incidence: 5.2% and 6.9% for those who were not deployed and deployed, respectively.	Unadjusted (model 1) and adjusted for age, gender, marital status, education, service and rank (model 2).	**Deployment** *Regulars* Not deployed OR: Ref[1] OR: Ref[2] Deployed OR: 1.34 [1.00 1.78][1] OR: 1.41 [1.04 1.90][2] *Reservists* Not deployed OR: Ref[1] OR: Ref[2] Deployed OR: 2.25 [1.14 4.46][1] OR: 2.48 [1.20 5.16][2] **Serving status**

		Inclusion/exclusion= -				Not serving OR: Ref[1] OR: Ref[2] Serving OR: 1.60 [1.25 2.06][1] OR: 1.73 [1.25 2.40][2] **Role during last deployment** *Serving regulars* No combat OR: Ref[1] OR: Ref[2] Combat OR: 1.70 [1.08 2.67][1] OR: 1.58 [0.98 2.55][2] *Ex-serving regulars* No combat OR: Ref[1] OR: Ref[2] Combat OR: 3.39 [2.25 5.11][1] OR: 2.53 [1.60 3.99][2]
42. Wittchen, 2012 [60]	Name: PIT-PTSD+ study Design: Retrospective longitudinal Follow-up period: On average 12 months post-deployment.	n= 1,483 Country= Germany %Female= - Age= - Type of job/company= Soldiers deployed in Afghanistan, and those who have not been deployed.	Exposure assessment: Deployment administration Year of assessment: 2010 Exposure categories: Deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed with a structured interview using DSM-4 criteria. Incidence: 12 month incidence: 2.1% and 0.2% in the deployed and non-deployed group ,respectively.	Unadjusted	**Population** Control group OR: Ref. (12 month diagnosis) OR: Ref. (12 month incidence) OR: Ref. (lifetime prevalence) Deployed soldiers OR: 2.5 [1.1 5.6] (12 month diagnosis) OR: 4.2 [0.7 24.5] (12 month incidence) OR: 1.7 [0.96 3.1] (lifetime prevalence) **Deployed soldiers**

		Inclusion/exclusion= -				Control soldiers OR: Ref. (12 month diagnosis) OR: Ref. (12 month incidence) OR: Ref. (lifetime prevalence) Kunduz OR: 2.1 [0.8 5.8] (12 month diagnosis) OR: 6.6 [1.03 41.9] (12 month incidence) OR: 1.7 [0.8 3.6] (lifetime prevalence) Combat units OR: 3.3 [0.5 23.7] (12 month diagnosis) OR: - (12 month incidence) OR: 2.6 [0.7 9.4] (lifetime prevalence)
OR = Odds ratio RR = Relative risk HR = Hazard ratio						

Supplementary file 4. Risk of bias of included articles. The risk of bias (i.e. low, moderate and high risk of bias) in six domains (i.e. study participation, study attrition, prognostic factor (i.e. exposure), outcome, study confounding and statistical analysis) is depicted, while also sum scores are shown.

	First author, year of publication	Participation	Attrition	Prognostic factor	Outcome	Confounding	Analysis/reporting
1	Armed Forces Health Surveillance Center, 2011	Moderate	Moderate	Moderate	Low	High	High
2	Andersen, 2019	Moderate	Moderate	Moderate	Moderate	Low	Low
3	Anderson, 2019	Low	Moderate	Moderate	Moderate	Low	Low
4	Berninger, 2010	High	High	Low	Moderate	Low	Low
5	Brownlow, 2018	Moderate	Moderate	Moderate	Moderate	High	Low
6	Brundage, 2015	Low	Low	Low	Low	High	High
7	Cameron, 2019	Low	Low	Low	Low	Low	Low
8	Chiu, 2011	Low	Moderate	Moderate	Moderate	Low	Low
9	Ciarleglio, 2018	Low	Moderate	Moderate	Low	Low	Low
10	Cone, 2015	High	High	Moderate	Moderate	Low	Low
11	Connorton, 2011	Moderate	Moderate	High	High	Moderate	Low
12	Cukor, 2011	Low	Moderate	Moderate	Moderate	Low	Low
13	Fear, 2010	High	High	Low	Moderate	Low	Low
14	Ferrajao, 2016	High	High	Moderate	Moderate	High	Low
15	Fichera, 2015	High	High	Moderate	Moderate	Low	Low
16	Fink, 2016	High	High	Moderate	Moderate	High	Low
17	Goodwin, 2012	Low	Low	Moderate	Moderate	Low	Low
18	Green, 2016	Moderate	Moderate	Moderate	Low	High	Low
19	Hansen, 2017	High	Moderate	Moderate	Moderate	Low	Low
20	Harvey, 2012	High	Moderate	Low	Moderate	Low	Low
21	Horesh, 2011	Moderate	Moderate	Moderate	Moderate	High	Moderate
22	Hourani, 2012	Moderate	High	Moderate	Moderate	High	High
23	Ikeda, 2017	Moderate	Moderate	Moderate	Moderate	Low	Low
24	Joseph, 2014	Moderate	Moderate	Moderate	Moderate	Low	Low
25	Karstoft, 2013	Moderate	Low	Moderate	Moderate	High	Low
26	Karstoft, 2015	Moderate	Low	Moderate	Moderate	High	Low
27	Kim, 2014	Low	Low	Moderate	Low	Low	Low
28	Levin-Rector, 2018	Low	Low	Low	Low	Moderate	Low
29	MacGregor, 2015	Moderate	Moderate	Low	Low	Low	Low
30	MacGregor, 2012	Low	Low	Low	Low	Low	Low
31	Maguen, 2012	Moderate	Moderate	Moderate	Moderate	Low	Low
32	Maguen, 2010	Moderate	Moderate	Low	Low	High	Low
33	Martindale, 2018	High	Moderate	Moderate	Low	High	High
34	Nagamine, 2018	Moderate	Moderate	Moderate	Moderate	High	Low
35	Osorio, 2018	High	High	Moderate	Moderate	Low	Low
36	Pihl-Thingvad, 2019	Low	Low	Moderate	Moderate	Low	Low
37	Polusny, 2011	Moderate	Moderate	Moderate	Moderate	Low	Low
38	Reijnen, 2015	High	High	Moderate	Moderate	High	Low
39	Shea, 2013	Moderate	Moderate	Moderate	Low	Low	Low
40	Soo, 2011	Moderate	Moderate	Moderate	Moderate	Low	Low
41	Stevelink, 2018	High	High	Moderate	Moderate	Low	Low
42	Wittchen, 2012	Moderate	Moderate	Moderate	Low	High	Low

Supplementary file 5. Risk of bias of included studies.

First author, Year;	Item	Risk of bias	Reason
1. Armed Forces Health Surveillance Center, 2011 [21]	Participation	Moderate	All armed forces were eligible, but no non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Although prognostic factors were self-reported, no substantial bias can be expected from self-reports of the current prognostic factors
	Outcome	Low	Outcomes were diagnosed in a hospital
	Confounding	High	No confounding analysis has been conducted
	Analysis/reporting	High	No proper analysis has been conducted, only descriptives were presented.
2. Andersen, 2019 [19]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
3. Anderson, 2019 [20]	Participation	Low	86% of eligible participants, participated at baseline
	Attrition	Moderate	60% of the participants were filled out their follow-up questionnaires
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
4. Berninger, 2010 [22]	Participation	High	There were differences (e.g. in PTSD status) between participants and non-participants
	Attrition	High	Participants without follow-up data were excluded. The above therefore also holds for those lost at follow-up
	Prognostic factor	Low	Prognostic factors were self-reported and from registers
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
5. Brownlow, 2018 [23]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	Only univariate analyses were reported

	Analysis/reporting	Low	Adequate analyses were used
6. Brundage, 2015 [24]	Participation	Low	It appears as if all eligible participants were analysed.
	Attrition	Low	It appears as if all eligible participants were analysed.
	Prognostic factor	Low	Deployment records were used
	Outcome	Low	Outcomes were diagnosed (it appears).
	Confounding	High	No confounding adjustment were done
	Analysis/reporting	High	Only descriptive statistics were provided
7. Cameron, 2019 [25]	Participation	Low	It appears as if all eligible participants were analysed.
	Attrition	Low	It appears as if all eligible participants were analysed.
	Prognostic factor	Low	Deployment records were used
	Outcome	Low	Outcomes were diagnosed
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
8. Chiu, 2011 [26]	Participation	Low	There were some differences between responders and non-responders.
	Attrition	Moderate	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Both self-reports and employer data were used
	Outcome	Moderate	Outcomes were self-reported using a validated questionnaire
	Confounding	Low	Confounding adjustment was performed.
	Analysis/reporting	Low	Adequate analyses were used
9. Ciarleglio, 2018 [27]	Participation	Low	11% non-response
	Attrition	Moderate	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Both self-reports and employer data were used
	Outcome	Low	Outcome was diagnosed
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
10. Cone, 2015 [28]	Participation	High	There are substantial differences between responders and non-responders.
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
11. Connorton, 2011 [29]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	High	Prognostic factors were self-reported and it is unclear how
	Outcome	High	Outcomes were self-reported and it is unclear how

	Confounding	Moderate	Multivariate analyses are not reported and it is unclear what was done
	Analysis/reporting	Low	Adequate analyses were done.
12. Cukor, 2011 [30]	Participation	Low	There was 86% participation
	Attrition	Moderate	There was 67% participation at follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Moderate	Outcomes were self-reported and obtained from interviews, with interview data used for exposure-outcome associations.
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
13. Fear, 2010 [31]	Participation	High	There are substantial differences between responders and non-responders.
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Low	Deployment administrative data were used
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
14. Ferrajao, 2016 [32]	Participation	High	Unclear but probably low participation rate
	Attrition	High	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	No adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
15. Fichera, 2015 [33]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
16. Fink, 2016 [34]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	No adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
17. Goodwin, 2012 [35]	Participation	Low	There were no substantial differences between responders and non-responders.
	Attrition	Low	There were no substantial differences between responders and non-responders (including

			those lost to follow-up).
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
18. Green, 2016 [36]	Participation	Moderate	There was a substantial non-response (20%)
	Attrition	Moderate	There was a substantial loss to follow-up (39%)
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Low	Outcome was diagnosed in an interview
	Confounding	High	No confounding adjustment was conducted
	Analysis/reporting	Low	Appropriate analyses were used.
19. Hansen, 2017 [37]	Participation	High	There was a substantial amount of non-responders and no non-responder analysis.
	Attrition	Moderate	There was a substantial amount of participants lost to follow-up and no loss to follow-up analysis.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
20. Harvey, 2012 [38]	Participation	High	There were substantial differences (e.g. in age and gender) between responders and non-responders.
	Attrition	Moderate	No loss to follow-up analysis were reported
	Prognostic factor	Low	Prospective factors were determined based on deployment characteristics
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
21. Horesh, 2011 [39]	Participation	Moderate	No non-responder analysis was performed
	Attrition	Moderate	No loss to follow-up analysis was performed
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No confounding analyses were conducted
	Analysis/reporting	Moderate	The description of the analysis is unclear
22. Hourani, 2012 [40]	Participation	Moderate	No non-responder analysis was performed
	Attrition	High	There was substantial loss to follow-up in this study
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported

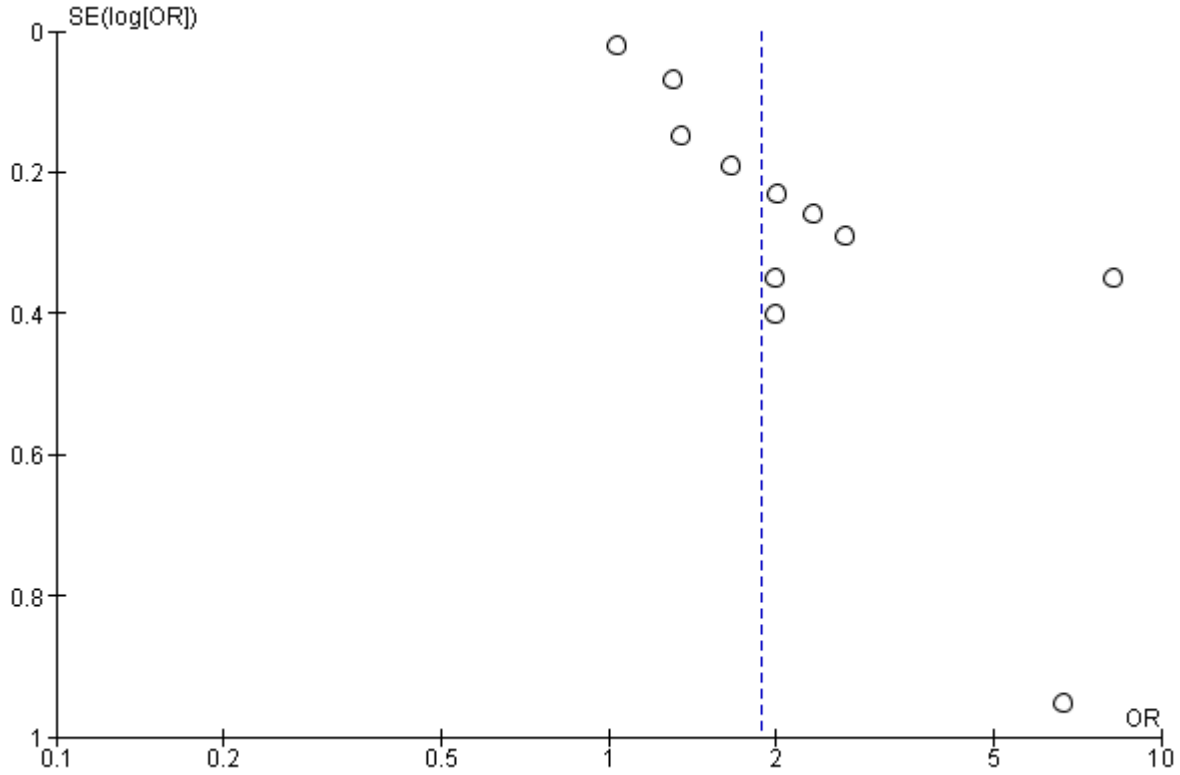
	Confounding	High	No confounding analyses were conducted (at least, not for the exposure-outcome associations)
	Analysis/reporting	High	Only descriptive statistics were reported (at least, for the exposure-outcome associations)
23. Ikeda, 2017 [41]	Participation	Moderate	About 15% non-response.
	Attrition	Moderate	There was substantial loss to follow-up with differences between those who were and were not lost.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
24. Joseph, 2014 [42]	Participation	Moderate	There was a substantial non-response
	Attrition	Moderate	There was a substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
25. Karstoft, 2013 [43]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Low	Loss to follow-up analyses indicated no substantial differences between those who remained in the cohort or not.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding were performed
	Analysis/reporting	Low	Adequate statistical analyses were conducted
26. Karstoft, 2015 [44]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Low	Loss to follow-up analyses indicated no substantial differences between those who remained in the cohort or not.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding were performed
	Analysis/reporting	Low	Adequate statistical analyses were conducted
27. Kim, 2014 [45]	Participation	Low	Very high >99% participation rate
	Attrition	Low	Very high >99% participation rate in follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcome was diagnosed during an interview
	Confounding	Low	Adjustment for confounding was performed

	Analysis/reporting	Low	Adequate analyses were conducted
28. Levin-Rector, 2018 [46]	Participation	Low	Responders comprised >90% of the eligible population
	Attrition	Low	Participants during follow-up comprised >90% of the cohort
	Prognostic factor	Low	Prognostic factors were obtained from database information
	Outcome	Low	Outcomes were obtained from diagnosed register information
	Confounding	Moderate	Only adjustment for clustering within units was done
	Analysis/reporting	Low	Adequate statistical analyses were conducted
29. MacGregor, 2015 [47]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Low	Prognostic factors were obtained from register data
	Outcome	Low	Outcomes were obtained from register data and were diagnosed.
	Confounding	Low	Adjustment for confounding has been conducted
	Analysis/reporting	Low	Adequate statistical analyses were used.
30. MacGregor, 2012 [48]	Participation	Low	All eligible participants were analysed.
	Attrition	Low	All eligible participants were analysed.
	Prognostic factor	Low	Register data were used
	Outcome	Low	Diagnosed register data were used
	Confounding	Low	Adjustment for confounding has been conducted
	Analysis/reporting	Low	Adequate statistical analyses were used.
31. Maguen, 2012 [49]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
32. Maguen, 2010 [50]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Low	Prognostic factors were obtained from company data.
	Outcome	Low	Outcome was diagnosed
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
33. Martindale, 2018 [51]	Participation	High	No non-responder analyses were presented, with substantial non-response.
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were obtained from an interview
	Outcome	Low	Outcome was diagnosed during an interview

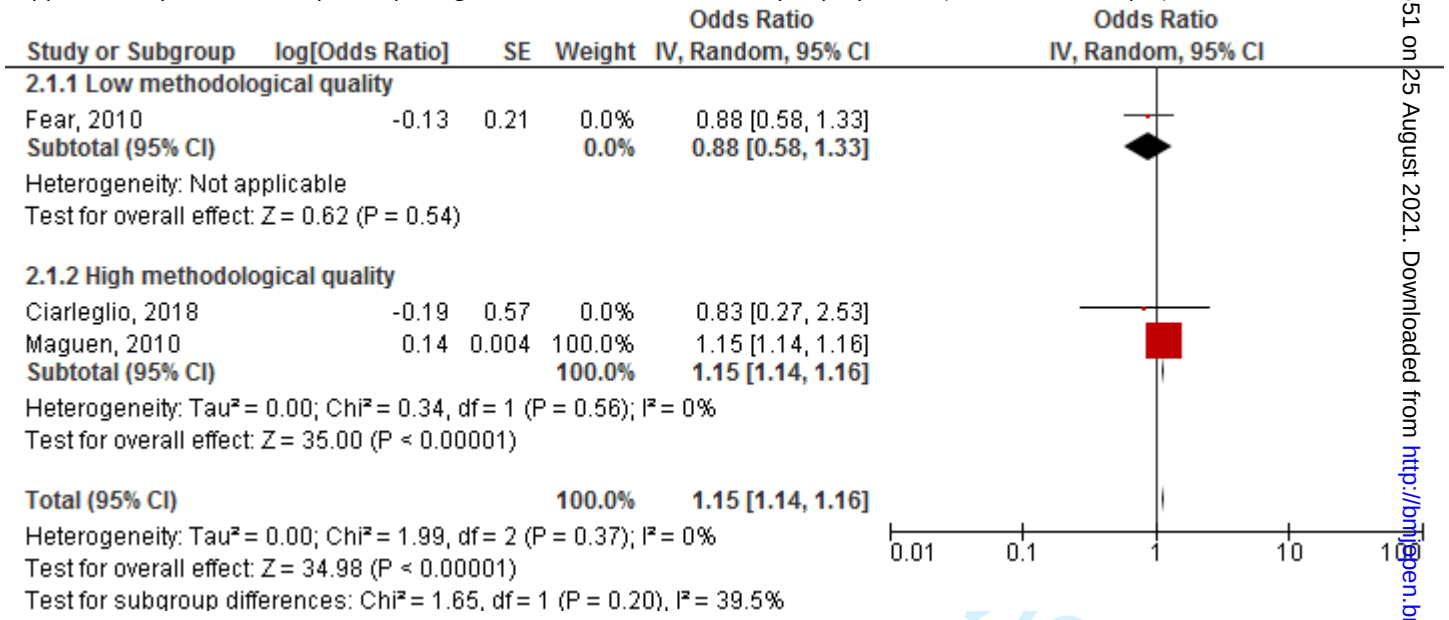
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	High	No statistical analysis was done on the exposure-outcome association (only other analysis).
34. Nagamine, 2018 [52]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
35. Osorio, 2018 [53]	Participation	High	A substantial amount of eligible participants did not participate. No non responder analysis was conducted.
	Attrition	High	A substantial amount of participants were lost in the follow-up. No loss to follow-up analysis was conducted.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
36. Pihl-Thingvad, 2019 [54]	Participation	Low	Responders and non-responders did not differ substantially from one another (only in age)
	Attrition	Low	Variables that predicted loss to follow-up (e.g. baseline PTSD) were adjusted for
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
37. Polusny, 2011 [55]	Participation	Moderate	There were slight differences between responders and non-responders
	Attrition	Moderate	There were slight differences between those with and without follow-up data
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
38. Reijnen, 2015 [56]	Participation	High	There were substantial differences (e.g. in mental health) between responders and non-responders.
	Attrition	High	Participants without follow-up data were excluded. The above therefore also holds for those lost at follow-up
	Prognostic factor	Moderate	Prospective factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No confounding adjustment was conducted

	Analysis/reporting	Low	Appropriate analyses were used.
39. Shea, 2013 [57]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcome was diagnosed during a structured interview.
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
40. Soo, 2011 [58]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
41. Stevelink, 2018 [59]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
42. Wittchen, 2012 [60]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcomes was diagnosed during a structured interview
	Confounding	High	No adjustment for confounding was performed
	Analysis/reporting	Low	Adequate analyses were conducted

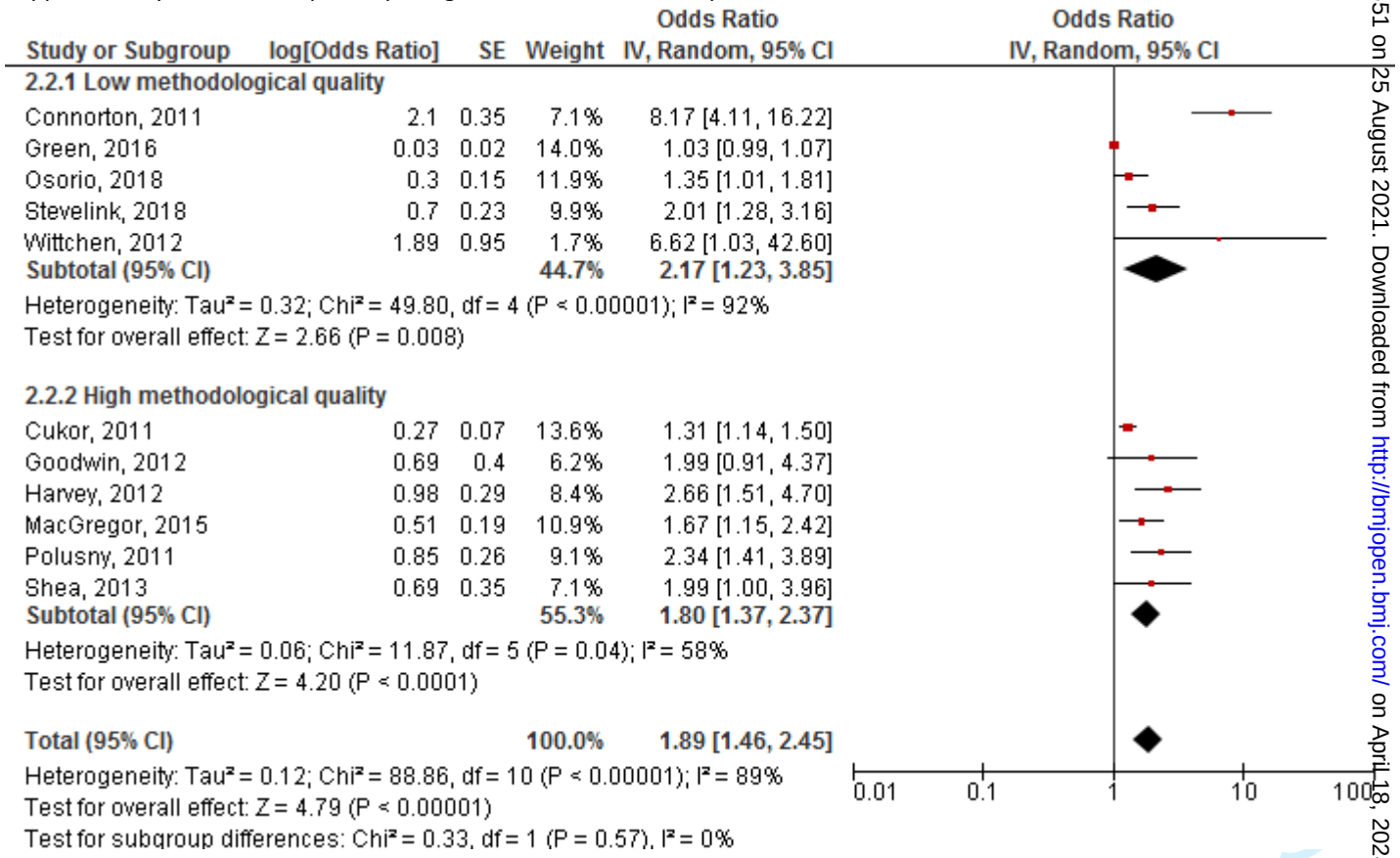
Supplementary file 6. Funnel plot, depicting the effect of combat exposure on PTSD.



Supplementary file 7. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for risk of bias.

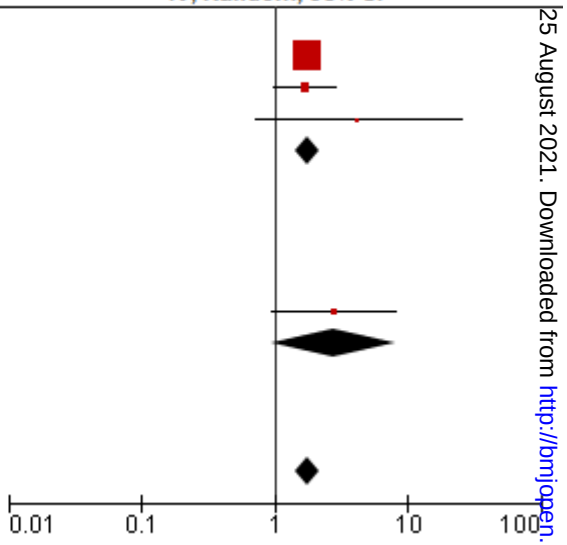


Supplementary file 8. Forest plot depicting the effect of combat exposure with PTSD, stratified for risk of bias.

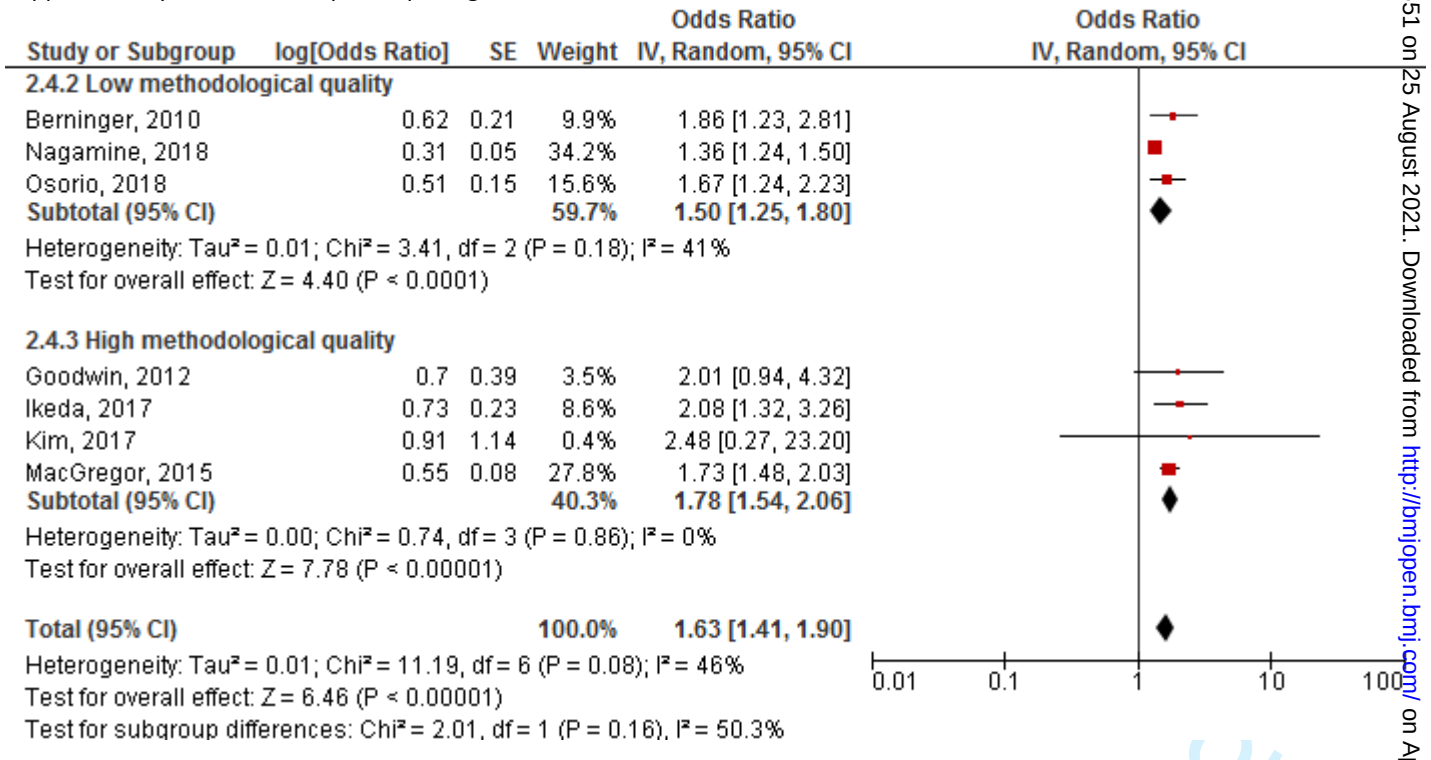


Supplementary file 9. Forest plot depicting the effect of army deployment with PTSD, stratified for risk of bias.

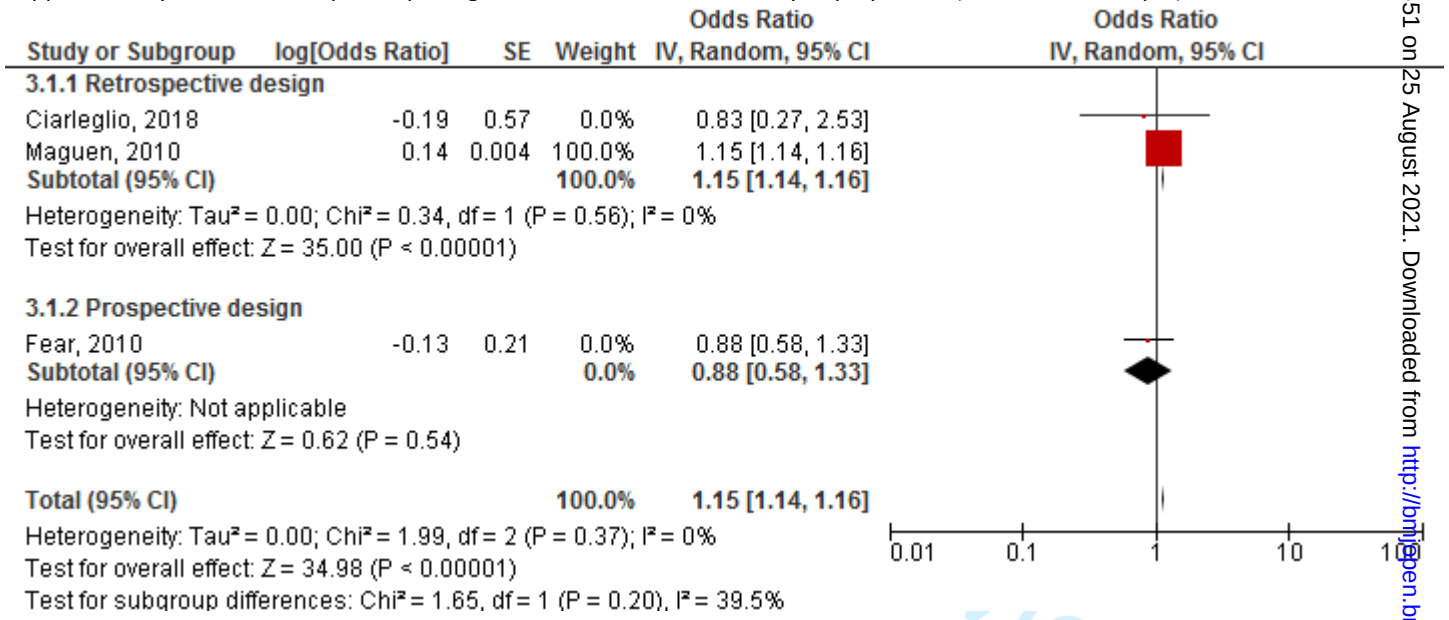
Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Random, 95% CI
2.3.1 Low methodological quality				
Reijnen, 2015	0.56	0.12	79.2%	1.75 [1.38, 2.21]
Stevelink, 2018	0.52	0.27	15.6%	1.68 [0.99, 2.86]
Wittchen, 2012	1.44	0.91	1.4%	4.22 [0.71, 25.12]
Subtotal (95% CI)			**96.2%**	**1.76 [1.42, 2.18]**
Heterogeneity: Tau² = 0.00; Chi² = 0.95, df = 2 (P = 0.62); I² = 0%				
Test for overall effect: Z = 5.20 (P < 0.00001)				
2.3.2 High methodological quality				
Joseph, 2014	1.03	0.55	3.8%	2.80 [0.95, 8.23]
Subtotal (95% CI)			**3.8%**	**2.80 [0.95, 8.23]**
Heterogeneity: Not applicable				
Test for overall effect: Z = 1.87 (P = 0.06)				
Total (95% CI)			**100.0%**	**1.79 [1.45, 2.21]**
Heterogeneity: Tau² = 0.00; Chi² = 1.64, df = 3 (P = 0.65); I² = 0%				
Test for overall effect: Z = 5.46 (P < 0.00001)				
Test for subgroup differences: Chi² = 0.68, df = 1 (P = 0.41), I² = 0%				



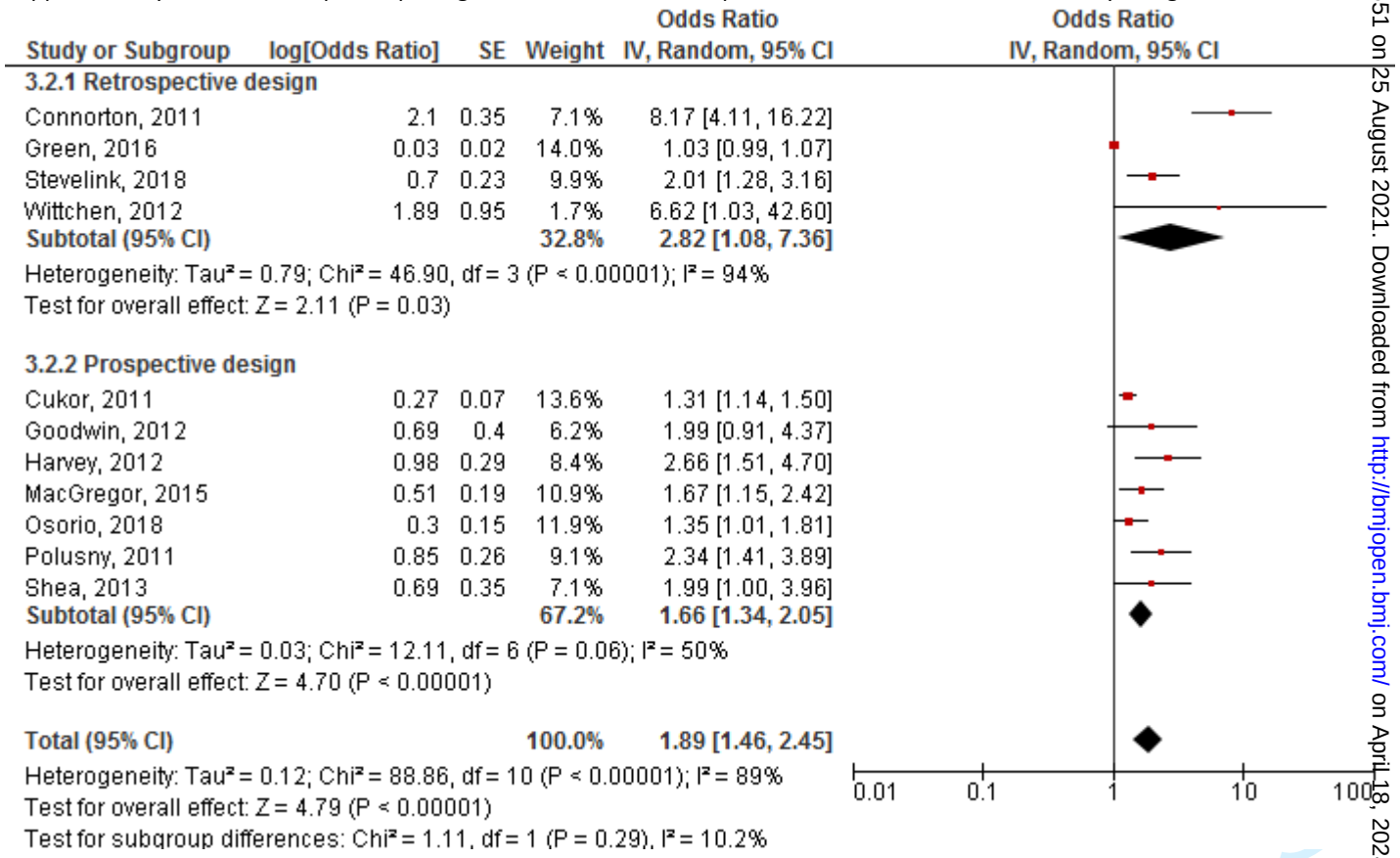
Supplementary file 10. Forest plot depicting the effect of confrontation with death with PTSD, stratified for risk of bias.



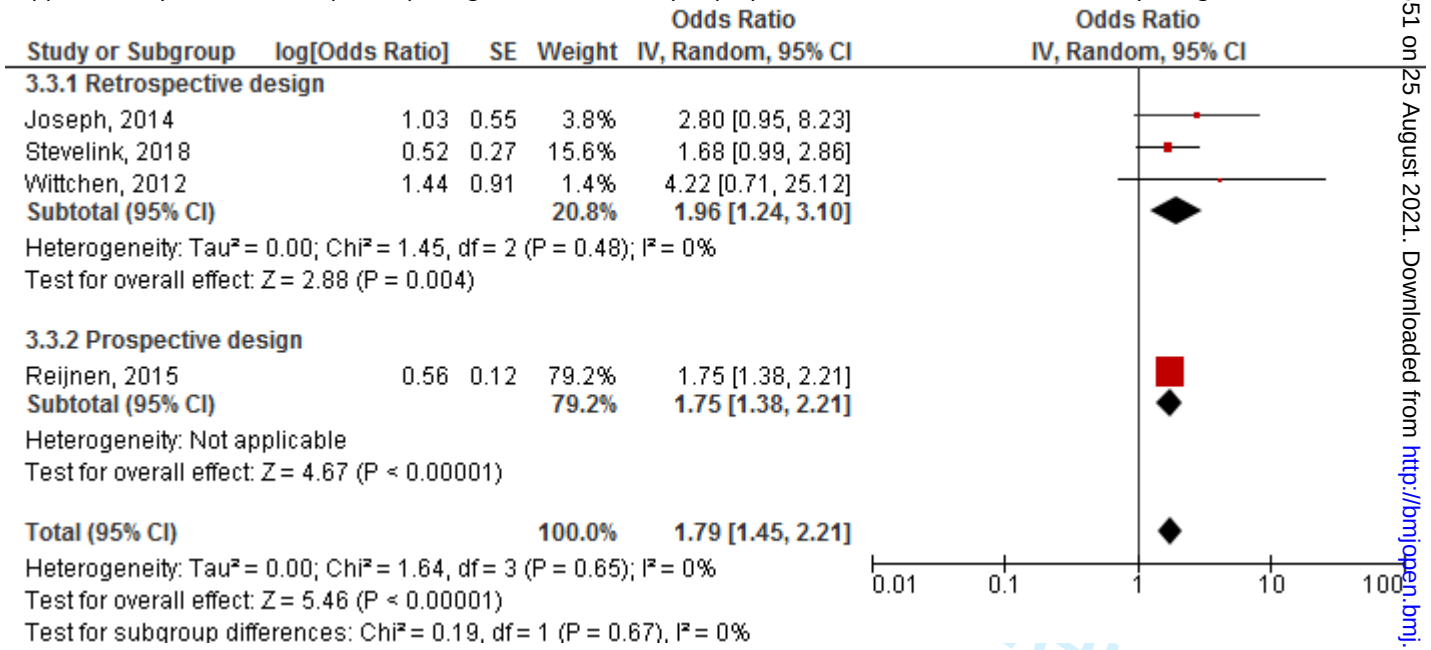
Supplementary file 11. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for study design.



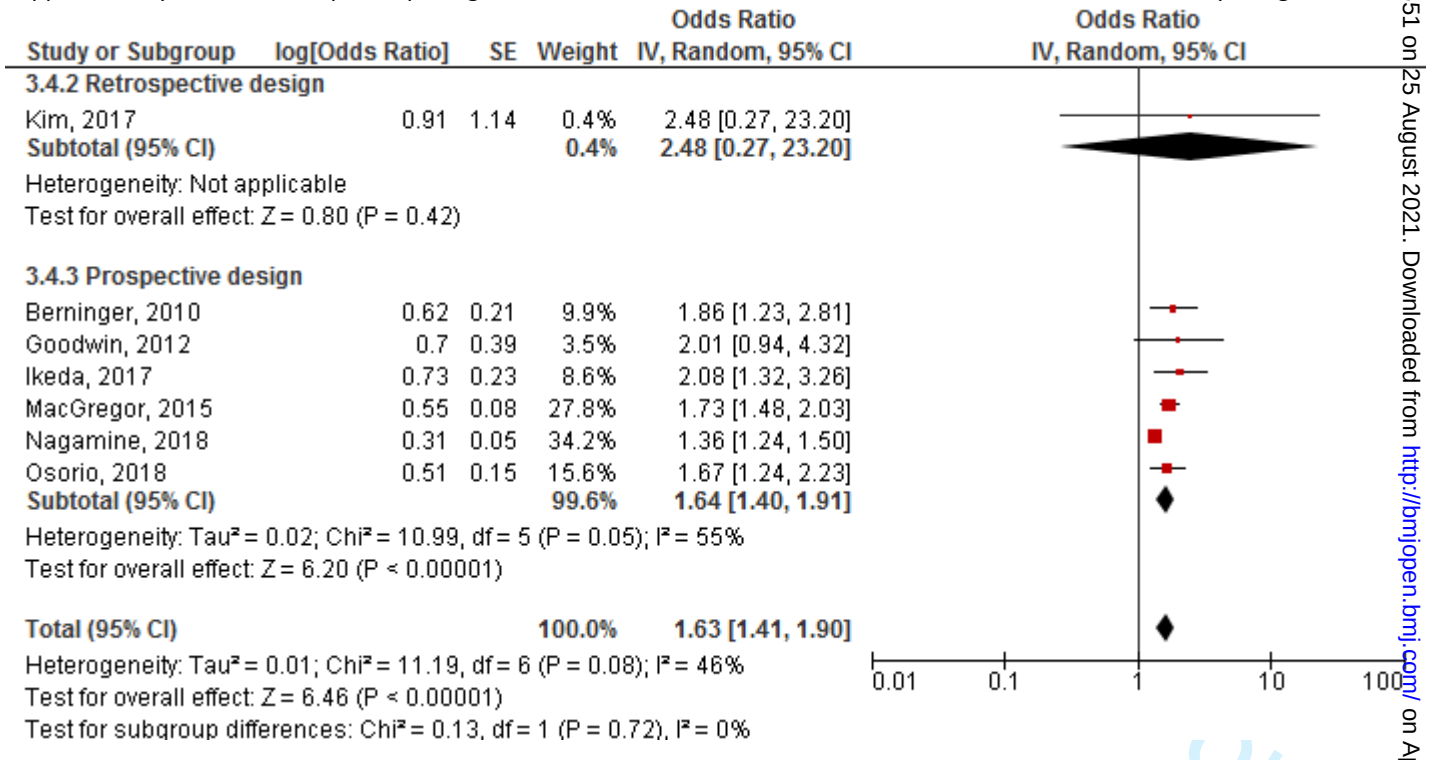
Supplementary file 12. Forest plot depicting the effect of combat exposure with PTSD, stratified for study design.



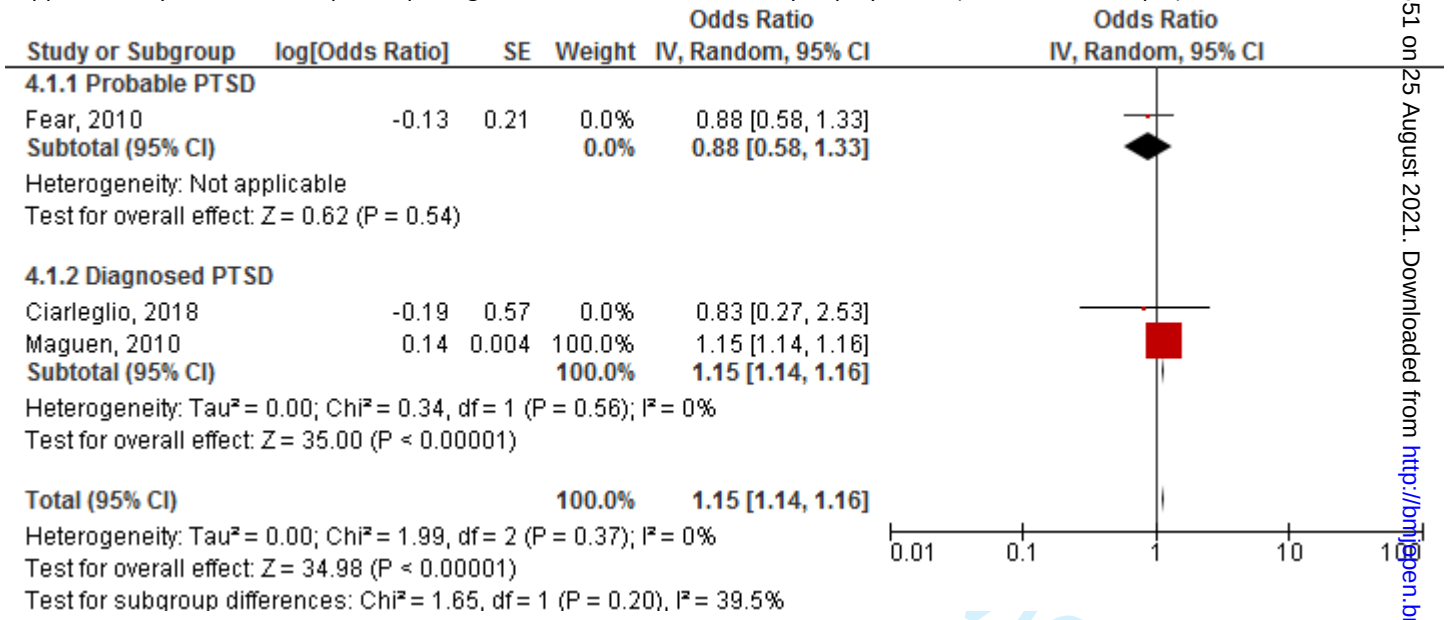
Supplementary file 13. Forest plot depicting the effect of army deployment with PTSD, stratified for study design.



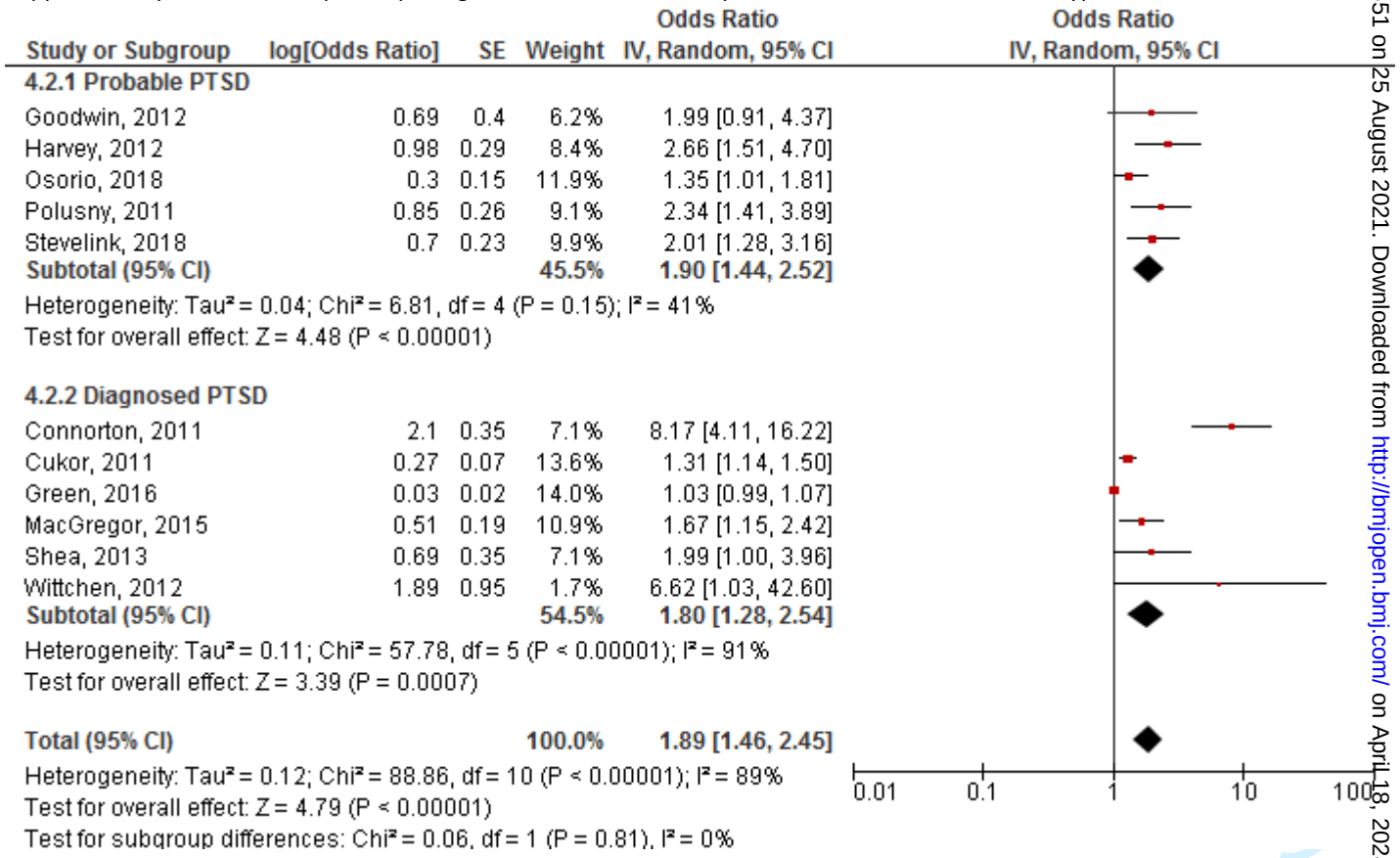
Supplementary file 14. Forest plot depicting the effect of confrontation with death with PTSD, stratified for study design.



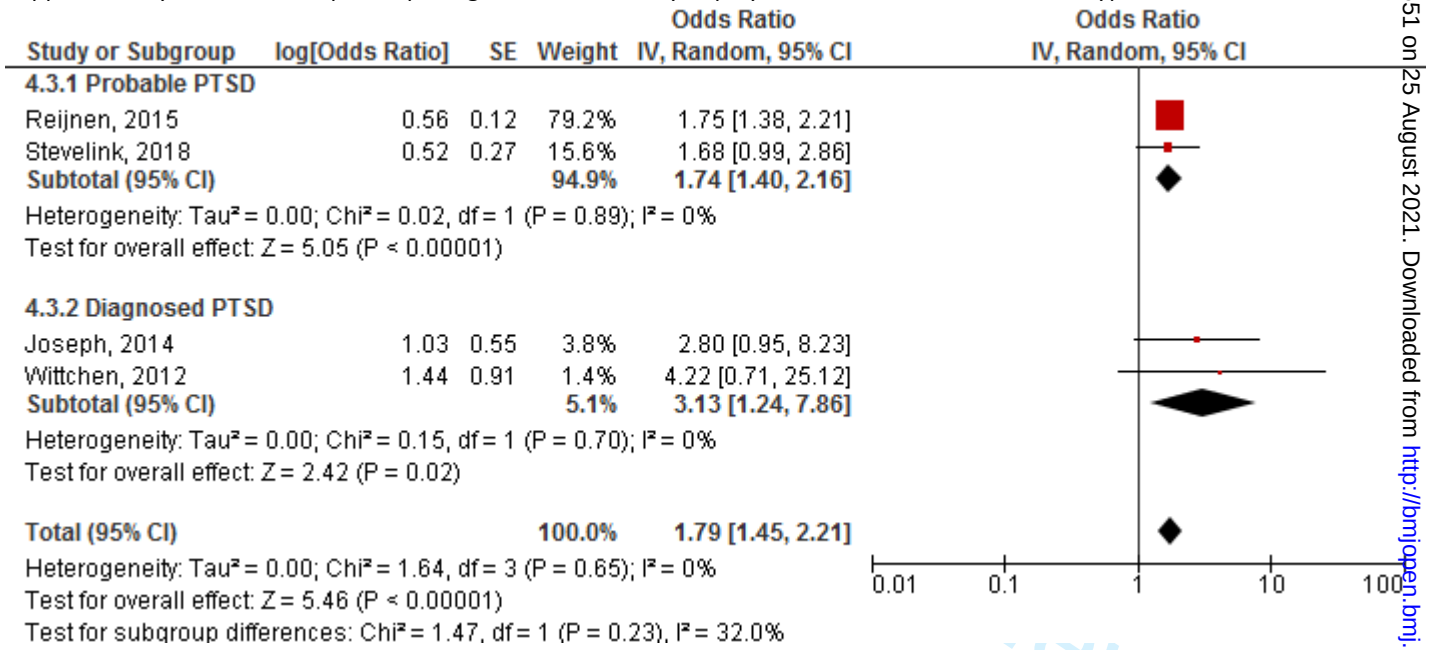
Supplementary file 15. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for type of PTSD ascertainment.



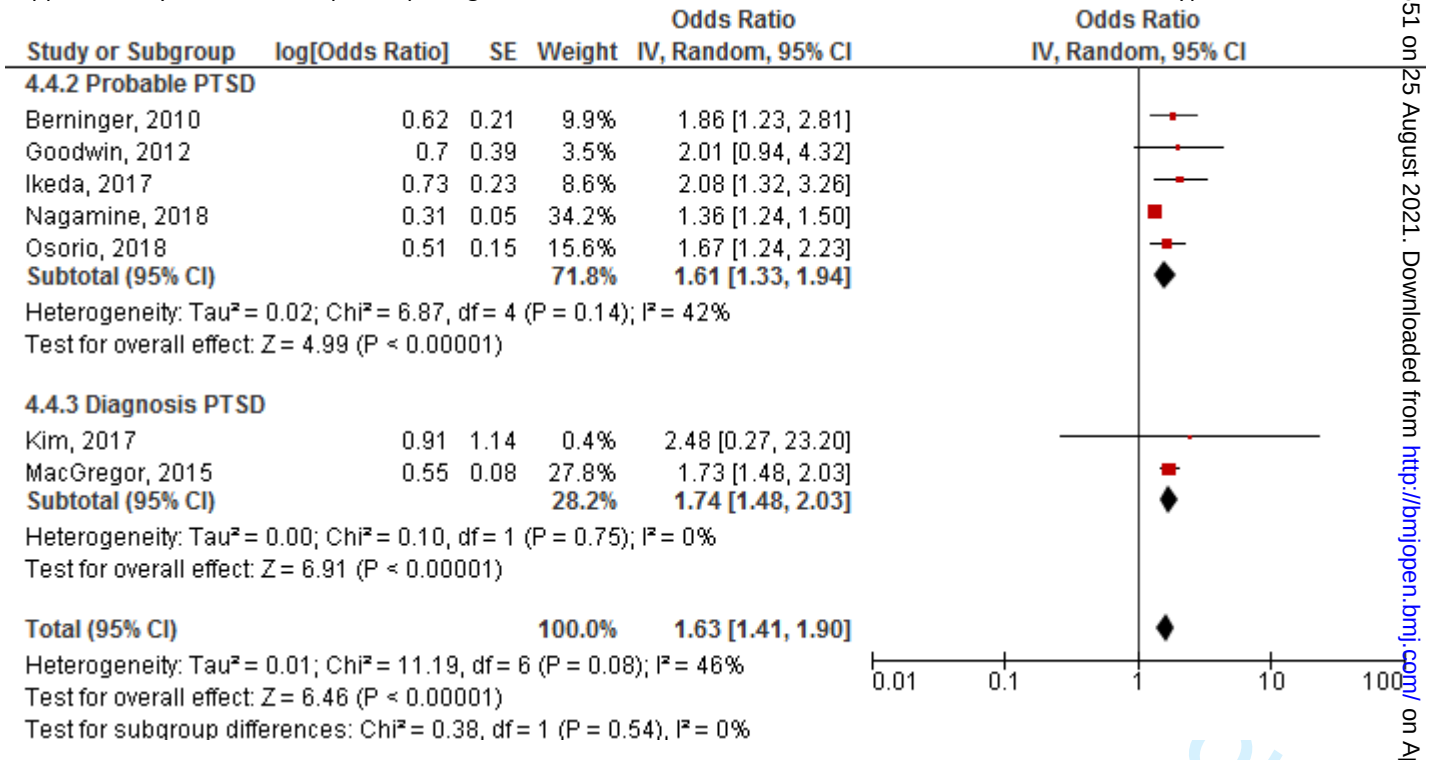
Supplementary file 16. Forest plot depicting the effect of combat exposure with PTSD, stratified for type of PTSD ascertainment.



Supplementary file 17. Forest plot depicting the effect of army deployment with PTSD, stratified for type of PTSD ascertainment.



Supplementary file 18. Forest plot depicting the effect of confrontation with death with PTSD, stratified for type of PTSD ascertainment.



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	4
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	5-6
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	7
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	7
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	7-9
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	7-9
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	7-9
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	7-9
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	10-11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	13

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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What work-related exposures are associated with post-traumatic stress disorder? A systematic review with meta-analysis

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Keywords:	MENTAL HEALTH, EPIDEMIOLOGY, OCCUPATIONAL & INDUSTRIAL MEDICINE

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What work-related exposures are associated with post-traumatic stress disorder? A systematic review with meta-analysis

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Number of References (60 max): 64

Abstract

Objectives: Although there is evidence that work-related exposures cause post-traumatic stress disorder (PTSD), there are few quantitative studies assessing the degree to which these factors contribute to PTSD. This systematic review with meta-analysis identified work-related exposures associated with PTSD, and quantified their contribution to this disorder.

Methods: We searched Medline, PsycINFO, Embase, PILOTS and Web of Science (2005 to 10-09-2019) for longitudinal studies on work-related exposures and PTSD. We described included articles, and conducted meta-analyses for exposures with sufficient homogeneous information. We performed subgroup analyses for risk of bias, study design and PTSD ascertainment. We assessed evidence quality using GRADE, and estimated population attributable fractions.

Results: After screening 8,590 records, we selected 33 studies (n=5,719,236). From what was moderate quality evidence at best, we identified various work-related exposures that were associated with PTSD, mainly involving individuals in the military and first responder (e.g., police or fire brigade) occupations. These exposures included the number of army deployments (odds ratio: 1.15 [1.14 1.16]), combat exposure (1.89 [1.46 2.45]), army deployment (1.79 [1.45 2.21]) and confrontation with death (1.63 [1.41 1.90]). Effects were robust across subgroups and exposures attributed modestly (7%-34%) to PTSD. We identified additional exposures in other occupations, including life threats, being present during an attack, and hearing about a colleague's trauma.

Conclusions: We identified various work-related exposures associated with PTSD and quantified their contribution. While exposure assessment, PTSD ascertainment, and inconsistency may have biased our findings, our data are of importance for development of preventive interventions and occupational health guidelines.

Key words: Post traumatic stress disorder; occupational health; occupational diseases; systematic review; meta-analysis

Strengths and limitation of this study

- Post-traumatic stress disorder (PTSD) is particularly prevalent among certain occupational groups, e.g., first responder (such as police or fire brigade) and military personnel.
- However, the association of work-related exposures with PTSD has not previously been quantified in a meta-analysis.
- We identified 33 studies (with n=5,719,236 participants) in which various work-related exposures were found to be associated with PTSD, based on moderate quality evidence at best.
- These findings can be used to support the development of preventive interventions, and as an aid to the assessment of occupational PTSD in occupational medicine guidelines.

Background

Post-traumatic stress disorder (PTSD) can be triggered when individuals experience or witness traumatic events. PTSD has been a clinical diagnosis since 1980, when the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) was published[1]. The most recent DSM-5[2] states that PTSD results from exposure to severely traumatic event(s), while exhibiting a pattern of symptoms characterised by intrusion, avoidance, negative moods and cognitions, arousal, and reactivity. A diagnosis of PTSD also involves duration and functional impairment criteria, and the patient's symptoms should be exclusive (i.e., not caused by drugs or other illnesses). Estimates of PTSD prevalence among the general population differ widely. For example, lifetime PTSD prevalence ranged from 6% to 9% in United States (US) and Canadian samples, while prevalence rates in Australian samples range from 1% to 2%[3]. The substantial differences between individual studies could result from different ways in which PTSD was ascertained, varying from any type of clinical diagnosis, to self-reports of DSM-5 criteria and PTSD symptoms assessed as *probable PTSD*.

PTSD can have a major impact on individuals and society as a whole, as it is associated with mental comorbidities[4], substance abuse[5] and suicide[6]. PTSD is particularly prevalent among certain occupational groups, such as police officers, firefighters, medical workers and military personnel, all of whom can experience events that might trigger PTSD[7 8]. One particular systematic review showed that the prevalence of PTSD in military veterans and other high-risk occupational groups can be almost twice as high as among the general population[8]. Another more recent review identified a number of occupational groups, including healthcare workers, police officers, prison workers, and emergency personnel, with an increased risk of PTSD[9]. Also, various specific work-related exposures (i.e., exposures to situations or conditions at work that may have an effect on PTSD) and their association with PTSD have been reported[7]. This included traumatic events experienced by military personnel and first responders (e.g., police officers or fire fighters). The latter review also identified journalists, healthcare workers or individuals in other occupations who are exposed to traumatic events or the aftermath thereof[7].

Despite this evidence, the association of work-related exposures with PTSD has not yet been quantified in a meta-analysis. Such knowledge is of importance to answer questions regarding work-related causation and prevention, as a prelude to developing interventions. With regard to prevention, we need to quantify the contribution of work-related exposures in the onset of PTSD[10]. Such data could be used to formulate clinically relevant exposure threshold limits, as has been done with other disorders[11 12]. It could also be of use in occupational health guidelines, as many countries provide financial compensation for individuals diagnosed with an occupational disease.

In this study, our aim was to 1) identify the work-related exposures associated with the onset of PTSD, and 2) quantify the extent to which such exposures contribute to this disorder. Evidence on the contribution of work-related factors to PTSD could be used to facilitate decisions in reporting schemes. It could also help to identify and prioritise preventive interventions against those exposures with the strongest effect, in terms of triggering PTSD.

Methods

The protocol for this systematic review with meta-analysis was registered in PROSPERO[13] a-priori. The review itself was conducted in accordance with the PRISMA statement guidelines[14].

Searches

The Medline, PsycINFO, Embase, PILOTS and Web of Science databases were systematically searched for material published from 2005 (January) to 2019 (September 10). This was an arbitrarily chosen period on the basis of changes in people's exposure to work-related traumatic events and changes in the definition of PTSD over time[2]. The search strategy consisted of a combination of controlled search terms (e.g., Medical Subject Headings/MeSH) and free-text words used to specify search terms related to: 1) PTSD 2) exposure, and 3) work. A methodological filter was used to select longitudinal studies (prospective, retrospective or case-control), studies published in English, and those involving human participants only. The search strategy used is described in detail in supplementary file 1. We validated this search with various key references, to avoid term bias. In addition to the database search, we conducted snowball searches for additional studies. These were based on citation tracking (forwards and backwards) from the articles and reviews retrieved in our electronic search. We also conducted scoping searches for key researchers on this topic, and used ResearchGate profiles to identify relevant records and projects (including unpublished projects). Outcome articles were compared to potential protocol papers, to assess selective reporting.

Inclusion and exclusion criteria

Two reviewers, working independently of one another, used Rayyan (an online tool: https://rayyan.qcri.org/) to screen for eligible references. The full texts of any such references (whose eligibility was based on the screening title and abstract) were retrieved for further screening. Any conflicts were resolved during a consensus meeting. We included studies on the association between any work-related exposure and the onset of PTSD (acute or delayed) in paid workers of working age (aged 18-65). Any studies that described work-related exposures in terms of work demands or other occupational factors were eligible for inclusion. However, studies in which exposures were related to job title or work title only were excluded. Studies were included if there was an actual diagnosis of PTSD (either using checklists with defined cut-off values or clinical criteria, e.g., using DSM criteria[2] and/or coded according to the International Classification of Disorders -ICD-9-CM 309.81-). Studies in which PTSD was assessed by means of self-reports only (not using any criteria) were excluded. We excluded any studies into the persistence or growth of PTSD. Those studies in which the exposure-outcome association was quantified, e.g., in terms of effect sizes such as a hazard ratio (HR), relative risk (RR) or odds ratio (OR), were included. We restricted ourselves to original articles, in English or Dutch, published in peer-reviewed scientific journals from 2005 onwards. Studies with a prospective, retrospective or case-control longitudinal design were included, while cross-sectional studies were excluded, to be able to monitor the time sequence between exposure and the PTSD onset, in which the assessments of exposure precede the actual onset of the disorder. The above-mentioned set of criteria were finalised after a pilot screening of 300 references.

Data extraction and risk of bias assessment

Two reviewers, working independently of one another, extracted data and assessed risk of bias from each of the eligible articles. Any conflicts were resolved during a consensus meeting. We extracted first author and year of publication, study name and design, sample (country, occupational group,

age and sex), exposure assessment, PTSD ascertainment, and effect size. Where it was not possible to retrieve sufficient information from the published articles, additional data were requested from study researchers.

Risk of bias was assessed using the 'Quality in Prognosis Studies' tool[15], with criteria related to study participation, attrition, prognostic factor (i.e., exposure) measurements, outcomes, confounding, and statistical analysis. Here, we attributed a low risk of bias regarding attrition to studies with a >80% participant retention.

Data analysis

The included articles were described in terms of extracted data and risk of bias. Work-related exposures were categorised according to the DSM-5 criteria for PTSD stressors[2]: 1) direct exposure to the trauma, 2) witnessing a trauma, 3) hearing about a colleague/co-workers (adapted to work context) was/were exposed to a trauma, or 4) indirect exposure to aversive details of a trauma (e.g., first responders and medics).

Where sufficient clinically and methodologically homogeneous information were available, a quantitative meta-analysis was conducted to determine a pooled effect size for the association of each exposure with PTSD. Review Manager (RevMan 5) was used for the meta-analyses, and to generate forest and funnel plots. The latter were used to assess publication bias, through visual inspection. According to the Cochrane collaboration handbook, funnel plots were only generated for exposures with effect sizes from ≥10 studies[16]. Most of the exposure-outcome associations featured statistical heterogeneity (I^2>75%), so random-effects estimates were adopted for statistical pooling. We assumed that the interpretation of effect estimates (e.g., HR and OR) was consistent, and we estimated pooled OR with 95% confidence interval (95%CI). We adopted the OR, as this was the most frequently reported effect size in the articles found (being reported in 32 articles, whereas two articles reported HRs and three articles reported RRs).

When more than one article reported on the same study, information from just one of these articles was used for analyses, using effect sizes from the article with the shortest follow-up duration (with a latency time of at least four weeks) to ensure that the work-related exposure of interest is indeed the most likely cause of PTSD. Wherever possible, we used information from fully adjusted models and we did not consider subgroups (e.g., sex differences). Population attributable fractions (PAFs) were estimated[17] to assess the extent to which work-related exposures contributed to the development of PTSD. Here, the proportion of workers exposed to the exposure of interest (P_e) were multiplied by the attributable proportion in the exposed workers: $P_e(OR-1)/(1+P_e(OR-1))$.

In line with our registered protocol[13], subgroup analyses were based on the risk of bias (with a cut-off score of 60% for the risk of bias scale summary score, to obtain two subgroups), on the study design (prospective vs retrospective) and on PTSD ascertainment (clinically diagnosed PTSD vs probable PTSD). In contrast to the protocol that we registered a-priori,[13] we were unable to compare other characteristics of PTSD (i.e., acute vs delayed) due to limited available data. Any information that could not be qualitatively analysed was described narratively.

Strength of evidence

The strength of the evidence was assessed using the GRADE (Grades of Recommendations, Assessment, Development and Evaluation) framework[18]. Four quality levels were distinguished: high, moderate, low, and very low. Our starting point for evidence grading was 'moderate', which has previously been proposed for use in the assessment of prognostic factors[19]. Various study limitations

could have detracted from the strength of the evidence (if the majority of the studies scored <60% on the risk of bias scale), as could inconsistency (I^2>50%), indirectness, imprecision (95%CI boundaries are <1 and >2), and publication bias (based on the funnel plots). Study findings with moderate or large effect sizes (i.e., lower limit of 95%CI OR>2.0) or an exposure-response gradient could boost the quality of the evidence.

Patient and public involvement

There was no patient or public involvement in designing and conducting this study.

Results

Study selection

The study selection procedure is described in Figure 1. We identified 14,529 records during database searches. After discarding duplicates, we screened the remaining 8,590 records on title and abstract. Of these, we assessed 107 full text articles and excluded 65 for various reasons (see Supplementary file 2 for more details). As no additional articles were found during snowball and scoping searches, 42 articles from 33 studies were described in this review[20-61].

Study description and methodological quality/risk of bias

Supplementary file 3 contains the extracted data, and risk of bias assessment is shown in supplementary file 4-5. The 33 included studies provided data on n=5,719,236 participants, ranging from n=19 to n=2,549,949 participants per study. Eighteen studies were from the US, four were from the United Kingdom, two were from Denmark, and two others from Japan. There was one study from each of the following countries: Israel, The Netherlands, Germany, Portugal, Italy, Norway and Korea. The majority of the studies (N=21) involved participants from armed forces. Five studies featured first responders who had attended the scene of a disaster, three focused on healthcare workers, two on employers at the scene of a disaster, one on bank workers and one on public transport workers.

Four studies reported no details of sex, five studies only used male participants, and 17 used samples in which the majority of participants were male (≤20% females). In only seven studies, did female participants make up a reasonable proportion (>20%) of the study sample. Twenty-eight studies reported exposures obtained from self-reports, 12 studies used deployment administration databases, and two studies were based on a combination of these two measurements. Baseline exposure assessment was carried out for the period 1983-2012. Twenty-five articles assessed PTSD (by clinical diagnosis) while the remaining 17 articles assessed probable PTSD/PTSD symptoms (by self-reports using pre-defined (e.g., DSM-5) criteria). The weighted average for PTSD prevalence during in the follow-up periods was 7.3%, while individual study prevalence ranged from 1.0% to 70.5%. The average prevalence for diagnosed cases of PTSD was slightly higher (7.3%) than for probable PTSD (6.4%).

Twenty-five studies were prospective studies and eight were retrospective studies. On average, methodological quality was 62% (SD:19%), ranging from 25% to 100%. Most articles showed a low risk of bias on analysis/reporting (N=37) and confounding (N=25). Less than half of the articles showed a low risk of bias on participation selection (N=11), attrition (N=9), prognostic factor (exposure) assessment (N=9) and outcome (PTSD) ascertainment (N=13).

Work-related exposures

Each of the exposure-outcome associations presented have been described and categorised according to the DSM-5 criteria for PTSD stressors[2]: 1) direct exposure, 2) witnessing a trauma, 3) hearing that a colleague or co-worker was exposed to a trauma, or 4) indirect exposure to aversive details of a trauma. An overview of qualitative and quantitative analyses of all exposure-outcome associations is shown in Table 1. Figures 2 and 3 depict quantitative analyses, while Table 2 contains an overview of any exposure-outcome associations that could not be statistically pooled.

Direct exposure

The exposure-outcome associations for direct exposures were quantitatively analysed for: number of army deployments (OR[95%CI]: 1.15[1.14 1.16], I^2=0%, n=333,024, Figure 2), combat exposure

(OR[95%CI]: 1.89[1.46 2.45], I^2=89%, n=28,304, Figure 2) and army deployment (OR[95%CI]: 1.79 [1.45 2.21], I^2=0%, n=11,023, Figure 3). The PAFs for these exposures were 7%, 14% and 34%, respectively. Evidence for these exposure-outcome associations was moderate, very low, and low quality, respectively. In some cases, the evidence was downgraded due to high risk of bias and inconsistency. There was some evidence for publication bias, although it was only possible to assess that for the 'combat exposure' variable (Supplementary file 6). Subgroup analyses based on risk of bias (Supplementary file 7-9), study design (Supplementary file 10-12) and PTSD ascertainment (Supplementary file 13-15) showed no statistically significant differences between effects for those subgroups.

In our qualitative analyses of exposures that could not be statistically pooled, we found exposure-outcome associations for exposures related to undergoing a traumatic event, cumulative exposure and the severity of exposure (Table 2). With regard to undergoing a traumatic event, the effect sizes ranged from OR[95%CI]: 0.86[0.32 2.28] (physical contacts with thieves)[34] to OR[95%CI]: 5.65[3.27 9.74] (workers fleeing from a tsunami)[42]. Cumulative exposure was e.g. expressed in length of deployment[37] (OR[95%CI]: 0.97[0.92 1.03]) and high frequency of violence (compared to no violence)[55] (OR[95%CI]: 6.5[1.6 25.6]). The effect sizes for exposure severity ranged from OR[95%CI]: 1.01[0.67 1.35] (severity of battles)[45] to OR[95%CI]: 6.5[1.6 26.0] (severe compared to no violence)[55]

Witnessing a trauma

With regard to the DSM-5 criterion 'witnessing a trauma', there was insufficient homogeneous data to pool studies statistically (Table 2). In five studies (with n=4,876 participants), effect sizes ranged from OR[95%CI]: 1.01[0.63 1.64] ('perceiving a life threat')[56] to OR[95%CI]: 9.3[6.1 14.2] ('being present during an attack')[38].

A colleague or co-worker was exposed to a trauma

Only one study (n=980) reported on effect sizes regarding 'colleague or co-worker exposed to a trauma'. This study, among public transport workers, found that 'hearing that a close colleague had suffered a person under train experience' was not significantly association with PTSD (OR[95%CI]: 0.55[0.12 2.47])[46]

Indirect exposure to aversive details

Regarding indirect exposure to adverse events, we statistically pooled the effect sizes from seven studies (n=75,902 participants) with moderate-quality evidence for an association between confrontation with death and PTSD (Figure 3; OR[95%CI]: 1.63[1.41 1.90]). Subgroup analyses regarding risk of bias (Supplementary file 16), study design (Supplementary file 17) and PSTD ascertainment (Supplementary file 18) showed no statistically significant differences between any of those subgroups.

Additional evidence from four studies (n=14,085 participants), which could not be statistically pooled, showed effect sizes ranging from OR[95%CI]: 1.03[1.00 1.06] (being exposed to the aftermath of a battle)[37] to OR[95%CI]: 4.0[2.5 6.6] (being present during the morning of the 9/11 attacks)[27].

Other exposures

We found additional evidence that could not be categorised into any of the DSM-5 criteria. An increased risk of PTSD was associated with experiencing stress, with evidence ranging from

OR[95%CI]: 1.01[0.98 1.04] (deployment concerns)[28] to OR[95%CI]: 3.52[2.94 4.21] (high deployment stress)[21]. Also, the time that has passed since a given traumatic event seems to be associated with PTSD. This factor can either reduce the PTSD risk (OR[95%CI]: 0.47[0.32 0.70] with a longer dwell time between deployments)[48] or increase it (OR[95%CI]: 1.89[0.99 3.60] if the period since the return from deployment exceeds 6.5 years)[32]. Other exposures included experiencing discrimination at work (OR[95%CI]: 5.72[3.37 9.71])[42] and having to perform duties that involved a risk of radiation exposure (OR[95%CI]: 1.08[0.97 1.20])[53].

Discussion

In this systematic review with meta-analysis and evidence grading, we found various associations, albeit based on moderate-quality evidence at best, showing that several work-related exposures are associated with PTSD development. This includes exposures such as the number of army deployments, combat exposure, army deployment and confrontation with death. The corresponding effect sizes ranged from 1.15[1.14 1.16] to 1.89[1.46 2.45] and PAFs varied from 7% (for the number of army deployments) to 34% (for army deployment). The latter values indicate the proportion of PTSD cases that could potentially be avoided in a working population, if the exposure in question were to be totally eliminated. The data suggests that there could be an only moderate relationship between PTSD and work situations. However, they could also indicate that PTSD cannot be attributed to a single work-related exposure and that it is multi-factorial in nature and/or is mediated by other factors. This could, perhaps, also account for the relatively low ORs found for some of the effects.

Only a limited data, which could not be statistically pooled, was available concerning exposures that corresponded to the DSM-5 criteria 'witnessing a trauma' and 'hearing that a colleague/co-worker was exposed to a trauma'. These exposures include 'perceiving a life threat', 'being present during an attack', and 'hearing that a close colleague had suffered a person under train experience'. The additional exposures that could not be categorised according to DSM-5 criteria include 'military deployment', 'deployment stress', and 'time since return from deployment'. In future, it may be worth considering exposures of this kind when diagnosing work-related PTSD.

The details uncovered by this review are key to a better understanding of work-related causes of PTSD, to the selection or development of preventive interventions, and to the identification of thresholds for occupational health guidelines. This review has updated earlier work[7 9] and we are the first to quantify the association between work-related exposures and PTSD. This update identifies occupational groups and exposures that do not feature in previous reviews, such as public transport workers[46] and bank workers (being exposed to robberies)[34].

Although the prevention of occupational diseases, including PTSD, is preferable, not all risks can be fully eliminated as witnessing traumatic events, disasters and war situations are likely to remain present in our working situations. In the working environment it is also important to attenuate the impact of exposures on workers or to treat them when having developed work-related PTSD. In the current review we also identified work-related factors that can reduce the risk of PTSD, which can be helpful to attenuate the impact of stressful exposures. For instance, among highly exposed occupational groups, a high level of preparedness (OR[95%CI]: 0.6[0.4 0.9])[62], unit support (OR[95%CI]: 0.5[0.3 0.8])[62], post-deployment support (OR[95%CI]: 0.3[0.2 0.4])[62] and social support (OR[95%CI]: 0.96[0.93 0.98])[37] were all found to be associated with a reduced risk of PTSD. These elements can be used in the development of interventions, especially for those in occupations that involve high PTSD risks.

Methodological strengths and limitations

The strengths of this review are the systematic methods used plus a protocol that was registered a-priori, the systematic review with meta-analysis, and the assessment of evidential quality using GRADE[18]. The findings appear to be quite robust, since subgroup analyses based on risk of bias, study design and PTSD ascertainment produced results that did not differ between any of those subgroups. Moreover, the PAFs estimated in our study provide insight into the extent to which the identified exposures were occupationally related to PTSD.

We deviated from our a-prior registered protocol[13] in that we were unable to compare different PTSD diagnoses (acute vs delayed). In our meta-analysis, we used effect sizes from the article with the shortest follow-up duration (with a latency time of at least four weeks). There were, however, also data available from few studies measuring both the short-term and long-term effects of exposure and their association with PTSD. For example, 'being present during a terrorist attack' was strongly associated with PTSD in the acute phase (after 10 months; OR[95%CI]: 9.3[6.1 14.2]), but this association was even stronger in the long term (after 34 months; OR[95%CI]: 10.0[5.4 18.6])[38]. Regarding 'being exposed to combat', the opposite was true. Stronger effects were seen in short term (OR[95%CI]: 2.91[1.34 6.31]) than long term (OR[95%CI]: 2.42[1.04 5.62])[39]. This is in line with another review indicating that, following exposure, the risk of PTSD attenuates over time[7].

Another potential source of heterogeneity stems from the method used to ascertain PTSD. In 25 articles, PTSD was assessed by clinical diagnosis while 17 articles assessed probable PTSD/PTSD symptoms, based on self-reports using pre-defined (e.g., DSM-5) criteria. We found that the average prevalence was slightly higher for diagnosed PTSD (7.3%) than for probable PTSD (6.4%). This is in line with a study of disaster workers, following the 9/11 attacks, in which 2-9% had probable self-reported PTSD, respectively[31]. However, 6-15% of these workers were diagnosed with PTSD. Nevertheless, our pooled effect sizes were robust across different methods for ascertaining PTSD. While ascertaining PTSD by clinical diagnosis may be more valid, this source of heterogeneity is unlikely to have substantially affected the findings presented. We have only assessed incidence of PTSD. Accordingly, this review does not address the persistence or growth of PTSD. Future studies should, therefore, focus on different types of PTSD diagnoses. They should also assess the work-relatedness of PTSD persistence and growth, as an aid to the development of occupational health guidelines.

One limitation of our study is that the majority of the studies in this review were based on participants from armed forces (N=21) and first responders (N=5). There was limited information on other occupations, such as public transport workers, bank employees and healthcare workers. Furthermore, most studies of the armed forces and of first responders tend to be male dominated and from Western countries. Future research should address these issues, by assessing previously unexplored occupational sectors and groups, as well as data from other countries. In this review we only included longitudinal studies in which the exposure would proceed the outcome, as a result of which a better inference of causality can be provided than with cross-sectional studies only. Moreover, we focussed in our review on articles published from 2005 onwards. This cut-off was based on changes in people's exposure to work-related traumatic events and changes to the definition of PTSD over time[2].

While our use of the GRADE framework provides an adequate way to assess quality of the evidence, it does not necessarily provide insights into causation of the association of work-related exposures and PTSD, for which other approaches such as the Bradford Hill criteria[63] could be used. It has been argued that the majority of the Bradford Hill criteria are to some extent incorporated in GRADE, such as the strength and consistency of the association[64]. Other criteria, such as that of the biological plausibility are not well covered nor are they in the current review evidence regarding work-related PTSD. Future studies should therefore aim at providing more insights into this, to further build the evidence base around work-related PTSD and the biology of risk for PTSD[65]. Although methodological quality of the included studies was of an acceptable level (62%, on average), the quality of the evidence was rated moderate at best. More than half of the articles showed a risk of bias with regard to participation (i.e., selection bias), attrition (with <80% of the

participants being retained during the follow-up period), and misclassification due to a limited assessment of the prognostic factors (i.e., exposure) and the outcome of interest. As mentioned above, the ascertainment of PTSD is unlikely to have caused a substantial bias in our findings. However, exposures were often measured by means of self-reports, which may well have biased our findings. In addition, the quality of the evidence was downgraded due to inconsistency for some of the exposures. Our assessment of publication bias was limited to just one of the pooled exposures. It appeared, however, that none of the studies had published or registered their protocol, which could have caused publication bias.

Conclusion

In this systematic review with meta-analysis of 33 studies (with n=5,719,236 participants), based on moderate quality evidence at best, we identified a number of work-related exposures (mainly involving individuals in the armed forces and in first responder occupations) that increase the risk of PTSD (by 15% to 89%). These exposures include 'number of army deployments', 'combat exposure', 'army deployment' and 'confrontation with death', for which we found a moderate contribution to the development of PTSD. We identified additional exposures in other occupations, such as bank workers, public transport workers, and medics. These included 'life threats', 'being present during an attack' and 'hearing about a colleague's trauma'. Although exposure assessment, PTSD ascertainment and inconsistency may have biased our findings, the results of this review are quite robust and are of importance for the development of preventive interventions and occupational health guidelines.

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Author contribution
Both authors (PC and HvdM) designed the study and reviewed the manuscript for important intellectual content. Both authors identified relevant articles and conducted data extraction and analyses together. PC drafter the first version of the manuscript. HvdM is the study guarantor.

Data sharing
All data relevant to the study are included in the article and supplementary documents.

Study ethics
Not applicable as this study is a systematic review

Competing interests
The authors declare no competing interests

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Data sharing
Additional data is provided in the supplementary files.

Ethical approval
As this is a systematic review, no ethical approval is required

Patient consent
As this is a systematic review, no patient consent is required

Table 1. Overview of the evidence from both qualitative and quantitative analyses, with exposures categorised according to DSM-5 criteria. For exposures for which quantitative analyses could be performed (Figure 2 and 3), quality of the evidence for the relationship between work-related exposures and PTSD according to the GRADE framework is shown. Other exposures are described qualitatively (Table 2).

DSM-5 criterion	Exposure	N	n	Limit[1]	Incons[2]	Indirect[3]	Imprec[4]	Pub bias[5]	OR [95%CI][6]	Grad[7]	GRADE	PAF	Reference
Direct exposure	Number of army deployments[8]	3	333,024	No	0%	No	No	N/A	1.15 [1.14 1.16]	No	Moderate	7%	Figure 2
	Combat exposure	11	28,304	Yes	89%	No	No	Yes	1.89 [1.46 2.45]	No	Very low	14%	Figure 2
	Army deployment[9]	4	11,023	Yes	0%	No	No	N/A	1.79 [1.45 2.21]	No	Low	34%	Figure 3
	Undergoing a traumatic event	13	1,703,107	-	-	-	-	-	Min: 0.86 [0.32 2.28] Max: 5.65 [3.27 9.74]	-	-		Table 2
	Cumulative exposure	8	1,749,762	-	-	-	-	-	Min: 0.97 [0.92 1.03] Max: 6.5 [1.6 25.8]	-	-		Table 2
	Exposure severity	3	2,558	-	-	-	-	-	Min: 1.01 [0.67 1.35] Max: 6.5 [1.6 26.0]	-	-		Table 2
Witnessing trauma	-	5	4,876	-	-	-	-	-	Min: 1.01 [0.63 1.64] Max: 9.3 [6.1 14.2]	-	-		Table 2
Colleague exposed[10]	-	1	980	-	-	-	-	-	0.55 [0.12 2.47]	-	-		Table 2
Indirect exposure	Confrontation with death	7	75,902	No	46%	No	No	N/A	1.63 [1.41 1.90]	No	Moderate	15%	Figure 3
		4	14,085	-	-	-	-	-	Min: 1.03 [1.00 1.06] Max: 4.0 [2.5 6.6]	-	-		Table 2
Other exposures	Stress	4	1,390,641	-	-	-	-	-	Min: 1.01 [0.98 1.04] Max: 3.52 [2.94 4.21]	-	-		Table 2
	Time since event	3	1,358,468	-	-	-	-	-	Min: 0.47 [0.32 0.70] Max: 1.89 [0.99 3.60]	-	-		Table 2
	Other	3	69,176	-	-	-	-	-	Min: 1.08 [0.97 1.20] Max: 5.72 [3.37 9.71]	-	-		Table 2

n= number of participants; N = number of studies; OR = Odds ratio; 95%CI = 95% confidence interval; PAF = population attributable fractions

[1] Limitation: downgraded if the majority of studies score lower than 60% on the risk of bias scale. [2] Inconsistency: downgrade if $I^2 \geq 50\%$.

[3] Indirectness: downgrade if indirectness is present. [4] Imprecision: downgrade if the 95% confidence interval is <1 and >2.

[5] Publication bias: downgraded if publication bias is present (based on the funnel plots). [6] Effect size: upgrade if the lower limit of the 95% confidence interval is >2.0.

[7] Gradient: upgraded if there is a dose-response gradient available.

[8] Depicting the effect of being deployed more than once, as compared to being deployed once.

[9] Depicting the effect of being deployed, as compared to not being deployed.

[10] For this study on occupational exposures, the DSM-5 criterion 'relative/friend' was adapted to 'colleague or co-worker'.

Table 2. Overview of all exposure-outcome effect sizes from qualitative analyses, with exposures categorised according to DSM-5 criteria. Odds ratios (OR) with 95% confidence intervals (95%CI) are shown.

DSM-5 criterion	Exposure category	Exposure	Effect size (OR [95%CI])
Direct exposure	Undergoing an event	Work-related threats[20]	1.10 [1.04 1.15]
		Work-related violence[20]	1.02 [0.98 1.06]
		Previous disaster experience[23]	1.4 [1.2 1.6]
		One injury sustained during the 9/11 attacks[29]	1.1 [0.6 2.0]
		Two or more injuries sustained during the 9/11 attacks[29]	1.4 [0.6 3.4]
		Participation in abusive violence[33]	3.32 [1.81 6.08]
		Robberies during working life[34]	1.18 [0.97 1.44]
		Physical contacts with robbers[34]	0.86 [0.32 2.28]
		Scuffle [taking part or being present][34]	1.92 [0.63 5.79]
		Being injured during the robbery[34]	1.28 [0.31 5.21]
		Discharged weapon on deployment[36]	1.48 [0.61 3.60]
		Experience of life-threatening danger[42]	4.32 [2.89 6.48]
		Major property loss[42]	3.45 [2.28 5.23]
		Escape from tsunami[42]	5.65 [3.27 9.74]
		Life threatening war[45]	1.91 [1.07 3.24]
		Conflict with passengers[46]	3.21 [1.14 9.03]
		Felt in great danger of being killed[48]	3.44 [2.50 4.72]
		Exposure to blast[50]	4.72 [2.9 7.7]
		Encountering explosive devices[54]	1.26 [0.95 1.66]
	Cumulative exposure	Prolonged work at the WTC site[23]	2.0 [1.7 2.3]
		Length of deployment[37]	0.97 [0.92 1.03]
		≥5 critical cases per call for traumatic surgeons[43]	7 [1.1 8]
		≥7 call duties a month for traumatic surgeons[43]	3.8 [0.9 7.2]
		≥15 operative cases per month[43]	2.8 [0.4 3.2]
		Cumulative years deployed in navy[47]	2.04 [1.93 2.15]
		Cumulative years deployed in army[47]	1.74 [1.71 1.76]
		No. of Combat Exposures[48]	1.62 [1.46 1.79]
		Two combat exposure deployment[48]	1.37 [1.17 1.61]
		Three combat exposure deployment[48]	1.30 [0.94 1.82]
		Two deployments[48]	1.00 [1.00 1.01]
		Three deployments[48]	1.00 [0.99 1.01]
		One exposure (compared to no exposure)[50]	4.67 [3.1 7.1]
		Two or more deployments (compared to no exposure)[50]	6.15 [4.4 8.7]
		Deployment length 1–3 months[53]	1.53 [1.37 1.70]
		Deployment length ≥3 months[53]	2.64 [2.33 2.99]
		Low frequency of violence (compared to no violence)[55]	4.0 [1.0 16.3]
		Medium frequency of violence (compared to no violence)[55]	5.9 [1.4 24.2]
		High frequency of violence (compared to no violence)[55]	6.5 [1.6 25.6]
	Exposure severity	Combat exposure scale[33]	1.98 [1.50 2.62]
		Severity of battles[45]	1.01 [0.67 1.35]
		Max. mild violence (compared to no violence)[55]	3.8 [0.3 46.2]
		Max. threats of violence (compared to no violence)[55]	5.4 [1.2 24.2]
		Max. moderate violence (compared to no violence)[55]	2.6 [0.6 10.8]
		Max. severe violence (compared to no violence)[55]	6.5 [1.6 26.0]
Witnessing the trauma		Perceived life threat[56]	1.01 [0.63 1.64]
		Observation of abusive violence[33]	8.36 [4.56 15.35]
		Presence during attack[38]	9.3 [6.1 14.2]
		Witnessing of plant explosions[42]	2.09 [1.43 3.06]
		Person under train experience[46]	1.54 [0.52 4.55]
		One person under train experiences[46]	1.77 [0.31 4.47]
		Two or more person under train experiences[46]	2.36 [0.57 9.70]
		Sudden train stop[46]	3.66 [0.82 16.4]
		Near train accident[46]	8.81 [1.96 39.3]

		Damage to train[46]	1.71 [0.48 6.14]
Colleague exposed		Person under train experience of colleague[46]	0.55 [0.12 2.47]
Indirect exposure to aversive details		Aftermath of battle[37]	1.03 [1.00 1.06]
		Morning of 9/11 (compared to >3 days)[27]	4.0 [2.5 6.6]
		Afternoon of 9/11 (compared to >3 days)[27]	2.1 [1.3 3.3]
		Day 2 (compared to >3 days)[27]	1.4 [0.9 2.4]
		Morning of 9/11 (compared to >3 days)[23]	2.0 [1.3 2.9]
		Afternoon of 9/11 (compared to >3 days)[23]	1.1 [0.8 1.5]
		Exposure to aftermath of battle[56]	1.81 [1.08 3.06]
Other exposures	Stress	High deployment stress[21]	3.52 [2.94 4.21]
		Deployment concerns summary score[28]	1.01 [0.98 1.04]
		Worried by other issues related to robbery[34]	2.64 [0.95 7.36]
		Unit cumulative high deployment stress rate (marine)[47]	1.04 [1.03 1.05]
		Unit cumulative high deployment stress rate (army)[47]	1.05 [1.04 1.06]
	Time since event	Months since most recent deployment[28]	1.00 [0.98 1.02]
		Time since return from deployment (up to 2 years)[32]	1.18 [0.75 1.86]
		Time since return from deployment (up to 3 years)[32]	1.80 [1.05 3.10]
		Time since return from deployment (up to 4 years)[32]	1.88 [0.98 3.62]
		Time since return from deployment (up to 5 years)[32]	1.53 [0.92 2.55]
		Time since return from deployment (up to 6.5 years)[32]	1.89 [0.99 3.60]
		Dwell to deployment ratio (1:1 versus <1:1)[48]	0.83 [0.60 1.13]
		Dwell to deployment ratio (2:1 versus <1:1)[48]	0.47 [0.32 0.70]
	Other	Supervising responsibilities[23]	2.2 [1.7 2.9]
		Discrimination/slurs[42]	5.72 [3.37 9.71]
		Duties with radiation exposure risk[53]	1.08 [0.97 1.20]

Figure caption

Figure 1. Flow chart depicting the search for literature.

Figure 2. Study findings (i.e., effect sizes) for articles reporting on the association of number of army deployments (depicting the effect of being deployed more than once, as compared to being deployed once; upper panel) and combat exposure (lower panel) with PTSD. Individual study as well as pooled effects are presented. SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure 3. Study findings (i.e., effect sizes) for articles reporting on the association of deployments status (depicting the effect of being deployed, as compared to not being deployed; upper panel) and confrontation with death (lower panel) with PTSD. Individual study as well as pooled effects are presented. SE = standard error; CI = confidence interval; IV = Inverse variance.

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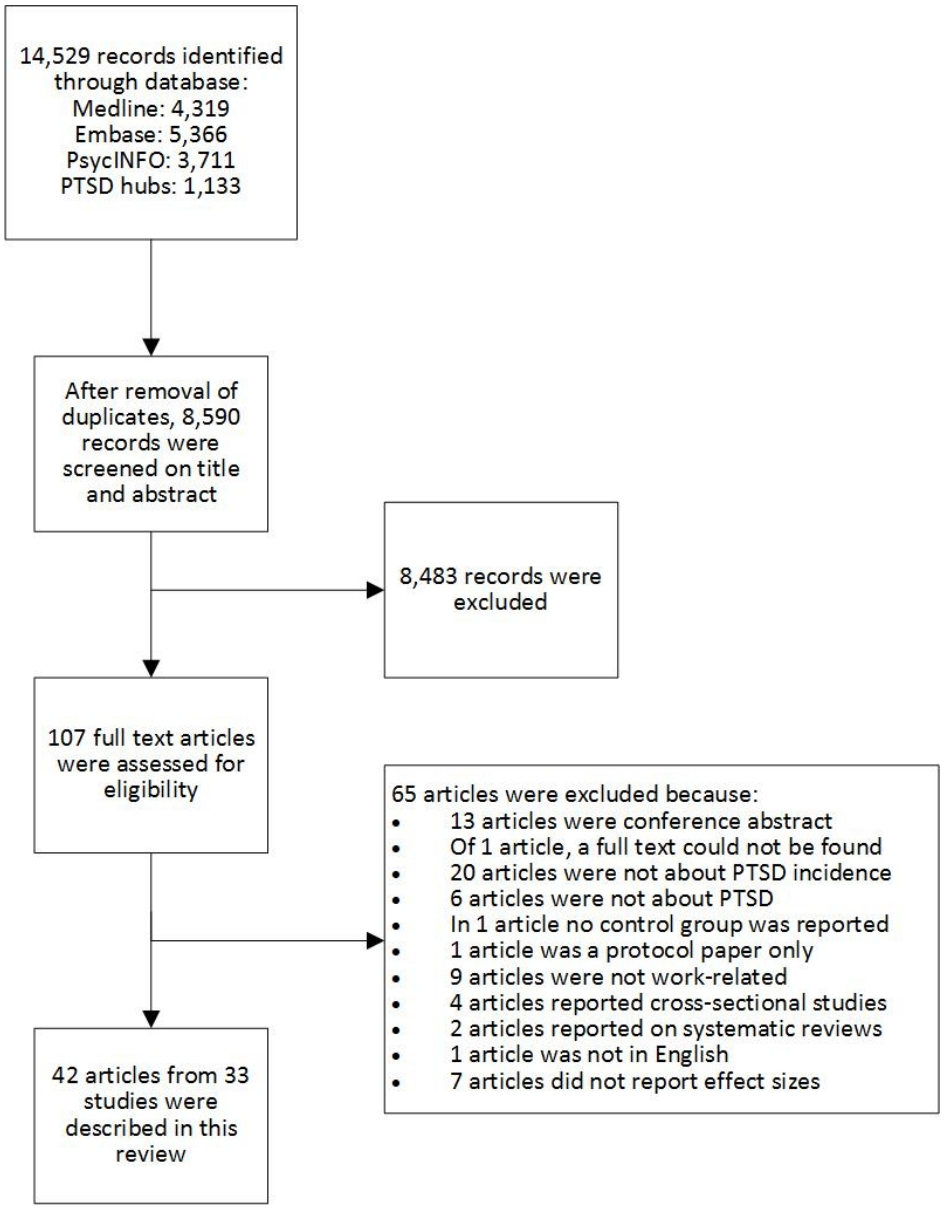

Flow chart depicting the search for literature.

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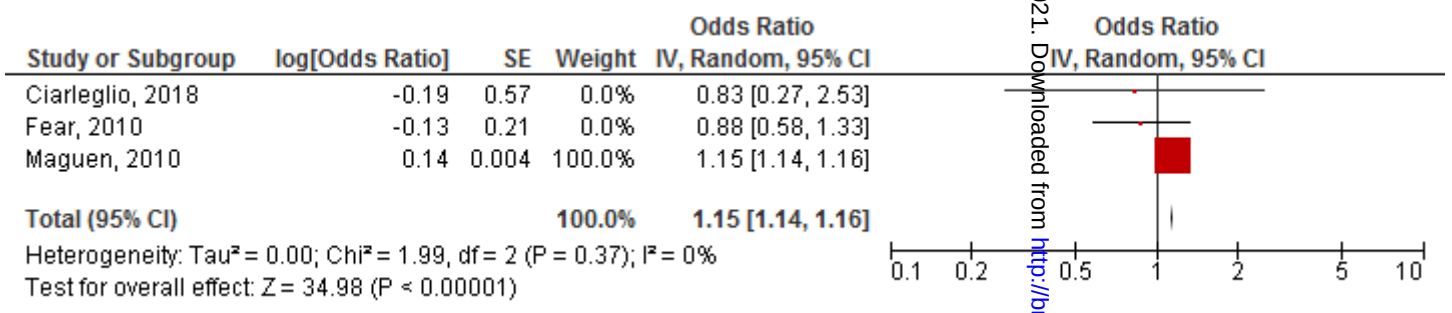
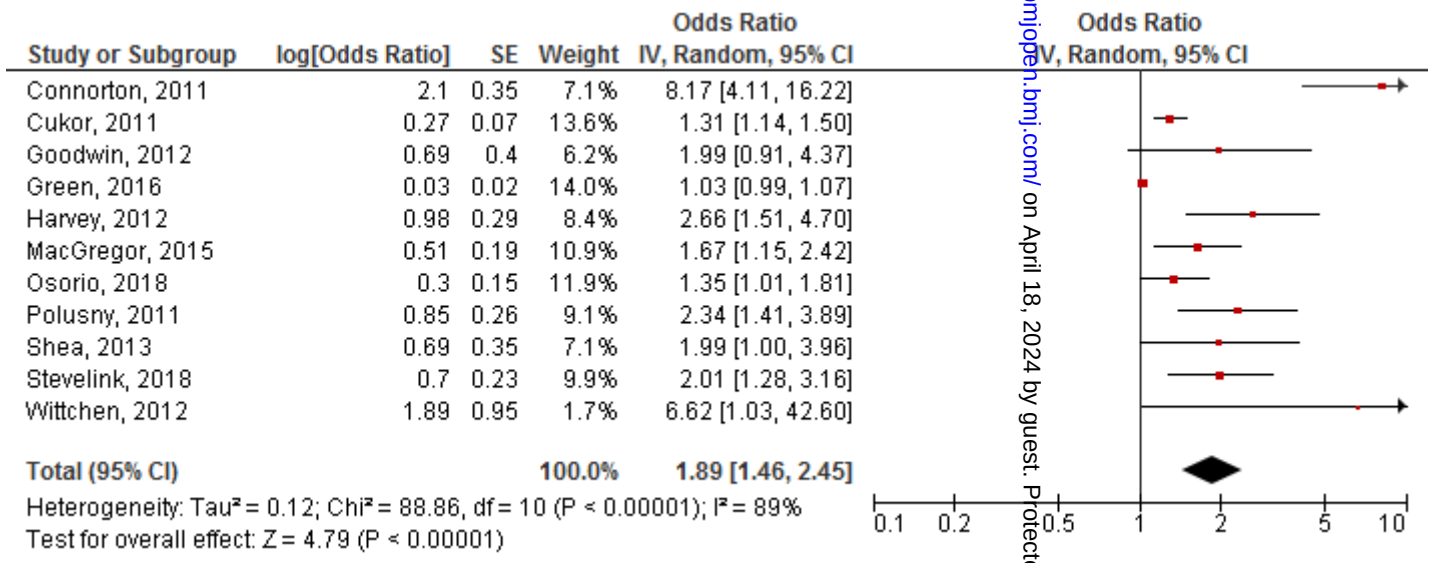
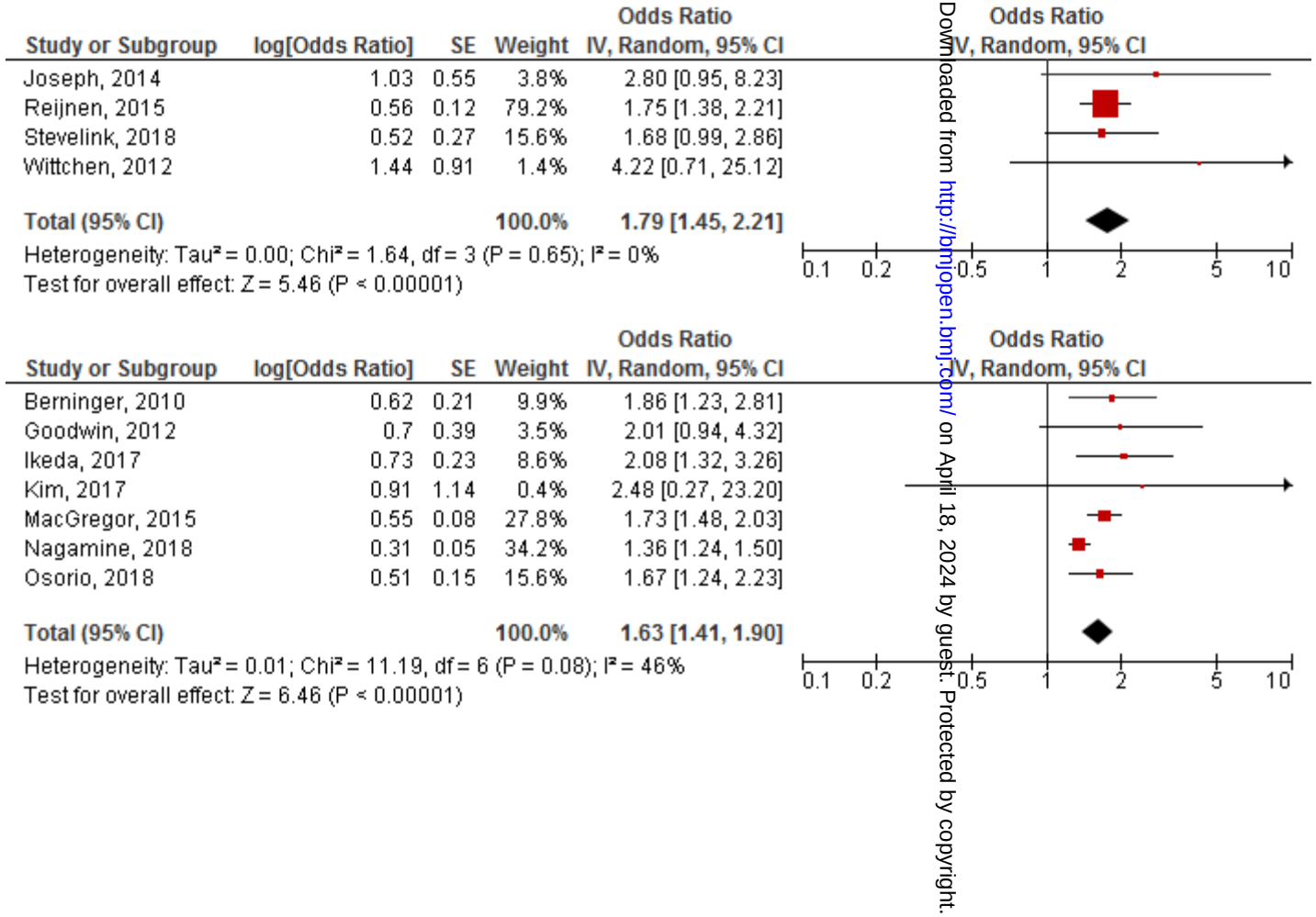






Supplementary file 1.

	Ovid MEDLINE(R) ALL <1946 to September 09, 2019>. Search date: 10 September 2019	
#	**Search**	**Results**
1	stress disorders, post-traumatic/ or stress disorders, traumatic, acute/	30925
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or traumatic stress).ab,kf,ti,sh.	42697
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,kf,ti. [trauma screening zoals de Harvard Trauma Screening Questionnaire - htsq]	160
4	or/1-3 [ptsd]	51153
5	exp Occupations/ or Workload/ or exp Work/ or Workplace/ or exp Occupational Diseases/ or Rehabilitation, Vocational/ or Occupational Health/ or Sick Leave/ or Absenteeism/ or Retirement/ or workers' compensation/ or exp Employment/ or exp Occupational Exposure/ or Volunteers/	361332
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,kf,ti.	2038626
7	exp "personnel, hospital"/ or exp emergency responders/	100417
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,kf,ti.	147998
9	or/5-8 [work]	2360997
10	Epidemiologic studies/	8073
11	exp case control studies/	1016792
12	exp cohort studies/	1894888
13	Case control.tw.	118051
14	(cohort adj (study or studies)).tw.	183886
15	Cohort analy$.tw.	7241
16	(Follow up adj (study or studies)).tw.	47481
17	(observational adj (study or studies)).tw.	95892
18	Longitudinal.tw.	227916
19	or/10-17 [observationele- en longitudinale studies]	2269321
20	(risk or predict*).mp.	3563653
21	19 or 20	4936872
22	and/4,9,21	6387
23	limit 22 to yr="2010-current"	4319

	Ovid Embase Classic+Embase <1947 to 2019 September 09>. Search date: 10 September 2019	
#	**Search**	**Results**
1	*posttraumatic stress disorder/ or *acute stress disorder/	30071
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or	56167

	traumatic stress).ab,kw,ti.	
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,kw,ti.	199
4	or/1-3 [ptsd]	60673
5	exp *Occupation/ or exp *occupational health/ or exp *work/ or *Volunteer/ or exp *named groups by occupation/	907358
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,kw,ti.	3266921
7	exp *hospital personnel/ or rescue personnel/	46527
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,kw,ti.	195059
9	or/5-8 [work]	3981638
10	*Clinical study/	56379
11	*Case control study/	6905
12	*Family study/	2834
13	*Longitudinal study/	7151
14	*Retrospective study/	19751
15	*Prospective study/	21494
16	Randomized controlled trials/	168154
17	15 not 16	21378
18	*Cohort analysis/	26124
19	(Cohort adj (study or studies)).mp.	275760
20	(Case control adj (study or studies)).tw.	126673
21	(follow up adj (study or studies)).tw.	66352
22	(observational adj (study or studies)).tw.	151582
23	(epidemiologic$ adj (study or studies)).tw.	106051
24	or/10-15,17-23	799536
25	(risk or predict*).mp.	5152294
26	24 or 25	5545704
27	and/4,9,26	7053
28	limit 27 to yr="2010-current"	5366

	Ovid PsycINFO <1806 to September Week 1 2019>. Search date: 10 September 2019	
#	**Search**	**Results**
1	posttraumatic stress disorder/ or acute stress disorder/	31361
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or traumatic stress).ab,id,ti.	49013
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,id,ti,tm.	292
4	or/1-3 [ptsd]	50242

5	exp occupations/ or exp occupational health/ or occupational status/	59891
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,id,ti.	866191
7	exp medical personnel/ or exp emergency personnel/	89105
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,id,ti.	68300
9	or/5-8 [work]	972972
10	(Clinical stud* or Case control stud* or Longitudinal stud* or Retrospective stud* or (Prospective stud* not (Randomized controlled trials or rct)) or Cohort analysis or (Cohort adj (study or studies)) or (Case control adj (study or studies)) or (follow up adj (study or studies)) or (observational adj (study or studies)) or (epidemiologic$ adj (study or studies))).ab,id,ti.	136663
11	(risk or predict*).mp.	730689
12	10 or 11	808563
13	and/4,9,12	5417
14	limit 13 to yr="2010-current"	3711

	ProQuest PTSDhubs. Search date: 10 September 2019	
#	**Search**	**Results**
1	(su((worka* OR worke* OR workg* OR worki* OR workl* OR workp* OR work capacity OR work disabilit* OR work abilit* OR at work OR work exposure OR work related OR workers OR job* OR employee OR staff OR personnel OR occupation OR occupations OR occupational OR outdoor work* OR day shift* OR night shift* OR shift work* OR vocational rehabilitation OR sick leave OR absenteeism OR sickness absen* OR absente* OR presente* OR "return to work" OR vocational reintegration OR retirement OR pension OR employment OR unemployed OR unemployment OR work status OR industries OR industrial sector OR volunteer* OR voluntary worker* OR repetitive work)) OR su((residents OR emergency responder? OR first responder? OR firefighter? OR fire fighter? OR Police officer? OR emergency medicals OR Armed forces OR paramedics OR veterans OR Journalist?))) AND (su(risk OR predict*) OR su((Clinical stud* OR Case control stud* OR Longitudinal stud* OR Retrospective stud* OR (Prospective stud* NOT (Randomized controlled trials OR rct)) OR Cohort analysis OR Cohort stud* OR Case control stud* OR follow up stud* OR observational stud* OR epidemiologic stud*)))	1849
2	Limit 1 to publication date = 2010-01-01 / 2019-09-10	1133

Supplementary file 2. Excluded articles

Article	Reason for exclusion	No papers
1. Amiri T. Occupational posttraumatic stress disorder: Latent structure and risk pathways. 2019, Dissertation Abstracts International, 80(4).	Conference abstract	1
2. Chin WS, Shiao JSC, Liao SC, Kuo CY, Chen CC, Guo YL. Psychiatric diseases at six years after occupational injuries. 2016. Occupational and Environmental Medicine, 73: A175.	Conference abstract	2
3. Connorton E, Miller M, Perry MJ, Hemenway D. Mental health and combat, peacekeeping, or relief work: Results from the National Comorbidity Survey Replication. 2011. Comprehensive Psychiatry, 52: E4.	Conference abstract	3
4. Geronazzo AL, Shen S, Duarte CS, Wu P, Lord E, Amsel L, Musa GJ, Wicks J, Yip J, Fan B, Guffanti G, Hoven CW. Cumulative exposure to work-related incidents and current posttraumatic stress disorder in new york city's first responders. 2013. European Psychiatry Conference.	Conference abstract	4
5. Goldmann E, Tamburrino M, Liberzon I, Slembarski R, Prescott MR, Calabrese J Galea S. Pre-, peri-, and post-deployment characteristics and risk of posttraumatic stress disorder among ohio national guard soldiers. 2010. American Journal of Epidemiology, 11: S90.	Conference abstract	5
6. Goodwin L, Jones M, Sundin J, Wessely S, Rona RJ, Fear NT. Prevalence and predictors of delayed onset PTSD in military personnel: Is there evidence for this disorder? Results of a prospective UK cohort study. 2011. Occupational and Environmental Medicine,1351-0711,1,A100.	Conference abstract	6
7. Herrell R, Wilk J, Bliese P, Hoge C. Combat intensity, psychopathology, and suicidal ideation in a population of soldiers after deployment to Iraq. 2011. Comprehensive Psychiatry, 52: E8.	Conference abstract	7
8. Herrell RK, Bliese PA, Hoge CW. Effect of combat intensity, depression, alcohol misuse, and family history of depression and alcohol misuse on PTSD in a sample of post-deployment US Soldiers. 2013. Comprehensive Psychiatry, 54: E4-E5.	Conference abstract	8
9. Herrell RK, Bliese PB, Hoge CW. Number of deployments and total months of deployment as predictors of post-traumatic stress disorder in active duty soldiers. 2011. American Journal of Epidemiology, 11: S289.	Conference abstract	9
10. Horesh D, Solomon Z, Ein-Dor T. Delayed-onset PTSD following combat: The role of social resources. 2013. Comprehensive Psychiatry, 54: e24.	Conference abstract	10
11. Kim AR, Sung JH, Cho SW, Jeong KS, Ahn YS. The relationship between the post-traumatic stress syndrome and the occupational stress among the firefighters in Korea. 2018. Occupational and Environmental Medicine, 75: A380.	Conference abstract	11
12. Pierce MD, Wood MD, Reddy M, Sevin E, Shea MT. A prospective examination of posttraumatic stress and alcohol use disorders among returning veterans. 2012. Alcoholism: Clinical and Experimental Research, 1: 303A.	Conference abstract	12
13. Subramaney U. Personality, trauma exposure, PTSD and depression in a cohort of SA metro policemen: A longitudinal study. 2010. South African Journal of Psychiatry, 16: 97-98.	Conference abstract	13
14. Huang, D, Wang X, Kung WW. The impact of job loss on posttraumatic stress disorder among Asian Americans: 11-12 years after the World Trade Center attack. 2019. Traumatology,1085-9373.	Full text could not be found	1
15. Andersen SB, Karstoft KI, Bertelsen M, Madsen T. Latent trajectories of trauma symptoms and resilience: the 3-year longitudinal prospective USPER study of Danish veterans deployed in Afghanistan. 2014. Journal of Clinical Psychiatry, 75(9): 1001-1008.	No PTSD incidence	1
16. Armstrong D, Shakespeare-Finch J, Shochet I. Predicting post-traumatic growth and post-traumatic stress in firefighters. 2014. Australian Journal of Psychology, 66(1): 38-46.	No PTSD incidence	2
17. Boasso AM, Steenkamp MM, Nash, WP, Larson JL, Litz BT. The relationship between course of PTSD symptoms in deployed U.S. Marines and degree of combat exposure. 2015. Journal of Traumatic Stress, 28(1): 73-78.	No PTSD incidence	3
18. Bowler RM, Harris M, Li J, Gocheva V, Stellman SD, Wilson K, Alper H, Schwarzer R,	No PTSD	4

	Cone JE.Longitudinal mental health impact among police responders to the 9/11 terrorist attack. 2012. American Journal of Industrial Medicine, 55(4): 297-312.	incidence	
19.	Chin WD, Shiao JS, Liao SC, Kuo CY, Chen CC, Guo YL. Depressive, anxiety and post-traumatic stress disorders at six years after occupational injuries. 2017. European Archives of Psychiatry & Clinical Neuroscience, 267(6): 507-516.	No PTSD incidence	5
20.	Eriksson CB, Lopes Cardozo B, Foy DW, Sabin M, Ager A, Snider L, Scholte WF, Kaiser R, Olff M, Rijnen B, Crawford CG, Zhu J, Simon W. Predeployment mental health and trauma exposure of expatriate humanitarian aid workers: Risk and resilience factors. 2013. Traumatology, 19(1): 41-48.	No PTSD incidence	6
21.	Garcia FE, Vazquez C, Inostroza C. Predictors of post-traumatic stress symptoms following occupational accidents: A longitudinal study. 2019. Anxiety, Stress, & Coping, 32(2): 168-178.	No PTSD incidence	7
22.	Hartley TA, Violanti JM, Sarkisian K, Andrew ME, Burchfiel CM. PTSD symptoms among police officers: associations with frequency, recency, and types of traumatic events. 2013. International Journal of Emergency Mental Health, 15(4): 241-253.	No PTSD incidence	8
23.	Huang H, Kashubeck-West S. Exposure, agency, perceived threat, and guilt as predictors of posttraumatic stress disorder in veterans. 2015. Journal of Counseling & Development, 93(1): 3-13.	No PTSD incidence	9
24.	Jaegers LA, Matthieu MM, Vaughn MG, Werth P, Katz IM, Ahmad SO. Posttraumatic Stress Disorder and Job Burnout Among Jail Officers. 2019. Journal of Occupational & Environmental Medicine, 61(6): 505-510.	No PTSD incidence	10
25.	Mac Donald CL, Johnson AM, Wierzechowski L, Kassner E, Stewart T, Nelson EC, Werner NJ, Zonies D, Oh J, Fang R, Brody DL. Prospectively assessed clinical outcomes in concussive blast vs nonblast traumatic brain injury among evacuated US military personnel. 2014. JAMA Neurology, 71(8): 994-1002.	No PTSD incidence	11
26.	Magruder KM, Goldberg J, Forsberg CW, Friedman MJ, Litz BT, Vaccarino V, Heagerty PJ, Gleason TC, Huang GD, Smith NL. Long-Term Trajectories of PTSD in Vietnam-Era Veterans: The Course and Consequences of PTSD in Twins. 2016. Journal of Traumatic Stress, 29(1): 5-16.	No PTSD incidence	12
27.	Marchand A, Nadeau C, Beaulieu-Prevost D, Boyer R, Martin M. Predictors of posttraumatic stress disorder among police officers: A prospective study. 2015. Psychological Trauma:Theory, Pesearch, Practice and Policy, 7(3): 212-221.	No PTSD incidence	13
28.	Nash WP, Boasso AM, Steenkamp MM, Larson JL, Lubin RE, Litz BT. Posttraumatic stress in deployed marines: Prospective trajectories of early adaptation. 2015. Journal of Abnormal Psychology, 124(1): 155-171.	No PTSD incidence	14
29.	Polusny MA, Kumpula MJ, Meis LA, Erbes CR, Arbisi PA, Murdoch M, Thuras P, Kehle-Forbes SM, Johnson AK. Gender differences in the effects of deployment-related stressors and pre-deployment risk factors on the development of PTSD symptoms in National Guard Soldiers deployed to Iraq and Afghanistan. 2014. Journal of Psychiatric Research, 49(1): 1-9.	No PTSD incidence	15
30.	Rona RJ, Jones M, Sundin J, Goodwin L, Hull L, Wessely S, Fear NT. Predicting persistent posttraumatic stress disorder (PTSD) in UK military personnel who served in Iraq: a longitudinal study. 2012. Journal of Psychiatric Research, 46(9): 1191-1198.	No PTSD incidence	16
31.	Ryan-Gonzalez C, Kimbrel N, Meyer EC, Gordon EM, DeBeer BB, Gulliver SB, Elliott TR, Mosissette S. Differences in PTSD symptoms among post-9/11 veterans with blast- and non-blast mild TBI. 2019. Journal of Neurotrauma, 0897-7151.	No PTSD incidence	17
32.	Steenkamp MM, Schlenger WE, Corry N, Henn-Haase C, Qian M, Li M, Horesh D, Karstoft KI, Williams C, Ho CL, Shalev A, Kulka R, Marmar C. Predictors of PTSD 40 years after combat: Findings from the National Vietnam Veterans longitudinal study. 2017. Depression & Anxiety, 34(8): 711-722.	No PTSD incidence	18
33.	Wolf E, Mitchell K, Koenen K, Miller M. Combat exposure severity as a moderator of genetic and environmental liability to post-traumatic stress disorder. 2014. Psychological Medicine, 44(7): 1499-1509.	No PTSD incidence	19
34.	Yuan C, Wang Z, Inslicht SS, McCaslin SE, Metzler TJ, Henn-Haase C, Apfel BA, Tong H, Neylan TC, Fang Y, Marmar CR. Protective factors for posttraumatic stress disorder symptoms in a prospective study of police officers. 2011. Psychiatry Research, 188(1): 45-50.	No PTSD incidence	20

35. Amster ED, Fertig SS, Green M, Carel R. Occupational exposures and psychological symptoms among fire fighters and police during a major wildfire: The carmel cohort study. 2018. Occupational and Environmental Medicine, 75: A590-A591	Not about PTSD	1
36. Cavanaugh CE, Campbell JC, Messing JT. A longitudinal study of the impact of cumulative violence victimization on comorbid posttraumatic stress and depression among female nurses and nursing personnel. 2014. Workplace Health and Safety, 62 (6): 224-232.	Not about PTSD	2
37. Han M, Park S, Park JH, Hwang SS, Kim I. Do police officers and firefighters have a higher risk of disease than other public officers? A 13-year nationwide cohort study in South Korea. 2018, BMJ Open; 8(1):e019987.	Not about PTSD	3
38. Jacobson IG, Horton JL, Leardmann CA, Ryan MA, Boyko EJ, Wells TS, Smith B, Smith TC. Posttraumatic stress disorder and depression among U.S. military health care professionals deployed in support of operations in Iraq and Afghanistan. 2012, J Trauma Stress;25(6):616-23.	Not about PTSD	4
39. Tvaryanas AP, Maupin GM. Risk of incident mental health conditions among critical care air transport team members. 2014. Aviation Space & Environmental Medicine, 85(1): 30-38.	Not about PTSD	5
40. Vasterling JJ, Brailey K, Proctor SP, Kane RL, Heeren T, Franz, Molly R. Neuropsychological outcomes of mild traumatic brain injury, post-traumatic stress disorder and depression in Iraq-deployed US Army soldiers. 2012. British Journal of Psychiatry, 201(3): 186-192.	Not about PTSD	6
41. Bandelow BB, Koch M, Zimmermann P, Biesold KH, Wedekind D, Falkai P. Posttraumatic stress disorder (PTSD) in the German Armed Forces: a retrospective study in inpatients of a German army hospital. 2012. European Archives of Psychiatry & Clinical Neuroscience, 262(6): 459-467.	No control group	1
42. Aslan M, Concato J, Peduzzi PN, Proctor SP, Schnurr PP, Marx BP, McFall ME, Gleason TC, Huang GD, Vasterling JJ. Design of 'Neuropsychological and mental health outcomes of Operation Iraqi Freedom: a longitudinal cohort study'. 2013. Journal of Investigative Medicine, 61(3):569-577.	Protocol paper only	1
43. Dinenberg RE, McCaslin SE, Bates MN, Cohen BE. Social support may protect against development of posttraumatic stress disorder: findings from the Heart and Soul Study. 2014. American Journal of Health Promotion, 28(5): 294-297.	Not work-related	1
44. Erbes CR, Polusny MA, Arbisi PA, Koffel E. PTSD symptoms in a cohort of National Guard soldiers deployed to Iraq: Evidence for nonspecific and specific components. 2012. Journal of Affective Disorders, 142(1): 269-274.	Not work-related	2
45. Eskridge SL, Macera CA, Galarneau MR, Holbrook TL, Woodruff SI, MacGregor AJ, Morton DJ, Shaffer RA. Influence of combat blast-related mild traumatic brain injury acute symptoms on mental health and service discharge outcomes. 2013. Journal of Neurotrauma, 30(16): 1391-1397.	Not work-related	3
46. Eskridge SL, Macera CA, Galarneau MR, Holbrook, TL, Woodruff SI, Macgregor AJ, Morton DJ, Shaffer RA. Combat blast injuries: Injury severity and posttraumatic stress disorder interaction on career outcomes in male servicemembers. 2013. Journal of Rehabilitation Research and Development, 50(1): 7-16.	Not work-related	4
47. Fink DS, Gradus JL, Keyes KM, Calabrese JR, Liberzon I, Tamburrino MB, Cohen GH, Sampson L, Galea S. Subthreshold PTSD and PTSD in a prospective-longitudinal cohort of military personnel: Potential targets for preventive interventions. 2018. Depression & Anxiety, 35(11): 1048-1055.	Not work-related	5
48. Fitch TJ, Yu X, Chien LC, Karim MM, Alamgir H. Traumatic life events and development of post-traumatic stress disorder among female factory workers in a developing country. 2018. International Journal of Social Psychiatry, 64(4): 351-358.	Not work-related	6
49. Gilbertson MW, McFarlane AC, Weathers FW, Keane TM, Yehuda R, Shalev AY, Lasko NB, Goetz JM, Pitman RK, Harvard VA. Is trauma a causal agent of psychopathologic symptoms in posttraumatic stress disorder? Findings from identical twins discordant for combat exposure. 2010. Journal of Clinical Psychiatry, 71(10): 1324-1330.	Not work-related	7
50. Horesh D, Solomon Z, Keinan G, Ein-Dor T. The clinical picture of late-onset PTSD: a 20-year longitudinal study of Israeli war veterans. 2013. Psychiatry Research, 208(3): 265-273.	Not work-related	8

51.	Goldmann E, Calabrese JR, Prescott MR, Tamburrino M, Liberzon I, Slembarski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano MB, Sizemore J, Galea S. Potentially modifiable pre-, peri-, and postdeployment characteristics associated with deployment-related posttraumatic stress disorder among ohio army national guard soldiers. Ann Epidemiol. 2012;22(2): 71-78.	No work-related exposure	1
52.	Banducci AN, McCaughey VK, Gradus JL, Street AE. The associations between deployment experiences, PTSD, and alcohol use among male and female veterans. 2019. Addictive Behaviors, 98: 106032,	Cross-sectional	1
53.	Huang, J. and Liu, Q. and Li, J. and Li, X. and You, J. and Zhang, L. and Tian, C. and Luan, R. Post-traumatic stress disorder status in a rescue group after the Wenchuan earthquake relief. 2013. Neural Regeneration Research, 8(20): 1898-1906.	Cross-sectional	2
54.	Jones M, Sundin J, Goodwin G, Hull L, Fear NT, Wessely S, Rona RJ. 2013. What Explains Post-Traumatic Stress Disorder (PTSD) in UK Service Personnel: Deployment or Something Else? Psychological Medicine, 43(8):1703-12.	Cross-sectional	3
55.	Rybojad B, Aftyka A, Baran M, Rzonca P. Risk Factors for Posttraumatic Stress Disorder in Polish Paramedics: A Pilot Study. 2016. Journal of Emergency Medicine, 50(2): 270-276.	Cross-sectional	4
56.	Liu B, Tarigan LH, Bromet EJ, Kim H. World Trade Center disaster exposure-related probable posttraumatic stress disorder among responders and civilians: a meta-analysis. 2014. PLoS ONE, 9(7): e101491.	Systematic review	1
57.	Schutte N, Bar O, Weiss U, Heuft G. Prediction of PTSD in police officers after six months--a prospective study. 2012. Spanish Journal of Psychology, 15(3): 1339-1348.	Systematic review	2
58.	Milosavljevic M, Drakulic B, Crnobaric C, Perunicic I, Tosevski DL. Risk factor assessment for posttraumatic stress disorder in war veterans in former Yugoslavia. 2011. Psihijatrija Danas, 43(2): 141-153.	Not in English	1
59.	Giupponi G, Thoma H, Lamis D, Forte A, Pompili M, Kapfhammer HP. Posttraumatic stress reactions of underground drivers after suicides by jumping to arriving trains; feasibility of an early stepped care outpatient intervention. J Trauma Dissociation. 2019; 20(5):495-510.	No effect sizes	1
60.	Osofsky HJ, Osofsky JD, Arey J, Kronenberg ME, Hansel TC, Many MM. Hurricane Katrina's first responders: the struggle to protect and serve in the aftermath of the disaster. 2011. Disaster Medicine and Public Health Preparedness, 5: S214-S219.	No effect sizes	2
61.	Rosenblatt AS, Li R, Fortier C, Liu X, Fonda JR, Villalon A, McGlinchey RE, Jorge RE. Latent factor structure of PTSD symptoms in veterans with a history of mild traumatic brain injury and close-range blast exposure. 2018. Psychological Trauma: Theory, Research, Practice, and Policy, 442-450.	No effect sizes	3
62.	Sheffler JL, Rushing NC, Stanley IH, Sachs-Ericsson NJ. The long-term impact of combat exposure on health, interpersonal, and economic domains of functioning. 2016. Aging and Mental Health, 20(11): 1202-1212.	No effect sizes	4
63.	Solberg O, Birkeland MS, Blix I, Hansen MB, Heir T. Towards an exposure-dependent model of post-traumatic stress: longitudinal course of post-traumatic stress symptomatology and functional impairment after the 2011 Oslo bombing. 2016. Psychological Medicine, 46(15): 3241-3254.	No effect sizes	5
64.	Taymur I, Sargin AE, Ozdel K, Turkcapar HM, Calisgan L, Zamki E, Demirel B. Possible Risk Factors for Acute Stress Disorder and Post-Traumatic Stress Disorder After an Industrial Explosion. 2014. Noropsikiyatri Arsivi, 51(1): 23-29.	No effect sizes	6
65.	Wisnivesky JP, Teitelbaum S, Todd AC, Boffetta P, Crane M, Crowley L, De la Hoz RE, Dellenbaugh C, Harrison DJ, Herbert R, Kim H, Jeon Y, Kaplan J, Katz CL, Levin SM, Luft BJ, Markowitz S, Moline JM, Ozbay F, Pietrzak RH, Shapiro M, Sharma V, Skloot G, Southwick SM, Stevenson LA, Udasin IG, Wallenstein S, Landrigan PJ. Persistence of multiple illnesses in World Trade Center rescue and recovery workers: a cohort study. 2011. Lancet, 378(9794): 888-897.	No effect sizes	7

Supplementary file 3. Data extraction of included studies.

First author, Year;	Study (name, design and follow-up period)	Sample description (n, Country, Type of job/company, relevant inclusion/exclusion criteria, %Female, Age)	Description of exposure assessment (way and year of baseline exposure assessment and description of categories)	Description of outcome (type of symptoms, way of assessment, and incidence over the follow-up period)	Adjustment	Effect estimates (e.g., HR, RR or OR with 95% confidence interval). Super scripts refer to the models specified in the 'adjustment' column
1. Armed Forces Health Surveillance Center, 2011 [21]	Name: Armed forces health surveillance Design: Prospective longitudinal Follow-up period: 12 months post deployment	n=1,344,668 Country=USA %Female= 11% Age= The majority was <25, with lower numbers of participants in the 25-29 and 30+ categories. Type of job/company= Active components of the forces (on Afghanistan and Iran missions). Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: between Oct 2001 and Dec 2010 Exposure categories: % PTSD diagnosis were compared between deployment number, gender, age group, military occupation (combat, health care and other) and 'dwelling time' between employments.	Type of symptoms: PTSD Way of assessment: Mental disorders assessed with ICD-9-CM (309.81), reported in military or civilian hospitals Incidence: -	No	PTSD incidence was in general higher after the second, third and fourth deployment, compared to the first and fifth. PTSD incidence was in general higher among males, those in lowest age group, health care workers and those with longer dwelling time between the deployments. No effect estimates were reported (only incidences).
2. Andersen, 2019 [19]	Name: - Design: Prospective longitudinal (with cross-sectional and longitudinal analyses) Follow-up period: 4 years	n= 2,678 Country= Denmark %Female= 66% Age= 45.1(10.1) years Type of job/company= Employees working in psychiatric wards, in the	Exposure assessment: Self-reported Year of assessment: 2011 Exposure categories: Work-related violence and threats on a 5 point likert scale with 0=never to 4=almost daily, with	Type of symptoms: PTSD Way of assessment: Self-reported with the Impact of Event Scale-Revised Incidence:14% (2 incidences)	Unadjusted (model 1), adjusted for gender, age, bullying, sexual harassment, conflicts at work, negative acts, private traumas and sector (model 2), additionally adjusted for	**Work-related threats** All four sectors PTSD at 2011 OR: 1.11 [1.07 1.14][1] OR: 1.10 [1.05 1.15][2] PTSD at 2015 OR: 1.10 [1.07 1.13][1] OR: 1.11 [1.07 1.5][2] OR: 1.10 [1.04 1.15][3] Elder care

		elder sector, at special schools and in the prison and probation service. Inclusion/exclusion=-	summary scores 0-24 and 0-44, respectively.		baseline PTSD (model 3)	PTSD at 2011 OR: 0.99 [0.88 1.23][1] OR: 0.98 [0.82 1.18][2] PTSD at 2015 OR: 1.12 [1.00 1.25][1] OR: 1.12 [0.94 1.33][2] OR: 1.22 [0.95 1.56][3] Prison and probation service PTSD at 2011 OR: 1.21 [1.14 1.28][1] OR: 1.18 [1.08 1.27][2] PTSD at 2015 OR: 1.73 [1.20 1.35][1] OR: 1.25 [1.17 1.34][2] OR: 1.22 [1.13 1.31][3] Psychiatry PTSD at 2011 OR: 1.14 [1.06 1.12][1] OR: 1.19 [1.09 1.32][2] PTSD at 2015 OR: 1.06 [0.99 1.13][1] OR: 1.06 [0.97 1.17][2] OR: 0.94 [0.83 1.07][3] Special schools PTSD at 2011 OR: 1.01 [0.93 1.09][1] OR: 0.95 [0.85 1.05][2] PTSD at 2015 OR: 1.08 [1.01 1.15][1] OR: 1.06 [0.98 1.14][2] OR: 1.07 [0.95 1.12][3] PTSD at 2011 Males

						OR: 1.19 [1.12 1.26][2] Females OR: 1.04 [0.99 1.09][2] PTSD at 2015 Males OR: 1.18 [1.09 1.26][3] Females OR: 1.02 [0.96 1.09][3] **Work-related violence** All four sectors PTSD at 2011 OR: 1.05 [1.03 1.08][1] OR: 1.05 [1.01 1.08][2] PTSD at 2015 OR: 1.02 [0.98 1.04][1] OR: 1.03 [1.00 1.06][2] OR: 1.02 [0.98 1.06][3] Elder care PTSD at 2011 OR: 1.04 [0.95 1.12][1] OR: 1.03 [0.94 1.13][2] PTSD at 2015 OR: 1.07 [0.97 1.15][1] OR: 1.03 [0.93 1.14][2] OR: 1.02 [0.90 1.16][3] Prison and probation service PTSD at 2011 OR: 1.29 [1.15 1.49][1] OR: 1.26 [1.09 1.46][2] PTSD at 2015 OR: 1.50 [1.31 1.73][1] OR: 1.42 [1.22 1.65][2] OR: 1.36 [1.36 1.60][3]

						Psychiatry PTSD at 2011 OR: 1.08 [1.01 1.15][1] OR: 1.13 [1.03 1.24][2] PTSD at 2015 OR: 1.04 [0.98 1.10][1] OR: 1.05 [0.96 1.14][2] OR: 0.98 [0.88 1.10][3] Special schools PTSD at 2011 OR: 1.04 [0.98 1.09][1] OR: 1.03 [0.97 1.10][2] PTSD at 2015 OR: 1.02 [0.97 1.07][1] OR: 1.02 [0.97 1.07][2] OR: 1.01 [0.42 1.08][3] PTSD at 2011 Males OR: 1.06 [0.99 1.12][2] Females OR: 1.03 [0.99 1.07][2] PTSD at 2015 Males OR: 1.07 [0.99 1.14][3] Females OR: 0.99 [0.95 1.05][3]
3. Anderson, 2019 [20]	Name: Army STARRS study Design: Prospective longitudinal (with baseline measurements 1-2 months before	n=4,645 Country=USA %Female=5% Age=26.9(0.2) years Type of job/company=	Exposure assessment: Self-reported Year of assessment: 2012 Exposure categories: Unit cohesion, stressful employment	Type of symptoms: PTSD (30 days) Way of assessment: Composite International Diagnostic Interview screening scales (CIDI-SC) and a six-item	Models were adjusted for all other exposures (model 1) and for lifetime PTSD at baseline (model 2).	**Age** OR: 1.00 [0.99 1.02][1] OR: 1.00 [0.99 1.02][2] **Sex** Female OR: Ref OR: Ref Male

	the deployment) Follow-up period: 9 months post-employment	Soldiers from three combat teams employed in Afghanistan Inclusion/exclusion= -	characteristics and sociodemographic were assessed	screening version of the PTSD Checklist (PCL) to assess lifetime DSM-4 mental disorders Incidence: 11.9% (lifetime)		OR: 0.73 [0.46 1.14][1] OR: 0.88 [0.51 1.51][2] **Race** White OR: Ref OR: Ref Black OR: 0.99 [0.67 1.48][1] OR: 1.04 [0.72 1.49][2] Asian OR: 1.28 [0.77 2.12][1] OR: 1.38 [0.80 2.39][2] Other OR: 1.49 [1.04 2.15][1] OR: 1.25 [0.86 1.82][2] **Ethnicity** Non-Hispanic OR: Ref OR: Ref Hispanic OR: 1.15 [0.83 1.59][1] OR: 1.22 [0.87 1.73][2] **Brigade Combat Team** Fort #1 OR: Ref OR: Ref Fort #2 OR: 1.15 [0.90 1.47][1] OR: 1.31 [0.97 1.77][2] Fort #3 OR: 1.00 [0.80 1.24][1] OR: 1.09 [0.82 1.45][2] **Number of deployments**

						Zero OR: Ref OR: Ref One OR: 1.09 [0.84 1.42][1] OR: 0.96 [0.73 1.27][2] ≥Two OR: 1.12 [0.87 1.43][1] OR: 0.92 [0.71 1.19][2] **Time in unit** >6months OR: Ref OR: Ref <1month OR: 1.51 [1.12 2.05][1] OR: 1.81 [1.24 2.63][2] 1–6 months OR: 0.75 [0.58 0.96][1] OR: 0.77 [0.64 0.94][2] **Lifetime PTSD at baseline** OR: 3.06 [2.24 4.17][1] **30-day PTSD at baseline** OR: 2.28 [1.36 3.82][1] **Deployment stress** Low/moderate OR: Ref OR: Ref High OR: 3.21 [2.75 3.74][1] OR: 3.52 [2.94 4.21][2] **Unit cohesion at baseline** OR: 0.82 [0.73 0.91][1]

						OR: 0.74 [0.65 0.84][2]
4. Berninger, 2010 [22]	Name: FDNY-WTC-MMP Design: Prospective longitudinal with baseline measurement within 6 months from the disaster. Follow-up period: 2.9 years	n=5,656 Country= USA %Female= 0% Age= - Type of job/company= New York fire department rescue workers who were involved in the 9/11 WTC disaster Inclusion/exclusion= Fire fighters who retired during the study, who arrived at the disaster site >14 days after the recue, and females; firefighters	Exposure assessment: Demographic and retirement from employee databases, all other information from self-reports. Year of assessment: 2001 Exposure categories: -	Type of symptoms: Probable PTSD Way of assessment: Self-reported using PTSD checklist (PCL-m) Incidence:16%	Univariate (model 1) and multivariate adjusting for all other exposures that contributed statistically significant in the univariate model (model 2).	**Age** 20-29 years OR: Ref 30-39 years OR: 1.0 [0.8 1.3][1] 40-49 years OR: 1.0 [0.8 1.3][1] 50-59 years OR: 0.6 [0.4 1.1][1] 60+ years OR: - Continuous OR: 0.98 [0.97 1.00][2] **Education** High School OR: Ref Some College OR: 1.1 [0.9 1.3][1] College OR: 1.1 [0.9 1.3][1] Post-College OR: 1.2 [0.8 1.8][1] **Living with a partner** Yes OR: Ref No OR: 1.06 [0.89 1.27][1] **Arrival Group** Morning of 9/11 OR: 4.8 [3.0 7.5][1] OR: 2.0 [1.3 2.9][2] Afternoon of 9/11 OR: 2.3 [1.5 3.5][1]

						OR: 1.1 [0.8 1.5][2] Day 2 OR: 1.4 [0.8 2.3][1] Days 3-14 OR: Ref **Prolonged work at the WTC site** ≥4 months OR: 2.0 [1.7 2.3][1] <4 months OR: Ref **Rank** Firefighter OR: Ref Line officer OR: 1.1 [0.95 1.30][1] Chiefs OR: 0.96 [0.70 1.32][1] **Number of deaths in firehouse** 0 deaths OR: Ref 1-3 deaths OR: 1.5 [1.2 1.9][1] 4+ deaths OR: 2.3 [1.8 2.9][1] **Supervising responsibilities** Yes OR: 2.2 [1.7 2.9][1] No OR: Ref **Previous disaster experience**

						Yes OR: 1.4 [1.2 1.6][1] No OR: Ref **Duration of work at WTC site (per month)** OR: 1.1 [1.1 1.2][2] **Reported increase in alcohol** OR: 1.3 [1.0 1.7][2] **Baseline probable PTSD** OR: 5.6 [4.4 7.0][2]
5. Brownlow, 2018 [23]	Name: Army STARSS study Design: Retrospective longitudinal Follow-up period: -	n= 14,254 for AAS and 25,629 for NSS. Country= USA %Female= 12% for AAS and 17% for NSS Age= 29.0(0.1) for AAS and 21.0(0.0) for NSS Type of job/company= Soldiers at all stages of their activity (AAS sub-study) and new recruits (NSS sub-study) Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2011-2013 Exposure categories: Deployment-related and lifetime stress were assessed (the former only for the AAS cohort).	Type of symptoms: Probable PTSD (lifetime and past 30-day prevalence) was assessed using the PTSD Checklist (PCL) using DSM-4 criteria Way of assessment: Self-reported Incidence:-	-	**Diversity of Deployment-Related Traumatic Stress Score [0-15]** *30-day PTSD* OR: 1.15 [1.13 1.16] (AAS) *Lifetime PTSD* OR: 1.17 [1.16 1.18] (AAS) **Cumulative Deployment-Related Traumatic Stress Score [0 60]** *30-day PTSD* OR: 1.03 [1.03 1.04] (AAS) *Lifetime PTSD* OR: 1.00 [0.99 1.00] (AAS) **Diversity of Lifetime Traumatic Stress Score** *30-day PTSD* OR: 1.14 [1.13 1.16] (AAS) OR: 1.34 [1.30 1.38] (NSS) *Lifetime PTSD* OR: 1.16 [1.15 1.17] (AAS) OR: 1.34 [1.31 1.38] (NSS)

						Cumulative Lifetime Traumatic Stress Score *30-day PTSD* OR: 1.02 [1.02 1.03] (AAS) OR: 0.99 [0.98 1.01] (NSS) *Lifetime PTSD* OR: 1.02 [1.01 1.02] (AAS) OR: 1.00 [0.99 1.01] (NSS)
6. Brundage, 2015 [24]	Name: Defense Medical Surveillance System (DMSS) Design: Prospective longitudinal Follow-up period: 36 months post-deployment.	n= 2,020,340 (Iraq/Afghanistan) and 529,609 (Korea/Japan) Country= USA %Female= - Age= - Type of job/company= Individuals who served in army, air force, navy and marine. Those who were deployed in Iraq and Afghanistan were compared with a reference group who returned from assignments in Korea and Japan. Inclusion/exclusion= -	Exposure assessment: Deployment administration Year of assessment: 2003-2014 Exposure categories: Iraq/Afghanistan vs Korea/Japan, and occupation. Also other factors were assessed but where not considered for this review.	Type of symptoms: PTSD Way of assessment: Diagnosis using ICD-9 criteria. Incidence: -	-	There were 4.85 diagnoses per 100 deployments among those who served in Iraq/Afghanistan, this was 1.04 among those who went to Japan/Korea (with a 4.66 ratio between the two groups). Diagnosis per 100 deployments were highest among combat specific (5.62) and health care (8.52) occupations who went to Iraq/Afghanistan, compared to others (4.17).
7. Cameron, 2019 [25]	Name: Defence Manpower Data Center (DMDC) Database and Defense Medical	n= 1.35 million Country = USA %Female= 12%	Exposure assessment: Deployment administration Year of assessment:	Type of symptoms: PTSD Way of assessment: Data from the	Unadjusted (model 1) and adjusted for all other exposures (model 2).	**Sex** Female RR: 1.65 [1.54 1.77][1] RR: 1.92 [1.84 2.00][2] Male

	Surveillance System (DMSS) Design: Retrospective longitudinal Follow-up period: -	Age= - Type of job/company = Active duty service members between 1999 and 2008. Inclusion/exclusion= -	1999-2008 Exposure categories: Rank and service type.	Defence Medical Surveillance System (DMSS), with ICD-9-CM coded diagnoses, were used. Incidence: 52,771 incident cases (~4%)		RR: Ref. RR: Ref. **Age** < 20 RR: Ref. RR: Ref. 20–24 RR: 1.41 [1.25 1.60][1] RR: 1.36 [1.27 1.46][2] 25–29 RR: 1.36 [1.20 1.54][1] RR: 1.52 [1.41 1.65][2] 30–34 RR: 1.00 [0.87 1.15][1] RR: 1.37 [1.25 1.50][2] 35–39 RR: 0.88 [0.76 1.02][1] RR: 1.37 [1.24 1.52][2] > 39 RR: 0.93 [0.80 1.08][1] RR: 1.68 [1.51 1.87][2] **Race** Black RR: Ref. RR: Ref. Other RR: 1.32 [1.18 1.47][1] RR: 1.45 [1.36 1.54][2] White RR: 1.35 [1.25 1.47][1] RR: 1.58 [1.51 1.66][2] **Marital Status** Married RR: 1.13 [1.06 1.20][1]

						RR: 1.38 [1.32 1.44][2] Other RR: 1.59 [1.40 1.80][1] RR: 1.72 [1.59 1.86][2] Single RR: Ref. RR: Ref. **Rank** E1-E4 RR: 3.90 [3.19 4.77][1] RR: 4.93 [4.31 5.63][2] E5-E9 RR: 3.02 [2.47 3.70][1] RR: 3.42 [3.02 3.89][2] O1-O3 RR: 1.08 [0.84 1.38][1] RR: 1.17 [1.00 1.36][2] O4-O9 RR: Ref. RR: Ref. **Service** Air Force RR: Ref. RR: Ref. Army RR: 3.80 [3.50 4.12][1] RR: 3.80 [3.59 4.02][2] Marines RR: 2.90 [2.63 3.19][1] RR: 2.92 [2.73 3.12][2] Navy RR: 1.38 [1.25 1.52][1] RR: 1.51 [1.41 1.61][2]
8. Chiu, 2011 [26]	Name: FDNY pension database	n= 1,915	Exposure assessment: Deployment	Type of symptoms: PTSD symptoms	Unadjusted (model 1) and adjusted for	**Exposure group** morning of 9/11

	Design: Prospective longitudinal Follow-up period: 4 years post-attack.	Country= USA %Female= 0% Age= 47.0 (6.9) years Type of job/company= New York fire department firefighters who were involved in the 9/11 WTC attacks. Inclusion/exclusion= Fire marshals, females, those who retired due to mental health disability and those who did not first arrive at the disaster site were excluded.	administration Year of assessment: 2001 Exposure categories: Retirement status, rank, and exposure.	Way of assessment: Self-reported using the PTSD checklist (PCL-17) , using a cut-off >= 39 (range 17-85). Incidence: 22%	all remaining exposures in the model (model 2).	OR: 4.9 [3.0 7.9][1] OR: 4.0 [2.5 6.6][2] afternoon of 9/11 OR: 2.4 [1.5 3.7][1] OR: 2.1 [1.3 3.3][2] day 2 OR: 1.7 [1.0 2.8][1] OR: 1.4 [0.9 2.4][2] day 3 to day 14 OR: Ref. OR: Ref. **Retirement status** Disability OR: 1.9 [1.5 2.4][1] OR: 1.7 [1.4 2.2][2] Non-disability OR: Ref. OR: Ref. **AUDIT score** ≥8 OR: 2.0 [1.5 2.5][1] OR: 1.9 [1.5 2.4][2] <8 OR: Ref. OR: Ref. **Age on 9/11 [in years]** <55 OR: 2.0 [1.4 3.0][1] OR: 1.5 [1.0 3.0][2] ≥55 OR: Ref. OR: Ref. **Age on 9/11 - in years**

						Continuous OR: 1.0 [1.0 1.0][1] **Marital status** Married OR: 0.8 [0.6 1.2][1] Living with a partner OR: 1.1 [0.6 2.1][1] Never married OR: 0.9 [0.5 1.6][1] Separated/widowed/divorced OR: Ref. **Marital status change since 9/11** Status change OR: 1.3 [0.9 1.9][1] No change OR: Ref. **Previous profession** No other profession OR: 1.2 [0.9 1.4][1] Other professions OR: Ref. **Rank** Chiefs OR: 0.5 [0.3 0.9][1] Captains and lieutenants OR: 0.8 [0.6 1.0][1] Firefighters OR: Ref.
9. Ciarleglio, 2018 [27]	Name: VU Cooperative Studies Program Study, combined	n= 375 Country= USA	Exposure assessment: Self-reported Year of assessment:	Type of symptoms: PTSD Way of assessment:	Multivariate models adjusting for all other exposures.	**Age in years** OR: 1.04 [0.99 1.09] **Gender**

	with data from Neurocognition Deployment Health Study (NDHS). Design: Retrospective longitudinal Follow-up period: Between 5.7 months (baseline) and 7.5 months post-deployment (long-term follow-up).	%Female= 5% Age= 35.1 (5.9) years Type of job/company= Army soldiers who were deployed in Iraq Inclusion/exclusion= -	2003-2005 Exposure categories: Deployment history and stress exposure.	Using a clinically administered PTSD scale. Incidence: 24% (prevalence)		Male OR: Ref. Female OR: 0.31 [0.07 1.53] **Number of deployments** Single deployment OR: Ref. Multiple deployments OR: 0.83 [0.27 2.57] **Months since most recent deployment** OR: 1.00 [0.98 1.02] **Composite emotional health factor post-deployment** OR: 1.09 [0.79 1.50] **Mental health treatment received post-deployment** No OR: Ref. Yes OR: 4.12 [2.18 7.80] **Early life events summary score** OR: 0.92 [0.84 1.00] **Combat and post-battle experiences** OR: 0.99 [0.95 1.03] **Deployment concerns summary score** OR: 1.01 [0.98 1.04]

						Life and family concerns OR: 0.99 [0.94 1.03] **Post-deployment life events summary score** OR: 1.07 [0.96 1.19] **Post-war-zone social support** OR: 0.92 [0.89 0.95]
10. Cone, 2015 [28]	Name: World Trade Center Health Registry Design: Prospective longitudinal Follow-up period: 10 years	n= 2,204 Country= USA %Female= 13% Age= 38 (median) Type of job/company= Police responders to the 9/11 WTC attacks Inclusion/exclusion= Those with at least one shift at the disaster site, those without pre-9/11 PTSD and with follow-up measurements.	Exposure assessment: Self-reported Year of assessment: 2001 Exposure categories: Demographic, injury, stressors, life threatening event, support.	Type of symptoms: Probable PTSD Way of assessment: Self-reported using a combination of the PCL checklist and DSM-4 criteria. Incidence: 11% (prevalence)	Adjusting for all other exposures.	**Age group at 9/11** 18-44 OR: Ref. 45-69 OR: 0.6 [0.3 1.3] **Gender** Male OR: Ref. Female OR: 1.3 [0.7 2.5] **Hispanic** No OR: Ref. Yes OR: 1.2 [0.7 2.0] **Household gross income at wave 3** ≥75K OR: Ref. <75K OR: 2.0 [1.2 3.4] **Having social support** All of the time

						OR: Ref. Most OR: 3.5 [2.0 6.1] Some OR: 3.6 [1.9 6.9] Little or none OR: 2.6 [1.04 6.5] **Current employment status at wave 3** Employed OR: Ref. Unable to work because of health OR: 3.7 [1.9 7.3] Retired OR: 1.3 [0.8 2.2] Other OR: 2.9 [0.8 10.1] **Number of life stressors in last 12 months** None OR: Ref. 1 to 2 OR: 1.7 [1.0 2.7] ≥3 OR: 3.2 [1.2 8.5] **Number of events threatened your life since 9/11** None OR: Ref. 1 to 2 OR: 1.0 [0.5 1.9] ≥3

						OR: 3.3 [1.9 5.6] **Number of injuries sustained during the 9/11 attacks** None OR: Ref. One OR: 1.1 [0.6 2.0] Two or more OR: 1.4 [0.6 3.4] **Report of unmet mental health care needs at wave 3** No OR: Ref. Yes OR: 9.5 [5.3 16.9]
11. Connorton, 2011 [29]	Name: National Comorbidity Survey Replication (NCS-R) Design: Retrospective longitudinal Follow-up period: -	n= 217 exposed and 2,110 unexposed. Country=USA %Female= 0% Age= 55.0(0.9) for exposed workers, 43.8 (0.9) for non-exposed workers Type of job/company= Participants employed in combat or service as peacekeeper or relief worker. Inclusion/exclusion= Females were excluded	Exposure assessment: Self-reported Year of assessment: 2001-2002 Exposure categories: Participants who were exposed to combat and peacekeeping/relieve work or combat only vs non-exposed participants.	Type of symptoms: PTSD (according to DSM-4 criteria) Way of assessment: Self-reported (no specific questionnaire mentioned) Incidence: 29/(217+2110)=1%	Univariate and multivariate analyses adjusting for age of exposure, age of onset diagnosis, race	**Exposure** No exposure OR: Ref Exposure to peacekeeping/relieve work and combat OR: 11.2 [2.9 43.2] Exposure to combat only OR: 7.3 [3.3 15.8] According to the authors the results remained the same in multivariate analyses (data not reported)

12. Cukor, 2011 [30]	Name: Weill Cornell 9/11 Screening Program Design: Prospective longitudinal Follow-up period: Up to 4 years.	n= 2,960 Country= USA %Female= - Age= - Type of job/company= 9/11 WTC disaster recovery workers. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2002-2004 Exposure categories: Occupational exposure	Type of symptoms: PTSD Way of assessment: Using the CAPS standardized clinical interview and using the PCL-C questionnaire using DSM-4 criteria. CAPS data were used for exposure-outcome assessment. Incidence: 9%, 5% and 2% had probable self-reported PTSD at T1, T2 and T3, respectively. 15%, 8% and 6% had diagnosed PTSD at T1, T2 and T3, respectively.	Adjusting for baseline PTSD and demographic variables	**Occupational exposure** No OR: Ref. Yes OR: 1.31 [1.13 1.51]
13. Fear, 2010 [31]	Name: HERRICK cohort (and other samples) Design: Prospective longitudinal Follow-up period: -	n= 3600 Country= UK %Female= - Age= - Type of job/company= Armed forces who were deployed in Iraq and Afghanistan, who were compared to armed forces who were not deployed.	Exposure assessment: Deployment administration Year of assessment: 2003 Exposure categories: Deployment, rank, number of deployments and time since deployment.	Type of symptoms: PTSD symptoms Way of assessment: Self-reporting using the PCL-C questionnaire. Incidence: 4%	Unadjusted (model 1) and adjusted for age, sex, marital status, education and rank (model 2)	**Deployment** Not deployed OR: Ref. OR: Ref. Regulars OR: 1.03 [0.79 1.36][1] OR: 1.13 [0.82 1.54][2] Reservists OR: 2.90 [1.37 6.12][1] OR: 2.83 [1.23 6.51][2] **Location of deployment** Not deployed in Iraq/Afghanistan OR: Ref.

		Inclusion/exclusion= -				Deployed in Iraq OR: 1.20 [0.87 1.67][2] Deployed in Afghanistan OR: 0.93 [0.54 1.59][2] Deployed in Iraq and Afghanistan OR: 0.92 [0.58 1.46][2] **Role of deployment** Combat service report OR: Ref. OR: Ref. Combat OR: 1.99 [1.42 2.78][1] OR: 1.87 [1.26 2.78][2] Service support OR: 0.58 [0.28 1.19][1] OR: 0.67 [0.32 1.41][2] **Number of deployments** One deployment OR: Ref. OR: Ref. Two deployments OR: 0.83 [0.51 1.36][1] OR: 0.96 [0.58 1.57][2] More than three deployments OR: 0.61 [0.29 1.26][1] OR: 0.72 [0.34 1.50][2] **Time since return from deployment** Up to 1 year OR: Ref. OR: Ref. Up to 2 years

						OR: 1.19 [0.76 1.86][1] OR: 1.18 [0.75 1.86][2] Up to 3 years OR: 1.95 [1.16 3.27][1] OR: 1.80 [1.05 3.10][2] Up to 4 years OR: 1.98 [1.08 3.65][1] OR: 1.88 [0.98 3.62][2] Up to 5 years OR: 1.59 [0.99 2.57][1] OR: 1.53 [0.92 2.55][2] Up to 6.5 years OR: 1.79 [0.98 3.26][1] OR: 1.89 [0.99 3.60][2]
14. Ferrajao, 2016 [32]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 120 Country= Portugal %Female= 0% Age= 64 [59-72] Type of job/company= Colonial war veterans Inclusion/exclusion= Participants who received psychiatric and psychological treatment during the last 5 years, and no history of traumatic brain injury, neurological disorders or physical disability were included.	Exposure assessment: Self-reported. Year of assessment: - Exposure categories: Combat exposure, abusive violence, sense of coherence.	Type of symptoms: PTSD symptoms Way of assessment: Self-reported using the Impact of Event Scale Revised (with a cut-off score: >=33) Incidence: 41% (prevalence)	Unadjusted	**Combat exposure scale [1 5]** OR: 1.98 [1.50, 2,62] **Sense of coherence** OR: -5.08 [-3.32, -7.78] **Observation of abusive violence** No OR: Ref. Yes OR: 8.36 [4.56, 15.35] **Participation in abusive violence** No OR: Ref. Yes OR: 3.32 [1.81, 6.08]
15. Fichera,	Name: -	n= 383	Exposure assessment:	Type of symptoms:	Adjusting for all	**Number of robberies during**

2015 [33]	Design: Prospective longitudinal, with baseline 7-15 days post-robbery Follow-up period: 45 days after the first session	Country= Italy %Female= 52% Age= 43 (9) years Type of job/company= Employees of a large bank who were victims of robberies. Inclusion/exclusion= Participants who had voluntarily joined and employer sponsored post-robbery support program.	Self-reported (questionnaires and interviews) Year of assessment: 2010-2012 Exposure categories: Personal characteristics and characteristics of the robberies	PTSD Way of assessment: Self-reported using the Impact of Events Scale (IES). Incidence: 14%	other exposures (model 1), when additionally adjusting for baseline PTSD (model 2), and the latter two models in which random intercepts were adopted (model 3 and 4).	**working life** OR: 1.25 [1.07 1.44][1] OR: 1.15 [0.97 1.36][2] OR: 1.27 [1.07 1.51][3] OR: 1.18 [0.97 1.44][4] **Gender** Males OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Females OR: 0.63 [0.31 1.29][1] OR: 0.72 [0.33 1.58][2] OR: 0.77 [0.34 1.78][3] OR: 0.85 [0.33 2.13][4] **Being cashier** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 0.52 [0.22 122][1] OR: 0.94 [0.36 2.42][2] OR: 0.40 [0.14 1.07][3] OR: 0.76 [0.25 2.25][4] **Physical contacts with robbers** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4]

						Yes OR: 1.21 [0.58 2.54][1] OR: 0.83 [0.36 1.87][2] OR: 1.23 [0.50 2.98][3] OR: 0.86 [0.32 2.28][4] **Scuffle [taking part or being present]** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.41 [0.61 3.27][1] OR: 1.64 [0.64 4.20][2] OR: 1.72 [0.62 4.78][3] OR: 1.92 [0.63 5.79][4] **Being injured during the robbery** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.69 [0.58 4.89][1] OR: 1.44 [0.44 4.73][2] OR: 1.81 [0.49 6.61][3] OR: 1.28 [0.31 5.21][4] **Worried by other issues related to robbery** No OR: Ref[1] OR: Ref[2]

						OR: Ref[3] OR: Ref[4] Yes OR: 2.47 [1.16 5.27][1] OR: 2.11 [0.91 4.91][2] OR: 2.88 [1.16 7.19][3] OR: 2.64 [0.95 7.36][4] **Feeling terror and hopelessness** True OR: 6.96 [2.25 21.53][1] OR: 1.19 [0.32 4.36][2] OR: 8.64 [2.19 34.10][3] OR: 1.59 [0.33 7.58][4] Partly true OR: 2.82 [0.98 8.10][1] OR: 1.10 [0.33 3.65][2] OR: 3.48 [1.00 12.12][3] OR: 1.45 [0.35 6.02][4] **Post-session individual interview requested** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.09 [0.29 4.09][1] OR: 0.41 [0.09 1.81][2] OR: 0.75 [0.14 4.07][3] OR: 0.35 [0.06 2.07][4] **PTSD at T1** No OR: Ref[1]

						OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: – OR: 1.11 [1.07 1.15][2] OR: – OR: 1.11 [1.07 1.16][4]
16. Fink, 2016 [34]	Name: Reserve and National Guard (RNG) study. Design: Prospective longitudinal Follow-up period: 4 years	n= 2,003 Country= USA %Female= 18% Age= - Type of job/company= Army reservists Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2010 Exposure categories: Personal characteristics, deployment history and rank.	Type of symptoms: PTSD Way of assessment: Self-reported using the PCL-C checklist, based on DSM-4 criteria. Criteria that sensitive and specific were used leading to two different PTSD definitions. Incidence: 4.7 and 2.9 per 100 person-year for sensitive and specific definition, respectively.	Univariate models using the sensitive (model 1) and specific (model 2) outcome definition.	Effects in incidence rate (IR) per 100/per-years **Age** 18–24 years IR: 4.8 [3.0–7.5][1] IR: 1.9 [0.8–4.3][2] 25–34 years IR: 4.4 [3.2–6.1][1] IR: 2.9 [1.9–4.4][2] >35 years IR: 4.9 [3.8–6.3][1] IR: 3.4 [2.5–4.7][2] **Sex** Male IR: 4.6 [3.8–5.7][1] IR: 3.2 [2.5–4.2][2] Female IR: 4.9 [3.2–7.4][1] IR: 1.4 [0.7–2.8][2] **Race/ethnicity** Non-Hispanic, white IR: 4.3 [3.4–5.3][1] IR: 2.4 [1.8–3.3][2] Non-Hispanic, black IR: 6.4 [4.0–10.2][1] IR: 4.6 [2.6–8.2][2]

						Hispanic IR: 5.5 [3.3–9.1][1] IR: 4.3 [2.4–7.6][2] Other IR: 5.3 [3.0–9.1][1] IR: 3.8 [2.0–7.2][2] **Education** < High school IR: 4.2 [1.0–16.6][1] IR: 7.9 [2.1–29.1][2] High school IR: 6.1 [3.9–9.4][1] IR: 3.6 [2.0–6.4][2] Some college IR: 4.8 [3.7–6.2][1] IR: 2.8 [2.0–3.8][2] > College IR: 3.5 [2.6–4.8][1] IR: 2.3 [1.6–3.4][2] **Marital status** Never married IR: 3.9 [2.7–5.7][1] IR: 2.3 [1.3–4.0][2] Married IR: 4.9 [3.8–6.2][1] IR: 2.9 [2.1–4.0][2] Previously married IR: 6.1 [3.9–9.5][1] IR: 4.8 [3.0–7.6][2] **Rank** Junior enlisted IR: 4.4 [2.2–8.8][1] IR: 1.2 [0.4–3.4][2] Non-Commissioned Officers

						IR: 5.1 [4.1–6.2][1] IR: 3.4 [2.6–4.4][2] Officer IR: 3.0 [2.0–4.5][1] IR: 1.4 [0.8–2.5][2] **Number of baseline deployments** Zero IR: 3.9 [2.5–5.9][1] IR: 1.4 [0.7–2.5][2] One IR: 4.8 [3.4–6.7][1] IR: 3.9 [2.6–5.9][2] Two IR: 5.1 [3.7–7.0][1] IR: 3.5 [2.4–5.0][2] More than three IR: 5.5 [3.6–8.3][1] IR: 2.9 [1.6–5.4][2] **Past-year deployment** Yes IR: 7.2 [4.6–11.2][1] IR: 3.0 [1.4–6.3][2] No IR: 5.3 [4.4–6.5][1] IR: 3.6 [2.8–4.6][2] **Past-year deployment trauma** Yes IR: 5.3 [3.2–8.7][1] IR: 2.0 [0.9–4.4][2] No IR: 4.6 [3.7–5.6][1] IR: 3.1 [2.4–4.0][2]

						Past-year civilian trauma Yes IR: 6.5 [5.2–8.1][1] IR: 4.2 [3.1–5.6][2] No IR: 2.9 [2.1–4.0][1] IR: 1.6 [1.0–2.5][2] **Component** Reserve IR: 4.0 [3.0–5.3][1] IR: 3.0 [2.1–4.2][2] National Guard IR: 5.3 [4.2–6.8][1] IR: 2.8 [2.0–4.0][2] **Branch** Air Force Reserve IR: 2.7 [1.3–5.6][1] IR: 1.1 [0.3–3.5][2] Army Reserve IR: 4.2 [2.8–6.3][1] IR: 4.2 [2.7–6.6][2] Marine Reserve IR: 5.3 [3.0–9.7][1] IR: 2.5 [1.1–5.5][2] Navy Reserve IR: 4.0 [2.2–7.2][1] IR: 1.9 [0.9–4.0][2] Air National Guard IR: 3.4 [1.9–6.1][1] IR: 0.4 [0.1–1.4][2] Army National Guard IR: 5.9 [4.5–7.7][1] IR: 3.6 [2.4–5.0][2]
17. Goodwin,	Name: -	n= 1,397	Exposure assessment:	Type of symptoms:	Univariate (model	**Sex**

2012 [35]	Design: Prospective longitudinal. Follow-up period: 40.3 months (median)	Country= UK %Female= 11% Age= - Type of job/company= Military personnel that were and were not deployed in the Iraq war. Inclusion/exclusion= -	Self-reported. Year of assessment: 2004-2006. Exposure categories: Personal characteristics, service, rank and deployment history.	PTSD symptoms (delayed onset) Way of assessment: Self-reported using the PCL-C checklist. Incidence: 3.5%	1) and multivariate (model 2) adjusting for service, rank, deployment characteristics, depression, anxiety, panic disorder, childhood adversity and general health, alcohol misuse, common mental disorders, and subthreshold PTSD all at phase 1.	Male OR: Ref. Female OR: 1.46 [0.64 3.36][1] **Age** <35 OR: Ref. ≥35 OR: 0.71 [0.38 1.34][1] **Marital status** In a relationship OR: Ref. Single, divorced, separated, widowed OR: 0.92 [0.39 2.14][1] **Service** Naval services OR: 0.40 [0.14 1.19][1] OR: 0.45 [0.16 1.28][2] Army OR: Ref. OR: Ref. Royal Air Force OR: 0.23 [0.07 0.81][1] OR: 0.53 [0.15 1.87][2] **Rank** Officer OR: 0.17 [0.05 0.57][1] OR: 0.21 [0.06 0.72][2] Other rank OR: Ref. OR: Ref.

						Deployment Regular OR: Ref. Reservist OR: 0.83 [0.42 1.68][1] **In a combat role on deployment** No OR: Ref. OR: Ref. Yes OR: 3.00 [1.57 5.75][1] OR: 2.61 [1.20 5.68][2] **Thought might be killed** No OR: Ref. OR: Ref. Yes OR: 3.69 [1.61 8.45][1] OR: 2.38 [1.03 5.46][2] **Discharged weapon on deployment** No OR: Ref. Yes OR: 1.48 [0.61 3.60][1] **Handled bodies on deployment** No OR: Ref. Yes OR: 2.01 [0.93 4.35][1]

						History of depression No OR: Ref. OR: Ref. Yes OR: 4.31 [2.19 8.49][1] OR: 3.67 [1.75 7.67][2] **History of anxiety/panic disorder** No OR: Ref. OR: Ref. Yes OR: 4.77 [1.92 11.82][1] OR: 2.85 [0.87 9.30][2] **Childhood adversity, antisocial behavior** No OR: Ref. OR: Ref. Yes OR: 3.26 [1.66 6.40][1] OR: 1.58 [0.73 3.43][2] **Childhood adversity, family relationship** 0 adversities OR: Ref. OR: Ref. 1 adversity OR: 1.36 [0.53 3.48][1] OR: 1.29 [0.46 3.63][2] 2 or more adversities OR: 2.92 [1.41 6.04][1] OR: 2.18 [0.99 4.77][2]

						General health status Fair/ poor OR: 3.05 [1.49 6.23][1] OR: 1.84 [0.79 4.28][2] Excellent/ good OR: Ref. OR: Ref. **Common mental disorder** Non-case OR: Ref. OR: Ref. Case OR: 5.58 [2.94 10.58][1] OR: 2.47 [1.12 5.46][2] **Multiple physical symptoms** Non-case OR: Ref. OR: Ref. Case OR: 7.32 [3.81 14.07][1] OR: 3.40 [1.54 7.47][2] **Alcohol misuse** Non-case OR: Ref. Case OR: 2.18 [1.00 4.75][1] **Subthreshold PTSD reported at phase 1** No OR: Ref. OR: Ref. Yes

						OR: 9.96 [4.67 21.20][1] OR: 4.87 [2.05 11.58][2] **Cumulative physical/psychological morbidity at phase 1** 0 reports OR: Ref. OR: Ref. 1 report OR: 4.40 [1.88 10.33][1] OR: 3.37 [1.30 8.73][2] 2 reports OR: 10.72 [4.09 28.08][1] OR: 6.56 [2.29 8.73][2] 3-4 reports OR: 17.14 [6.84 42.97][1] OR: 8.14 [2.81 23.57][2] **Relationship status** No change OR: Ref. In a new relationship since phase 1 OR: 1.17 [0.39 3.52][1] End of a relationship since phase 1 OR: 2.18 [0.84 5.62][1] **Serving status** In service phases 1 and 2 OR: Ref. OR: Ref. Not in service phases 1 and 2 OR: 1.51 [0.58 3.89][1] OR: 1.14 [0.40 3.29][2] Left service

						OR: 2.24 [1.13 4.42][1] OR: 1.46 [0.66 3.23][2] **General health status** Good health stable OR: Ref. OR: Ref. Poor health stable OR: 7.83 [3.33 18.44][1] OR: 3.72 [1.19 11.65][2] Decline in health since phase 1 OR: 6.44 [2.89 14.35][1] OR: 3.74 [1.41 9.91][2] Improvement in health since phase 1 OR: 1.71 [0.47 6.24][1] OR: 0.88 [0.24 3.24][2] **Alcohol misuse** No change [no misuse] OR: Ref. OR: Ref. No change [misuse] OR: 3.84 [1.37 10.77][1] OR: 1.29 [0.40 4.18][2] Deterioration change since phase 1 OR: 6.10 [2.45 15.17][1] OR: 6.15 [2.05 18.48][2] Improvement change since phase 1 OR: 1.60 [0.47 5.47][1] OR: 0.76 [0.21 2.71][2] **Common mental disorders** No change or positive change

						OR: Ref. OR: Ref. Negative change since phase 1 OR: 6.29 [3.24 12.21][1] OR: 7.12 [3.07 16.52][2] **Multiple physical symptoms** No change or improvement OR: Ref. OR: Ref. Decline in health since phase 1 OR: 9.73 [4.56 20.76][1] OR: 7.85 [2.86 21.52][2]
18. Green, 2016 [36]	Name: Project VALOR Design: Retrospective longitudinal Follow-up period: -	n= 738 Country= USA %Female= 51% Age= 37.7 (9.9) years. Type of job/company= Iraq and Afghanistan army and marine corps veterans. Inclusion/exclusion= Participants who had undergone mental health evaluation at a veterans facility were included. Participants with probable PTSD and females were oversampled to get a	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Deployment risk and resilience.	Type of symptoms: PTSD Way of assessment: Using a structured clinical interview with DSM-4 criteria. Incidence: 73% and 68% for females and males, respectively.	Unadjusted	**Age** OR: 1.01 [0.81 1.03] **Race** White OR: Ref. Black OR: 1.83 [0.76 4.41] Other OR: 0.46 [0.19 1.11] **Combat experiences** OR: 1.03 [1.00 1.07] **Aftermath of battle** OR: 1.03 [1.00 1.06] **Social support** OR: 0.96 [0.93 0.98] **Length of deployment** OR: 0.97 [0.92 1.03]

		good representation of these groups in the final sample. Only participants with one deployment were included.				**Deployment phase** Insurgency OR: Ref. Invasion OR: 0.38 [0.16 0.91] Surge OR: 0.44 [0.21 0.93]
19. Hansen, 2017[37]	Name: Mental Health and Work Environment Factors in the Aftermath of the Oslo Terrorist Attack Design: Prospective longitudinal Follow-up period: 10, 22 and 34 months after the attack	n= 1,933 Country= Norway %Female= 58% Age= 45.4(10.9) years Type of job/company= Employees of the ministries at the moment of the Oslo terrorist attack. Inclusion/exclusion= -	Exposure assessment: Deployment administration Year of assessment: 2011 Exposure categories: Mental health, exposure, work, perceived safety and psychosocial variables.	Type of symptoms: PTS symptoms Way of assessment: Self-reported using a Norwegian version of the Posttraumatic Stress Disorder Checklist – Specific (PCL-C), using DSM-4 criteria. Incidence: 6%, 4%, and 4% during the three follow-up periods, respectively.	Unadjusted (model 1) and multivariate (model 2) with age and gender and traumatic experiences, education level and leadership position.	**Presence during attack** Not present during attack *10 months* OR: Ref.[1] OR: Ref.[2] *22 months* OR: Ref.[1] OR: Ref.[2] *34 months* OR: Ref.[1] OR: Ref.[2] Present during attack *10 months* OR: 8.4 [5.6 12.6][1] OR: 9.3 [6.1 14.2][2] *22 months* OR: 6.9 [4.3 11.2][1] OR: 8.9 [5.2 15.3][2] *34 months* OR: 8.8 [5.2 15.1][1] OR: 10.0 [5.4 18.6][2]
20. Harvey, 2012 [38]	Name: - Design: Prospective longitudinal	n= 552 in combat group, 391 in control group Country= UK %Female= 17% in	Exposure assessment: Deployment administration Year of assessment: 2003	Type of symptoms: PTSD symptoms (using a cut-off >=50) Way of assessment: 17-item National	Univariate (model 1) and adjusted for gender, age, rank and service (model 2).	**Combat status** Control group *Short-term* OR: Ref OR: Ref *Long-term*

	Follow-up period: 16 months and 4.8 year post-deployment	combat group, 19% in control group Age= 39.4(7.9) in combat group, 42.0(8.9) in control group Type of job/company= Military personnel that were and were not deployed in the Iraq war Inclusion/exclusion= -	Exposure categories: Combat versus control group	Centre for PTSD Checklist (PCL-C) Incidence: Short term: 2.2% in control group and 6.3% in the combat group. Long-term: 2.0% in the control group and 5.1 in the combat group.		OR: Ref OR: Ref Combat group *Short-term* OR: 3.01 [1.36 6.64][1] OR: 2.91 [1.34 6.31][2] *Long-term* OR: 2.62 [1.12 6.16][1] OR: 2.42 [1.04 5.62][2]
21. Horesh, 2011 [39]	Name: - Design: Prospective longitudinal Follow-up period: 1, 2 and 20 years post-war	n= 675 Country= Israel %Female= - Age= - Type of job/company= War veterans from the Lebanon war Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 1983 Exposure categories: Combat exposure was self-reported.	Type of symptoms: PTSD, grouped into four groups: no-PTSD, 1983 PTSD, 1984 delayed onset PTSD and 2002 delayed onset PTSD. Way of assessment: Self-reported using the PTSD inventory, using DSM-3 criteria. Incidence: 16.5%	-	64.5% of the participants in the 1983 PTSD group reported extreme exposure to danger, compared to 24.5% of the no-PTSD group, 35.8% of the 2002 delayed onset PTSD group and 41.4% of the 1984 delayed onset PTSD group. Whereas 27.9% of the participants in the no-PTSD group reported extreme battles severity, 48.2% of the participants in the 1983 PTSD group reported extreme battles severity. In comparison, 39.6% of the participants in the 2002 delayed onset PTSD group and 34.5% of the participants in the 1984 delayed onset PTSD group reported extreme battles severity.
22. Hourani,	Name: -	n= 2116	Exposure assessment:	Type of symptoms:	-	Those with PTSD symptoms

2012 [40]	Design: Prospective longitudinal Follow-up period: 6 months	Country= USA %Female= - Age= - Type of job/company= Marines Inclusion/exclusion= Participants who transitioned from active military duty to civilian life were for a minimum of 2 months were included.	Self-reported Year of assessment: 2010 Exposure categories: Exposures like number of deployments and stress were used.	PTSD symptoms Way of assessment: Self-reported using the National Centre for PTSD Checklist (PCL-C) of the Department of Veterans Affairs – Civilian Version. Incidence: Baseline prevalence 28%, follow-up incidence 10%		also were more likely to report a previous trauma during their lifetime at baseline. High combat exposure scale scores were associated with PTSD. Baseline social support was associated with PTSD.
23. Ikeda, 2017 [41]	Name: Fukushima Nuclear Energy Worker's Support (NEWS) Project. Design: Prospective longitudinal Follow-up period: Baseline at 2-3 months post-disaster, with follow-up 3 years after that.	n= 1,417 Country= Japan %Female= 5% Age= 39.3 years Type of job/company= Employers of the Tokyo Electric Power Company in Fukushima. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2011 Exposure categories: Sociodemographic, disaster-related experiences and psychological distress.	Type of symptoms: PTSD symptoms (using a cut-off >=25) Way of assessment: Self-reported using the Japanese version of the Impact of Event Scale-Revisited (IES-R), using DSM-4 criteria. Incidence: 26%	Adjusted for age, gender and job location	**Experience of life-threatening danger** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 4.32 [2.89 6.48] (2011) OR: 3.47 [2.43 4.95] (2012) OR: 2.78 [1.87 4.14] (2013) OR: 2.23 [1.34 3.72] (2014) **Major property loss** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes

						OR: 3.45 [2.28 5.23] (2011) OR: 2.55 [1.77 3.66] (2012) OR: 1.88 [1.25 2.84] (2013) OR: 1.39 [0.81 2.37] (2014) **Discrimination/slurs** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 5.72 [3.37 9.71] (2011) OR: 4.47 [2.83 7.08] (2012) OR: 3.50 [2.10 5.84] (2013) OR: 2.74 [1.42 5.30] (2014) **Escape from tsunami** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 5.65 [3.27 9.74] (2011) OR: 3.72 [2.30 6.02] (2012) OR: 2.45 [1.40 4.27] (2013) OR: 1.61 [0.78 3.35] (2014) **Witnessing of plant explosions** No OR: Ref. (2011) Yes OR: 2.09 [1.43 3.06] (2011) **Family member deaths**

						No OR: Ref. (2011) Yes OR: 1.60 [0.80 3.19] (2011) **Colleague deaths** No OR: Ref. (2011) Yes OR: 2.08 [1.33 3.26] (2011) **Home evacuation** No OR: Ref. (2011) Yes OR: 1.49 [1.03 2.15] (2011)
24. Joseph, 2014 [42]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 453 Country= USA %Female= 24% Age= - Type of job/company= Traumatic surgeons Inclusion/exclusion = --	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Personal characteristics, and exposure at work.	Type of symptoms: PTSD (symptoms and diagnosed PTSD - only diagnosed PTSD was extracted for this review) Way of assessment: Self-reported using the PCL checklist (with a cut-off score >=44). Incidence: 15% (prevalence)	Univariate (model 1) and adjusting for all other exposure (model 2).	**Age** <51 years OR: Ref.[1] OR: Ref.[2] ≥51 years OR: 1.8 [0.7 3.4][1] **Gender** Female OR: Ref.[1] OR: Ref.[2] Male OR: 2.1 [1.4 4.6][1] OR: 1.8 [0.9 5.3][2] **Marital status** Other OR: Ref.[1] Single OR: 1.2 [0.4 2.8][1]

						Race Other OR: Ref.[1] White OR: 1.1 [0.8 2.6][1] **Comorbidities** No OR: Ref.[1] Yes OR: 2.4 [0.6 4.1][1] **Urban hospital** No OR: Ref.[1] Yes OR: 1.6 [0.5 2.4][1] **Academic facility** No OR: Ref.[1] Yes OR: 3.6 [0.9 7.8][1] **24-h resident coverage** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.8 [1.1 3.2][1] OR: 1.4 [0.8 4.2][2] **≥5 critical cases per call** No OR: Ref.[1] OR: Ref.[2] Yes

						OR: 2.4 [1.6 9.4][1] OR: 7 [1.1 8][2] **≥7 call duties a month** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.6 [2.1 14.6][1] OR: 3.8 [0.9 7.2][2] **≥15 operative cases per month** No OR: Ref.[1] OR: Ref.[2] Yes OR: 3.1 [1.1 7.2][1] OR: 2.8 [0.4 3.2][2] **≥4-h relaxation per day** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.6 [1.8 11.5][1] OR: 3.1 [0.9 6.7][2] **≥2-wk vacation per year** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.1 [0.9 6.8][1] OR: 1.4 [0.6 4.1][2] **Military experience**

						<u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 1.4 [0.8 5.6][1] OR: 1.1 [0.7 3.8][2] **War deployment** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 4.2 [2.8 14.1][1] OR: 2.8 [0.9 7.9][2] **Smoking** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 1.2 [0.8 3.1][1] **Alcohol** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 1.1 [0.5 2.3][1] **Annual income >$300,000** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 3.6 [0.9 8.4][1]
25. Karstoft, 2013 [43]	<u>Name:</u> - <u>Design:</u> Prospective longitdinal	<u>n</u>= 675 (369 who were diagnosed with a combat stress reaction and 306 without)	<u>Exposure assessment</u>: Self-reported <u>Year of assessment</u>: 1983	<u>Type of symptoms</u>: PTSD <u>Way of assessment</u>: Self-reported using	-	**Severity of battles** OR: 0.96 [0.63 1.48] (combat stress reaction) OR: 0.87 [0.55 1.36] (no combat stress reaction)

	Follow-up period: 1, 2 and 20 years post-war.	Country= Israel %Female= 0% Age= 25.8(4.7) Type of job/company= Combat veterans who were on active duty in the Lebanon war. Inclusion/exclusion= -	Exposure categories: Exposures such as the severity of battles, life threatening war, unit atmosphere and social support were assessed.	the PTSD inventory, using DSM-3 criteria. Latent growth modelling was used to identify PTSD subgroups. For the current review we only assessed the 'delayed onset' PTSD group, as this reflects incidence of PTSD. Incidence: -		**Life threatening war** OR: 1.90 [1.08 3.35] (combat stress reaction) OR: 0.95 [0.64 1.43] (no combat stress reaction) **Unit atmosphere** OR: 1.08 [1.00 1.17] (combat stress reaction) OR: 1.02 [0.96 1.09] (no combat stress reaction) **Social support** OR: 0.58 [0.25 1.31] (combat stress reaction) OR: 0.66 [0.29 1.53] (no combat stress reaction)
26. Karstoft, 2015 [44]	Name: - Design: Prospective longitudinal Follow-up period: 1, 2 and 20 years post-war.	n= 675 (369 who were diagnosed with a combat stress reaction and 306 without) Country= Israel %Female= 0% Age= 25.8(4.7) Type of job/company= Combat veterans who were on active duty in the Lebanon war. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 1983 Exposure categories: Exposures such as the severity of battles, life threatening war, coping were assessed.	Type of symptoms: PTSD Way of assessment: Self-reported using the PTSD inventory, using DSM-3 criteria. Latent growth modelling was used to identify PTSD subgroups. For the current review we only assessed the 'delayed onset' PTSD group, as this reflects incidence of PTSD. Incidence: -	-	**Severity of battles** OR: 1.01 [0.67 1.35] (combat stress reaction) OR: 0.87 [0.57 1.32] (no combat stress reaction) **Life threatening war** OR: 1.91 [1.07 3.24] (combat stress reaction) OR: 1.01 [0.68 1.50] (no combat stress reaction) **Locus of control** OR: 1.12 [0.93 1.35] (combat stress reaction) OR: 0.88 [0.73 1.05] (no combat stress reaction) **Problem-focused coping**

						OR: 1.72 [0.80 3.73] (combat stress reaction) OR: 3.11 [1.16 8.38] (no combat stress reaction) **Emotion-focused coping** OR: 0.60 [0.26–1.35] (combat stress reaction) OR: 0.28 [0.09–0.93] (no combat stress reaction)
27. Kim, 2014 [45]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 980 Country= Korea %Female= 0% Age= Most participants were in their 40s. Type of job/company= Subway drivers employed by a public company in Seoul Inclusion/exclusion= Participants currently on sick leave and female drivers were excluded.	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Person under train experiences and other work-related exposures were assessed.	Type of symptoms: PTSD (1 year and lifetime prevalence). Way of assessment: The Korean version of the Composite International Diagnostic Interview (K-CIDI) was administered to diagnose PTSD, using DSM-4 criteria. Incidence: 1.6% (one year prevalence)	Multi-variate analyses with all other exposures and age. For 1 year prevalence (model 1) and lifetime prevalence (model 2).	**Person under train experience** No OR: Ref OR: Ref Yes OR: 1.54 [0.52 4.55][1] OR: 2.06 [0.94 4.55][2] **Number of person under train experiences** 0 experiences OR: Ref OR: Ref 1 experience OR: 1.77 [0.31 4.47][1] OR: 1.45 [0.55 3.85][2] ≥2 experiences OR: 2.36 [0.57 9.70][1] OR: 3.57 [1.32 3.65][2] **Severity of victim's injury** Alive OR: Ref OR: Ref Death OR: 2.49 [0.27 23.27][1]

						OR: 1.39 [0.40 4.82][2] **Person under train experience** <u>>5 years ago</u> OR: Ref OR: Ref <u>≤5 years</u> OR: 1.01 [0.11 9.06][1] OR: 0.33 [0.03 2.63][2] **Conflict with passengers** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 3.21 [1.14 9.03][1] OR: 3.32 [1.55 7.12][2] **Sudden stop** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 3.66 [0.82 16.4][1] OR: 7.53 [1.77 32.02][2] **Near accident** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 8.81 [1.96 39.3][1] OR: 6.36 [2.40 16.90][2] **Breakdown** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u>

						OR: 1.71 [0.48 6.14][1] OR: 1.89 [0.75 4.75][2] **Person under train experience of colleague** No OR: Ref.[1] OR: Ref.[2] Yes OR: 0.55 [0.12 2.47][2] OR: 2.84 [1.32 6.12][2]
28. Levin-Rector, 2018 [46]	Name: Defence Manpower Data Center (DMDC), Career History and Archival Medical Personnel System (CHAMPS), and the Expeditionary Medical Encounter Database (EMED) Design: Prospective longitudinal Follow-up period: 35-43 months.	n= 332,093 (marine) and 773,359 (army) Country= USA %Female= 7% (marine) and 17% (army) Age= 20.0 (3.9) (marine) and 21.7 (2.1) (army) Type of job/company= All service members who went into the army or navy between 2001 and 2011. Inclusion/exclusion= -	Exposure assessment: Military databases Year of assessment: 2001-2011 Exposure categories: Personal and deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed PTSD obtained from military records. Incidence: 4.3% (marine); 7.6% (army).	Adjusting for clustering within units.	**Sex** Female HR: Ref. (marine) HR: Ref. (army) Male HR: 0.40 [0.36 0.44] (marine) HR: 0.57 [0.55 0.59] (army) **Age at accession** HR: 0.99 [0.98 1.00] (marine) HR: 1.01 [1.00 1.01] (army) **Race** White HR: Ref. (marine) HR: Ref. (army) Non-white HR: 0.95 [0.91 1.00] (marine) HR: 0.96 [0.94 0.98] (army) **Ethnicity** Non-Hispanic HR: Ref. (marine) HR: Ref. (army) Hispanic HR: 0.80 [0.75 0.84] (marine) HR: 0.86 [0.84 0.89] (army)

						Prior substance abuse disorder diagnosis HR: 3.10 [2.92 3.30] (marine) HR: 2.05 [2.00 2.10] (army) **Waiver status** No waiver HR: Ref. (marine) HR: Ref. (army) Received medical waiver HR: 1.13 [1.07 1.20] (marine) HR: 1.02 [0.99 1.05] (army) Received other waiver HR: 1.12 [1.08 1.16] (marine) HR: 1.12 [1.10 1.15] (army) **Marital status** Single HR: Ref. (marine) HR: Ref. (army) Divorced/widowed HR: 1.21 [1.06 1.39] (marine) HR: 1.18 [1.12 1.24] (army) Married HR: 1.31 [1.24 1.38] (marine) HR: 1.20 [1.18 1.23] (army) **Rank** Enlisted HR: Ref. (marine) HR: Ref. (army) Officer HR: 0.16 [0.13 0.21] (marine) HR: 0.20 [0.15 0.26] (army) **Occupation**

						Combat specialist HR: Ref. (marine) HR: Ref. (army) Communications/intelligence HR: 0.54 [0.48 0.62] (marine) HR: 0.73 [0.70 0.77] (army) Craft/repair specialist HR: 0.46 [0.40 0.54] (marine) HR: 0.62 [0.60 0.65] (army) Functional support/other HR: 0.46 [0.41 0.51] (marine) HR: 0.56 [0.53 0.59] (army) Service and supply HR: 0.77 [0.68 0.87] (marine) HR: 0.84 [0.80 0.88] (army) Healthcare specialist HR: 1.03 [0.98 1.08] (army) **Cumulative years deployed** HR: 2.04 [1.93 2.15] (marine) HR: 1.74 [1.71 1.76] (army) **Unit cumulative high deployment stress rate (per 100)** HR: 1.04 [1.03 1.05] (marine) HR: 1.05 [1.04 1.06] (army) **Unit stability** HR: 1.11 [0.92 1.33] (marine) HR: 0.69 [0.64 0.74] (army)
29. MacGregor, 2015 [47]	Name: Defence Manpower Data Center (DMDC) Design: Prospective	n= 8,064 (3,416 health care profession, 4,648 no health care profession) Country= USA	Exposure assessment: Self-reported. Year of assessment: 2001-2008	Type of symptoms: PTSD Way of assessment: Diagnosed, according to ICD-9-CM criteria,	Univariate (model 1) and multivariate (model 2) adjusting for all remaining exposures	**Health Care Occupation** No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes

	longitudinal Follow-up period: Up to 60 days.	%Female= 0% Age= Ranging from 27.9 (5.7) to 30.2 (7.0) in various participating groups. Type of job/company= Navy personnel with one, two or three deployments in Iraq and/or Afghanistan. Inclusion/exclusion= Participants who completed a health assessment within 60 days post-deployment were included. Women were excluded	Exposure categories: military occupation, combat rank, deployment specific variables	from inpatient and outpatient databased. Incidence: Ranging from 1.9% to 17.9% for various participating groups.		OR: 2.02 [1.45 2.80][1] (1 deployment) OR: 2.27 [1.26 4.08][1] (2 deployments) OR: 4.37 [1.25 15.28][1] (3 deployments) **Age** OR: 0.97 [0.94 0.99][1] (1 deployment) OR: 0.97 [0.93 1.02][1] (2 deployments) OR: 0.94 [0.86 1.03][1] (3 deployments) **Rank** Enlisted OR: Ref. OR: Ref. Officer OR: 0.35 [0.18 0.65][1] (1 deployment) OR: 0.54 [0.12 2.47][1] (2 deployments) **Married** No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes OR: 0.93 [0.67 1.30][1] (1 deployment) OR: 0.54 [0.32 0.89][1] (2 deployments) OR: 0.96 [0.36 2.56][1] (3 deployments)

						Some College No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes OR: 1.61 [0.97 2.68][1] (1 deployment) OR: 0.66 [0.22 1.97][1] (2 deployments) OR: 0.41 [0.04 3.92][1] (3 deployments) **Medical utilization** Low OR: Ref. OR: Ref. OR: Ref. Moderate OR: 6.64 [3.50 12.60][1] (1 deployment) OR: 3.40 [1.64 7.06][1] (2 deployments) OR: 13.84 [1.69 113.49][1] (3 deployments) High OR: 34.52 [19.35 61.59][1] (1 deployment) OR: 15.25 [7.89 29.49][1] (2 deployments) OR: 46.96 [5.98 368.58][1] (3 deployments) **Deployment location** Afghanistan/Iraq OR: Ref.

						OR: Ref. OR: Ref. <u>Kuwait</u> OR: 0.78 [0.55 1.10][1] (1 deployment) OR: 0.81 [0.44 1.48][1] (2 deployments) OR: 1.32 [0.94 1.82][1] (3 deployments) **Number of combat exposures** OR: 1.62 [1.46 1.79][1] (1 deployment) OR: 1.37 [1.17 1.61][1] (2 deployments) OR: 1.30 [0.94 1.82][1] (3 deployments) **Current Deployment Time** OR: 1.00 [1.00 1.01][1] (1 deployment) OR: 1.00 [1.00 1.01][1] (2 deployments) OR: 1.00 [0.99 1.01][1] (3 deployments) **Previous deployment time** OR: 1.00 [1.00 1.01][1] (2 deployments) OR: 1.00 [0.99 1.01][1] (3 deployments) **Previous dwell time** OR: 1.00 [1.00 1.00][1] (2 deployments) OR: 1.00 [1.00 1.00][1] (3

						deployments) *Only health care occupation below* **Felt in great danger of being killed** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.14 [3.13 5.46][1] OR: 3.44 [2.50 4.72][2] **Engaged in direct combat and discharged weapon** No OR: Ref.[1] OR: Ref.[2] Yes OR: 3.43 [2.42 4.87][1] OR: 1.67 [1.15 2.44][2] **Exposed to wounded/dead civilians** No OR: Ref.[1] Yes OR: 1.51 [1.16 1.96][1] **Exposed to wounded/dead friendly forces** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.99 [1.52 2.60][1] OR: 1.53 [1.13 2.07][2]

						Exposed to wounded/dead enemy No OR: Ref.[1] Yes OR: 1.79 [1.38 2.34][1]
30. MacGregor, 2012 [48]	Name: Defence Manpower Data Center (DMDC) Design: Prospective longitudinal Follow-up period: 4 years	n=65,704 Country= USA %Female= - Age= 22 (19-53) Type of job/company= Marine corps personnel deployed to Iraq or Kuwait. Inclusion/exclusion= Deployments between 4 and 8 months were considered. Special forces and participants with earlier mental health issues were excluded. Only those with more than one deployment were analysed.	Exposure assessment: Deployment adminstration Year of assessment: 2003-2007 Exposure categories: Dwell-to-deployment ratios were categorised into <1:1, 1:1 and 2:1.	Type of symptoms: PTSD Way of assessment: Diagnosed PTSD with ICD-9-CM criteria were obtained from impatient and outpatient registers Incidence: 1.5%	Adjustment for age and military rank	**Dwell to deployment ratio** <1:1 OR: Ref. 1:1 OR: 0.83 [0.60 1.13] 2:1 OR: 0.47 [0.32 0.70]
31. Maguen, 2012 [49]	Name: Department of Veterans Affairs (VA) database	n= 968 Country= USA %Female= 12%	Exposure assessment: Department of Veterans Affairs administrative data (including self-reports)	Type of symptoms: PTSD Way of assessment: Using the self-	Univariate (model 1) and multivariate (model 2), adjusting for age, sex, race, marital status, unit,	**Number of exposures** None OR: Ref. OR: Ref. One

	Design: Retrospective longitudinal Follow-up period: 11 days	Age= 30.3(8.4) years Type of job/company= War veterans who have been deployed in Iran and Afghanistan. Inclusion/exclusion= Participants with either no head injury or a head injury with traumatic brain injury were included, but not those with head injury without brain damage.	Year of assessment: 2007-2010 Exposure categories: Exposure to traumatic brain injury mechanisms	reported Primary Care PTSD Screen (PC-PTSD) screening instrument Incidence: -	branch of service, rank and number of deployments.	OR: 4.93 [3.3 7.3][1] OR: 4.67 [3.1 7.1][2] Two + OR: 6.96 [5.1 9.6][1] OR: 6.15 [4.4 8.7][2] **Type of exposure** None OR: Ref. OR: Ref. Blast only OR: 5.13 [3.2 8.2][1] OR: 4.72 [2.9 7.7][2] Blast plus OR: 7.45 [5.4 10.3][1] OR: 6.52 [4.6 9.3][2] 1 Non blast OR: 4.53 [2.4 8.6][1] OR: 4.60 [2.4 8.8][2] 2+ Non blast OR: 2.94 [1.17 7.4][1] OR: 3.36 [1.32 8.6][2]
32. Maguen, 2010 [50]	Name: Department of Veterans Affairs (VA) database Design: Retrospective longitudinal Follow-up period: -	n= 329,049 Country= USA %Female= 12% Age= 31.2(9.0) Type of job/company= War veterans who have been deployed in Iran and Afghanistan. Inclusion/exclusion= -	Exposure assessment: Deployment data Year of assessment: 2001 Exposure categories: Demographic and military service data.	Type of symptoms: PTSD Way of assessment: PTSD obtained from medical health records of those who visited veteran facilities from 2002 to 2008. Diagnosis was done with ICD-9-CM criteria. Incidence: 17% among females, 22% among	Univariate models were conducted for females (model 1) and males (model 2) separately.	**Age** 16–24 RR: Ref. RR: Ref. 25–29 RR: 1.05 [0.99 1.11][1] RR: 0.96 [0.94 0.97][2] 30–39 RR: 1.24 [1.17 1.32][1] RR: 0.98 [0.96 0.99][2] 40–71 RR: 1.21 [1.13 1.30][1] RR: 0.79 [0.77 0.81][2] **Race/Ethnicity**

				males.		White RR: Ref. RR: Ref. Black RR: 0.95 [0.86 0.98][1] RR: 0.98 [0.96 1.00][2] Hispanic RR: 0.95 [0.88 1.01][1] RR: 0.89 [0.88 0.92][2] Other RR: 0.97 [0.86 1.10][1] RR: 1.02 [0.98 1.07][2] **Marital status** Married RR: Ref. RR: Ref. Never married RR: 0.97 [0.92 1.02][1] RR: 0.82 [0.80 0.83][2] Divorced/separated/widowed RR: 1.15 [1.08 1.22][1] RR: 1.08 [1.06 1.10][2] **Component type** Active duty RR: Ref. RR: Ref. Reserve/National Guard RR: 0.90 [0.86 0.94][1] RR: 0.74 [0.73 0.75][2] **Branch of service** Army RR: Ref. RR: Ref. Marine

						RR: 0.94 [0.85 1.05][1] RR: 0.95 [0.93 0.97][2] Navy RR: 0.45 [0.41 0.49][1] RR: 0.33 [0.32 0.34][2] Air Force RR: 0.45 [0.41 0.49][1] RR: 0.26 [0.25 0.27][2] **Rank** Enlisted RR: Ref. RR: Ref. Officer RR: 0.69 [0.63 0.77][1] RR: 0.51 [0.49 0.54][2] **Number of deployments** One RR: Ref. RR: Ref. More than one RR: 1.14 [1.09 1.19][1] RR: 1.15 [1.13 1.16][2]
33. Martindale, 2018 [51]	Name: - Design: Prospective longitudinal Follow-up period: Between 6 and 9 years.	n= 19 Country= USA %Female= 16% Age= 39.0(9.4) years. Type of job/company= Military personnel deployed in Afghanistan or Iraq	Exposure assessment: Self-reported Year of assessment: 2007-2010 Exposure categories: Blast exposure, traumatic brain injury and re-deployment were assessed.	Type of symptoms: PTSD Way of assessment: Via a structured interview, the Structured Clinical Interview for DSM-4 Axis I Disorders (SCID Incidence: 6/19 and 5/19 had current PTSD at T1 and T2,	-	Only individual participant data were presented, showing associations between the exposures and PTSD.

		Inclusion/exclusion= Participants with a history in traumatic brain injury or other neurological or mental disorders were excluded.		respectively.		
34. Nagamine, 2018 [52]	Name: - Design: Prospective longitudinal, with baseline measurements one month post-deployment. Follow-up period: 6 and 12 months post-deployment.	n= 56,753 Country= Japan %Female= 3% Age=- Type of job/company= Members of the ground defence force at 2011 Great East Japan Earthquake. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Information on personal attributes and mission duties.	Type of symptoms: PTSD symptoms (using a cut-off: >- 25) Way of assessment: Self-reported with the Impact of Event Scale-Revised (IES-R). Incidence: 2283/56753=4%	Multivariate model	**Age** OR: 1.39 [1.27 1.52] **Sex** Male OR: Ref. Female OR: 1.61 [1.29 2.00] **Rank** Enlisted/private OR: Ref. Officer OR: 0.77 [0.67 0.88] Administrative official OR: 1.24 [0.82 1.87] **Deployment length** < 1 month OR: Ref. 1–3 months OR: 1.53 [1.37 1.70] ≥ 3 months OR: 2.64 [2.33 2.99] **Personally affected** No OR: Ref. Yes OR: 2.19 [1.95 2.44]

						Body recovery duties No OR: Ref. Yes OR: 1.37 [1.25 1.51] **Duties with radiation exposure risk** No OR: Ref. Yes OR: 1.08 [0.97 1.20] **Timing of post-deployment leave** Within two weeks OR: Ref. Over two weeks OR: 1.34 [1.22 1.47] No leave taken OR: 1.50 [1.29 1.75] **Post-deployment overwork** No OR: Ref. Yes: < 3 months OR: 1.39 [1.26 1.53] Yes: ≥ 3 months OR: 2.02 [1.78 2.29] **Post-deployment relocation** No OR: Ref. Yes OR: 1.12 [0.98 1.28]
35. Osorio, 2018 [53]	Name: Secondary analyses on the	n= 1,635	Exposure assessment: Self-reported	Type of symptoms: PTSD symptoms (re-	Nine different models	**Violent combat** No

	Battlemind RCT. Design: Prospective longitudinal Follow-up period: 4-6 months post deployment.	Country= UK %Female= 2% Age= 39% was younger than 25 years. Type of job/company= Members of three branches of the army forces, returning from deployment in Afghanistan. Inclusion/exclusion= -	Year of assessment: 2009 Exposure categories: Violent combat situations, proximity to wounding or death and encountering explosive devices.	experience is extracted for this review - in the paper also: avoidance, numbing, arousal and anxious is reported) Way of assessment: Using the National Center for Posttraumatic Stress Disorders Checklist – Civilian Version (PCL-C). PTSD in general, but also avoiding, numbing and arousal behaviour were reported. For this review we only extracted PTSD. Incidence: 34%	Model 1: Unadjusted Model 2: Adjusted Model 3: Adjusted for proximity to wounding or death. Model 4: Adjusted for encountering explosive devices. Model 5: adjusted for PTSD re-experiencing, avoidance, numbing, or arousal. Model 6: Adjusted for distress. Model 7: Adjusted for alcohol. Model 8: Ranks, deployment and gender. Model 9: Adjusted for violent combat, proximity to wounding or death, encountering explosive devices, PTSD re-experiencing, avoidance, numbing, arousal, distress, alcohol consumption, rank, gender, reserves, deployment.	RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 2.43 [1.95 3.02][1] RR: —[2] RR: 1.56 [1.21 2.01][3] RR: 2.04 [1.62 2.58][4] RR: 1.81 [1.43 2.29][5] RR: 2.63 [2.10 3.31][6] RR: 2.32 [1.85 2.89][7] RR: 2.36 [1.89 2.95][8] RR: 1.35 [1.01 1.81][9] **Proximity to wounding or death** No RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 3.01 [2.42 3.74][1] RR: 2.42 [1.89 3.11][2] RR: —[3] RR: 2.62 [2.08 3.31][4]

						RR: 2.02 [1.59 2.56][5] RR: 3.03 [2.42 3.80][6] RR: 2.94 [2.36 3.67][7] RR: 3.01 [2.41 3.75][8] RR: 1.67 [1.25 2.23][9] **Encountering explosive devices** No RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 2.14 [1.71 2.67][1] RR: 1.66 [1.30 2.10][2] RR: 1.54 [1.21 1.95][3] RR: —[4] RR: 1.70 [1.33 2.16][5] RR: 2.17 [1.72 2.73][6] RR: 2.01 [1.60 2.52][7] RR: 2.06 [1.65 2.59][8] RR: 1.26 [0.95 1.66][9]
36. Pihl-Thingvad, 2019 [54]	Name: Everyday violence project Design: Prospective longitudinal Follow-up period: 12 months	n= 1,763 Country= Denmark %Female= 78% Age= 48.7 (9.4) years. Type of job/company=	Exposure assessment: Self-reported. Year of assessment: 2016-2017 Exposure categories: Patient-initiated violence.	Type of symptoms: PTSD Way of assessment: Self-reported using the International Trauma Questionnaire, with ICD-11 criteria.	Crude model adjusting for age and gender (model 1), additionally adjusting for BMI, alcohol, years of experience, critical incidents outside of work, posttraumatic	**Frequency of violence** No violence OR: Ref. OR: Ref. OR: Ref. Low frequency OR: 4.4 [1.3 14.8][1] OR: 3.0 [0.90 10.4][2] OR: 4.0 [1.0 16.3][3]

		Social educators working with disabled adults. Inclusion/exclusion= Participants in leadership position and with PTSD at baseline were excluded.		Incidence: 3.5%	stress disorder symptom level at baseline, trauma coping self-efficacy, workplace social capital linking, and training (model 2). In model 3, additional for frequency and severity of violence was done.	Medium frequency OR: 6.3 [1.8 22.9][1] OR: 3.7 [1.0 13.8][2] OR: 5.9 [1.4 24.2][3] High frequency OR: 10.2 [2.9 36.3][1] OR: 4.2 [1.1 15.9][2] OR: 6.5 [1.6 25.6][3] **Severity of violence** No violence OR: Ref. OR: Ref. OR: Ref. Max. mild violence OR: 2.3 [0.2 22.8][1] OR: 2.3 [0.2 24.4][2] OR: 3.8 [0.3 46.2][3] Max. threats of violence OR: 5.1 [1.5 17.5][1] OR: 3.6 [1.0 12.4][2] OR: 5.4 [1.2 24.2][3] Max. moderate violence OR: 4.1 [1.1 14.5][1] OR: 2.1 [0.6 8.1][2] OR: 2.6 [0.6 10.8][3] Max. severe violence OR: 13.7 [3.1 37.1][1] OR: 5.3 [1.5 19.5][2] OR: 6.5 [1.6 26.0][3]
37. Polusny, 2011 [55]	Name: Readiness and Resilience in National Guard Soldiers. Design: Prospective	n= 426 Country= USA %Female= 12% Age= Mostly younger	Exposure assessment: Self-reported Year of assessment: 2006 Exposure categories:	Type of symptoms: Probable PTSD (new onset) Way of assessment: Self-reported using the PCL checklist, with	Adjusting for all other pre-deployment factors (model 2), additionally adjusting for deployment	**Baseline PTSD symptoms** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 0.73 [0.34 1.58][1]

	longitudinal Follow-up period: 2 months	than 30. Type of job/company= National Guard soldiers Inclusion/exclusion= Those with PTSD at baseline were excluded.	Psychosocial risk, protective factors and deployment exposures.	DSM-4 criteria. Incidence: 14%	exposures (model 2) and additionally adjusting for post-deployment factors (model 3).	OR: 0.79 [0.34 1.85][2] OR: 0.69 [0.27 1.79][3] **Military preparedness** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 0.58 [0.39 0.87][1] OR: 0.62 [0.40 0.95][2] OR: 0.77 [0.48 1.25][3] **Concerns about life/family disruptions** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 1.38 [0.97 1.97][1] OR: 1.31 [0.88 1.95][2] OR: 1.12 [0.71 1.77][3] **Unit support** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 1.43 [0.95 2.15][1] OR: 1.15 [0.73 1.79][2] OR: 1.15 [0.70 1.89][3] **Combat experiences** No OR: Ref.[2]

						OR: Ref.[3] Yes OR: 2.19 [1.40 3.41][2] OR: 2.35 [1.41 3.92][3] **Exposure to aftermath of battle** No OR: Ref.[2] OR: Ref.[3] Yes OR: 1.62 [1.04 2.53][2] OR: 1.81 [1.08 3.06][3] **Perceived life threat** No OR: Ref.[2] OR: Ref.[3] Yes OR: 1.21 [0.81 1.81][2] OR: 1.01 [0.63 1.64][3] **Post-deployment social support** No OR: Ref.[3] Yes OR: 0.31 [0.19 0.50][3] **Post-deployment life stressors** No OR: Ref.[3] Yes OR: 1.96 [1.17 3.28][3]
38. Reijnen, 2015 [56]	Name: -	n= 994	Exposure assessment: Self-reported	Type of symptoms: PTSD symptoms	-	**Deployment** Pre-deployment

	Design: Prospective longitudinal with baseline measurements 1 month prior to deployment Follow-up period: 2 years post deployment.	Country= Netherlands %Female= 9% Age= 28.5 (9.0) Type of job/company= Dutch military personnel who were deployed to Afghanistan Inclusion/exclusion=-	Year of assessment: 2005-2008 Exposure categories: Different categories of time since deployment (compared to pre-deployment)	Way of assessment: Self-reported with the Dutch Self-Rating Inventory for PTSD, using DSM-4 cut-off values Incidence: 8.9%		OR: Ref 1 month post-deployment OR: 2.12 [1.4 3.3] 6 months post-deployment OR: 2.18 [1.4 3.4] 1 year post-deployment OR: 1.62 [1.0 2.6] 2 years post-deployment OR: 1.33 [2.8 5.8]
39. Shea, 2013 [57]	Name: - Design: Prospective longitudinal Follow-up period: 6 months post deployment.	n= 238 Country= USA %Female= 8% Age= 33.5 (9.5) years. Type of job/company= Members of the National Guard units recently returned from deployment to Iraq and Afghanistan. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2006-2009 Exposure categories: Personal characteristics, pre-deployment and deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed during a CAPS structured interview. Incidence: 13%	Adjusting for demographics (model 1), additionally adjusting for pre-deployment characteristics (model 2), additionally adjusting for deployment-related variables (model 3), and additionally adjusting for post-deployment characteristics (model 4).	It is unclear what the reference group is for the below associations **Gender** OR: 1.03 [0.12 8.89][1] OR: 0.46 [0.04 5.14][2] OR: 0.94 [0.03 28.56][3] OR: 1.12 [0.03 38.70][4] **Ethnicity** OR: 0.33 [0.04 2.64][1] OR: 0.17 [0.02 1.61][2] OR: 0.08 [0.00 1.45][3] OR: 0.07 [0.00 1.18][4] **Age** OR: 1.09 [0.69 1.72][1] OR: 1.01 [0.60 1.72][2] OR: 0.7 [0.34 1.41][3] OR: 1.12 [0.31 1.45][4] **Negative temperament** OR: 2.95 [1.66 5.23][2] OR: 2.23 [1.18 4.22][3]

						OR: 1.46 [0.69 3.09][4] **Pre-deployment life events** OR: 1.92 [1.19 3.10][2] OR: 1.78 [1.00 3.19][3] OR: 1.1 [0.56 2.18][4] **Preparation and training** OR: 0.89 [0.52 1.55][2] OR: 1.41 [0.68 2.91][3] OR: 1.99 [0.83 4.62][4] **Life and family concerns** OR: 2.77 [1.34 5.75][3] OR: 2.77 [1.28 6.01][4] **Deployment environment** OR: 1.44 [0.68 3.05][3] OR: 1.31 [0.58 2.99][4] **Unit support** OR: 1.03 [0.56 1.90][3] OR: 1.15 [0.58 2.30][4] **Combat exposure** OR: 1.88 [1.01 3.50][3] OR: 2.00 [1.01 3.97][4] **Post-deployment support** OR: 0.36 [0.15 0.87][4] **Post-deployment life events** OR: 1.82 [0.98 3.39][4]
40. Soo, 2011 [58]	Name: FDNY-WTC-MMP Design:	n= 11,006 Country= USA	Exposure assessment: Demographics and work status and number of colleagues who died	Type of symptoms: Probable PTSD Way of assessment:	Univariate (model 1 & 3) and adjusted for all other exposures (model 2	**Arrival group** Group 3 and 4 HR: Ref[1] HR: Ref[2]

	Prospective longitudinal Follow-up period: 9 years, with follow-up measurements every 18 months.	%Female= 0% Age= 39.5 (7.4) years Type of job/company= New York firefighters involved in the 9/11 WTC attacks. Inclusion/exclusion= Firefighters who arrived at the site more than 14 days before the close of the WTC site were included. Women were excluded.	were obtained from databases. Other variables were self-reported. Year of assessment: 2002 Exposure categories: Exposure to the WTC sites	Self-reported using the PCL-C checklist. Incidence: 8% (after the first follow-up).	& 4), for those with PTSD at baseline (model 1 & 2) and without (model 3 & 4).	HR: Ref[3] HR: Ref[4] Group 1 HR: 0.76 [0.58-1.00][1] HR: 0.74 [0.56-0.99][2] HR: 2.21 [1.80-2.70][3] HR: 1.38 [1.12-1.70][4] Group 2 HR: 0.97 [0.75-1.25][1] HR: 0.85 [0.66-1.11][2] HR: 1.16 [0.98-1.39][3] HR: 0.90 [0.75-1.08][4] **≥1 death at firehouse on 9/11** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.84 [0.71-1.00][1] HR: 0.87 [0.73-1.04][2] HR: 1.31 [1.12-1.54][3] HR: 1.11 [0.95-1.31][4] **Received counselling during year 1** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.89 [0.76-1.04][1] HR: 0.98 [0.83-1.15][2] HR: 2.02 [1.74-2.35][3]

						HR: 1.59 [1.36-1.85][4] **Each concurrent aerodigestive symptom** <u>No</u> HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] <u>Yes</u> HR: 0.87 [0.84-0.90][1] HR: 0.89 [0.86-0.93][2] HR: 1.62 [1.56-1.67][3] HR: 1.45 [1.40-1.51][4] **Concurrent alcohol intake** <u>No increase since 9/11</u> <u>Increased since 9/11</u> HR: 0.77 [0.53-1.12][1] HR: 0.83 [0.56-1.22][2] HR: 5.85 [4.56-7.52][3] HR: 3.43 [2.67-4.43][4] <u>Increased since 9/11, now back to pre-9/11 levels</u> HR: 0.95 [0.76-1.18][1] HR: 1.01 [0.81-1.27][2] HR: 2.95 [2.46-3.55][3] HR: 2.06 [1.71-2.47][4] **Concurrent exercise** <u>No change since last questionnaire</u> <u>Decreased since last questionnaire</u> HR: 0.74 [0.62-0.88][1] HR: 0.76 [0.63-0.92][2] HR: 2.65 [2.27-3.09][3]

						HR: 1.69 [1.44-1.97][4] Decreased since last questionnaire for health reasons HR: 0.38 [0.28-0.52][1] HR: 0.56 [0.41-0.78][2] HR: 4.20 [3.53-4.99][3] HR: 3.19 [2.64-3.86][4] Increased since last questionnaire HR: 0.95 [0.77-1.18][1] HR: 0.92 [0.74-1.14][2] HR: 1.13 [0.91-1.41][3] HR: 0.92 [0.74-1.14][4] **Concurrent smoking status** Never Current HR: 1.03 [0.81-1.32][1] HR: 1.04 [0.81-1.33][2] HR: 1.13 [0.90-1.42][3] HR: 1.07 [0.85-1.35][4] Former HR: 0.91 [0.76-1.08][1] HR: 0.95 [0.79-1.15][2] HR: 1.24 [1.07-1.43][3] HR: 1.23 [1.06-1.42][4] **Experience with prior disaster** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.82 [0.69-0.96][1]

						HR: 0.86 [0.73-1.02][2] HR: 1.29 [1.13-1.48][3] HR: 1.11 [0.96-1.27][4] **Non-white race/ethnicity** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.98 [0.70-1.36][1] HR: 1.05 [0.75-1.46][2] HR: 1.20 [0.94-1.54][3] HR: 1.37 [1.07-1.75][4] **Age on 9/11** HR: 1.02 [1.01-1.04][2] HR: 1.00 [0.99-1.01][4]
41. Stevelink, 2018 [59]	Name: HERRICK cohort Design: Retrospective longitudinal Follow-up period: -	n=8,093 Country= UK %Female= 13% and 8% for those who were deployed and not Age= 40.0 (13.0) and 40.2 (9.4) for those who were not and were deployed, respectively. Type of job/company= Military personnel that were and were not deployed in Iraq.	Exposure assessment: Deployment administration Year of assessment: 2014-2016 Exposure categories: Deployment and service status.	Type of symptoms: Probable PTSD Way of assessment: Self-reported with the PCL-C checklist. Incidence: 5.2% and 6.9% for those who were not deployed and deployed, respectively.	Unadjusted (model 1) and adjusted for age, gender, marital status, education, service and rank (model 2).	**Deployment** *Regulars* Not deployed OR: Ref[1] OR: Ref[2] Deployed OR: 1.34 [1.00 1.78][1] OR: 1.41 [1.04 1.90][2] *Reservists* Not deployed OR: Ref[1] OR: Ref[2] Deployed OR: 2.25 [1.14 4.46][1] OR: 2.48 [1.20 5.16][2] **Serving status**

		Inclusion/exclusion= -				Not serving OR: Ref[1] OR: Ref[2] Serving OR: 1.60 [1.25 2.06][1] OR: 1.73 [1.25 2.40][2] **Role during last deployment** *Serving regulars* No combat OR: Ref[1] OR: Ref[2] Combat OR: 1.70 [1.08 2.67][1] OR: 1.58 [0.98 2.55][2] *Ex-serving regulars* No combat OR: Ref[1] OR: Ref[2] Combat OR: 3.39 [2.25 5.11][1] OR: 2.53 [1.60 3.99][2]
42. Wittchen, 2012 [60]	Name: PIT-PTSD+ study Design: Retrospective longitudinal Follow-up period: On average 12 months post-deployment.	n= 1,483 Country= Germany %Female= - Age= - Type of job/company= Soldiers deployed in Afghanistan, and those who have not been deployed.	Exposure assessment: Deployment administration Year of assessment: 2010 Exposure categories: Deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed with a structured interview using DSM-4 criteria. Incidence: 12 month incidence: 2.1% and 0.2% in the deployed and non-deployed group ,respectively.	Unadjusted	**Population** Control group OR: Ref. (12 month diagnosis) OR: Ref. (12 month incidence) OR: Ref. (lifetime prevalence) Deployed soldiers OR: 2.5 [1.1 5.6] (12 month diagnosis) OR: 4.2 [0.7 24.5] (12 month incidence) OR: 1.7 [0.96 3.1] (lifetime prevalence) **Deployed soldiers**

		Inclusion/exclusion= -				Control soldiers OR: Ref. (12 month diagnosis) OR: Ref. (12 month incidence) OR: Ref. (lifetime prevalence) Kunduz OR: 2.1 [0.8 5.8] (12 month diagnosis) OR: 6.6 [1.03 41.9] (12 month incidence) OR: 1.7 [0.8 3.6] (lifetime prevalence) Combat units OR: 3.3 [0.5 23.7] (12 month diagnosis) OR: - (12 month incidence) OR: 2.6 [0.7 9.4] (lifetime prevalence)
OR = Odds ratio RR = Relative risk HR = Hazard ratio						

Supplementary file 4. Risk of bias of included articles. The risk of bias (i.e. low, moderate and high risk of bias) in six domains (i.e. study participation, study attrition, prognostic factor (i.e. exposure), outcome, study confounding and statistical analysis) is depicted, while also sum scores are shown.

	First author, year of publication	Participation	Attrition	Prognostic factor	Outcome	Confounding	Analysis/reporting
1	Armed Forces Health Surveillance Center, 2011	Moderate	Moderate	Moderate	Low	High	High
2	Andersen, 2019	Moderate	Moderate	Moderate	Moderate	Low	Low
3	Anderson, 2019	Low	Moderate	Moderate	Moderate	Low	Low
4	Berninger, 2010	High	High	Low	Moderate	Low	Low
5	Brownlow, 2018	Moderate	Moderate	Moderate	Moderate	High	Low
6	Brundage, 2015	Low	Low	Low	Low	High	High
7	Cameron, 2019	Low	Low	Low	Low	Low	Low
8	Chiu, 2011	Low	Moderate	Moderate	Moderate	Low	Low
9	Ciarleglio, 2018	Low	Moderate	Moderate	Low	Low	Low
10	Cone, 2015	High	High	Moderate	Moderate	Low	Low
11	Connorton, 2011	Moderate	Moderate	High	High	Moderate	Low
12	Cukor, 2011	Low	Moderate	Moderate	Moderate	Low	Low
13	Fear, 2010	High	High	Low	Moderate	Low	Low
14	Ferrajao, 2016	High	High	Moderate	Moderate	High	Low
15	Fichera, 2015	High	High	Moderate	Moderate	Low	Low
16	Fink, 2016	High	High	Moderate	Moderate	High	Low
17	Goodwin, 2012	Low	Low	Moderate	Moderate	Low	Low
18	Green, 2016	Moderate	Moderate	Moderate	Low	High	Low
19	Hansen, 2017	High	Moderate	Moderate	Moderate	Low	Low
20	Harvey, 2012	High	Moderate	Low	Moderate	Low	Low
21	Horesh, 2011	Moderate	Moderate	Moderate	Moderate	High	Moderate
22	Hourani, 2012	Moderate	High	Moderate	Moderate	High	High
23	Ikeda, 2017	Moderate	Moderate	Moderate	Moderate	Low	Low
24	Joseph, 2014	Moderate	Moderate	Moderate	Moderate	Low	Low
25	Karstoft, 2013	Moderate	Low	Moderate	Moderate	High	Low
26	Karstoft, 2015	Moderate	Low	Moderate	Moderate	High	Low
27	Kim, 2014	Low	Low	Moderate	Low	Low	Low
28	Levin-Rector, 2018	Low	Low	Low	Low	Moderate	Low
29	MacGregor, 2015	Moderate	Moderate	Low	Low	Low	Low
30	MacGregor, 2012	Low	Low	Low	Low	Low	Low
31	Maguen, 2012	Moderate	Moderate	Moderate	Moderate	Low	Low
32	Maguen, 2010	Moderate	Moderate	Low	Low	High	Low
33	Martindale, 2018	High	Moderate	Moderate	Low	High	High
34	Nagamine, 2018	Moderate	Moderate	Moderate	Moderate	High	Low
35	Osorio, 2018	High	High	Moderate	Moderate	Low	Low
36	Pihl-Thingvad, 2019	Low	Low	Moderate	Moderate	Low	Low
37	Polusny, 2011	Moderate	Moderate	Moderate	Moderate	Low	Low
38	Reijnen, 2015	High	High	Moderate	Moderate	High	Low
39	Shea, 2013	Moderate	Moderate	Moderate	Low	Low	Low
40	Soo, 2011	Moderate	Moderate	Moderate	Moderate	Low	Low
41	Stevelink, 2018	High	High	Moderate	Moderate	Low	Low
42	Wittchen, 2012	Moderate	Moderate	Moderate	Low	High	Low

Supplementary file 5. Risk of bias of included studies.

First author, Year;	Item	Risk of bias	Reason
1. Armed Forces Health Surveillance Center, 2011 [21]	Participation	Moderate	All armed forces were eligible, but no non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Although prognostic factors were self-reported, no substantial bias can be expected from self-reports of the current prognostic factors
	Outcome	Low	Outcomes were diagnosed in a hospital
	Confounding	High	No confounding analysis has been conducted
	Analysis/reporting	High	No proper analysis has been conducted, only descriptives were presented.
2. Andersen, 2019 [19]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
3. Anderson, 2019 [20]	Participation	Low	86% of eligible participants, participated at baseline
	Attrition	Moderate	60% of the participants were filled out their follow-up questionnaires
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
4. Berninger, 2010 [22]	Participation	High	There were differences (e.g. in PTSD status) between participants and non-participants
	Attrition	High	Participants without follow-up data were excluded. The above therefore also holds for those lost at follow-up
	Prognostic factor	Low	Prognostic factors were self-reported and from registers
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
5. Brownlow, 2018 [23]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	Only univariate analyses were reported

	Analysis/reporting	Low	Adequate analyses were used
6. Brundage, 2015 [24]	Participation	Low	It appears as if all eligible participants were analysed.
	Attrition	Low	It appears as if all eligible participants were analysed.
	Prognostic factor	Low	Deployment records were used
	Outcome	Low	Outcomes were diagnosed (it appears).
	Confounding	High	No confounding adjustment were done
	Analysis/reporting	High	Only descriptive statistics were provided
7. Cameron, 2019 [25]	Participation	Low	It appears as if all eligible participants were analysed.
	Attrition	Low	It appears as if all eligible participants were analysed.
	Prognostic factor	Low	Deployment records were used
	Outcome	Low	Outcomes were diagnosed
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
8. Chiu, 2011 [26]	Participation	Low	There were some differences between responders and non-responders.
	Attrition	Moderate	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Both self-reports and employer data were used
	Outcome	Moderate	Outcomes were self-reported using a validated questionnaire
	Confounding	Low	Confounding adjustment was performed.
	Analysis/reporting	Low	Adequate analyses were used
9. Ciarleglio, 2018 [27]	Participation	Low	11% non-response
	Attrition	Moderate	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Both self-reports and employer data were used
	Outcome	Low	Outcome was diagnosed
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
10. Cone, 2015 [28]	Participation	High	There are substantial differences between responders and non-responders.
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
11. Connorton, 2011 [29]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	High	Prognostic factors were self-reported and it is unclear how
	Outcome	High	Outcomes were self-reported and it is unclear how

	Confounding	Moderate	Multivariate analyses are not reported and it is unclear what was done
	Analysis/reporting	Low	Adequate analyses were done.
12. Cukor, 2011 [30]	Participation	Low	There was 86% participation
	Attrition	Moderate	There was 67% participation at follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Moderate	Outcomes were self-reported and obtained from interviews, with interview data used for exposure-outcome associations.
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
13. Fear, 2010 [31]	Participation	High	There are substantial differences between responders and non-responders.
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Low	Deployment administrative data were used
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
14. Ferrajao, 2016 [32]	Participation	High	Unclear but probably low participation rate
	Attrition	High	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	No adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
15. Fichera, 2015 [33]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
16. Fink, 2016 [34]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	No adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
17. Goodwin, 2012 [35]	Participation	Low	There were no substantial differences between responders and non-responders.
	Attrition	Low	There were no substantial differences between responders and non-responders (including

			those lost to follow-up).
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
18. Green, 2016 [36]	Participation	Moderate	There was a substantial non-response (20%)
	Attrition	Moderate	There was a substantial loss to follow-up (39%)
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Low	Outcome was diagnosed in an interview
	Confounding	High	No confounding adjustment was conducted
	Analysis/reporting	Low	Appropriate analyses were used.
19. Hansen, 2017 [37]	Participation	High	There was a substantial amount of non-responders and no non-responder analysis.
	Attrition	Moderate	There was a substantial amount of participants lost to follow-up and no loss to follow-up analysis.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
20. Harvey, 2012 [38]	Participation	High	There were substantial differences (e.g. in age and gender) between responders and non-responders.
	Attrition	Moderate	No loss to follow-up analysis were reported
	Prognostic factor	Low	Prospective factors were determined based on deployment characteristics
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
21. Horesh, 2011 [39]	Participation	Moderate	No non-responder analysis was performed
	Attrition	Moderate	No loss to follow-up analysis was performed
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No confounding analyses were conducted
	Analysis/reporting	Moderate	The description of the analysis is unclear
22. Hourani, 2012 [40]	Participation	Moderate	No non-responder analysis was performed
	Attrition	High	There was substantial loss to follow-up in this study
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported

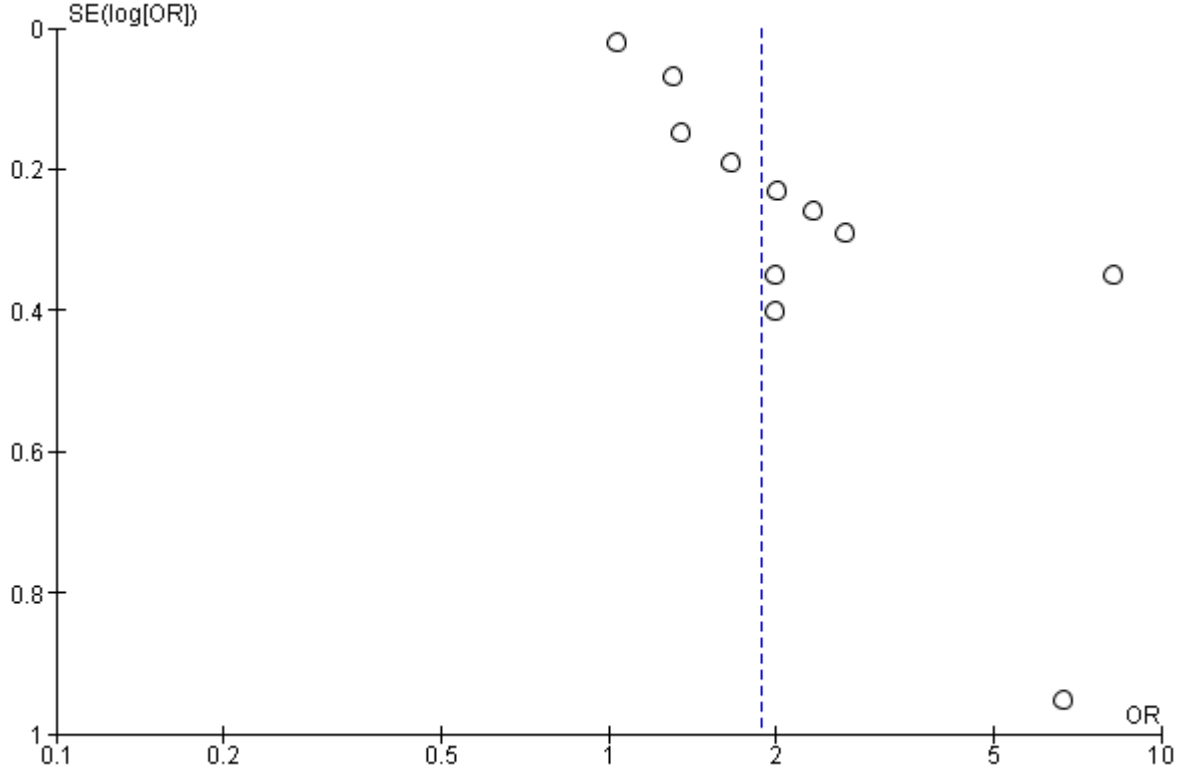
	Confounding	High	No confounding analyses were conducted (at least, not for the exposure-outcome associations)
	Analysis/reporting	High	Only descriptive statistics were reported (at least, for the exposure-outcome associations)
23. Ikeda, 2017 [41]	Participation	Moderate	About 15% non-response.
	Attrition	Moderate	There was substantial loss to follow-up with differences between those who were and were not lost.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
24. Joseph, 2014 [42]	Participation	Moderate	There was a substantial non-response
	Attrition	Moderate	There was a substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
25. Karstoft, 2013 [43]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Low	Loss to follow-up analyses indicated no substantial differences between those who remained in the cohort or not.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding were performed
	Analysis/reporting	Low	Adequate statistical analyses were conducted
26. Karstoft, 2015 [44]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Low	Loss to follow-up analyses indicated no substantial differences between those who remained in the cohort or not.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding were performed
	Analysis/reporting	Low	Adequate statistical analyses were conducted
27. Kim, 2014 [45]	Participation	Low	Very high >99% participation rate
	Attrition	Low	Very high >99% participation rate in follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcome was diagnosed during an interview
	Confounding	Low	Adjustment for confounding was performed

	Analysis/reporting	Low	Adequate analyses were conducted
28. Levin-Rector, 2018 [46]	Participation	Low	Responders comprised >90% of the eligible population
	Attrition	Low	Participants during follow-up comprised >90% of the cohort
	Prognostic factor	Low	Prognostic factors were obtained from database information
	Outcome	Low	Outcomes were obtained from diagnosed register information
	Confounding	Moderate	Only adjustment for clustering within units was done
	Analysis/reporting	Low	Adequate statistical analyses were conducted
29. MacGregor, 2015 [47]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Low	Prognostic factors were obtained from register data
	Outcome	Low	Outcomes were obtained from register data and were diagnosed.
	Confounding	Low	Adjustment for confounding has been conducted
	Analysis/reporting	Low	Adequate statistical analyses were used.
30. MacGregor, 2012 [48]	Participation	Low	All eligible participants were analysed.
	Attrition	Low	All eligible participants were analysed.
	Prognostic factor	Low	Register data were used
	Outcome	Low	Diagnosed register data were used
	Confounding	Low	Adjustment for confounding has been conducted
	Analysis/reporting	Low	Adequate statistical analyses were used.
31. Maguen, 2012 [49]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
32. Maguen, 2010 [50]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Low	Prognostic factors were obtained from company data.
	Outcome	Low	Outcome was diagnosed
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
33. Martindale, 2018 [51]	Participation	High	No non-responder analyses were presented, with substantial non-response.
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were obtained from an interview
	Outcome	Low	Outcome was diagnosed during an interview

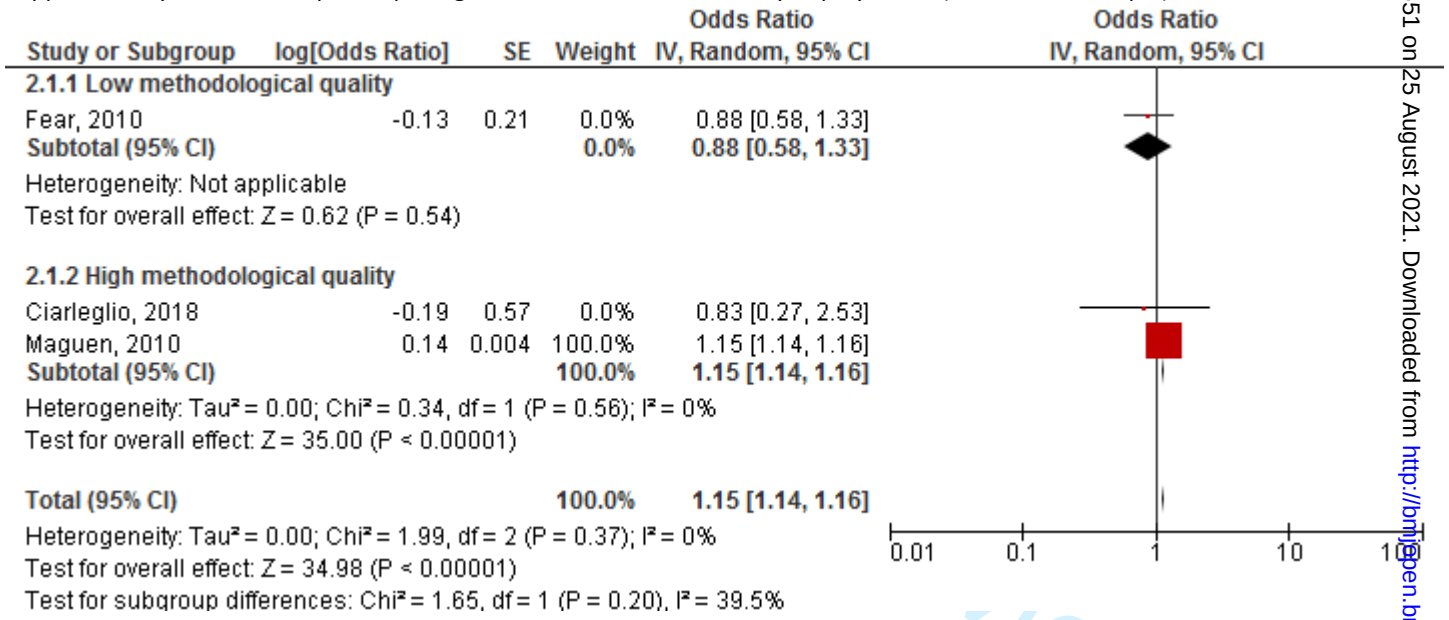
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	High	No statistical analysis was done on the exposure-outcome association (only other analysis).
34. Nagamine, 2018 [52]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
35. Osorio, 2018 [53]	Participation	High	A substantial amount of eligible participants did not participate. No non responder analysis was conducted.
	Attrition	High	A substantial amount of participants were lost in the follow-up. No loss to follow-up analysis was conducted.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
36. Pihl-Thingvad, 2019 [54]	Participation	Low	Responders and non-responders did not differ substantially from one another (only in age)
	Attrition	Low	Variables that predicted loss to follow-up (e.g. baseline PTSD) were adjusted for
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
37. Polusny, 2011 [55]	Participation	Moderate	There were slight differences between responders and non-responders
	Attrition	Moderate	There were slight differences between those with and without follow-up data
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
38. Reijnen, 2015 [56]	Participation	High	There were substantial differences (e.g. in mental health) between responders and non-responders.
	Attrition	High	Participants without follow-up data were excluded. The above therefore also holds for those lost at follow-up
	Prognostic factor	Moderate	Prospective factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No confounding adjustment was conducted

	Analysis/reporting	Low	Appropriate analyses were used.
39. Shea, 2013 [57]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcome was diagnosed during a structured interview.
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
40. Soo, 2011 [58]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
41. Stevelink, 2018 [59]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
42. Wittchen, 2012 [60]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcomes was diagnosed during a structured interview
	Confounding	High	No adjustment for confounding was performed
	Analysis/reporting	Low	Adequate analyses were conducted

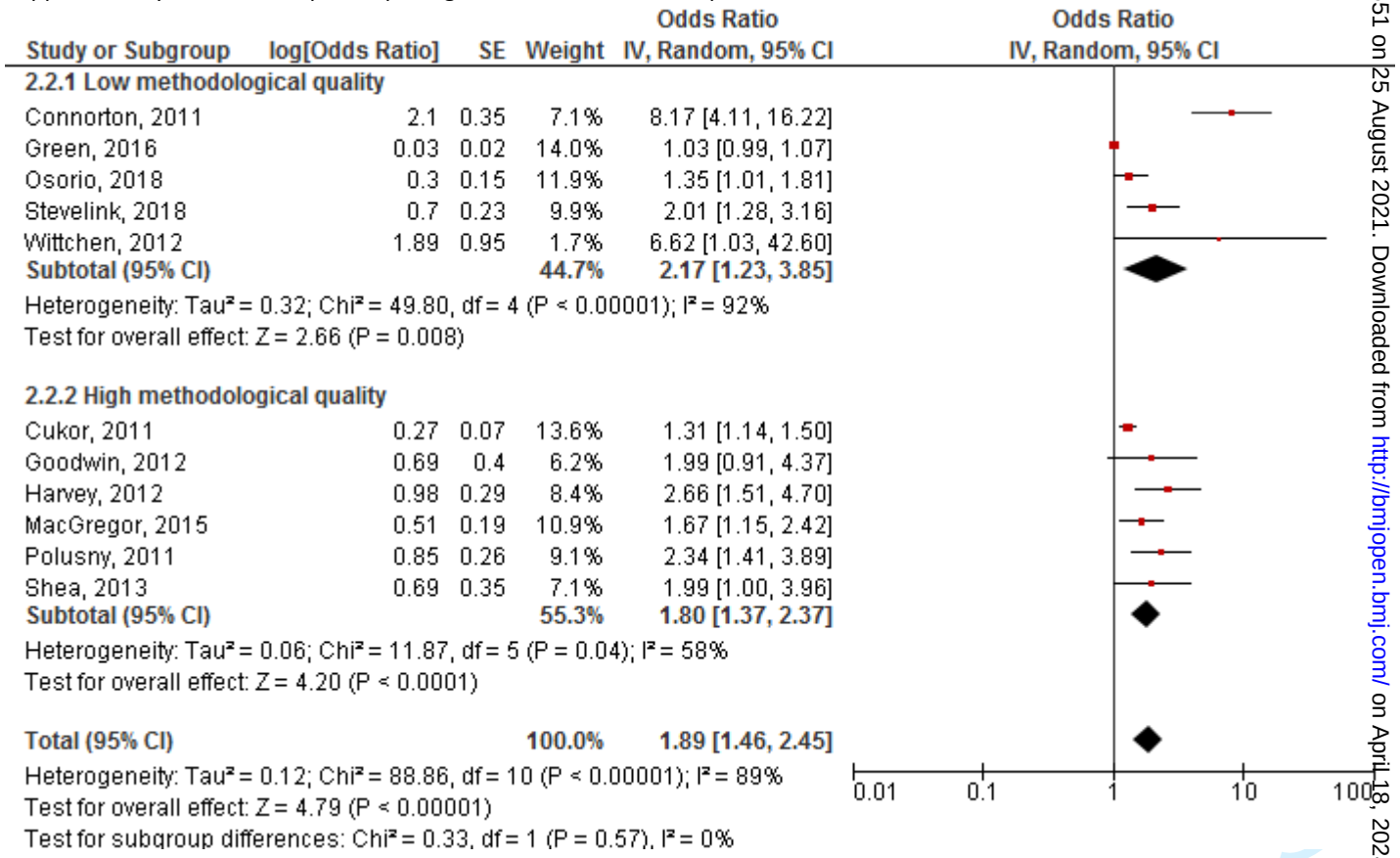
Supplementary file 6. Funnel plot, depicting the effect of combat exposure on PTSD.



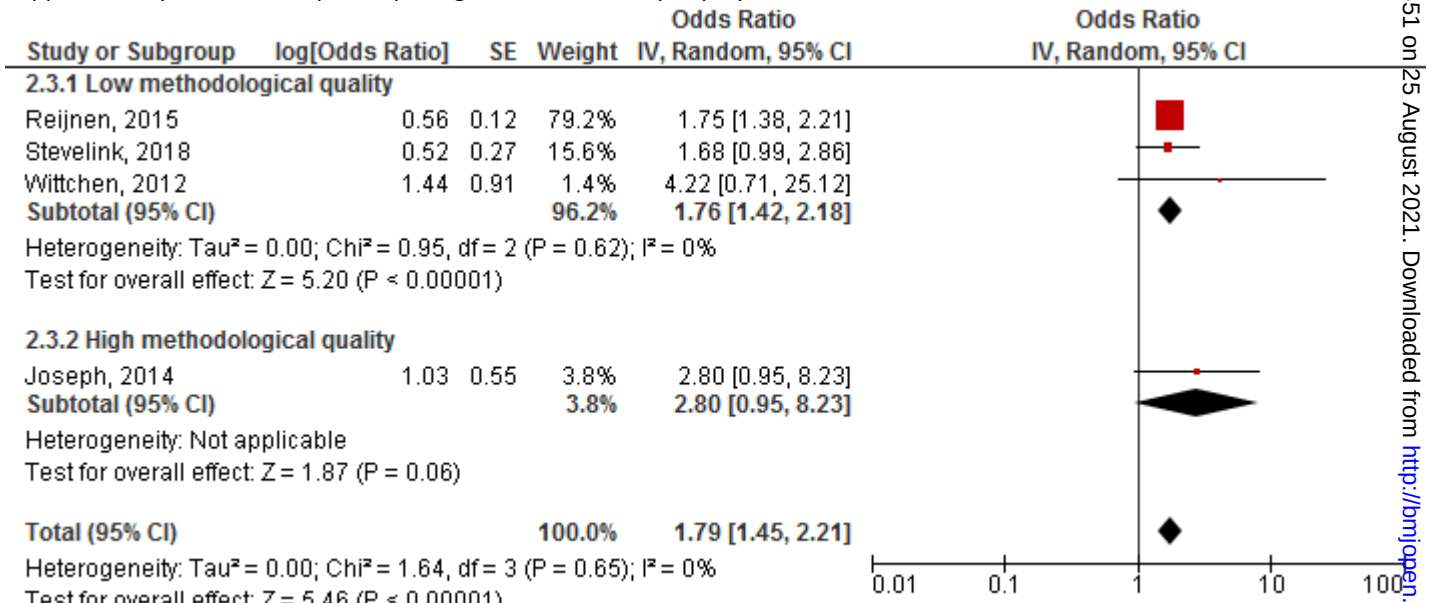
Supplementary file 7. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for risk of bias.



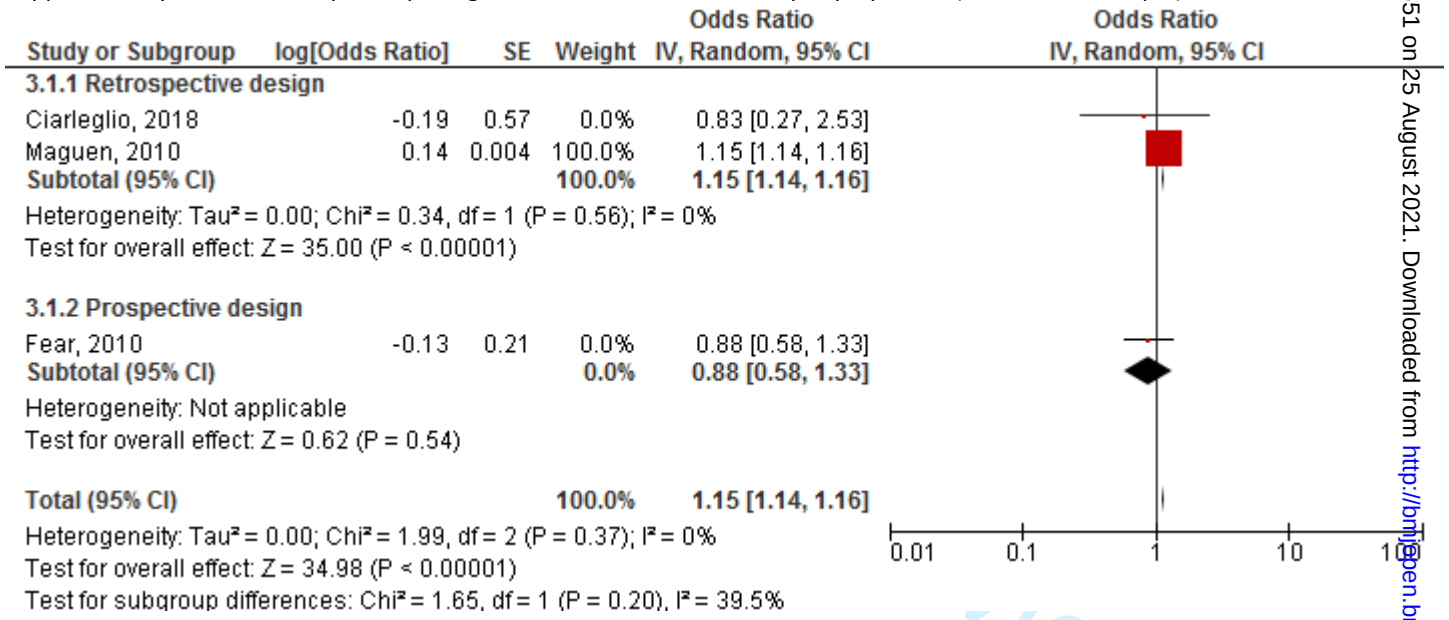
Supplementary file 8. Forest plot depicting the effect of combat exposure with PTSD, stratified for risk of bias.



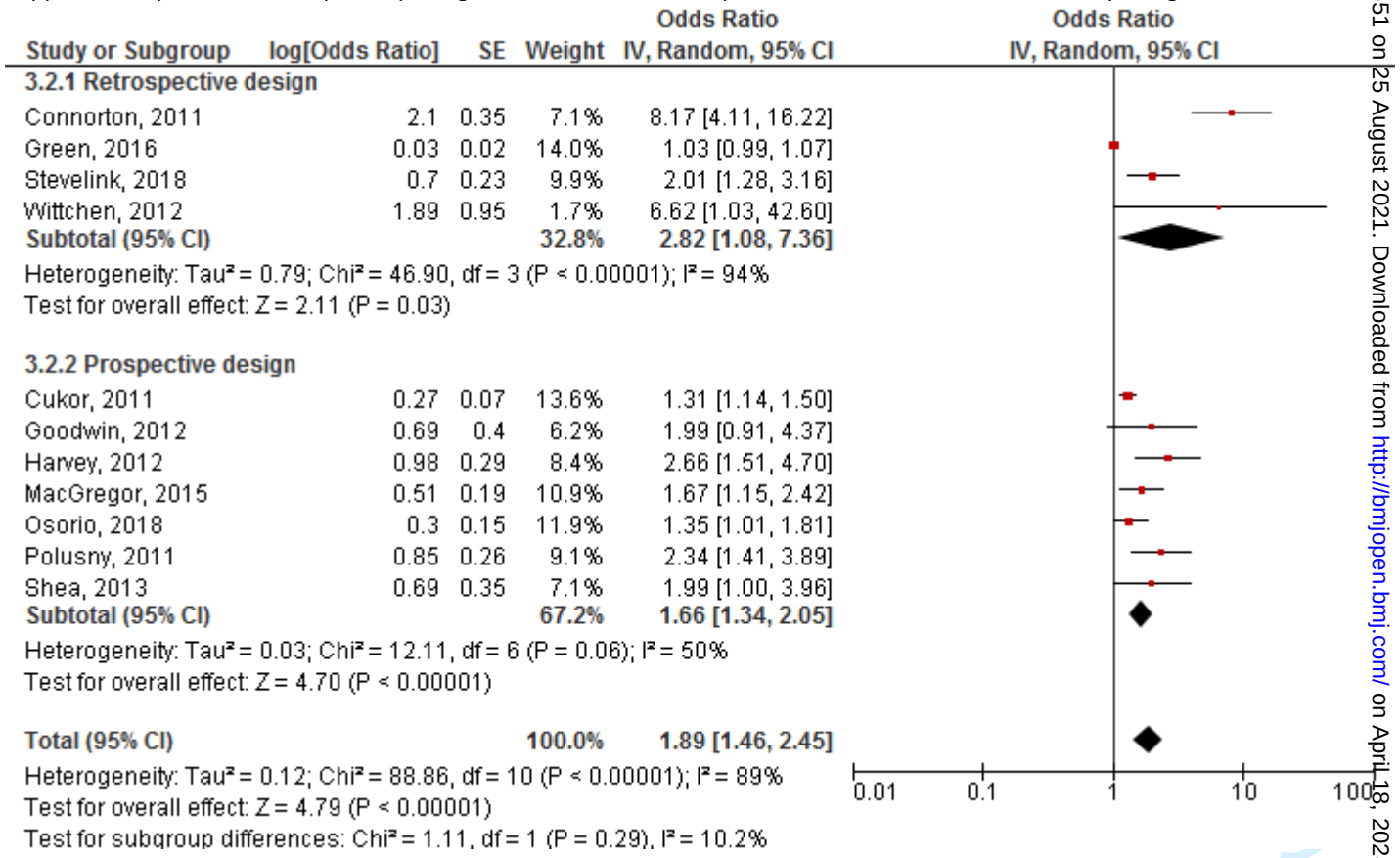
Supplementary file 9. Forest plot depicting the effect of army deployment with PTSD, stratified for risk of bias.



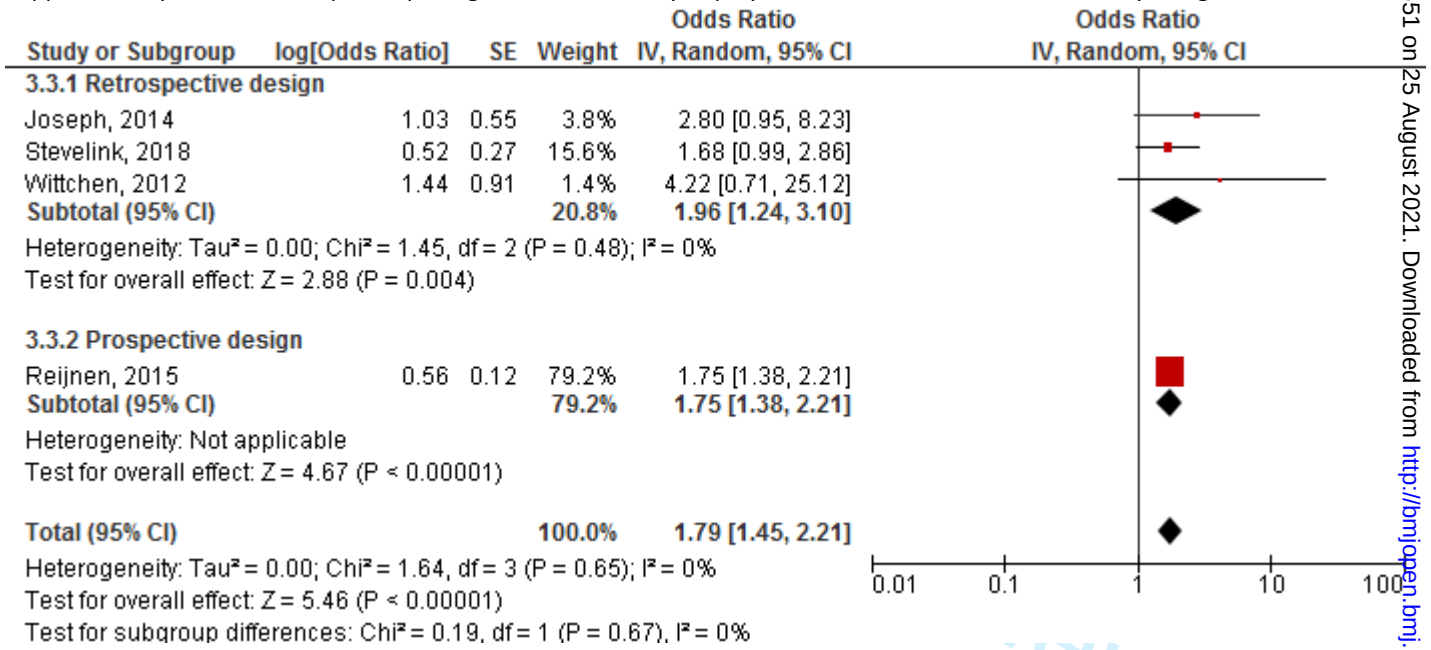
Supplementary file 10. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for study design.



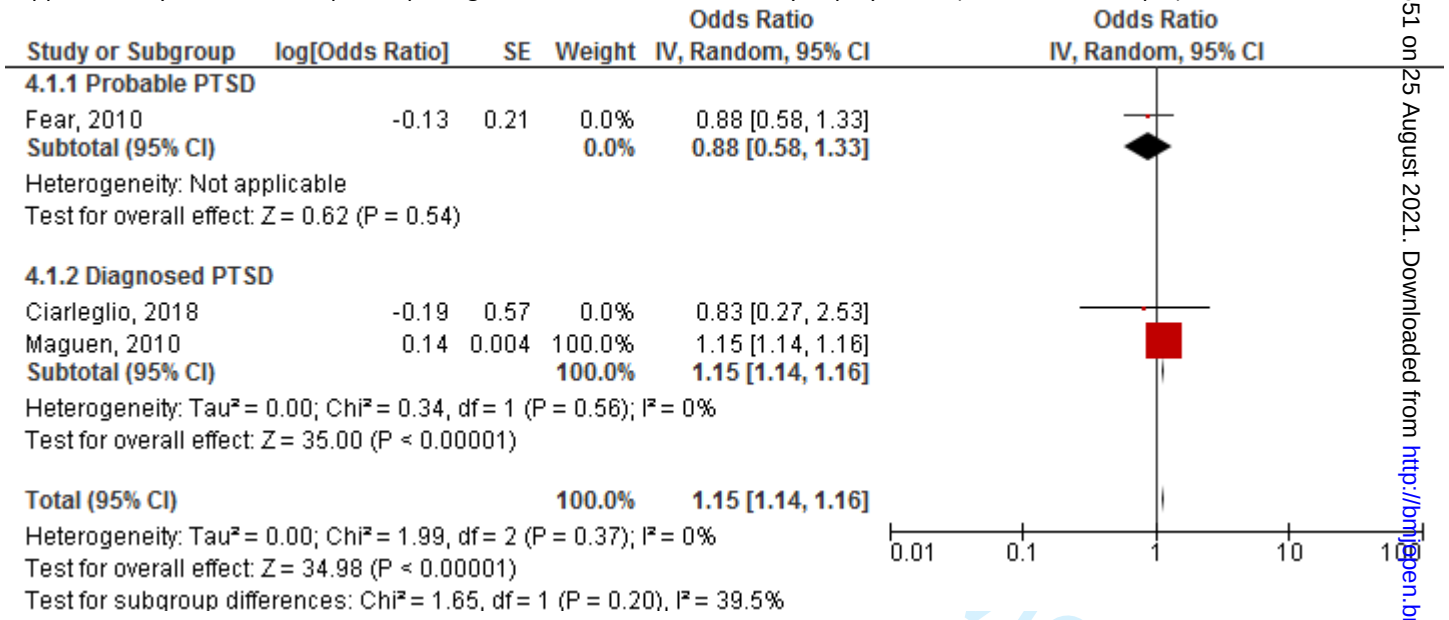
Supplementary file 11. Forest plot depicting the effect of combat exposure with PTSD, stratified for study design.



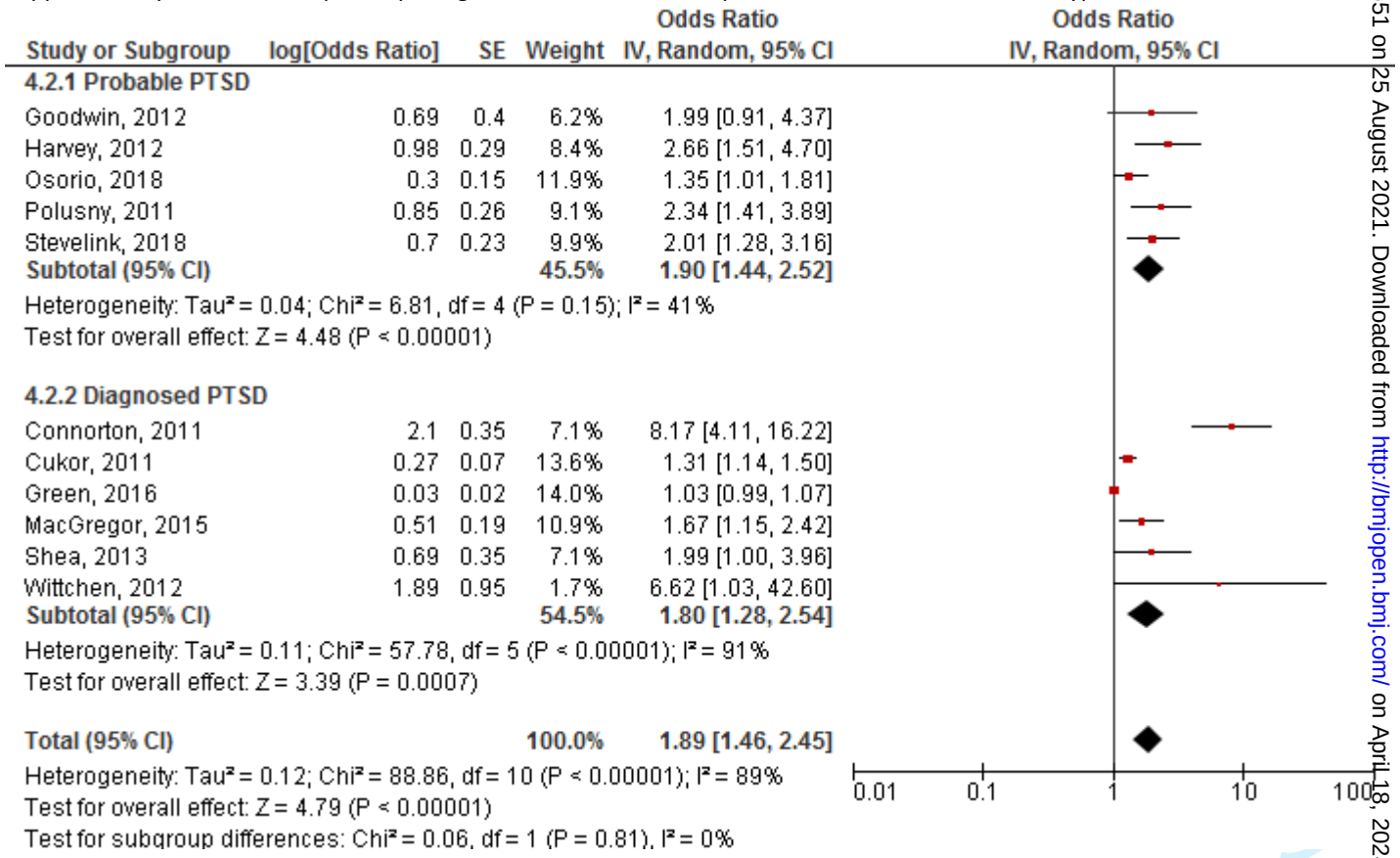
Supplementary file 12. Forest plot depicting the effect of army deployment with PTSD, stratified for study design.



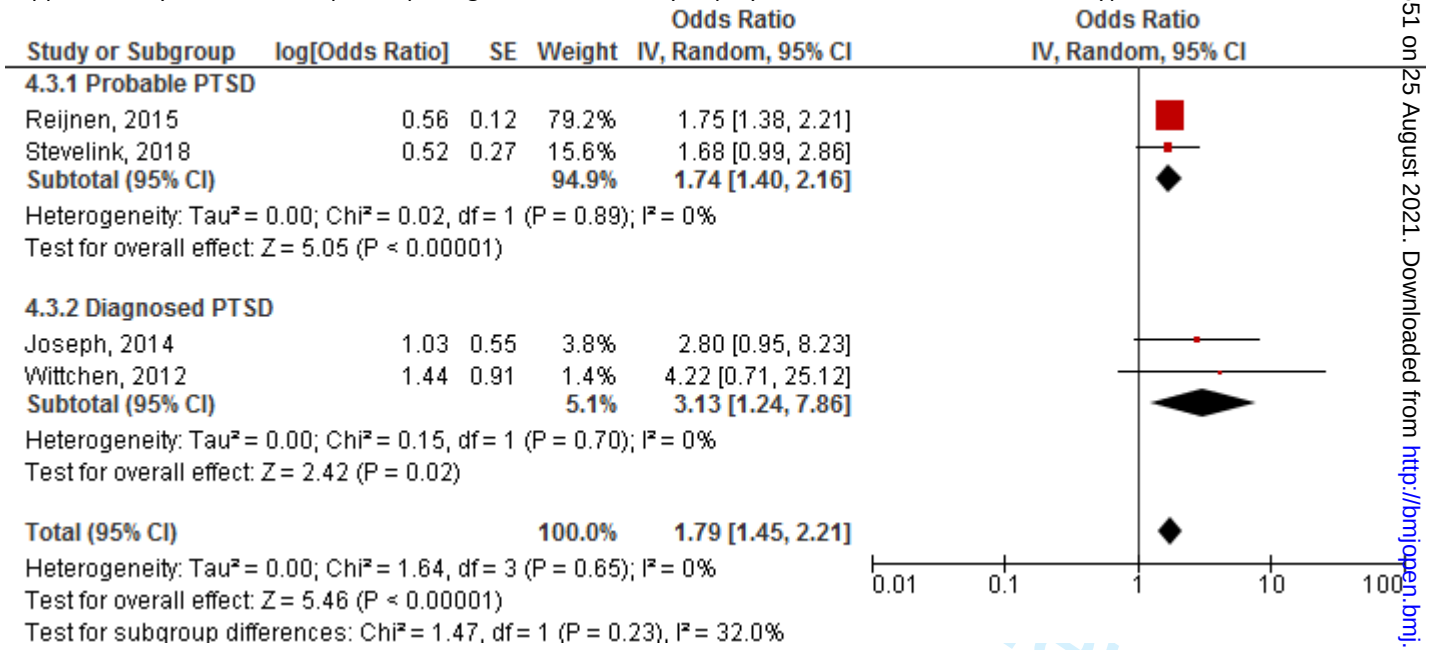
Supplementary file 13. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for type of PTSD ascertainment.



Supplementary file 14. Forest plot depicting the effect of combat exposure with PTSD, stratified for type of PTSD ascertainment.

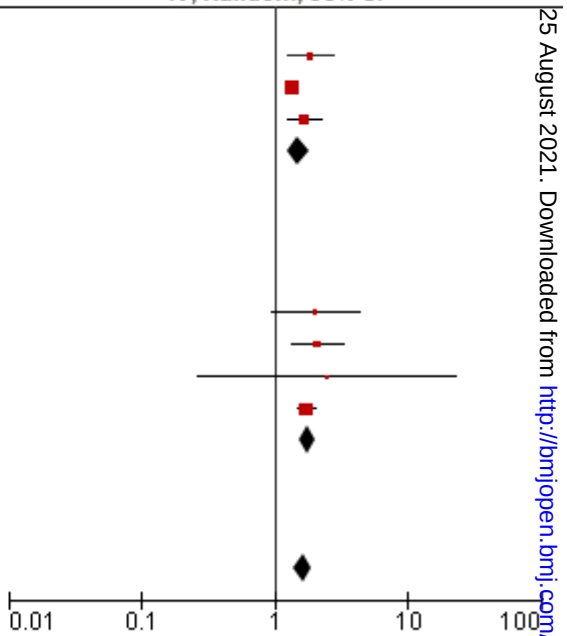


Supplementary file 15. Forest plot depicting the effect of army deployment with PTSD, stratified for type of PTSD ascertainment.

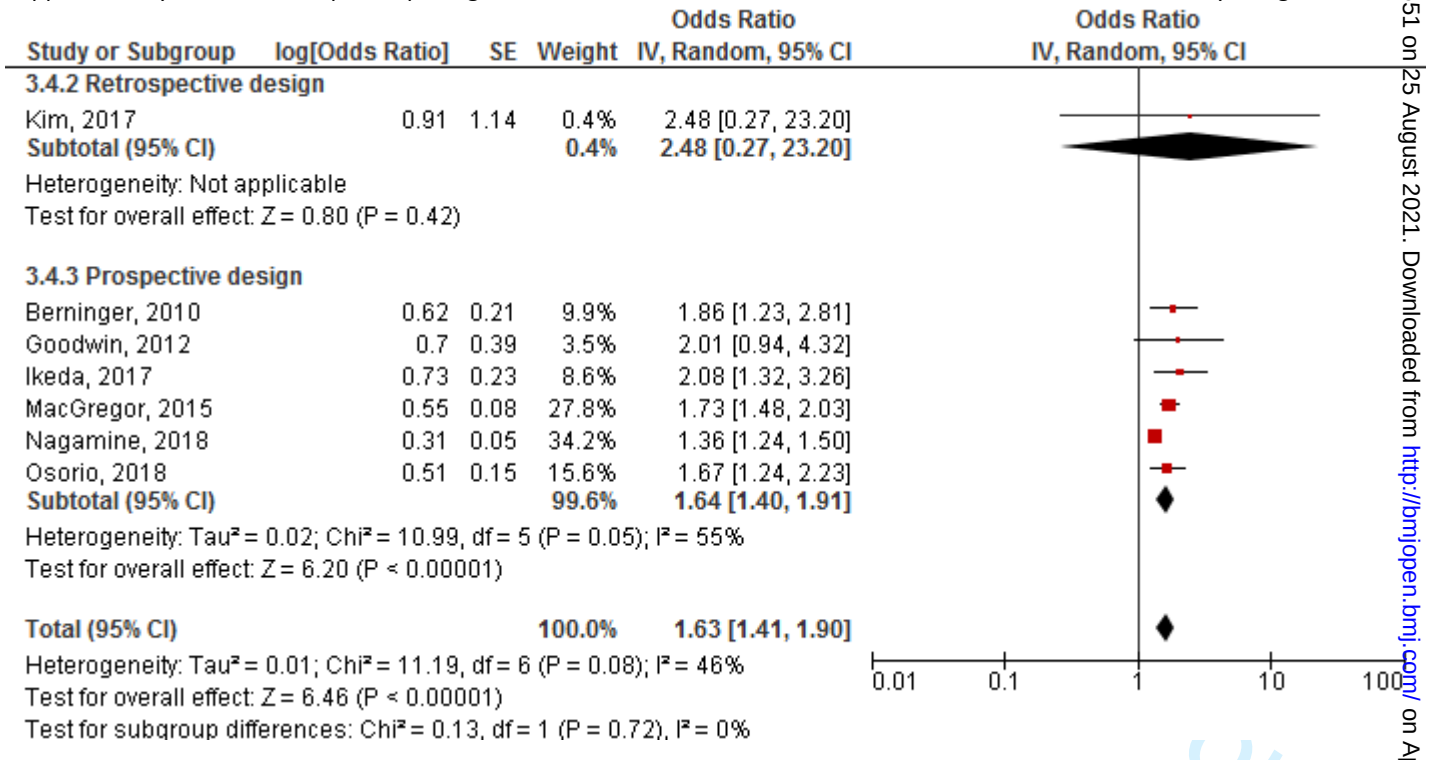


Supplementary file 16. Forest plot depicting the effect of confrontation with death with PTSD, stratified for risk of bias.

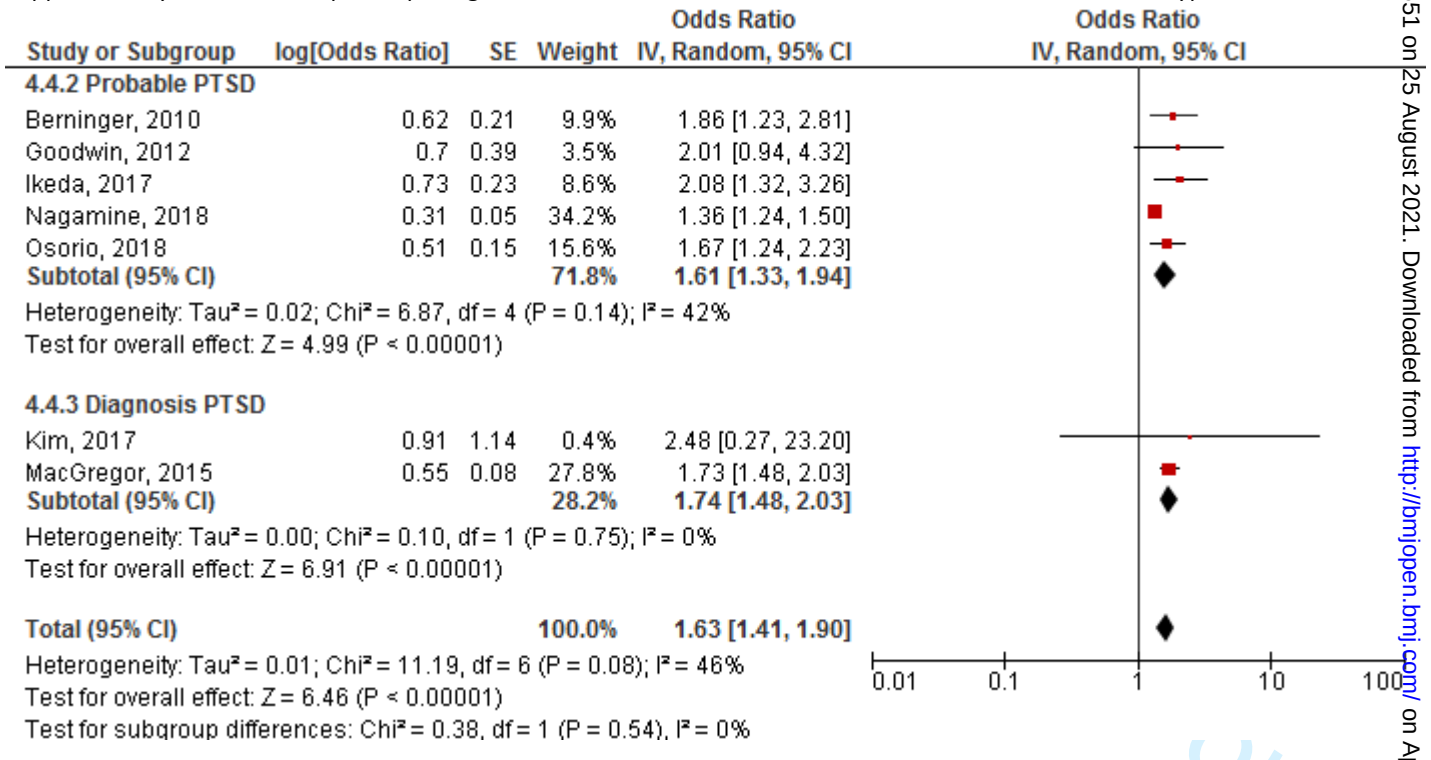
Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Random, 95% CI
2.4.2 Low methodological quality				
Berninger, 2010	0.62	0.21	9.9%	1.86 [1.23, 2.81]
Nagamine, 2018	0.31	0.05	34.2%	1.36 [1.24, 1.50]
Osorio, 2018	0.51	0.15	15.6%	1.67 [1.24, 2.23]
Subtotal (95% CI)			**59.7%**	**1.50 [1.25, 1.80]**
Heterogeneity: Tau² = 0.01; Chi² = 3.41, df = 2 (P = 0.18); I² = 41%				
Test for overall effect: Z = 4.40 (P < 0.0001)				
2.4.3 High methodological quality				
Goodwin, 2012	0.7	0.39	3.5%	2.01 [0.94, 4.32]
Ikeda, 2017	0.73	0.23	8.6%	2.08 [1.32, 3.26]
Kim, 2017	0.91	1.14	0.4%	2.48 [0.27, 23.20]
MacGregor, 2015	0.55	0.08	27.8%	1.73 [1.48, 2.03]
Subtotal (95% CI)			**40.3%**	**1.78 [1.54, 2.06]**
Heterogeneity: Tau² = 0.00; Chi² = 0.74, df = 3 (P = 0.86); I² = 0%				
Test for overall effect: Z = 7.78 (P < 0.00001)				
Total (95% CI)			**100.0%**	**1.63 [1.41, 1.90]**
Heterogeneity: Tau² = 0.01; Chi² = 11.19, df = 6 (P = 0.08); I² = 46%				
Test for overall effect: Z = 6.46 (P < 0.00001)				
Test for subgroup differences: Chi² = 2.01, df = 1 (P = 0.16), I² = 50.3%				



Supplementary file 17. Forest plot depicting the effect of confrontation with death with PTSD, stratified for study design.



Supplementary file 18. Forest plot depicting the effect of confrontation with death with PTSD, stratified for type of PTSD ascertainment.



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	4
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	5-6
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	7
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	7
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	7-9
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	7-9
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	7-9
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	7-9
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	10-11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	13

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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What work-related exposures are associated with post-traumatic stress disorder? A systematic review with meta-analysis

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Keywords:	MENTAL HEALTH, EPIDEMIOLOGY, OCCUPATIONAL & INDUSTRIAL MEDICINE

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What work-related exposures are associated with post-traumatic stress disorder? A systematic review with meta-analysis

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Number of References (60 max): 64

Abstract

Objectives: Although there is evidence that work-related exposures cause post-traumatic stress disorder (PTSD), there are few quantitative studies assessing the degree to which these factors contribute to PTSD. This systematic review with meta-analysis identified work-related exposures associated with PTSD, and quantified their contribution to this disorder.

Methods: We searched Medline, PsycINFO, Embase, PILOTS and Web of Science (2005 to 10-09-2019) for longitudinal studies on work-related exposures and PTSD. We described included articles, and conducted meta-analyses for exposures with sufficient homogeneous information. We performed subgroup analyses for risk of bias, study design and PTSD ascertainment. We assessed evidence quality using GRADE, and estimated population attributable fractions.

Results: After screening 8,590 records, we selected 33 studies (n=5,719,236). From what was moderate quality evidence at best, we identified various work-related exposures that were associated with PTSD, mainly involving individuals in the military and first responder (e.g., police or fire brigade) occupations. These exposures included the number of army deployments (odds ratio: 1.15 [1.14 1.16]), combat exposure (1.89 [1.46 2.45]), army deployment (1.79 [1.45 2.21]) and confrontation with death (1.63 [1.41 1.90]). Effects were robust across subgroups and exposures attributed modestly (7%-34%) to PTSD. We identified additional exposures in other occupations, including life threats, being present during an attack, and hearing about a colleague's trauma.

Conclusions: We identified various work-related exposures associated with PTSD and quantified their contribution. While exposure assessment, PTSD ascertainment, and inconsistency may have biased our findings, our data are of importance for development of preventive interventions and occupational health guidelines.

Key words: Post traumatic stress disorder; occupational health; occupational diseases; systematic review; meta-analysis

Strengths and limitation of this study

- The strengths of this review are the systematic methods, including the a-priori registered protocol, a thorough meta-analysis with sensitivity analyses, estimation of population attributable fractions and the assessment of evidential quality with GRADE.
- Reported studies bear sources of heterogeneity and possible bias, e.g. in the ascertainment of post-traumatic stress disorders (which was not always clinically diagnosed but sometimes based on self-reports)
- The external validity of our findings is limited as the majority of the studies in our review were based on armed forces, first responders and other male dominated occupations, and mainly from Western countries.
- Evidence reported in our review was moderate quality at best, among other elements, due to risk of bias regarding participation (i.e., selection bias), attrition and misclassification.

Background

Post-traumatic stress disorder (PTSD) can be triggered when individuals experience or witness traumatic events. PTSD has been a clinical diagnosis since 1980, when the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) was published[1]. The most recent DSM-5[2] states that PTSD results from exposure to severely traumatic event(s), while exhibiting a pattern of symptoms characterised by intrusion, avoidance, negative moods and cognitions, arousal, and reactivity. A diagnosis of PTSD also involves duration and functional impairment criteria, and the patient's symptoms should be exclusive (i.e., not caused by drugs or other illnesses). Estimates of PTSD prevalence among the general population differ widely. For example, lifetime PTSD prevalence ranged from 6% to 9% in United States (US) and Canadian samples, while prevalence rates in Australian samples range from 1% to 2%[3]. The substantial differences between individual studies could result from different ways in which PTSD was ascertained, varying from any type of clinical diagnosis, to self-reports of DSM-5 criteria and PTSD symptoms assessed as *probable PTSD*.

PTSD can have a major impact on individuals and society as a whole, as it is associated with mental comorbidities[4], substance abuse[5] and suicide[6]. PTSD is particularly prevalent among certain occupational groups, such as police officers, firefighters, medical workers and military personnel, all of whom can experience events that might trigger PTSD[7 8]. One particular systematic review showed that the prevalence of PTSD in military veterans and other high-risk occupational groups can be almost twice as high as among the general population[8]. Another more recent review identified a number of occupational groups, including healthcare workers, police officers, prison workers, and emergency personnel, with an increased risk of PTSD[9]. Also, various specific work-related exposures (i.e., exposures to situations or conditions at work that may have an effect on PTSD) and their association with PTSD have been reported[7]. This included traumatic events experienced by military personnel and first responders (e.g., police officers or fire fighters). The latter review also identified journalists, healthcare workers or individuals in other occupations who are exposed to traumatic events or the aftermath thereof[7].

Despite this evidence, the association of work-related exposures with PTSD has not yet been quantified in a meta-analysis. Such knowledge is of importance to answer questions regarding work-related causation and prevention, as a prelude to developing interventions. With regard to prevention, we need to quantify the contribution of work-related exposures in the onset of PTSD[10]. Such data could be used to formulate clinically relevant exposure threshold limits, as has been done with other disorders[11 12]. It could also be of use in occupational health guidelines, as many countries provide financial compensation for individuals diagnosed with an occupational disease.

In this study, our aim was to 1) identify the work-related exposures associated with the onset of PTSD, and 2) quantify the extent to which such exposures contribute to this disorder. Evidence on the contribution of work-related factors to PTSD could be used to facilitate decisions in reporting schemes. It could also help to identify and prioritise preventive interventions against those exposures with the strongest effect, in terms of triggering PTSD.

Methods

The protocol for this systematic review with meta-analysis was registered in PROSPERO[13] a-priori. The review itself was conducted in accordance with the PRISMA statement guidelines[14].

Searches

The Medline, PsycINFO, Embase, PILOTS and Web of Science databases were systematically searched for material published from 2005 (January) to 2019 (September 10). This was an arbitrarily chosen period on the basis of changes in people's exposure to work-related traumatic events and changes in the definition of PTSD over time[2]. The search strategy consisted of a combination of controlled search terms (e.g., Medical Subject Headings/MeSH) and free-text words used to specify search terms related to: 1) PTSD 2) exposure, and 3) work. A methodological filter was used to select longitudinal studies (prospective, retrospective or case-control), studies published in English, and those involving human participants only. The search strategy used is described in detail in supplementary file 1. We validated this search with various key references, to avoid term bias. In addition to the database search, we conducted snowball searches for additional studies. These were based on citation tracking (forwards and backwards) from the articles and reviews retrieved in our electronic search. We also conducted scoping searches for key researchers on this topic, and used ResearchGate profiles to identify relevant records and projects (including unpublished projects). Outcome articles were compared to potential protocol papers, to assess selective reporting.

Inclusion and exclusion criteria

Two reviewers, working independently of one another, used Rayyan (an online tool: https://rayyan.qcri.org/) to screen for eligible references. The full texts of any such references (whose eligibility was based on the screening title and abstract) were retrieved for further screening. Any conflicts were resolved during a consensus meeting. We included studies on the association between any work-related exposure and the onset of PTSD (acute or delayed) in paid workers of working age (aged 18-65). Any studies that described work-related exposures in terms of work demands or other occupational factors were eligible for inclusion. However, studies in which exposures were related to job title or work title only were excluded. Studies were included if there was an actual diagnosis of PTSD (either using checklists with defined cut-off values or clinical criteria, e.g., using DSM criteria[2] and/or coded according to the International Classification of Disorders -ICD-9-CM 309.81-). Studies in which PTSD was assessed by means of self-reports only (not using any criteria) were excluded. We excluded any studies into the persistence or growth of PTSD. Those studies in which the exposure-outcome association was quantified, e.g., in terms of effect sizes such as a hazard ratio (HR), relative risk (RR) or odds ratio (OR), were included. We restricted ourselves to original articles, in English or Dutch, published in peer-reviewed scientific journals from 2005 onwards. Studies with a prospective, retrospective or case-control longitudinal design were included, while cross-sectional studies were excluded, to be able to monitor the time sequence between exposure and the PTSD onset, in which the assessments of exposure precede the actual onset of the disorder. The above-mentioned set of criteria were finalised after a pilot screening of 300 references.

Data extraction and risk of bias assessment

Two reviewers, working independently of one another, extracted data and assessed risk of bias from each of the eligible articles. Any conflicts were resolved during a consensus meeting. We extracted first author and year of publication, study name and design, sample (country, occupational group,

age and sex), exposure assessment, PTSD ascertainment, and effect size. Where it was not possible to retrieve sufficient information from the published articles, additional data were requested from study researchers.

Risk of bias was assessed using the 'Quality in Prognosis Studies' tool[15], with criteria related to study participation, attrition, prognostic factor (i.e., exposure) measurements, outcomes, confounding, and statistical analysis. Here, we attributed a low risk of bias regarding attrition to studies with a >80% participant retention.

Data analysis

The included articles were described in terms of extracted data and risk of bias. Work-related exposures were categorised according to the DSM-5 criteria for PTSD stressors[2]: 1) direct exposure to the trauma, 2) witnessing a trauma, 3) hearing about a colleague/co-workers (adapted to work context) was/were exposed to a trauma, or 4) indirect exposure to aversive details of a trauma (e.g., first responders and medics).

Where sufficient clinically and methodologically homogeneous information were available, a quantitative meta-analysis was conducted to determine a pooled effect size for the association of each exposure with PTSD. Review Manager (RevMan 5) was used for the meta-analyses, and to generate forest and funnel plots. The latter were used to assess publication bias, through visual inspection. According to the Cochrane collaboration handbook, funnel plots were only generated for exposures with effect sizes from ≥10 studies[16]. Most of the exposure-outcome associations featured statistical heterogeneity (I^2>75%), so random-effects estimates were adopted for statistical pooling. We assumed that the interpretation of effect estimates (e.g., HR and OR) was consistent, and we estimated pooled OR with 95% confidence interval (95%CI). We adopted the OR, as this was the most frequently reported effect size in the articles found (being reported in 32 articles, whereas two articles reported HRs and three articles reported RRs).

When more than one article reported on the same study, information from just one of these articles was used for analyses, using effect sizes from the article with the shortest follow-up duration (with a latency time of at least four weeks) to ensure that the work-related exposure of interest is indeed the most likely cause of PTSD. Wherever possible, we used information from fully adjusted models and we did not consider subgroups (e.g., sex differences). Population attributable fractions (PAFs) were estimated[17] to assess the extent to which work-related exposures contributed to the development of PTSD. Here, the proportion of workers exposed to the exposure of interest (P_e) were multiplied by the attributable proportion in the exposed workers: $P_e(OR-1)/(1+P_e(OR-1))$.

In line with our registered protocol[13], subgroup analyses were based on the risk of bias (with a cut-off score of 60% for the risk of bias scale summary score, to obtain two subgroups), on the study design (prospective vs retrospective) and on PTSD ascertainment (clinically diagnosed PTSD vs probable PTSD). In contrast to the protocol that we registered a-priori,[13] we were unable to compare other characteristics of PTSD (i.e., acute vs delayed) due to limited available data. Any information that could not be qualitatively analysed was described narratively.

Strength of evidence

The strength of the evidence was assessed using the GRADE (Grades of Recommendations, Assessment, Development and Evaluation) framework[18]. Four quality levels were distinguished: high, moderate, low, and very low. Our starting point for evidence grading was 'moderate', which has previously been proposed for use in the assessment of prognostic factors[19]. Various study limitations

could have detracted from the strength of the evidence (if the majority of the studies scored <60% on the risk of bias scale), as could inconsistency (I^2>50%), indirectness, imprecision (95%CI boundaries are <1 and >2), and publication bias (based on the funnel plots). Study findings with moderate or large effect sizes (i.e., lower limit of 95%CI OR>2.0) or an exposure-response gradient could boost the quality of the evidence.

Patient and public involvement

There was no patient or public involvement in designing and conducting this study.

Results

Study selection

The study selection procedure is described in Figure 1. We identified 14,529 records during database searches. After discarding duplicates, we screened the remaining 8,590 records on title and abstract. Of these, we assessed 107 full text articles and excluded 65 for various reasons (see Supplementary file 2 for more details). As no additional articles were found during snowball and scoping searches, 42 articles from 33 studies were described in this review[20-61].

Study description and methodological quality/risk of bias

Supplementary file 3 contains the extracted data, and risk of bias assessment is shown in supplementary file 4-5. The 33 included studies provided data on n=5,719,236 participants, ranging from n=19 to n=2,549,949 participants per study. Eighteen studies were from the US, four were from the United Kingdom, two were from Denmark, and two others from Japan. There was one study from each of the following countries: Israel, The Netherlands, Germany, Portugal, Italy, Norway and Korea. The majority of the studies (N=21) involved participants from armed forces. Five studies featured first responders who had attended the scene of a disaster, three focused on healthcare workers, two on employers at the scene of a disaster, one on bank workers and one on public transport workers.

Four studies reported no details of sex, five studies only used male participants, and 17 used samples in which the majority of participants were male (≤20% females). In only seven studies, did female participants make up a reasonable proportion (>20%) of the study sample. Twenty-eight studies reported exposures obtained from self-reports, 12 studies used deployment administration databases, and two studies were based on a combination of these two measurements. Baseline exposure assessment was carried out for the period 1983-2012. Twenty-five articles assessed PTSD (by clinical diagnosis) while the remaining 17 articles assessed probable PTSD/PTSD symptoms (by self-reports using pre-defined (e.g., DSM-5) criteria). The weighted average for PTSD prevalence during in the follow-up periods was 7.3%, while individual study prevalence ranged from 1.0% to 70.5%. The average prevalence for diagnosed cases of PTSD was slightly higher (7.3%) than for probable PTSD (6.4%).

Twenty-five studies were prospective studies and eight were retrospective studies. On average, methodological quality was 62% (SD:19%), ranging from 25% to 100%. Most articles showed a low risk of bias on analysis/reporting (N=37) and confounding (N=25). Less than half of the articles showed a low risk of bias on participation selection (N=11), attrition (N=9), prognostic factor (exposure) assessment (N=9) and outcome (PTSD) ascertainment (N=13).

Work-related exposures

Each of the exposure-outcome associations presented have been described and categorised according to the DSM-5 criteria for PTSD stressors[2]: 1) direct exposure, 2) witnessing a trauma, 3) hearing that a colleague or co-worker was exposed to a trauma, or 4) indirect exposure to aversive details of a trauma. An overview of qualitative and quantitative analyses of all exposure-outcome associations is shown in Table 1. Figures 2 and 3 depict quantitative analyses, while Table 2 contains an overview of any exposure-outcome associations that could not be statistically pooled.

Direct exposure

The exposure-outcome associations for direct exposures were quantitatively analysed for: number of army deployments (OR[95%CI]: 1.15[1.14 1.16], I^2=0%, n=333,024, Figure 2), combat exposure

(OR[95%CI]: 1.89[1.46 2.45], I^2=89%, n=28,304, Figure 2) and army deployment (OR[95%CI]: 1.79 [1.45 2.21], I^2=0%, n=11,023, Figure 3). The PAFs for these exposures were 7%, 14% and 34%, respectively. Evidence for these exposure-outcome associations was moderate, very low, and low quality, respectively. In some cases, the evidence was downgraded due to high risk of bias and inconsistency. There was some evidence for publication bias, although it was only possible to assess that for the 'combat exposure' variable (Supplementary file 6). Subgroup analyses based on risk of bias (Supplementary file 7-9), study design (Supplementary file 10-12) and PTSD ascertainment (Supplementary file 13-15) showed no statistically significant differences between effects for those subgroups.

In our qualitative analyses of exposures that could not be statistically pooled, we found exposure-outcome associations for exposures related to undergoing a traumatic event, cumulative exposure and the severity of exposure (Table 2). With regard to undergoing a traumatic event, the effect sizes ranged from OR[95%CI]: 0.86[0.32 2.28] (physical contacts with thieves)[34] to OR[95%CI]: 5.65[3.27 9.74] (workers fleeing from a tsunami)[42]. Cumulative exposure was e.g. expressed in length of deployment[37] (OR[95%CI]: 0.97[0.92 1.03]) and high frequency of violence (compared to no violence)[55] (OR[95%CI]: 6.5[1.6 25.6]). The effect sizes for exposure severity ranged from OR[95%CI]: 1.01[0.67 1.35] (severity of battles)[45] to OR[95%CI]: 6.5[1.6 26.0] (severe compared to no violence)[55]

Witnessing a trauma

With regard to the DSM-5 criterion 'witnessing a trauma', there was insufficient homogeneous data to pool studies statistically (Table 2). In five studies (with n=4,876 participants), effect sizes ranged from OR[95%CI]: 1.01[0.63 1.64] ('perceiving a life threat')[56] to OR[95%CI]: 9.3[6.1 14.2] ('being present during an attack')[38].

A colleague or co-worker was exposed to a trauma

Only one study (n=980) reported on effect sizes regarding 'colleague or co-worker exposed to a trauma'. This study, among public transport workers, found that 'hearing that a close colleague had suffered a person under train experience' was not significantly association with PTSD (OR[95%CI]: 0.55[0.12 2.47])[46]

Indirect exposure to aversive details

Regarding indirect exposure to adverse events, we statistically pooled the effect sizes from seven studies (n=75,902 participants) with moderate-quality evidence for an association between confrontation with death and PTSD (Figure 3; OR[95%CI]: 1.63[1.41 1.90]). Subgroup analyses regarding risk of bias (Supplementary file 16), study design (Supplementary file 17) and PSTD ascertainment (Supplementary file 18) showed no statistically significant differences between any of those subgroups.

Additional evidence from four studies (n=14,085 participants), which could not be statistically pooled, showed effect sizes ranging from OR[95%CI]: 1.03[1.00 1.06] (being exposed to the aftermath of a battle)[37] to OR[95%CI]: 4.0[2.5 6.6] (being present during the morning of the 9/11 attacks)[27].

Other exposures

We found additional evidence that could not be categorised into any of the DSM-5 criteria. An increased risk of PTSD was associated with experiencing stress, with evidence ranging from

OR[95%CI]: 1.01[0.98 1.04] (deployment concerns)[28] to OR[95%CI]: 3.52[2.94 4.21] (high deployment stress)[21]. Also, the time that has passed since a given traumatic event seems to be associated with PTSD. This factor can either reduce the PTSD risk (OR[95%CI]: 0.47[0.32 0.70] with a longer dwell time between deployments)[48] or increase it (OR[95%CI]: 1.89[0.99 3.60] if the period since the return from deployment exceeds 6.5 years)[32]. Other exposures included experiencing discrimination at work (OR[95%CI]: 5.72[3.37 9.71])[42] and having to perform duties that involved a risk of radiation exposure (OR[95%CI]: 1.08[0.97 1.20])[53].

Discussion

In this systematic review with meta-analysis and evidence grading, we found various associations, albeit based on moderate-quality evidence at best, showing that several work-related exposures are associated with PTSD development. This includes exposures such as the number of army deployments, combat exposure, army deployment and confrontation with death. The corresponding effect sizes ranged from 1.15[1.14 1.16] to 1.89[1.46 2.45] and PAFs varied from 7% (for the number of army deployments) to 34% (for army deployment). The latter values indicate the proportion of PTSD cases that could potentially be avoided in a working population, if the exposure in question were to be totally eliminated. The data suggests that there could be an only moderate relationship between PTSD and work situations. However, they could also indicate that PTSD cannot be attributed to a single work-related exposure and that it is multi-factorial in nature and/or is mediated by other factors. This could, perhaps, also account for the relatively low ORs found for some of the effects.

Only a limited data, which could not be statistically pooled, was available concerning exposures that corresponded to the DSM-5 criteria 'witnessing a trauma' and 'hearing that a colleague/co-worker was exposed to a trauma'. These exposures include 'perceiving a life threat', 'being present during an attack', and 'hearing that a close colleague had suffered a person under train experience'. The additional exposures that could not be categorised according to DSM-5 criteria include 'military deployment', 'deployment stress', and 'time since return from deployment'. In future, it may be worth considering exposures of this kind when diagnosing work-related PTSD.

The details uncovered by this review are key to a better understanding of work-related causes of PTSD, to the selection or development of preventive interventions, and to the identification of thresholds for occupational health guidelines. This review has updated earlier work[7 9] and we are the first to quantify the association between work-related exposures and PTSD. This update identifies occupational groups and exposures that do not feature in previous reviews, such as public transport workers[46] and bank workers (being exposed to robberies)[34].

Although the prevention of occupational diseases, including PTSD, is preferable, not all risks can be fully eliminated as witnessing traumatic events, disasters and war situations are likely to remain present in our working situations. In the working environment it is also important to attenuate the impact of exposures on workers or to treat them when having developed work-related PTSD. In the current review we also identified work-related factors that can reduce the risk of PTSD, which can be helpful to attenuate the impact of stressful exposures. For instance, among highly exposed occupational groups, a high level of preparedness (OR[95%CI]: 0.6[0.4 0.9])[62], unit support (OR[95%CI]: 0.5[0.3 0.8])[62], post-deployment support (OR[95%CI]: 0.3[0.2 0.4])[62] and social support (OR[95%CI]: 0.96[0.93 0.98])[37] were all found to be associated with a reduced risk of PTSD. These elements can be used in the development of interventions, especially for those in occupations that involve high PTSD risks.

Methodological strengths and limitations

The strengths of this review are the systematic methods used plus a protocol that was registered a-priori, the systematic review with meta-analysis, and the assessment of evidential quality using GRADE[18]. The findings appear to be quite robust, since subgroup analyses based on risk of bias, study design and PTSD ascertainment produced results that did not differ between any of those subgroups. Moreover, the PAFs estimated in our study provide insight into the extent to which the identified exposures were occupationally related to PTSD.

We deviated from our a-prior registered protocol[13] in that we were unable to compare different PTSD diagnoses (acute vs delayed). In our meta-analysis, we used effect sizes from the article with the shortest follow-up duration (with a latency time of at least four weeks). There were, however, also data available from few studies measuring both the short-term and long-term effects of exposure and their association with PTSD. For example, 'being present during a terrorist attack' was strongly associated with PTSD in the acute phase (after 10 months; OR[95%CI]: 9.3[6.1 14.2]), but this association was even stronger in the long term (after 34 months; OR[95%CI]: 10.0[5.4 18.6])[38]. Regarding 'being exposed to combat', the opposite was true. Stronger effects were seen in short term (OR[95%CI]: 2.91[1.34 6.31]) than long term (OR[95%CI]: 2.42[1.04 5.62])[39]. This is in line with another review indicating that, following exposure, the risk of PTSD attenuates over time[7].

Another potential source of heterogeneity stems from the method used to ascertain PTSD. In 25 articles, PTSD was assessed by clinical diagnosis while 17 articles assessed probable PTSD/PTSD symptoms, based on self-reports using pre-defined (e.g., DSM-5) criteria. We found that the average prevalence was slightly higher for diagnosed PTSD (7.3%) than for probable PTSD (6.4%). This is in line with a study of disaster workers, following the 9/11 attacks, in which 2-9% had probable self-reported PTSD, respectively[31]. However, 6-15% of these workers were diagnosed with PTSD. Nevertheless, our pooled effect sizes were robust across different methods for ascertaining PTSD. While ascertaining PTSD by clinical diagnosis may be more valid, this source of heterogeneity is unlikely to have substantially affected the findings presented. We have only assessed incidence of PTSD. Accordingly, this review does not address the persistence or growth of PTSD. Future studies should, therefore, focus on different types of PTSD diagnoses. They should also assess the work-relatedness of PTSD persistence and growth, as an aid to the development of occupational health guidelines.

One limitation of our study is that the majority of the studies in this review were based on participants from armed forces (N=21) and first responders (N=5). There was limited information on other occupations, such as public transport workers, bank employees and healthcare workers. Furthermore, most studies of the armed forces and of first responders tend to be male dominated and from Western countries. Future research should address these issues, by assessing previously unexplored occupational sectors and groups, as well as data from other countries. In this review we only included longitudinal studies in which the exposure would proceed the outcome, as a result of which a better inference of causality can be provided than with cross-sectional studies only. Moreover, we focussed in our review on articles published from 2005 onwards. This cut-off was based on changes in people's exposure to work-related traumatic events and changes to the definition of PTSD over time[2].

While our use of the GRADE framework provides an adequate way to assess quality of the evidence, it does not necessarily provide insights into causation of the association of work-related exposures and PTSD, for which other approaches such as the Bradford Hill criteria[63] could be used. It has been argued that the majority of the Bradford Hill criteria are to some extent incorporated in GRADE, such as the strength and consistency of the association[64]. Other criteria, such as that of the biological plausibility are not well covered nor are they in the current review evidence regarding work-related PTSD. Future studies should therefore aim at providing more insights into this, to further build the evidence base around work-related PTSD and the biology of risk for PTSD[65]. Although methodological quality of the included studies was of an acceptable level (62%, on average), the quality of the evidence was rated moderate at best. More than half of the articles showed a risk of bias with regard to participation (i.e., selection bias), attrition (with <80% of the

participants being retained during the follow-up period), and misclassification due to a limited assessment of the prognostic factors (i.e., exposure) and the outcome of interest. As mentioned above, the ascertainment of PTSD is unlikely to have caused a substantial bias in our findings. However, exposures were often measured by means of self-reports, which may well have biased our findings. In addition, the quality of the evidence was downgraded due to inconsistency for some of the exposures. Our assessment of publication bias was limited to just one of the pooled exposures. It appeared, however, that none of the studies had published or registered their protocol, which could have caused publication bias.

Conclusion

In this systematic review with meta-analysis of 33 studies (with n=5,719,236 participants), based on moderate quality evidence at best, we identified a number of work-related exposures (mainly involving individuals in the armed forces and in first responder occupations) that increase the risk of PTSD (by 15% to 89%). These exposures include 'number of army deployments', 'combat exposure', 'army deployment' and 'confrontation with death', for which we found a moderate contribution to the development of PTSD. We identified additional exposures in other occupations, such as bank workers, public transport workers, and medics. These included 'life threats', 'being present during an attack' and 'hearing about a colleague's trauma'. Although exposure assessment, PTSD ascertainment and inconsistency may have biased our findings, the results of this review are quite robust and are of importance for the development of preventive interventions and occupational health guidelines.

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Author contribution
Both authors (PC and HvdM) designed the study and reviewed the manuscript for important intellectual content. Both authors identified relevant articles and conducted data extraction and analyses together. PC drafter the first version of the manuscript. HvdM is the study guarantor.

Data sharing
All data relevant to the study are included in the article and supplementary documents.

Study ethics
Not applicable as this study is a systematic review

Competing interests
The authors declare no competing interests

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Data sharing
Additional data is provided in the supplementary files.

Ethical approval
As this is a systematic review, no ethical approval is required

Patient consent
As this is a systematic review, no patient consent is required

Table 1. Overview of the evidence from both qualitative and quantitative analyses, with exposures categorised according to DSM-5 criteria. For exposures for which quantitative analyses could be performed (Figure 2 and 3), quality of the evidence for the relationship between work-related exposures and PTSD according to the GRADE framework is shown. Other exposures are described qualitatively (Table 2).

DSM-5 criterion	Exposure	N	n	Limit[1]	Incons[2]	Indirect[3]	Imprec[4]	Pub bias[5]	OR [95%CI][6]	Grad[7]	GRADE	PAF	Reference
Direct exposure	Number of army deployments[8]	3	333,024	No	0%	No	No	N/A	1.15 [1.14 1.16]	No	Moderate	7%	Figure 2
	Combat exposure	11	28,304	Yes	89%	No	No	Yes	1.89 [1.46 2.45]	No	Very low	14%	Figure 2
	Army deployment[9]	4	11,023	Yes	0%	No	No	N/A	1.79 [1.45 2.21]	No	Low	34%	Figure 3
	Undergoing a traumatic event	13	1,703,107	-	-	-	-	-	Min: 0.86 [0.32 2.28] Max: 5.65 [3.27 9.74]	-	-		Table 2
	Cumulative exposure	8	1,749,762	-	-	-	-	-	Min: 0.97 [0.92 1.03] Max: 6.5 [1.6 25.8]	-	-		Table 2
	Exposure severity	3	2,558	-	-	-	-	-	Min: 1.01 [0.67 1.35] Max: 6.5 [1.6 26.0]	-	-		Table 2
Witnessing trauma	-	5	4,876	-	-	-	-	-	Min: 1.01 [0.63 1.64] Max: 9.3 [6.1 14.2]	-	-		Table 2
Colleague exposed[10]	-	1	980	-	-	-	-	-	0.55 [0.12 2.47]	-	-		Table 2
Indirect exposure	Confrontation with death	7	75,902	No	46%	No	No	N/A	1.63 [1.41 1.90]	No	Moderate	15%	Figure 3
		4	14,085	-	-	-	-	-	Min: 1.03 [1.00 1.06] Max: 4.0 [2.5 6.6]	-	-		Table 2
Other exposures	Stress	4	1,390,641	-	-	-	-	-	Min: 1.01 [0.98 1.04] Max: 3.52 [2.94 4.21]	-	-		Table 2
	Time since event	3	1,358,468	-	-	-	-	-	Min: 0.47 [0.32 0.70] Max: 1.89 [0.99 3.60]	-	-		Table 2
	Other	3	69,176	-	-	-	-	-	Min: 1.08 [0.97 1.20] Max: 5.72 [3.37 9.71]	-	-		Table 2

n= number of participants; N = number of studies; OR = Odds ratio; 95%CI = 95% confidence interval; PAF = population attributable fractions

[1] Limitation: downgraded if the majority of studies score lower than 60% on the risk of bias scale. [2] Inconsistency: downgrade if $I^2 \geq 50\%$.

[3] Indirectness: downgrade if indirectness is present. [4] Imprecision: downgrade if the 95% confidence interval is <1 and >2.

[5] Publication bias: downgraded if publication bias is present (based on the funnel plots). [6] Effect size: upgrade if the lower limit of the 95% confidence interval is >2.0.

[7] Gradient: upgraded if there is a dose-response gradient available.

[8] Depicting the effect of being deployed more than once, as compared to being deployed once.

[9] Depicting the effect of being deployed, as compared to not being deployed.

[10] For this study on occupational exposures, the DSM-5 criterion 'relative/friend' was adapted to 'colleague or co-worker'.

Table 2. Overview of all exposure-outcome effect sizes from qualitative analyses, with exposures categorised according to DSM-5 criteria. Odds ratios (OR) with 95% confidence intervals (95%CI) are shown.

DSM-5 criterion	Exposure category	Exposure	Effect size (OR [95%CI])
Direct exposure	Undergoing an event	Work-related threats[20]	1.10 [1.04 1.15]
		Work-related violence[20]	1.02 [0.98 1.06]
		Previous disaster experience[23]	1.4 [1.2 1.6]
		One injury sustained during the 9/11 attacks[29]	1.1 [0.6 2.0]
		Two or more injuries sustained during the 9/11 attacks[29]	1.4 [0.6 3.4]
		Participation in abusive violence[33]	3.32 [1.81 6.08]
		Robberies during working life[34]	1.18 [0.97 1.44]
		Physical contacts with robbers[34]	0.86 [0.32 2.28]
		Scuffle [taking part or being present][34]	1.92 [0.63 5.79]
		Being injured during the robbery[34]	1.28 [0.31 5.21]
		Discharged weapon on deployment[36]	1.48 [0.61 3.60]
		Experience of life-threatening danger[42]	4.32 [2.89 6.48]
		Major property loss[42]	3.45 [2.28 5.23]
		Escape from tsunami[42]	5.65 [3.27 9.74]
		Life threatening war[45]	1.91 [1.07 3.24]
		Conflict with passengers[46]	3.21 [1.14 9.03]
		Felt in great danger of being killed[48]	3.44 [2.50 4.72]
		Exposure to blast[50]	4.72 [2.9 7.7]
		Encountering explosive devices[54]	1.26 [0.95 1.66]
	Cumulative exposure	Prolonged work at the WTC site[23]	2.0 [1.7 2.3]
		Length of deployment[37]	0.97 [0.92 1.03]
		≥5 critical cases per call for traumatic surgeons[43]	7 [1.1 8]
		≥7 call duties a month for traumatic surgeons[43]	3.8 [0.9 7.2]
		≥15 operative cases per month[43]	2.8 [0.4 3.2]
		Cumulative years deployed in navy[47]	2.04 [1.93 2.15]
		Cumulative years deployed in army[47]	1.74 [1.71 1.76]
		No. of Combat Exposures[48]	1.62 [1.46 1.79]
		Two combat exposure deployment[48]	1.37 [1.17 1.61]
		Three combat exposure deployment[48]	1.30 [0.94 1.82]
		Two deployments[48]	1.00 [1.00 1.01]
		Three deployments[48]	1.00 [0.99 1.01]
		One exposure (compared to no exposure)[50]	4.67 [3.1 7.1]
		Two or more deployments (compared to no exposure)[50]	6.15 [4.4 8.7]
		Deployment length 1–3 months[53]	1.53 [1.37 1.70]
		Deployment length ≥3 months[53]	2.64 [2.33 2.99]
		Low frequency of violence (compared to no violence)[55]	4.0 [1.0 16.3]
		Medium frequency of violence (compared to no violence)[55]	5.9 [1.4 24.2]
		High frequency of violence (compared to no violence)[55]	6.5 [1.6 25.6]
	Exposure severity	Combat exposure scale[33]	1.98 [1.50 2.62]
		Severity of battles[45]	1.01 [0.67 1.35]
		Max. mild violence (compared to no violence)[55]	3.8 [0.3 46.2]
		Max. threats of violence (compared to no violence)[55]	5.4 [1.2 24.2]
		Max. moderate violence (compared to no violence)[55]	2.6 [0.6 10.8]
		Max. severe violence (compared to no violence)[55]	6.5 [1.6 26.0]
Witnessing the trauma		Perceived life threat[56]	1.01 [0.63 1.64]
		Observation of abusive violence[33]	8.36 [4.56 15.35]
		Presence during attack[38]	9.3 [6.1 14.2]
		Witnessing of plant explosions[42]	2.09 [1.43 3.06]
		Person under train experience[46]	1.54 [0.52 4.55]
		One person under train experiences[46]	1.77 [0.31 4.47]
		Two or more person under train experiences[46]	2.36 [0.57 9.70]
		Sudden train stop[46]	3.66 [0.82 16.4]
		Near train accident[46]	8.81 [1.96 39.3]

		Damage to train[46]	1.71 [0.48 6.14]
Colleague exposed		Person under train experience of colleague[46]	0.55 [0.12 2.47]
Indirect exposure to aversive details		Aftermath of battle[37]	1.03 [1.00 1.06]
		Morning of 9/11 (compared to >3 days)[27]	4.0 [2.5 6.6]
		Afternoon of 9/11 (compared to >3 days)[27]	2.1 [1.3 3.3]
		Day 2 (compared to >3 days)[27]	1.4 [0.9 2.4]
		Morning of 9/11 (compared to >3 days)[23]	2.0 [1.3 2.9]
		Afternoon of 9/11 (compared to >3 days)[23]	1.1 [0.8 1.5]
		Exposure to aftermath of battle[56]	1.81 [1.08 3.06]
Other exposures	Stress	High deployment stress[21]	3.52 [2.94 4.21]
		Deployment concerns summary score[28]	1.01 [0.98 1.04]
		Worried by other issues related to robbery[34]	2.64 [0.95 7.36]
		Unit cumulative high deployment stress rate (marine)[47]	1.04 [1.03 1.05]
		Unit cumulative high deployment stress rate (army)[47]	1.05 [1.04 1.06]
	Time since event	Months since most recent deployment[28]	1.00 [0.98 1.02]
		Time since return from deployment (up to 2 years)[32]	1.18 [0.75 1.86]
		Time since return from deployment (up to 3 years)[32]	1.80 [1.05 3.10]
		Time since return from deployment (up to 4 years)[32]	1.88 [0.98 3.62]
		Time since return from deployment (up to 5 years)[32]	1.53 [0.92 2.55]
		Time since return from deployment (up to 6.5 years)[32]	1.89 [0.99 3.60]
		Dwell to deployment ratio (1:1 versus <1:1)[48]	0.83 [0.60 1.13]
		Dwell to deployment ratio (2:1 versus <1:1)[48]	0.47 [0.32 0.70]
	Other	Supervising responsibilities[23]	2.2 [1.7 2.9]
		Discrimination/slurs[42]	5.72 [3.37 9.71]
		Duties with radiation exposure risk[53]	1.08 [0.97 1.20]

Figure caption

Figure 1. Flow chart depicting the search for literature.

Figure 2. Study findings (i.e., effect sizes) for articles reporting on the association of number of army deployments (depicting the effect of being deployed more than once, as compared to being deployed once; upper panel) and combat exposure (lower panel) with PTSD. Individual study as well as pooled effects are presented. SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure 3. Study findings (i.e., effect sizes) for articles reporting on the association of deployments status (depicting the effect of being deployed, as compared to not being deployed; upper panel) and confrontation with death (lower panel) with PTSD. Individual study as well as pooled effects are presented. SE = standard error; CI = confidence interval; IV = Inverse variance.

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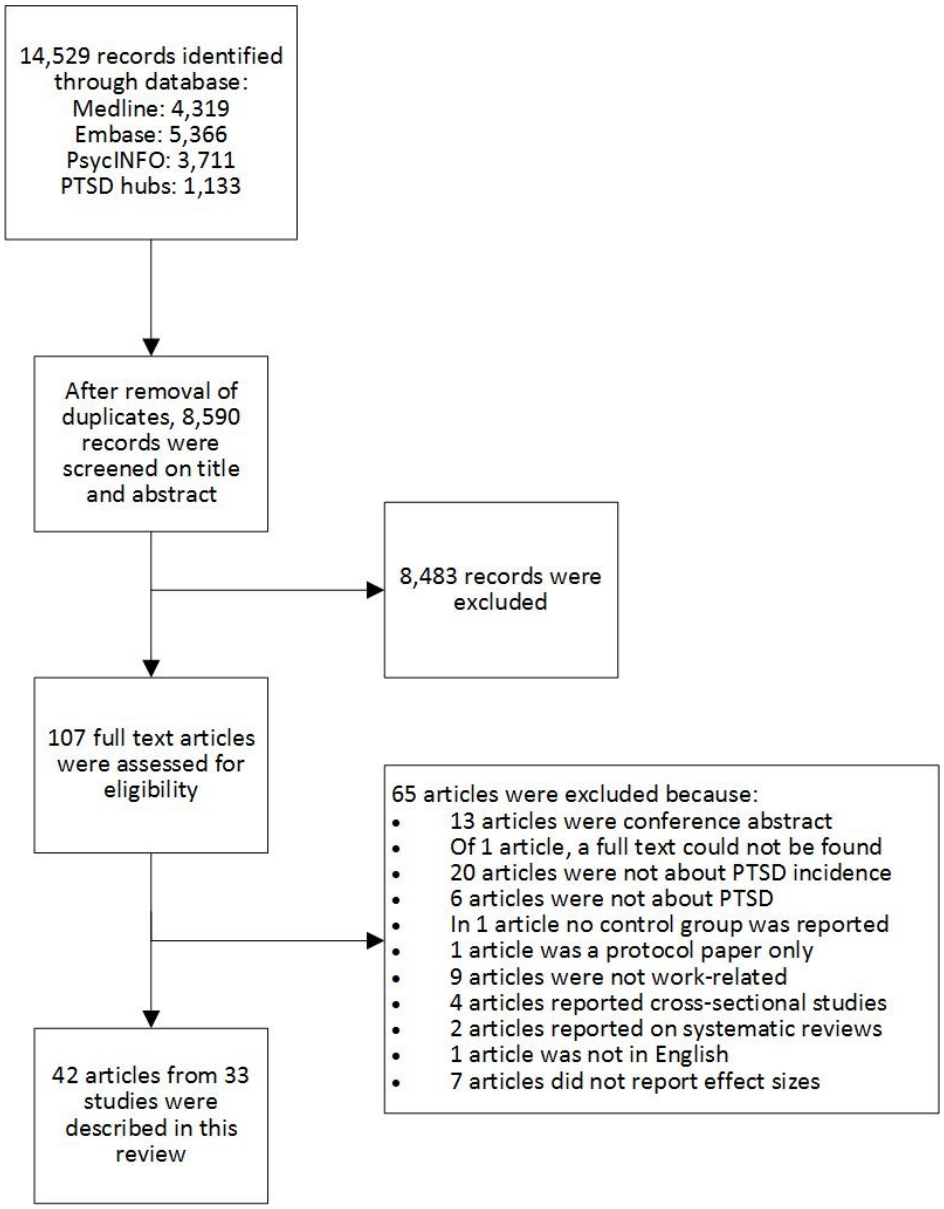

Flow chart depicting the search for literature.

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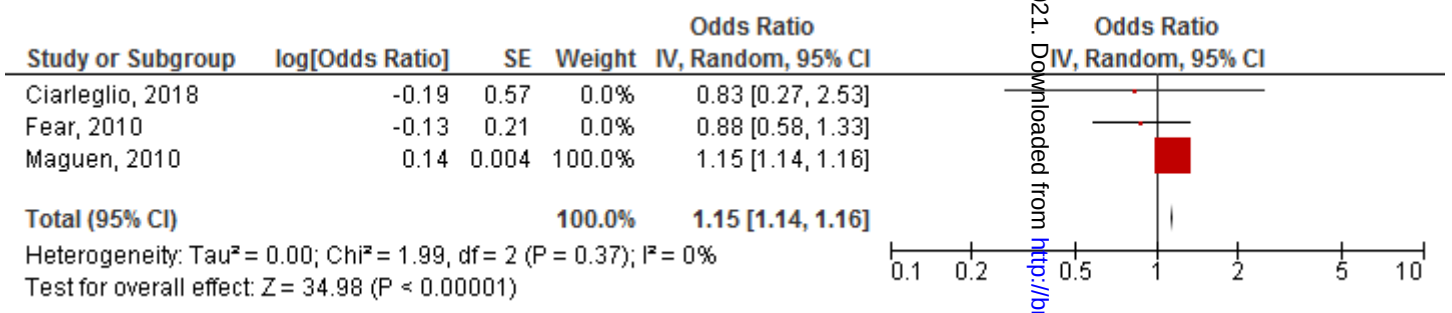
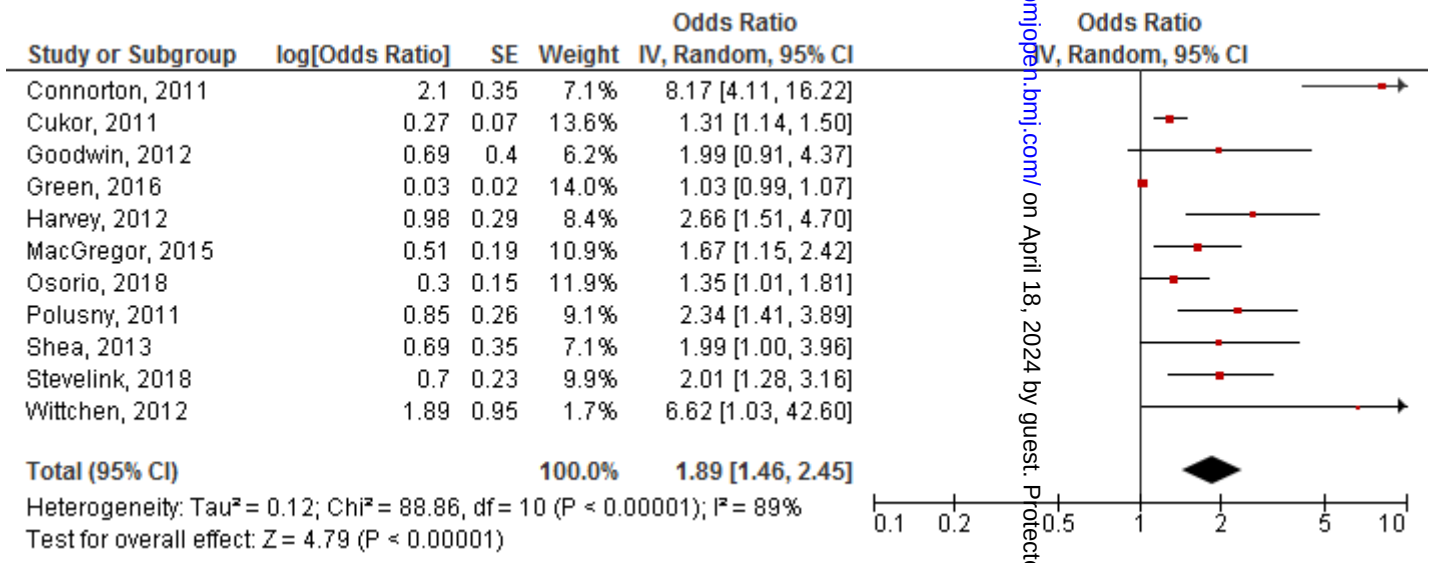
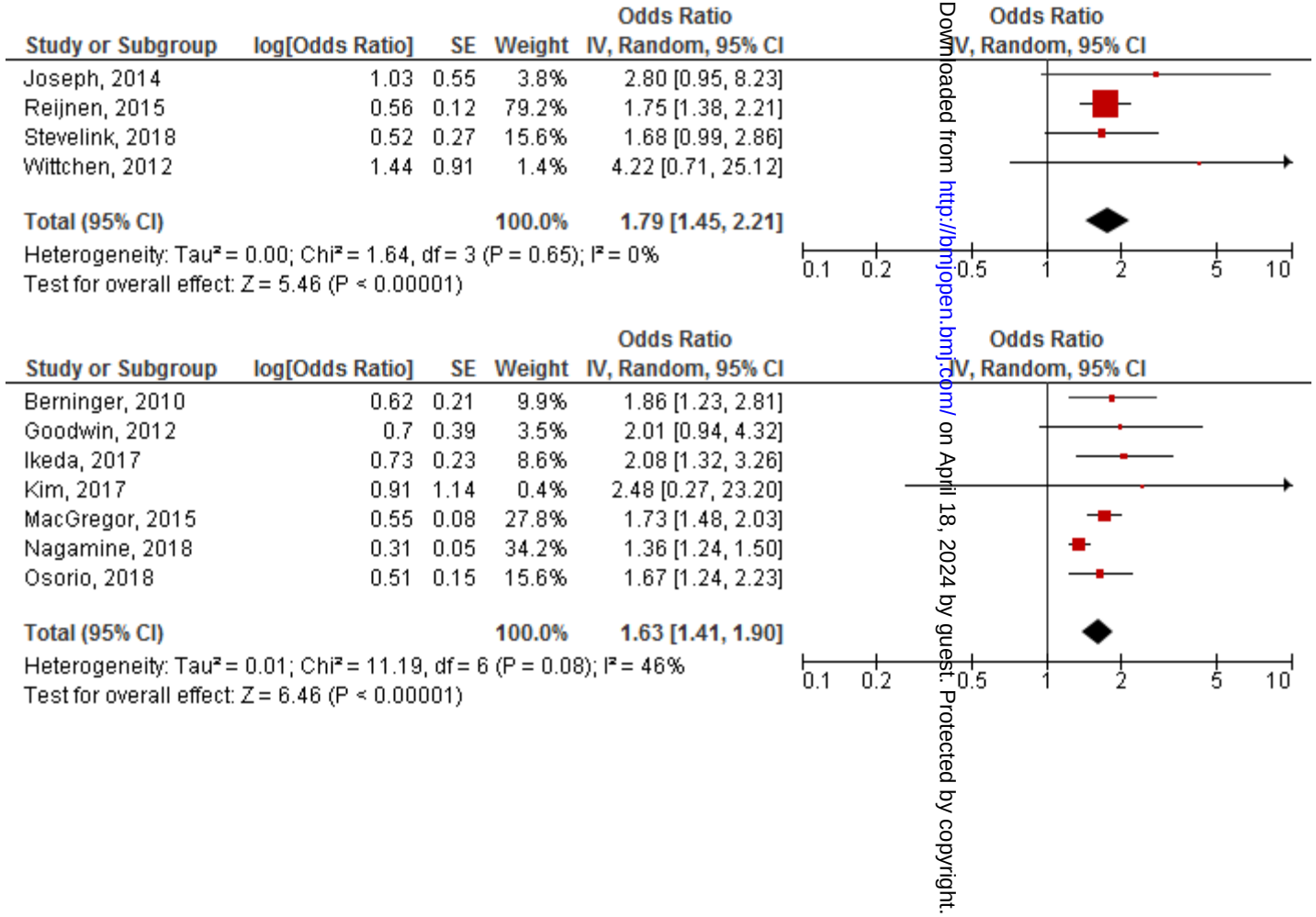






Supplementary file 1.

	Ovid MEDLINE(R) ALL <1946 to September 09, 2019>. Search date: 10 September 2019	
#	**Search**	**Results**
1	stress disorders, post-traumatic/ or stress disorders, traumatic, acute/	30925
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or traumatic stress).ab,kf,ti,sh.	42697
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,kf,ti. [trauma screening zoals de Harvard Trauma Screening Questionnaire - htsq]	160
4	or/1-3 [ptsd]	51153
5	exp Occupations/ or Workload/ or exp Work/ or Workplace/ or exp Occupational Diseases/ or Rehabilitation, Vocational/ or Occupational Health/ or Sick Leave/ or Absenteeism/ or Retirement/ or workers' compensation/ or exp Employment/ or exp Occupational Exposure/ or Volunteers/	361332
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,kf,ti.	2038626
7	exp "personnel, hospital"/ or exp emergency responders/	100417
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,kf,ti.	147998
9	or/5-8 [work]	2360997
10	Epidemiologic studies/	8073
11	exp case control studies/	1016792
12	exp cohort studies/	1894888
13	Case control.tw.	118051
14	(cohort adj (study or studies)).tw.	183886
15	Cohort analy$.tw.	7241
16	(Follow up adj (study or studies)).tw.	47481
17	(observational adj (study or studies)).tw.	95892
18	Longitudinal.tw.	227916
19	or/10-17 [observationele- en longitudinale studies]	2269321
20	(risk or predict*).mp.	3563653
21	19 or 20	4936872
22	and/4,9,21	6387
23	limit 22 to yr="2010-current"	4319

	Ovid Embase Classic+Embase <1947 to 2019 September 09>. Search date: 10 September 2019	
#	**Search**	**Results**
1	*posttraumatic stress disorder/ or *acute stress disorder/	30071
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or	56167

	traumatic stress).ab,kw,ti.	
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,kw,ti.	199
4	or/1-3 [ptsd]	60673
5	exp *Occupation/ or exp *occupational health/ or exp *work/ or *Volunteer/ or exp *named groups by occupation/	907358
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,kw,ti.	3266921
7	exp *hospital personnel/ or rescue personnel/	46527
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,kw,ti.	195059
9	or/5-8 [work]	3981638
10	*Clinical study/	56379
11	*Case control study/	6905
12	*Family study/	2834
13	*Longitudinal study/	7151
14	*Retrospective study/	19751
15	*Prospective study/	21494
16	Randomized controlled trials/	168154
17	15 not 16	21378
18	*Cohort analysis/	26124
19	(Cohort adj (study or studies)).mp.	275760
20	(Case control adj (study or studies)).tw.	126673
21	(follow up adj (study or studies)).tw.	66352
22	(observational adj (study or studies)).tw.	151582
23	(epidemiologic$ adj (study or studies)).tw.	106051
24	or/10-15,17-23	799536
25	(risk or predict*).mp.	5152294
26	24 or 25	5545704
27	and/4,9,26	7053
28	limit 27 to yr="2010-current"	5366

	Ovid PsycINFO <1806 to September Week 1 2019>. Search date: 10 September 2019	
#	**Search**	**Results**
1	posttraumatic stress disorder/ or acute stress disorder/	31361
2	(acute stress or (asd and stress) or ptsd or ptss or posttraumatic stress or post traumatic stress or acute stress disorder or posttraumatic symptom? or post traumatic symptom? or traumatic stress).ab,id,ti.	49013
3	(htsq or trauma screen* or (trauma screen* and stress)).ab,id,ti,tm.	292
4	or/1-3 [ptsd]	50242

5	exp occupations/ or exp occupational health/ or occupational status/	59891
6	(worka* or worke* or workg* or worki* or workl* or workp* or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or retirement or pension or employment or unemployed or unemployment or work status or industries or industrial sector or volunteer* or voluntary worker* or repetitive work).ab,id,ti.	866191
7	exp medical personnel/ or exp emergency personnel/	89105
8	(residents or emergency responder? or first responder? or firefighter? or fire fighter? or Police officer? or emergency medicals or Armed forces or paramedics or veterans or Journalist?).ab,id,ti.	68300
9	or/5-8 [work]	972972
10	(Clinical stud* or Case control stud* or Longitudinal stud* or Retrospective stud* or (Prospective stud* not (Randomized controlled trials or rct)) or Cohort analysis or (Cohort adj (study or studies)) or (Case control adj (study or studies)) or (follow up adj (study or studies)) or (observational adj (study or studies)) or (epidemiologic$ adj (study or studies))).ab,id,ti.	136663
11	(risk or predict*).mp.	730689
12	10 or 11	808563
13	and/4,9,12	5417
14	limit 13 to yr="2010-current"	3711

	ProQuest PTSDhubs. Search date: 10 September 2019	
#	**Search**	**Results**
1	(su((worka* OR worke* OR workg* OR worki* OR workl* OR workp* OR work capacity OR work disabilit* OR work abilit* OR at work OR work exposure OR work related OR workers OR job* OR employee OR staff OR personnel OR occupation OR occupations OR occupational OR outdoor work* OR day shift* OR night shift* OR shift work* OR vocational rehabilitation OR sick leave OR absenteeism OR sickness absen* OR absente* OR presente* OR "return to work" OR vocational reintegration OR retirement OR pension OR employment OR unemployed OR unemployment OR work status OR industries OR industrial sector OR volunteer* OR voluntary worker* OR repetitive work)) OR su((residents OR emergency responder? OR first responder? OR firefighter? OR fire fighter? OR Police officer? OR emergency medicals OR Armed forces OR paramedics OR veterans OR Journalist?))) AND (su(risk OR predict*) OR su((Clinical stud* OR Case control stud* OR Longitudinal stud* OR Retrospective stud* OR (Prospective stud* NOT (Randomized controlled trials OR rct)) OR Cohort analysis OR Cohort stud* OR Case control stud* OR follow up stud* OR observational stud* OR epidemiologic stud*)))	1849
2	Limit 1 to publication date = 2010-01-01 / 2019-09-10	1133

Supplementary file 2. Excluded articles

Article	Reason for exclusion	No papers
1. Amiri T. Occupational posttraumatic stress disorder: Latent structure and risk pathways. 2019, Dissertation Abstracts International, 80(4).	Conference abstract	1
2. Chin WS, Shiao JSC, Liao SC, Kuo CY, Chen CC, Guo YL. Psychiatric diseases at six years after occupational injuries. 2016. Occupational and Environmental Medicine, 73: A175.	Conference abstract	2
3. Connorton E, Miller M, Perry MJ, Hemenway D. Mental health and combat, peacekeeping, or relief work: Results from the National Comorbidity Survey Replication. 2011. Comprehensive Psychiatry, 52: E4.	Conference abstract	3
4. Geronazzo AL, Shen S, Duarte CS, Wu P, Lord E, Amsel L, Musa GJ, Wicks J, Yip J, Fan B, Guffanti G, Hoven CW. Cumulative exposure to work-related incidents and current posttraumatic stress disorder in new york city's first responders. 2013. European Psychiatry Conference.	Conference abstract	4
5. Goldmann E, Tamburrino M, Liberzon I, Slembarski R, Prescott MR, Calabrese J Galea S. Pre-, peri-, and post-deployment characteristics and risk of posttraumatic stress disorder among ohio national guard soldiers. 2010. American Journal of Epidemiology, 11: S90.	Conference abstract	5
6. Goodwin L, Jones M, Sundin J, Wessely S, Rona RJ, Fear NT. Prevalence and predictors of delayed onset PTSD in military personnel: Is there evidence for this disorder? Results of a prospective UK cohort study. 2011. Occupational and Environmental Medicine,1351-0711,1,A100.	Conference abstract	6
7. Herrell R, Wilk J, Bliese P, Hoge C. Combat intensity, psychopathology, and suicidal ideation in a population of soldiers after deployment to Iraq. 2011. Comprehensive Psychiatry, 52: E8.	Conference abstract	7
8. Herrell RK, Bliese PA, Hoge CW. Effect of combat intensity, depression, alcohol misuse, and family history of depression and alcohol misuse on PTSD in a sample of post-deployment US Soldiers. 2013. Comprehensive Psychiatry, 54: E4-E5.	Conference abstract	8
9. Herrell RK, Bliese PB, Hoge CW. Number of deployments and total months of deployment as predictors of post-traumatic stress disorder in active duty soldiers. 2011. American Journal of Epidemiology, 11: S289.	Conference abstract	9
10. Horesh D, Solomon Z, Ein-Dor T. Delayed-onset PTSD following combat: The role of social resources. 2013. Comprehensive Psychiatry, 54: e24.	Conference abstract	10
11. Kim AR, Sung JH, Cho SW, Jeong KS, Ahn YS. The relationship between the post-traumatic stress syndrome and the occupational stress among the firefighters in Korea. 2018. Occupational and Environmental Medicine, 75: A380.	Conference abstract	11
12. Pierce MD, Wood MD, Reddy M, Sevin E, Shea MT. A prospective examination of posttraumatic stress and alcohol use disorders among returning veterans. 2012. Alcoholism: Clinical and Experimental Research, 1: 303A.	Conference abstract	12
13. Subramaney U. Personality, trauma exposure, PTSD and depression in a cohort of SA metro policemen: A longitudinal study. 2010. South African Journal of Psychiatry, 16: 97-98.	Conference abstract	13
14. Huang, D, Wang X, Kung WW. The impact of job loss on posttraumatic stress disorder among Asian Americans: 11-12 years after the World Trade Center attack. 2019. Traumatology,1085-9373.	Full text could not be found	1
15. Andersen SB, Karstoft KI, Bertelsen M, Madsen T. Latent trajectories of trauma symptoms and resilience: the 3-year longitudinal prospective USPER study of Danish veterans deployed in Afghanistan. 2014. Journal of Clinical Psychiatry, 75(9): 1001-1008.	No PTSD incidence	1
16. Armstrong D, Shakespeare-Finch J, Shochet I. Predicting post-traumatic growth and post-traumatic stress in firefighters. 2014. Australian Journal of Psychology, 66(1): 38-46.	No PTSD incidence	2
17. Boasso AM, Steenkamp MM, Nash, WP, Larson JL, Litz BT. The relationship between course of PTSD symptoms in deployed U.S. Marines and degree of combat exposure. 2015. Journal of Traumatic Stress, 28(1): 73-78.	No PTSD incidence	3
18. Bowler RM, Harris M, Li J, Gocheva V, Stellman SD, Wilson K, Alper H, Schwarzer R,	No PTSD	4

	Cone JE.Longitudinal mental health impact among police responders to the 9/11 terrorist attack. 2012. American Journal of Industrial Medicine, 55(4): 297-312.	incidence	
19.	Chin WD, Shiao JS, Liao SC, Kuo CY, Chen CC, Guo YL. Depressive, anxiety and post-traumatic stress disorders at six years after occupational injuries. 2017. European Archives of Psychiatry & Clinical Neuroscience, 267(6): 507-516.	No PTSD incidence	5
20.	Eriksson CB, Lopes Cardozo B, Foy DW, Sabin M, Ager A, Snider L, Scholte WF, Kaiser R, Olff M, Rijnen B, Crawford CG, Zhu J, Simon W. Predeployment mental health and trauma exposure of expatriate humanitarian aid workers: Risk and resilience factors. 2013. Traumatology, 19(1): 41-48.	No PTSD incidence	6
21.	Garcia FE, Vazquez C, Inostroza C. Predictors of post-traumatic stress symptoms following occupational accidents: A longitudinal study. 2019. Anxiety, Stress, & Coping, 32(2): 168-178.	No PTSD incidence	7
22.	Hartley TA, Violanti JM, Sarkisian K, Andrew ME, Burchfiel CM. PTSD symptoms among police officers: associations with frequency, recency, and types of traumatic events. 2013. International Journal of Emergency Mental Health, 15(4): 241-253.	No PTSD incidence	8
23.	Huang H, Kashubeck-West S. Exposure, agency, perceived threat, and guilt as predictors of posttraumatic stress disorder in veterans. 2015. Journal of Counseling & Development, 93(1): 3-13.	No PTSD incidence	9
24.	Jaegers LA, Matthieu MM, Vaughn MG, Werth P, Katz IM, Ahmad SO. Posttraumatic Stress Disorder and Job Burnout Among Jail Officers. 2019. Journal of Occupational & Environmental Medicine, 61(6): 505-510.	No PTSD incidence	10
25.	Mac Donald CL, Johnson AM, Wierzechowski L, Kassner E, Stewart T, Nelson EC, Werner NJ, Zonies D, Oh J, Fang R, Brody DL. Prospectively assessed clinical outcomes in concussive blast vs nonblast traumatic brain injury among evacuated US military personnel. 2014. JAMA Neurology, 71(8): 994-1002.	No PTSD incidence	11
26.	Magruder KM, Goldberg J, Forsberg CW, Friedman MJ, Litz BT, Vaccarino V, Heagerty PJ, Gleason TC, Huang GD, Smith NL. Long-Term Trajectories of PTSD in Vietnam-Era Veterans: The Course and Consequences of PTSD in Twins. 2016. Journal of Traumatic Stress, 29(1): 5-16.	No PTSD incidence	12
27.	Marchand A, Nadeau C, Beaulieu-Prevost D, Boyer R, Martin M. Predictors of posttraumatic stress disorder among police officers: A prospective study. 2015. Psychological Trauma:Theory, Pesearch, Practice and Policy, 7(3): 212-221.	No PTSD incidence	13
28.	Nash WP, Boasso AM, Steenkamp MM, Larson JL, Lubin RE, Litz BT. Posttraumatic stress in deployed marines: Prospective trajectories of early adaptation. 2015. Journal of Abnormal Psychology, 124(1): 155-171.	No PTSD incidence	14
29.	Polusny MA, Kumpula MJ, Meis LA, Erbes CR, Arbisi PA, Murdoch M, Thuras P, Kehle-Forbes SM, Johnson AK. Gender differences in the effects of deployment-related stressors and pre-deployment risk factors on the development of PTSD symptoms in National Guard Soldiers deployed to Iraq and Afghanistan. 2014. Journal of Psychiatric Research, 49(1): 1-9.	No PTSD incidence	15
30.	Rona RJ, Jones M, Sundin J, Goodwin L, Hull L, Wessely S, Fear NT. Predicting persistent posttraumatic stress disorder (PTSD) in UK military personnel who served in Iraq: a longitudinal study. 2012. Journal of Psychiatric Research, 46(9): 1191-1198.	No PTSD incidence	16
31.	Ryan-Gonzalez C, Kimbrel N, Meyer EC, Gordon EM, DeBeer BB, Gulliver SB, Elliott TR, Mosissette S. Differences in PTSD symptoms among post-9/11 veterans with blast- and non-blast mild TBI. 2019. Journal of Neurotrauma, 0897-7151.	No PTSD incidence	17
32.	Steenkamp MM, Schlenger WE, Corry N, Henn-Haase C, Qian M, Li M, Horesh D, Karstoft KI, Williams C, Ho CL, Shalev A, Kulka R, Marmar C. Predictors of PTSD 40 years after combat: Findings from the National Vietnam Veterans longitudinal study. 2017. Depression & Anxiety, 34(8): 711-722.	No PTSD incidence	18
33.	Wolf E, Mitchell K, Koenen K, Miller M. Combat exposure severity as a moderator of genetic and environmental liability to post-traumatic stress disorder. 2014. Psychological Medicine, 44(7): 1499-1509.	No PTSD incidence	19
34.	Yuan C, Wang Z, Inslicht SS, McCaslin SE, Metzler TJ, Henn-Haase C, Apfel BA, Tong H, Neylan TC, Fang Y, Marmar CR. Protective factors for posttraumatic stress disorder symptoms in a prospective study of police officers. 2011. Psychiatry Research, 188(1): 45-50.	No PTSD incidence	20

35. Amster ED, Fertig SS, Green M, Carel R. Occupational exposures and psychological symptoms among fire fighters and police during a major wildfire: The carmel cohort study. 2018. Occupational and Environmental Medicine, 75: A590-A591	Not about PTSD	1
36. Cavanaugh CE, Campbell JC, Messing JT. A longitudinal study of the impact of cumulative violence victimization on comorbid posttraumatic stress and depression among female nurses and nursing personnel. 2014. Workplace Health and Safety, 62 (6): 224-232.	Not about PTSD	2
37. Han M, Park S, Park JH, Hwang SS, Kim I. Do police officers and firefighters have a higher risk of disease than other public officers? A 13-year nationwide cohort study in South Korea. 2018, BMJ Open; 8(1):e019987.	Not about PTSD	3
38. Jacobson IG, Horton JL, Leardmann CA, Ryan MA, Boyko EJ, Wells TS, Smith B, Smith TC. Posttraumatic stress disorder and depression among U.S. military health care professionals deployed in support of operations in Iraq and Afghanistan. 2012, J Trauma Stress;25(6):616-23.	Not about PTSD	4
39. Tvaryanas AP, Maupin GM. Risk of incident mental health conditions among critical care air transport team members. 2014. Aviation Space & Environmental Medicine, 85(1): 30-38.	Not about PTSD	5
40. Vasterling JJ, Brailey K, Proctor SP, Kane RL, Heeren T, Franz, Molly R. Neuropsychological outcomes of mild traumatic brain injury, post-traumatic stress disorder and depression in Iraq-deployed US Army soldiers. 2012. British Journal of Psychiatry, 201(3): 186-192.	Not about PTSD	6
41. Bandelow BB, Koch M, Zimmermann P, Biesold KH, Wedekind D, Falkai P. Posttraumatic stress disorder (PTSD) in the German Armed Forces: a retrospective study in inpatients of a German army hospital. 2012. European Archives of Psychiatry & Clinical Neuroscience, 262(6): 459-467.	No control group	1
42. Aslan M, Concato J, Peduzzi PN, Proctor SP, Schnurr PP, Marx BP, McFall ME, Gleason TC, Huang GD, Vasterling JJ. Design of 'Neuropsychological and mental health outcomes of Operation Iraqi Freedom: a longitudinal cohort study'. 2013. Journal of Investigative Medicine, 61(3):569-577.	Protocol paper only	1
43. Dinenberg RE, McCaslin SE, Bates MN, Cohen BE. Social support may protect against development of posttraumatic stress disorder: findings from the Heart and Soul Study. 2014. American Journal of Health Promotion, 28(5): 294-297.	Not work-related	1
44. Erbes CR, Polusny MA, Arbisi PA, Koffel E. PTSD symptoms in a cohort of National Guard soldiers deployed to Iraq: Evidence for nonspecific and specific components. 2012. Journal of Affective Disorders, 142(1): 269-274.	Not work-related	2
45. Eskridge SL, Macera CA, Galarneau MR, Holbrook TL, Woodruff SI, MacGregor AJ, Morton DJ, Shaffer RA. Influence of combat blast-related mild traumatic brain injury acute symptoms on mental health and service discharge outcomes. 2013. Journal of Neurotrauma, 30(16): 1391-1397.	Not work-related	3
46. Eskridge SL, Macera CA, Galarneau MR, Holbrook, TL, Woodruff SI, Macgregor AJ, Morton DJ, Shaffer RA. Combat blast injuries: Injury severity and posttraumatic stress disorder interaction on career outcomes in male servicemembers. 2013. Journal of Rehabilitation Research and Development, 50(1): 7-16.	Not work-related	4
47. Fink DS, Gradus JL, Keyes KM, Calabrese JR, Liberzon I, Tamburrino MB, Cohen GH, Sampson L, Galea S. Subthreshold PTSD and PTSD in a prospective-longitudinal cohort of military personnel: Potential targets for preventive interventions. 2018. Depression & Anxiety, 35(11): 1048-1055.	Not work-related	5
48. Fitch TJ, Yu X, Chien LC, Karim MM, Alamgir H. Traumatic life events and development of post-traumatic stress disorder among female factory workers in a developing country. 2018. International Journal of Social Psychiatry, 64(4): 351-358.	Not work-related	6
49. Gilbertson MW, McFarlane AC, Weathers FW, Keane TM, Yehuda R, Shalev AY, Lasko NB, Goetz JM, Pitman RK, Harvard VA. Is trauma a causal agent of psychopathologic symptoms in posttraumatic stress disorder? Findings from identical twins discordant for combat exposure. 2010. Journal of Clinical Psychiatry, 71(10): 1324-1330.	Not work-related	7
50. Horesh D, Solomon Z, Keinan G, Ein-Dor T. The clinical picture of late-onset PTSD: a 20-year longitudinal study of Israeli war veterans. 2013. Psychiatry Research, 208(3): 265-273.	Not work-related	8

51.	Goldmann E, Calabrese JR, Prescott MR, Tamburrino M, Liberzon I, Slembarski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano MB, Sizemore J, Galea S. Potentially modifiable pre-, peri-, and postdeployment characteristics associated with deployment-related posttraumatic stress disorder among ohio army national guard soldiers. Ann Epidemiol. 2012;22(2): 71-78.	No work-related exposure	1
52.	Banducci AN, McCaughey VK, Gradus JL, Street AE. The associations between deployment experiences, PTSD, and alcohol use among male and female veterans. 2019. Addictive Behaviors, 98: 106032,	Cross-sectional	1
53.	Huang, J. and Liu, Q. and Li, J. and Li, X. and You, J. and Zhang, L. and Tian, C. and Luan, R. Post-traumatic stress disorder status in a rescue group after the Wenchuan earthquake relief. 2013. Neural Regeneration Research, 8(20): 1898-1906.	Cross-sectional	2
54.	Jones M, Sundin J, Goodwin G, Hull L, Fear NT, Wessely S, Rona RJ. 2013. What Explains Post-Traumatic Stress Disorder (PTSD) in UK Service Personnel: Deployment or Something Else? Psychological Medicine, 43(8):1703-12.	Cross-sectional	3
55.	Rybojad B, Aftyka A, Baran M, Rzonca P. Risk Factors for Posttraumatic Stress Disorder in Polish Paramedics: A Pilot Study. 2016. Journal of Emergency Medicine, 50(2): 270-276.	Cross-sectional	4
56.	Liu B, Tarigan LH, Bromet EJ, Kim H. World Trade Center disaster exposure-related probable posttraumatic stress disorder among responders and civilians: a meta-analysis. 2014. PLoS ONE, 9(7): e101491.	Systematic review	1
57.	Schutte N, Bar O, Weiss U, Heuft G. Prediction of PTSD in police officers after six months--a prospective study. 2012. Spanish Journal of Psychology, 15(3): 1339-1348.	Systematic review	2
58.	Milosavljevic M, Drakulic B, Crnobaric C, Perunicic I, Tosevski DL. Risk factor assessment for posttraumatic stress disorder in war veterans in former Yugoslavia. 2011. Psihijatrija Danas, 43(2): 141-153.	Not in English	1
59.	Giupponi G, Thoma H, Lamis D, Forte A, Pompili M, Kapfhammer HP. Posttraumatic stress reactions of underground drivers after suicides by jumping to arriving trains; feasibility of an early stepped care outpatient intervention. J Trauma Dissociation. 2019; 20(5):495-510.	No effect sizes	1
60.	Osofsky HJ, Osofsky JD, Arey J, Kronenberg ME, Hansel TC, Many MM. Hurricane Katrina's first responders: the struggle to protect and serve in the aftermath of the disaster. 2011. Disaster Medicine and Public Health Preparedness, 5: S214-S219.	No effect sizes	2
61.	Rosenblatt AS, Li R, Fortier C, Liu X, Fonda JR, Villalon A, McGlinchey RE, Jorge RE. Latent factor structure of PTSD symptoms in veterans with a history of mild traumatic brain injury and close-range blast exposure. 2018. Psychological Trauma: Theory, Research, Practice, and Policy, 442-450.	No effect sizes	3
62.	Sheffler JL, Rushing NC, Stanley IH, Sachs-Ericsson NJ. The long-term impact of combat exposure on health, interpersonal, and economic domains of functioning. 2016. Aging and Mental Health, 20(11): 1202-1212.	No effect sizes	4
63.	Solberg O, Birkeland MS, Blix I, Hansen MB, Heir T. Towards an exposure-dependent model of post-traumatic stress: longitudinal course of post-traumatic stress symptomatology and functional impairment after the 2011 Oslo bombing. 2016. Psychological Medicine, 46(15): 3241-3254.	No effect sizes	5
64.	Taymur I, Sargin AE, Ozdel K, Turkcapar HM, Calisgan L, Zamki E, Demirel B. Possible Risk Factors for Acute Stress Disorder and Post-Traumatic Stress Disorder After an Industrial Explosion. 2014. Noropsikiyatri Arsivi, 51(1): 23-29.	No effect sizes	6
65.	Wisnivesky JP, Teitelbaum S, Todd AC, Boffetta P, Crane M, Crowley L, De la Hoz RE, Dellenbaugh C, Harrison DJ, Herbert R, Kim H, Jeon Y, Kaplan J, Katz CL, Levin SM, Luft BJ, Markowitz S, Moline JM, Ozbay F, Pietrzak RH, Shapiro M, Sharma V, Skloot G, Southwick SM, Stevenson LA, Udasin IG, Wallenstein S, Landrigan PJ. Persistence of multiple illnesses in World Trade Center rescue and recovery workers: a cohort study. 2011. Lancet, 378(9794): 888-897.	No effect sizes	7

Supplementary file 3. Data extraction of included studies.

First author, Year;	Study (name, design and follow-up period)	Sample description (n, Country, Type of job/company, relevant inclusion/exclusion criteria, %Female, Age)	Description of exposure assessment (way and year of baseline exposure assessment and description of categories)	Description of outcome (type of symptoms, way of assessment, and incidence over the follow-up period)	Adjustment	Effect estimates (e.g., HR, RR or OR with 95% confidence interval). Super scripts refer to the models specified in the 'adjustment' column
1. Armed Forces Health Surveillance Center, 2011 [21]	Name: Armed forces health surveillance Design: Prospective longitudinal Follow-up period: 12 months post deployment	n=1,344,668 Country=USA %Female= 11% Age= The majority was <25, with lower numbers of participants in the 25-29 and 30+ categories. Type of job/company= Active components of the forces (on Afghanistan and Iran missions). Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: between Oct 2001 and Dec 2010 Exposure categories: % PTSD diagnosis were compared between deployment number, gender, age group, military occupation (combat, health care and other) and 'dwelling time' between employments.	Type of symptoms: PTSD Way of assessment: Mental disorders assessed with ICD-9-CM (309.81), reported in military or civilian hospitals Incidence: -	No	PTSD incidence was in general higher after the second, third and fourth deployment, compared to the first and fifth. PTSD incidence was in general higher among males, those in lowest age group, health care workers and those with longer dwelling time between the deployments. No effect estimates were reported (only incidences).
2. Andersen, 2019 [19]	Name: - Design: Prospective longitudinal (with cross-sectional and longitudinal analyses) Follow-up period: 4 years	n= 2,678 Country= Denmark %Female= 66% Age= 45.1(10.1) years Type of job/company= Employees working in psychiatric wards, in the	Exposure assessment: Self-reported Year of assessment: 2011 Exposure categories: Work-related violence and threats on a 5 point likert scale with 0=never to 4=almost daily, with	Type of symptoms: PTSD Way of assessment: Self-reported with the Impact of Event Scale-Revised Incidence:14% (2 incidences)	Unadjusted (model 1), adjusted for gender, age, bullying, sexual harassment, conflicts at work, negative acts, private traumas and sector (model 2), additionally adjusted for	**Work-related threats** All four sectors PTSD at 2011 OR: 1.11 [1.07 1.14][1] OR: 1.10 [1.05 1.15][2] PTSD at 2015 OR: 1.10 [1.07 1.13][1] OR: 1.11 [1.07 1.5][2] OR: 1.10 [1.04 1.15][3] Elder care

		elder sector, at special schools and in the prison and probation service. Inclusion/exclusion=-	summary scores 0-24 and 0-44, respectively.		baseline PTSD (model 3)	PTSD at 2011 OR: 0.99 [0.88 1.23][1] OR: 0.98 [0.82 1.18][2] PTSD at 2015 OR: 1.12 [1.00 1.25][1] OR: 1.12 [0.94 1.33][2] OR: 1.22 [0.95 1.56][3] Prison and probation service PTSD at 2011 OR: 1.21 [1.14 1.28][1] OR: 1.18 [1.08 1.27][2] PTSD at 2015 OR: 1.73 [1.20 1.35][1] OR: 1.25 [1.17 1.34][2] OR: 1.22 [1.13 1.31][3] Psychiatry PTSD at 2011 OR: 1.14 [1.06 1.12][1] OR: 1.19 [1.09 1.32][2] PTSD at 2015 OR: 1.06 [0.99 1.13][1] OR: 1.06 [0.97 1.17][2] OR: 0.94 [0.83 1.07][3] Special schools PTSD at 2011 OR: 1.01 [0.93 1.09][1] OR: 0.95 [0.85 1.05][2] PTSD at 2015 OR: 1.08 [1.01 1.15][1] OR: 1.06 [0.98 1.14][2] OR: 1.07 [0.95 1.12][3] PTSD at 2011 Males

						OR: 1.19 [1.12 1.26][2] Females OR: 1.04 [0.99 1.09][2] PTSD at 2015 Males OR: 1.18 [1.09 1.26][3] Females OR: 1.02 [0.96 1.09][3] **Work-related violence** All four sectors PTSD at 2011 OR: 1.05 [1.03 1.08][1] OR: 1.05 [1.01 1.08][2] PTSD at 2015 OR: 1.02 [0.98 1.04][1] OR: 1.03 [1.00 1.06][2] OR: 1.02 [0.98 1.06][3] Elder care PTSD at 2011 OR: 1.04 [0.95 1.12][1] OR: 1.03 [0.94 1.13][2] PTSD at 2015 OR: 1.07 [0.97 1.15][1] OR: 1.03 [0.93 1.14][2] OR: 1.02 [0.90 1.16][3] Prison and probation service PTSD at 2011 OR: 1.29 [1.15 1.49][1] OR: 1.26 [1.09 1.46][2] PTSD at 2015 OR: 1.50 [1.31 1.73][1] OR: 1.42 [1.22 1.65][2] OR: 1.36 [1.36 1.60][3]

						Psychiatry PTSD at 2011 OR: 1.08 [1.01 1.15][1] OR: 1.13 [1.03 1.24][2] PTSD at 2015 OR: 1.04 [0.98 1.10][1] OR: 1.05 [0.96 1.14][2] OR: 0.98 [0.88 1.10][3] Special schools PTSD at 2011 OR: 1.04 [0.98 1.09][1] OR: 1.03 [0.97 1.10][2] PTSD at 2015 OR: 1.02 [0.97 1.07][1] OR: 1.02 [0.97 1.07][2] OR: 1.01 [0.42 1.08][3] PTSD at 2011 Males OR: 1.06 [0.99 1.12][2] Females OR: 1.03 [0.99 1.07][2] PTSD at 2015 Males OR: 1.07 [0.99 1.14][3] Females OR: 0.99 [0.95 1.05][3]
3. Anderson, 2019 [20]	Name: Army STARRS study Design: Prospective longitudinal (with baseline measurements 1-2 months before	n=4,645 Country=USA %Female=5% Age=26.9(0.2) years Type of job/company=	Exposure assessment: Self-reported Year of assessment: 2012 Exposure categories: Unit cohesion, stressful employment	Type of symptoms: PTSD (30 days) Way of assessment: Composite International Diagnostic Interview screening scales (CIDI-SC) and a six-item	Models were adjusted for all other exposures (model 1) and for lifetime PTSD at baseline (model 2).	**Age** OR: 1.00 [0.99 1.02][1] OR: 1.00 [0.99 1.02][2] **Sex** Female OR: Ref OR: Ref Male

	the deployment) Follow-up period: 9 months post-employment	Soldiers from three combat teams employed in Afghanistan Inclusion/exclusion= -	characteristics and sociodemographic were assessed	screening version of the PTSD Checklist (PCL) to assess lifetime DSM-4 mental disorders Incidence: 11.9% (lifetime)		OR: 0.73 [0.46 1.14][1] OR: 0.88 [0.51 1.51][2] **Race** White OR: Ref OR: Ref Black OR: 0.99 [0.67 1.48][1] OR: 1.04 [0.72 1.49][2] Asian OR: 1.28 [0.77 2.12][1] OR: 1.38 [0.80 2.39][2] Other OR: 1.49 [1.04 2.15][1] OR: 1.25 [0.86 1.82][2] **Ethnicity** Non-Hispanic OR: Ref OR: Ref Hispanic OR: 1.15 [0.83 1.59][1] OR: 1.22 [0.87 1.73][2] **Brigade Combat Team** Fort #1 OR: Ref OR: Ref Fort #2 OR: 1.15 [0.90 1.47][1] OR: 1.31 [0.97 1.77][2] Fort #3 OR: 1.00 [0.80 1.24][1] OR: 1.09 [0.82 1.45][2] **Number of deployments**

						Zero OR: Ref OR: Ref One OR: 1.09 [0.84 1.42][1] OR: 0.96 [0.73 1.27][2] ≥Two OR: 1.12 [0.87 1.43][1] OR: 0.92 [0.71 1.19][2] **Time in unit** >6months OR: Ref OR: Ref <1month OR: 1.51 [1.12 2.05][1] OR: 1.81 [1.24 2.63][2] 1–6 months OR: 0.75 [0.58 0.96][1] OR: 0.77 [0.64 0.94][2] **Lifetime PTSD at baseline** OR: 3.06 [2.24 4.17][1] **30-day PTSD at baseline** OR: 2.28 [1.36 3.82][1] **Deployment stress** Low/moderate OR: Ref OR: Ref High OR: 3.21 [2.75 3.74][1] OR: 3.52 [2.94 4.21][2] **Unit cohesion at baseline** OR: 0.82 [0.73 0.91][1]

						OR: 0.74 [0.65 0.84][2]
4. Berninger, 2010 [22]	Name: FDNY-WTC-MMP Design: Prospective longitudinal with baseline measurement within 6 months from the disaster. Follow-up period: 2.9 years	n=5,656 Country= USA %Female= 0% Age= - Type of job/company= New York fire department rescue workers who were involved in the 9/11 WTC disaster Inclusion/exclusion= Fire fighters who retired during the study, who arrived at the disaster site >14 days after the recue, and females; firefighters	Exposure assessment: Demographic and retirement from employee databases, all other information from self-reports. Year of assessment: 2001 Exposure categories: -	Type of symptoms: Probable PTSD Way of assessment: Self-reported using PTSD checklist (PCL-m) Incidence:16%	Univariate (model 1) and multivariate adjusting for all other exposures that contributed statistically significant in the univariate model (model 2).	**Age** 20-29 years OR: Ref 30-39 years OR: 1.0 [0.8 1.3][1] 40-49 years OR: 1.0 [0.8 1.3][1] 50-59 years OR: 0.6 [0.4 1.1][1] 60+ years OR: - Continuous OR: 0.98 [0.97 1.00][2] **Education** High School OR: Ref Some College OR: 1.1 [0.9 1.3][1] College OR: 1.1 [0.9 1.3][1] Post-College OR: 1.2 [0.8 1.8][1] **Living with a partner** Yes OR: Ref No OR: 1.06 [0.89 1.27][1] **Arrival Group** Morning of 9/11 OR: 4.8 [3.0 7.5][1] OR: 2.0 [1.3 2.9][2] Afternoon of 9/11 OR: 2.3 [1.5 3.5][1]

						OR: 1.1 [0.8 1.5][2] Day 2 OR: 1.4 [0.8 2.3][1] Days 3-14 OR: Ref **Prolonged work at the WTC site** ≥4 months OR: 2.0 [1.7 2.3][1] <4 months OR: Ref **Rank** Firefighter OR: Ref Line officer OR: 1.1 [0.95 1.30][1] Chiefs OR: 0.96 [0.70 1.32][1] **Number of deaths in firehouse** 0 deaths OR: Ref 1-3 deaths OR: 1.5 [1.2 1.9][1] 4+ deaths OR: 2.3 [1.8 2.9][1] **Supervising responsibilities** Yes OR: 2.2 [1.7 2.9][1] No OR: Ref **Previous disaster experience**

						Yes OR: 1.4 [1.2 1.6][1] No OR: Ref **Duration of work at WTC site (per month)** OR: 1.1 [1.1 1.2][2] **Reported increase in alcohol** OR: 1.3 [1.0 1.7][2] **Baseline probable PTSD** OR: 5.6 [4.4 7.0][2]
5. Brownlow, 2018 [23]	Name: Army STARSS study Design: Retrospective longitudinal Follow-up period: -	n= 14,254 for AAS and 25,629 for NSS. Country= USA %Female= 12% for AAS and 17% for NSS Age= 29.0(0.1) for AAS and 21.0(0.0) for NSS Type of job/company= Soldiers at all stages of their activity (AAS sub-study) and new recruits (NSS sub-study) Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2011-2013 Exposure categories: Deployment-related and lifetime stress were assessed (the former only for the AAS cohort).	Type of symptoms: Probable PTSD (lifetime and past 30-day prevalence) was assessed using the PTSD Checklist (PCL) using DSM-4 criteria Way of assessment: Self-reported Incidence:-	-	**Diversity of Deployment-Related Traumatic Stress Score [0-15]** *30-day PTSD* OR: 1.15 [1.13 1.16] (AAS) *Lifetime PTSD* OR: 1.17 [1.16 1.18] (AAS) **Cumulative Deployment-Related Traumatic Stress Score [0 60]** *30-day PTSD* OR: 1.03 [1.03 1.04] (AAS) *Lifetime PTSD* OR: 1.00 [0.99 1.00] (AAS) **Diversity of Lifetime Traumatic Stress Score** *30-day PTSD* OR: 1.14 [1.13 1.16] (AAS) OR: 1.34 [1.30 1.38] (NSS) *Lifetime PTSD* OR: 1.16 [1.15 1.17] (AAS) OR: 1.34 [1.31 1.38] (NSS)

						Cumulative Lifetime Traumatic Stress Score *30-day PTSD* OR: 1.02 [1.02 1.03] (AAS) OR: 0.99 [0.98 1.01] (NSS) *Lifetime PTSD* OR: 1.02 [1.01 1.02] (AAS) OR: 1.00 [0.99 1.01] (NSS)
6. Brundage, 2015 [24]	Name: Defense Medical Surveillance System (DMSS) Design: Prospective longitudinal Follow-up period: 36 months post-deployment.	n= 2,020,340 (Iraq/Afghanistan) and 529,609 (Korea/Japan) Country= USA %Female= - Age= - Type of job/company= Individuals who served in army, air force, navy and marine. Those who were deployed in Iraq and Afghanistan were compared with a reference group who returned from assignments in Korea and Japan. Inclusion/exclusion= -	Exposure assessment: Deployment administration Year of assessment: 2003-2014 Exposure categories: Iraq/Afghanistan vs Korea/Japan, and occupation. Also other factors were assessed but where not considered for this review.	Type of symptoms: PTSD Way of assessment: Diagnosis using ICD-9 criteria. Incidence: -	-	There were 4.85 diagnoses per 100 deployments among those who served in Iraq/Afghanistan, this was 1.04 among those who went to Japan/Korea (with a 4.66 ratio between the two groups). Diagnosis per 100 deployments were highest among combat specific (5.62) and health care (8.52) occupations who went to Iraq/Afghanistan, compared to others (4.17).
7. Cameron, 2019 [25]	Name: Defence Manpower Data Center (DMDC) Database and Defense Medical	n= 1.35 million Country = USA %Female= 12%	Exposure assessment: Deployment administration Year of assessment:	Type of symptoms: PTSD Way of assessment: Data from the	Unadjusted (model 1) and adjusted for all other exposures (model 2).	**Sex** Female RR: 1.65 [1.54 1.77][1] RR: 1.92 [1.84 2.00][2] Male

	Surveillance System (DMSS) Design: Retrospective longitudinal Follow-up period: -	Age= - Type of job/company = Active duty service members between 1999 and 2008. Inclusion/exclusion= -	1999-2008 Exposure categories: Rank and service type.	Defence Medical Surveillance System (DMSS), with ICD-9-CM coded diagnoses, were used. Incidence: 52,771 incident cases (~4%)		RR: Ref. RR: Ref. **Age** < 20 RR: Ref. RR: Ref. 20–24 RR: 1.41 [1.25 1.60][1] RR: 1.36 [1.27 1.46][2] 25–29 RR: 1.36 [1.20 1.54][1] RR: 1.52 [1.41 1.65][2] 30–34 RR: 1.00 [0.87 1.15][1] RR: 1.37 [1.25 1.50][2] 35–39 RR: 0.88 [0.76 1.02][1] RR: 1.37 [1.24 1.52][2] > 39 RR: 0.93 [0.80 1.08][1] RR: 1.68 [1.51 1.87][2] **Race** Black RR: Ref. RR: Ref. Other RR: 1.32 [1.18 1.47][1] RR: 1.45 [1.36 1.54][2] White RR: 1.35 [1.25 1.47][1] RR: 1.58 [1.51 1.66][2] **Marital Status** Married RR: 1.13 [1.06 1.20][1]

						RR: 1.38 [1.32 1.44][2] Other RR: 1.59 [1.40 1.80][1] RR: 1.72 [1.59 1.86][2] Single RR: Ref. RR: Ref. **Rank** E1-E4 RR: 3.90 [3.19 4.77][1] RR: 4.93 [4.31 5.63][2] E5-E9 RR: 3.02 [2.47 3.70][1] RR: 3.42 [3.02 3.89][2] O1-O3 RR: 1.08 [0.84 1.38][1] RR: 1.17 [1.00 1.36][2] O4-O9 RR: Ref. RR: Ref. **Service** Air Force RR: Ref. RR: Ref. Army RR: 3.80 [3.50 4.12][1] RR: 3.80 [3.59 4.02][2] Marines RR: 2.90 [2.63 3.19][1] RR: 2.92 [2.73 3.12][2] Navy RR: 1.38 [1.25 1.52][1] RR: 1.51 [1.41 1.61][2]
8. Chiu, 2011 [26]	Name: FDNY pension database	n= 1,915	Exposure assessment: Deployment	Type of symptoms: PTSD symptoms	Unadjusted (model 1) and adjusted for	**Exposure group** morning of 9/11

	Design: Prospective longitudinal Follow-up period: 4 years post-attack.	Country= USA %Female= 0% Age= 47.0 (6.9) years Type of job/company= New York fire department firefighters who were involved in the 9/11 WTC attacks. Inclusion/exclusion= Fire marshals, females, those who retired due to mental health disability and those who did not first arrive at the disaster site were excluded.	administration Year of assessment: 2001 Exposure categories: Retirement status, rank, and exposure.	Way of assessment: Self-reported using the PTSD checklist (PCL-17) , using a cut-off >= 39 (range 17-85). Incidence: 22%	all remaining exposures in the model (model 2).	OR: 4.9 [3.0 7.9][1] OR: 4.0 [2.5 6.6][2] afternoon of 9/11 OR: 2.4 [1.5 3.7][1] OR: 2.1 [1.3 3.3][2] day 2 OR: 1.7 [1.0 2.8][1] OR: 1.4 [0.9 2.4][2] day 3 to day 14 OR: Ref. OR: Ref. **Retirement status** Disability OR: 1.9 [1.5 2.4][1] OR: 1.7 [1.4 2.2][2] Non-disability OR: Ref. OR: Ref. **AUDIT score** ≥8 OR: 2.0 [1.5 2.5][1] OR: 1.9 [1.5 2.4][2] <8 OR: Ref. OR: Ref. **Age on 9/11 [in years]** <55 OR: 2.0 [1.4 3.0][1] OR: 1.5 [1.0 3.0][2] ≥55 OR: Ref. OR: Ref. **Age on 9/11 - in years**

						Continuous OR: 1.0 [1.0 1.0][1] **Marital status** Married OR: 0.8 [0.6 1.2][1] Living with a partner OR: 1.1 [0.6 2.1][1] Never married OR: 0.9 [0.5 1.6][1] Separated/widowed/divorced OR: Ref. **Marital status change since 9/11** Status change OR: 1.3 [0.9 1.9][1] No change OR: Ref. **Previous profession** No other profession OR: 1.2 [0.9 1.4][1] Other professions OR: Ref. **Rank** Chiefs OR: 0.5 [0.3 0.9][1] Captains and lieutenants OR: 0.8 [0.6 1.0][1] Firefighters OR: Ref.
9. Ciarleglio, 2018 [27]	Name: VU Cooperative Studies Program Study, combined	n= 375 Country= USA	Exposure assessment: Self-reported Year of assessment:	Type of symptoms: PTSD Way of assessment:	Multivariate models adjusting for all other exposures.	**Age in years** OR: 1.04 [0.99 1.09] **Gender**

	with data from Neurocognition Deployment Health Study (NDHS). Design: Retrospective longitudinal Follow-up period: Between 5.7 months (baseline) and 7.5 months post-deployment (long-term follow-up).	%Female= 5% Age= 35.1 (5.9) years Type of job/company= Army soldiers who were deployed in Iraq Inclusion/exclusion= -	2003-2005 Exposure categories: Deployment history and stress exposure.	Using a clinically administered PTSD scale. Incidence: 24% (prevalence)		Male OR: Ref. Female OR: 0.31 [0.07 1.53] **Number of deployments** Single deployment OR: Ref. Multiple deployments OR: 0.83 [0.27 2.57] **Months since most recent deployment** OR: 1.00 [0.98 1.02] **Composite emotional health factor post-deployment** OR: 1.09 [0.79 1.50] **Mental health treatment received post-deployment** No OR: Ref. Yes OR: 4.12 [2.18 7.80] **Early life events summary score** OR: 0.92 [0.84 1.00] **Combat and post-battle experiences** OR: 0.99 [0.95 1.03] **Deployment concerns summary score** OR: 1.01 [0.98 1.04]

						Life and family concerns OR: 0.99 [0.94 1.03] **Post-deployment life events summary score** OR: 1.07 [0.96 1.19] **Post-war-zone social support** OR: 0.92 [0.89 0.95]
10. Cone, 2015 [28]	Name: World Trade Center Health Registry Design: Prospective longitudinal Follow-up period: 10 years	n= 2,204 Country= USA %Female= 13% Age= 38 (median) Type of job/company= Police responders to the 9/11 WTC attacks Inclusion/exclusion= Those with at least one shift at the disaster site, those without pre-9/11 PTSD and with follow-up measurements.	Exposure assessment: Self-reported Year of assessment: 2001 Exposure categories: Demographic, injury, stressors, life threatening event, support.	Type of symptoms: Probable PTSD Way of assessment: Self-reported using a combination of the PCL checklist and DSM-4 criteria. Incidence: 11% (prevalence)	Adjusting for all other exposures.	**Age group at 9/11** 18-44 OR: Ref. 45-69 OR: 0.6 [0.3 1.3] **Gender** Male OR: Ref. Female OR: 1.3 [0.7 2.5] **Hispanic** No OR: Ref. Yes OR: 1.2 [0.7 2.0] **Household gross income at wave 3** ≥75K OR: Ref. <75K OR: 2.0 [1.2 3.4] **Having social support** All of the time

						OR: Ref. Most OR: 3.5 [2.0 6.1] Some OR: 3.6 [1.9 6.9] Little or none OR: 2.6 [1.04 6.5] **Current employment status at wave 3** Employed OR: Ref. Unable to work because of health OR: 3.7 [1.9 7.3] Retired OR: 1.3 [0.8 2.2] Other OR: 2.9 [0.8 10.1] **Number of life stressors in last 12 months** None OR: Ref. 1 to 2 OR: 1.7 [1.0 2.7] ≥3 OR: 3.2 [1.2 8.5] **Number of events threatened your life since 9/11** None OR: Ref. 1 to 2 OR: 1.0 [0.5 1.9] ≥3

						OR: 3.3 [1.9 5.6] **Number of injuries sustained during the 9/11 attacks** None OR: Ref. One OR: 1.1 [0.6 2.0] Two or more OR: 1.4 [0.6 3.4] **Report of unmet mental health care needs at wave 3** No OR: Ref. Yes OR: 9.5 [5.3 16.9]
11. Connorton, 2011 [29]	Name: National Comorbidity Survey Replication (NCS-R) Design: Retrospective longitudinal Follow-up period: -	n= 217 exposed and 2,110 unexposed. Country=USA %Female= 0% Age= 55.0(0.9) for exposed workers, 43.8 (0.9) for non-exposed workers Type of job/company= Participants employed in combat or service as peacekeeper or relief worker. Inclusion/exclusion= Females were excluded	Exposure assessment: Self-reported Year of assessment: 2001-2002 Exposure categories: Participants who were exposed to combat and peacekeeping/relieve work or combat only vs non-exposed participants.	Type of symptoms: PTSD (according to DSM-4 criteria) Way of assessment: Self-reported (no specific questionnaire mentioned) Incidence: 29/(217+2110)=1%	Univariate and multivariate analyses adjusting for age of exposure, age of onset diagnosis, race	**Exposure** No exposure OR: Ref Exposure to peacekeeping/relieve work and combat OR: 11.2 [2.9 43.2] Exposure to combat only OR: 7.3 [3.3 15.8] According to the authors the results remained the same in multivariate analyses (data not reported)

12. Cukor, 2011 [30]	Name: Weill Cornell 9/11 Screening Program Design: Prospective longitudinal Follow-up period: Up to 4 years.	n= 2,960 Country= USA %Female= - Age= - Type of job/company= 9/11 WTC disaster recovery workers. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2002-2004 Exposure categories: Occupational exposure	Type of symptoms: PTSD Way of assessment: Using the CAPS standardized clinical interview and using the PCL-C questionnaire using DSM-4 criteria. CAPS data were used for exposure-outcome assessment. Incidence: 9%, 5% and 2% had probable self-reported PTSD at T1, T2 and T3, respectively. 15%, 8% and 6% had diagnosed PTSD at T1, T2 and T3, respectively.	Adjusting for baseline PTSD and demographic variables	**Occupational exposure** No OR: Ref. Yes OR: 1.31 [1.13 1.51]
13. Fear, 2010 [31]	Name: HERRICK cohort (and other samples) Design: Prospective longitudinal Follow-up period: -	n= 3600 Country= UK %Female= - Age= - Type of job/company= Armed forces who were deployed in Iraq and Afghanistan, who were compared to armed forces who were not deployed.	Exposure assessment: Deployment administration Year of assessment: 2003 Exposure categories: Deployment, rank, number of deployments and time since deployment.	Type of symptoms: PTSD symptoms Way of assessment: Self-reporting using the PCL-C questionnaire. Incidence: 4%	Unadjusted (model 1) and adjusted for age, sex, marital status, education and rank (model 2)	**Deployment** Not deployed OR: Ref. OR: Ref. Regulars OR: 1.03 [0.79 1.36][1] OR: 1.13 [0.82 1.54][2] Reservists OR: 2.90 [1.37 6.12][1] OR: 2.83 [1.23 6.51][2] **Location of deployment** Not deployed in Iraq/Afghanistan OR: Ref.

		Inclusion/exclusion= -				Deployed in Iraq OR: 1.20 [0.87 1.67][2] Deployed in Afghanistan OR: 0.93 [0.54 1.59][2] Deployed in Iraq and Afghanistan OR: 0.92 [0.58 1.46][2] **Role of deployment** Combat service report OR: Ref. OR: Ref. Combat OR: 1.99 [1.42 2.78][1] OR: 1.87 [1.26 2.78][2] Service support OR: 0.58 [0.28 1.19][1] OR: 0.67 [0.32 1.41][2] **Number of deployments** One deployment OR: Ref. OR: Ref. Two deployments OR: 0.83 [0.51 1.36][1] OR: 0.96 [0.58 1.57][2] More than three deployments OR: 0.61 [0.29 1.26][1] OR: 0.72 [0.34 1.50][2] **Time since return from deployment** Up to 1 year OR: Ref. OR: Ref. Up to 2 years

						OR: 1.19 [0.76 1.86][1] OR: 1.18 [0.75 1.86][2] Up to 3 years OR: 1.95 [1.16 3.27][1] OR: 1.80 [1.05 3.10][2] Up to 4 years OR: 1.98 [1.08 3.65][1] OR: 1.88 [0.98 3.62][2] Up to 5 years OR: 1.59 [0.99 2.57][1] OR: 1.53 [0.92 2.55][2] Up to 6.5 years OR: 1.79 [0.98 3.26][1] OR: 1.89 [0.99 3.60][2]
14. Ferrajao, 2016 [32]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 120 Country= Portugal %Female= 0% Age= 64 [59-72] Type of job/company= Colonial war veterans Inclusion/exclusion= Participants who received psychiatric and psychological treatment during the last 5 years, and no history of traumatic brain injury, neurological disorders or physical disability were included.	Exposure assessment: Self-reported. Year of assessment: - Exposure categories: Combat exposure, abusive violence, sense of coherence.	Type of symptoms: PTSD symptoms Way of assessment: Self-reported using the Impact of Event Scale Revised (with a cut-off score: >=33) Incidence: 41% (prevalence)	Unadjusted	**Combat exposure scale [1 5]** OR: 1.98 [1.50, 2,62] **Sense of coherence** OR: -5.08 [-3.32, -7.78] **Observation of abusive violence** No OR: Ref. Yes OR: 8.36 [4.56, 15.35] **Participation in abusive violence** No OR: Ref. Yes OR: 3.32 [1.81, 6.08]
15. Fichera,	Name: -	n= 383	Exposure assessment:	Type of symptoms:	Adjusting for all	**Number of robberies during**

2015 [33]	Design: Prospective longitudinal, with baseline 7-15 days post-robbery Follow-up period: 45 days after the first session	Country= Italy %Female= 52% Age= 43 (9) years Type of job/company= Employees of a large bank who were victims of robberies. Inclusion/exclusion= Participants who had voluntarily joined and employer sponsored post-robbery support program.	Self-reported (questionnaires and interviews) Year of assessment: 2010-2012 Exposure categories: Personal characteristics and characteristics of the robberies	PTSD Way of assessment: Self-reported using the Impact of Events Scale (IES). Incidence: 14%	other exposures (model 1), when additionally adjusting for baseline PTSD (model 2), and the latter two models in which random intercepts were adopted (model 3 and 4).	**working life** OR: 1.25 [1.07 1.44][1] OR: 1.15 [0.97 1.36][2] OR: 1.27 [1.07 1.51][3] OR: 1.18 [0.97 1.44][4] **Gender** Males OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Females OR: 0.63 [0.31 1.29][1] OR: 0.72 [0.33 1.58][2] OR: 0.77 [0.34 1.78][3] OR: 0.85 [0.33 2.13][4] **Being cashier** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 0.52 [0.22 122][1] OR: 0.94 [0.36 2.42][2] OR: 0.40 [0.14 1.07][3] OR: 0.76 [0.25 2.25][4] **Physical contacts with robbers** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4]

						Yes OR: 1.21 [0.58 2.54][1] OR: 0.83 [0.36 1.87][2] OR: 1.23 [0.50 2.98][3] OR: 0.86 [0.32 2.28][4] **Scuffle [taking part or being present]** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.41 [0.61 3.27][1] OR: 1.64 [0.64 4.20][2] OR: 1.72 [0.62 4.78][3] OR: 1.92 [0.63 5.79][4] **Being injured during the robbery** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.69 [0.58 4.89][1] OR: 1.44 [0.44 4.73][2] OR: 1.81 [0.49 6.61][3] OR: 1.28 [0.31 5.21][4] **Worried by other issues related to robbery** No OR: Ref[1] OR: Ref[2]

						OR: Ref[3] OR: Ref[4] Yes OR: 2.47 [1.16 5.27][1] OR: 2.11 [0.91 4.91][2] OR: 2.88 [1.16 7.19][3] OR: 2.64 [0.95 7.36][4] **Feeling terror and hopelessness** True OR: 6.96 [2.25 21.53][1] OR: 1.19 [0.32 4.36][2] OR: 8.64 [2.19 34.10][3] OR: 1.59 [0.33 7.58][4] Partly true OR: 2.82 [0.98 8.10][1] OR: 1.10 [0.33 3.65][2] OR: 3.48 [1.00 12.12][3] OR: 1.45 [0.35 6.02][4] **Post-session individual interview requested** No OR: Ref[1] OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: 1.09 [0.29 4.09][1] OR: 0.41 [0.09 1.81][2] OR: 0.75 [0.14 4.07][3] OR: 0.35 [0.06 2.07][4] **PTSD at T1** No OR: Ref[1]

						OR: Ref[2] OR: Ref[3] OR: Ref[4] Yes OR: – OR: 1.11 [1.07 1.15][2] OR: – OR: 1.11 [1.07 1.16][4]
16. Fink, 2016 [34]	Name: Reserve and National Guard (RNG) study. Design: Prospective longitudinal Follow-up period: 4 years	n= 2,003 Country= USA %Female= 18% Age= - Type of job/company= Army reservists Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2010 Exposure categories: Personal characteristics, deployment history and rank.	Type of symptoms: PTSD Way of assessment: Self-reported using the PCL-C checklist, based on DSM-4 criteria. Criteria that sensitive and specific were used leading to two different PTSD definitions. Incidence: 4.7 and 2.9 per 100 person-year for sensitive and specific definition, respectively.	Univariate models using the sensitive (model 1) and specific (model 2) outcome definition.	Effects in incidence rate (IR) per 100/per-years **Age** 18–24 years IR: 4.8 [3.0–7.5][1] IR: 1.9 [0.8–4.3][2] 25–34 years IR: 4.4 [3.2–6.1][1] IR: 2.9 [1.9–4.4][2] >35 years IR: 4.9 [3.8–6.3][1] IR: 3.4 [2.5–4.7][2] **Sex** Male IR: 4.6 [3.8–5.7][1] IR: 3.2 [2.5–4.2][2] Female IR: 4.9 [3.2–7.4][1] IR: 1.4 [0.7–2.8][2] **Race/ethnicity** Non-Hispanic, white IR: 4.3 [3.4–5.3][1] IR: 2.4 [1.8–3.3][2] Non-Hispanic, black IR: 6.4 [4.0–10.2][1] IR: 4.6 [2.6–8.2][2]

						Hispanic IR: 5.5 [3.3–9.1][1] IR: 4.3 [2.4–7.6][2] Other IR: 5.3 [3.0–9.1][1] IR: 3.8 [2.0–7.2][2] **Education** < High school IR: 4.2 [1.0–16.6][1] IR: 7.9 [2.1–29.1][2] High school IR: 6.1 [3.9–9.4][1] IR: 3.6 [2.0–6.4][2] Some college IR: 4.8 [3.7–6.2][1] IR: 2.8 [2.0–3.8][2] > College IR: 3.5 [2.6–4.8][1] IR: 2.3 [1.6–3.4][2] **Marital status** Never married IR: 3.9 [2.7–5.7][1] IR: 2.3 [1.3–4.0][2] Married IR: 4.9 [3.8–6.2][1] IR: 2.9 [2.1–4.0][2] Previously married IR: 6.1 [3.9–9.5][1] IR: 4.8 [3.0–7.6][2] **Rank** Junior enlisted IR: 4.4 [2.2–8.8][1] IR: 1.2 [0.4–3.4][2] Non-Commissioned Officers

						IR: 5.1 [4.1–6.2][1] IR: 3.4 [2.6–4.4][2] Officer IR: 3.0 [2.0–4.5][1] IR: 1.4 [0.8–2.5][2] **Number of baseline deployments** Zero IR: 3.9 [2.5–5.9][1] IR: 1.4 [0.7–2.5][2] One IR: 4.8 [3.4–6.7][1] IR: 3.9 [2.6–5.9][2] Two IR: 5.1 [3.7–7.0][1] IR: 3.5 [2.4–5.0][2] More than three IR: 5.5 [3.6–8.3][1] IR: 2.9 [1.6–5.4][2] **Past-year deployment** Yes IR: 7.2 [4.6–11.2][1] IR: 3.0 [1.4–6.3][2] No IR: 5.3 [4.4–6.5][1] IR: 3.6 [2.8–4.6][2] **Past-year deployment trauma** Yes IR: 5.3 [3.2–8.7][1] IR: 2.0 [0.9–4.4][2] No IR: 4.6 [3.7–5.6][1] IR: 3.1 [2.4–4.0][2]

						Past-year civilian trauma Yes IR: 6.5 [5.2–8.1][1] IR: 4.2 [3.1–5.6][2] No IR: 2.9 [2.1–4.0][1] IR: 1.6 [1.0–2.5][2] **Component** Reserve IR: 4.0 [3.0–5.3][1] IR: 3.0 [2.1–4.2][2] National Guard IR: 5.3 [4.2–6.8][1] IR: 2.8 [2.0–4.0][2] **Branch** Air Force Reserve IR: 2.7 [1.3–5.6][1] IR: 1.1 [0.3–3.5][2] Army Reserve IR: 4.2 [2.8–6.3][1] IR: 4.2 [2.7–6.6][2] Marine Reserve IR: 5.3 [3.0–9.7][1] IR: 2.5 [1.1–5.5][2] Navy Reserve IR: 4.0 [2.2–7.2][1] IR: 1.9 [0.9–4.0][2] Air National Guard IR: 3.4 [1.9–6.1][1] IR: 0.4 [0.1–1.4][2] Army National Guard IR: 5.9 [4.5–7.7][1] IR: 3.6 [2.4–5.0][2]
17. Goodwin,	Name: -	n= 1,397	Exposure assessment:	Type of symptoms:	Univariate (model	**Sex**

2012 [35]	Design: Prospective longitudinal. Follow-up period: 40.3 months (median)	Country= UK %Female= 11% Age= - Type of job/company= Military personnel that were and were not deployed in the Iraq war. Inclusion/exclusion= -	Self-reported. Year of assessment: 2004-2006. Exposure categories: Personal characteristics, service, rank and deployment history.	PTSD symptoms (delayed onset) Way of assessment: Self-reported using the PCL-C checklist. Incidence: 3.5%	1) and multivariate (model 2) adjusting for service, rank, deployment characteristics, depression, anxiety, panic disorder, childhood adversity and general health, alcohol misuse, common mental disorders, and subthreshold PTSD all at phase 1.	Male OR: Ref. Female OR: 1.46 [0.64 3.36][1] **Age** <35 OR: Ref. ≥35 OR: 0.71 [0.38 1.34][1] **Marital status** In a relationship OR: Ref. Single, divorced, separated, widowed OR: 0.92 [0.39 2.14][1] **Service** Naval services OR: 0.40 [0.14 1.19][1] OR: 0.45 [0.16 1.28][2] Army OR: Ref. OR: Ref. Royal Air Force OR: 0.23 [0.07 0.81][1] OR: 0.53 [0.15 1.87][2] **Rank** Officer OR: 0.17 [0.05 0.57][1] OR: 0.21 [0.06 0.72][2] Other rank OR: Ref. OR: Ref.

						Deployment Regular OR: Ref. Reservist OR: 0.83 [0.42 1.68][1] **In a combat role on deployment** No OR: Ref. OR: Ref. Yes OR: 3.00 [1.57 5.75][1] OR: 2.61 [1.20 5.68][2] **Thought might be killed** No OR: Ref. OR: Ref. Yes OR: 3.69 [1.61 8.45][1] OR: 2.38 [1.03 5.46][2] **Discharged weapon on deployment** No OR: Ref. Yes OR: 1.48 [0.61 3.60][1] **Handled bodies on deployment** No OR: Ref. Yes OR: 2.01 [0.93 4.35][1]

						History of depression No OR: Ref. OR: Ref. Yes OR: 4.31 [2.19 8.49][1] OR: 3.67 [1.75 7.67][2] **History of anxiety/panic disorder** No OR: Ref. OR: Ref. Yes OR: 4.77 [1.92 11.82][1] OR: 2.85 [0.87 9.30][2] **Childhood adversity, antisocial behavior** No OR: Ref. OR: Ref. Yes OR: 3.26 [1.66 6.40][1] OR: 1.58 [0.73 3.43][2] **Childhood adversity, family relationship** 0 adversities OR: Ref. OR: Ref. 1 adversity OR: 1.36 [0.53 3.48][1] OR: 1.29 [0.46 3.63][2] 2 or more adversities OR: 2.92 [1.41 6.04][1] OR: 2.18 [0.99 4.77][2]

						General health status Fair/ poor OR: 3.05 [1.49 6.23][1] OR: 1.84 [0.79 4.28][2] Excellent/ good OR: Ref. OR: Ref. **Common mental disorder** Non-case OR: Ref. OR: Ref. Case OR: 5.58 [2.94 10.58][1] OR: 2.47 [1.12 5.46][2] **Multiple physical symptoms** Non-case OR: Ref. OR: Ref. Case OR: 7.32 [3.81 14.07][1] OR: 3.40 [1.54 7.47][2] **Alcohol misuse** Non-case OR: Ref. Case OR: 2.18 [1.00 4.75][1] **Subthreshold PTSD reported at phase 1** No OR: Ref. OR: Ref. Yes

						OR: 9.96 [4.67 21.20][1] OR: 4.87 [2.05 11.58][2] **Cumulative physical/psychological morbidity at phase 1** 0 reports OR: Ref. OR: Ref. 1 report OR: 4.40 [1.88 10.33][1] OR: 3.37 [1.30 8.73][2] 2 reports OR: 10.72 [4.09 28.08][1] OR: 6.56 [2.29 8.73][2] 3-4 reports OR: 17.14 [6.84 42.97][1] OR: 8.14 [2.81 23.57][2] **Relationship status** No change OR: Ref. In a new relationship since phase 1 OR: 1.17 [0.39 3.52][1] End of a relationship since phase 1 OR: 2.18 [0.84 5.62][1] **Serving status** In service phases 1 and 2 OR: Ref. OR: Ref. Not in service phases 1 and 2 OR: 1.51 [0.58 3.89][1] OR: 1.14 [0.40 3.29][2] Left service

						OR: 2.24 [1.13 4.42][1] OR: 1.46 [0.66 3.23][2] **General health status** Good health stable OR: Ref. OR: Ref. Poor health stable OR: 7.83 [3.33 18.44][1] OR: 3.72 [1.19 11.65][2] Decline in health since phase 1 OR: 6.44 [2.89 14.35][1] OR: 3.74 [1.41 9.91][2] Improvement in health since phase 1 OR: 1.71 [0.47 6.24][1] OR: 0.88 [0.24 3.24][2] **Alcohol misuse** No change [no misuse] OR: Ref. OR: Ref. No change [misuse] OR: 3.84 [1.37 10.77][1] OR: 1.29 [0.40 4.18][2] Deterioration change since phase 1 OR: 6.10 [2.45 15.17][1] OR: 6.15 [2.05 18.48][2] Improvement change since phase 1 OR: 1.60 [0.47 5.47][1] OR: 0.76 [0.21 2.71][2] **Common mental disorders** No change or positive change

						OR: Ref. OR: Ref. Negative change since phase 1 OR: 6.29 [3.24 12.21][1] OR: 7.12 [3.07 16.52][2] **Multiple physical symptoms** No change or improvement OR: Ref. OR: Ref. Decline in health since phase 1 OR: 9.73 [4.56 20.76][1] OR: 7.85 [2.86 21.52][2]
18. Green, 2016 [36]	Name: Project VALOR Design: Retrospective longitudinal Follow-up period: -	n= 738 Country= USA %Female= 51% Age= 37.7 (9.9) years. Type of job/company= Iraq and Afghanistan army and marine corps veterans. Inclusion/exclusion= Participants who had undergone mental health evaluation at a veterans facility were included. Participants with probable PTSD and females were oversampled to get a	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Deployment risk and resilience.	Type of symptoms: PTSD Way of assessment: Using a structured clinical interview with DSM-4 criteria. Incidence: 73% and 68% for females and males, respectively.	Unadjusted	**Age** OR: 1.01 [0.81 1.03] **Race** White OR: Ref. Black OR: 1.83 [0.76 4.41] Other OR: 0.46 [0.19 1.11] **Combat experiences** OR: 1.03 [1.00 1.07] **Aftermath of battle** OR: 1.03 [1.00 1.06] **Social support** OR: 0.96 [0.93 0.98] **Length of deployment** OR: 0.97 [0.92 1.03]

		good representation of these groups in the final sample. Only participants with one deployment were included.				**Deployment phase** Insurgency OR: Ref. Invasion OR: 0.38 [0.16 0.91] Surge OR: 0.44 [0.21 0.93]
19. Hansen, 2017[37]	Name: Mental Health and Work Environment Factors in the Aftermath of the Oslo Terrorist Attack Design: Prospective longitudinal Follow-up period: 10, 22 and 34 months after the attack	n= 1,933 Country= Norway %Female= 58% Age= 45.4(10.9) years Type of job/company= Employees of the ministries at the moment of the Oslo terrorist attack. Inclusion/exclusion= -	Exposure assessment: Deployment administration Year of assessment: 2011 Exposure categories: Mental health, exposure, work, perceived safety and psychosocial variables.	Type of symptoms: PTS symptoms Way of assessment: Self-reported using a Norwegian version of the Posttraumatic Stress Disorder Checklist – Specific (PCL-C), using DSM-4 criteria. Incidence: 6%, 4%, and 4% during the three follow-up periods, respectively.	Unadjusted (model 1) and multivariate (model 2) with age and gender and traumatic experiences, education level and leadership position.	**Presence during attack** Not present during attack *10 months* OR: Ref.[1] OR: Ref.[2] *22 months* OR: Ref.[1] OR: Ref.[2] *34 months* OR: Ref.[1] OR: Ref.[2] Present during attack *10 months* OR: 8.4 [5.6 12.6][1] OR: 9.3 [6.1 14.2][2] *22 months* OR: 6.9 [4.3 11.2][1] OR: 8.9 [5.2 15.3][2] *34 months* OR: 8.8 [5.2 15.1][1] OR: 10.0 [5.4 18.6][2]
20. Harvey, 2012 [38]	Name: - Design: Prospective longitudinal	n= 552 in combat group, 391 in control group Country= UK %Female= 17% in	Exposure assessment: Deployment administration Year of assessment: 2003	Type of symptoms: PTSD symptoms (using a cut-off >=50) Way of assessment: 17-item National	Univariate (model 1) and adjusted for gender, age, rank and service (model 2).	**Combat status** Control group *Short-term* OR: Ref OR: Ref *Long-term*

	Follow-up period: 16 months and 4.8 year post-deployment	combat group, 19% in control group Age= 39.4(7.9) in combat group, 42.0(8.9) in control group Type of job/company= Military personnel that were and were not deployed in the Iraq war Inclusion/exclusion= -	Exposure categories: Combat versus control group	Centre for PTSD Checklist (PCL-C) Incidence: Short term: 2.2% in control group and 6.3% in the combat group. Long-term: 2.0% in the control group and 5.1 in the combat group.		OR: Ref OR: Ref Combat group *Short-term* OR: 3.01 [1.36 6.64][1] OR: 2.91 [1.34 6.31][2] *Long-term* OR: 2.62 [1.12 6.16][1] OR: 2.42 [1.04 5.62][2]
21. Horesh, 2011 [39]	Name: - Design: Prospective longitudinal Follow-up period: 1, 2 and 20 years post-war	n= 675 Country= Israel %Female= - Age= - Type of job/company= War veterans from the Lebanon war Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 1983 Exposure categories: Combat exposure was self-reported.	Type of symptoms: PTSD, grouped into four groups: no-PTSD, 1983 PTSD, 1984 delayed onset PTSD and 2002 delayed onset PTSD. Way of assessment: Self-reported using the PTSD inventory, using DSM-3 criteria. Incidence: 16.5%	-	64.5% of the participants in the 1983 PTSD group reported extreme exposure to danger, compared to 24.5% of the no-PTSD group, 35.8% of the 2002 delayed onset PTSD group and 41.4% of the 1984 delayed onset PTSD group. Whereas 27.9% of the participants in the no-PTSD group reported extreme battles severity, 48.2% of the participants in the 1983 PTSD group reported extreme battles severity. In comparison, 39.6% of the participants in the 2002 delayed onset PTSD group and 34.5% of the participants in the 1984 delayed onset PTSD group reported extreme battles severity.
22. Hourani,	Name: -	n= 2116	Exposure assessment:	Type of symptoms:	-	Those with PTSD symptoms

2012 [40]	Design: Prospective longitudinal Follow-up period: 6 months	Country= USA %Female= - Age= - Type of job/company= Marines Inclusion/exclusion= Participants who transitioned from active military duty to civilian life were for a minimum of 2 months were included.	Self-reported Year of assessment: 2010 Exposure categories: Exposures like number of deployments and stress were used.	PTSD symptoms Way of assessment: Self-reported using the National Centre for PTSD Checklist (PCL-C) of the Department of Veterans Affairs – Civilian Version. Incidence: Baseline prevalence 28%, follow-up incidence 10%		also were more likely to report a previous trauma during their lifetime at baseline. High combat exposure scale scores were associated with PTSD. Baseline social support was associated with PTSD.
23. Ikeda, 2017 [41]	Name: Fukushima Nuclear Energy Worker's Support (NEWS) Project. Design: Prospective longitudinal Follow-up period: Baseline at 2-3 months post-disaster, with follow-up 3 years after that.	n= 1,417 Country= Japan %Female= 5% Age= 39.3 years Type of job/company= Employers of the Tokyo Electric Power Company in Fukushima. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2011 Exposure categories: Sociodemographic, disaster-related experiences and psychological distress.	Type of symptoms: PTSD symptoms (using a cut-off >=25) Way of assessment: Self-reported using the Japanese version of the Impact of Event Scale-Revisited (IES-R), using DSM-4 criteria. Incidence: 26%	Adjusted for age, gender and job location	**Experience of life-threatening danger** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 4.32 [2.89 6.48] (2011) OR: 3.47 [2.43 4.95] (2012) OR: 2.78 [1.87 4.14] (2013) OR: 2.23 [1.34 3.72] (2014) **Major property loss** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes

						OR: 3.45 [2.28 5.23] (2011) OR: 2.55 [1.77 3.66] (2012) OR: 1.88 [1.25 2.84] (2013) OR: 1.39 [0.81 2.37] (2014) **Discrimination/slurs** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 5.72 [3.37 9.71] (2011) OR: 4.47 [2.83 7.08] (2012) OR: 3.50 [2.10 5.84] (2013) OR: 2.74 [1.42 5.30] (2014) **Escape from tsunami** No OR: Ref. (2011) OR: Ref. (2012) OR: Ref. (2013) OR: Ref. (2014) Yes OR: 5.65 [3.27 9.74] (2011) OR: 3.72 [2.30 6.02] (2012) OR: 2.45 [1.40 4.27] (2013) OR: 1.61 [0.78 3.35] (2014) **Witnessing of plant explosions** No OR: Ref. (2011) Yes OR: 2.09 [1.43 3.06] (2011) **Family member deaths**

						No OR: Ref. (2011) Yes OR: 1.60 [0.80 3.19] (2011) **Colleague deaths** No OR: Ref. (2011) Yes OR: 2.08 [1.33 3.26] (2011) **Home evacuation** No OR: Ref. (2011) Yes OR: 1.49 [1.03 2.15] (2011)
24. Joseph, 2014 [42]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 453 Country= USA %Female= 24% Age= - Type of job/company= Traumatic surgeons Inclusion/exclusion = --	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Personal characteristics, and exposure at work.	Type of symptoms: PTSD (symptoms and diagnosed PTSD - only diagnosed PTSD was extracted for this review) Way of assessment: Self-reported using the PCL checklist (with a cut-off score >=44). Incidence: 15% (prevalence)	Univariate (model 1) and adjusting for all other exposure (model 2).	**Age** <51 years OR: Ref.[1] OR: Ref.[2] ≥51 years OR: 1.8 [0.7 3.4][1] **Gender** Female OR: Ref.[1] OR: Ref.[2] Male OR: 2.1 [1.4 4.6][1] OR: 1.8 [0.9 5.3][2] **Marital status** Other OR: Ref.[1] Single OR: 1.2 [0.4 2.8][1]

						Race Other OR: Ref.[1] White OR: 1.1 [0.8 2.6][1] **Comorbidities** No OR: Ref.[1] Yes OR: 2.4 [0.6 4.1][1] **Urban hospital** No OR: Ref.[1] Yes OR: 1.6 [0.5 2.4][1] **Academic facility** No OR: Ref.[1] Yes OR: 3.6 [0.9 7.8][1] **24-h resident coverage** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.8 [1.1 3.2][1] OR: 1.4 [0.8 4.2][2] **≥5 critical cases per call** No OR: Ref.[1] OR: Ref.[2] Yes

						OR: 2.4 [1.6 9.4][1] OR: 7 [1.1 8][2] **≥7 call duties a month** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.6 [2.1 14.6][1] OR: 3.8 [0.9 7.2][2] **≥15 operative cases per month** No OR: Ref.[1] OR: Ref.[2] Yes OR: 3.1 [1.1 7.2][1] OR: 2.8 [0.4 3.2][2] **≥4-h relaxation per day** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.6 [1.8 11.5][1] OR: 3.1 [0.9 6.7][2] **≥2-wk vacation per year** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.1 [0.9 6.8][1] OR: 1.4 [0.6 4.1][2] **Military experience**

						<u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 1.4 [0.8 5.6][1] OR: 1.1 [0.7 3.8][2] **War deployment** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 4.2 [2.8 14.1][1] OR: 2.8 [0.9 7.9][2] **Smoking** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 1.2 [0.8 3.1][1] **Alcohol** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 1.1 [0.5 2.3][1] **Annual income >$300,000** <u>No</u> OR: Ref.[1] <u>Yes</u> OR: 3.6 [0.9 8.4][1]
25. Karstoft, 2013 [43]	<u>Name:</u> - <u>Design:</u> Prospective longitdinal	<u>n</u>= 675 (369 who were diagnosed with a combat stress reaction and 306 without)	<u>Exposure assessment</u>: Self-reported <u>Year of assessment</u>: 1983	<u>Type of symptoms</u>: PTSD <u>Way of assessment</u>: Self-reported using	-	**Severity of battles** OR: 0.96 [0.63 1.48] (combat stress reaction) OR: 0.87 [0.55 1.36] (no combat stress reaction)

	Follow-up period: 1, 2 and 20 years post-war.	Country= Israel %Female= 0% Age= 25.8(4.7) Type of job/company= Combat veterans who were on active duty in the Lebanon war. Inclusion/exclusion= -	Exposure categories: Exposures such as the severity of battles, life threatening war, unit atmosphere and social support were assessed.	the PTSD inventory, using DSM-3 criteria. Latent growth modelling was used to identify PTSD subgroups. For the current review we only assessed the 'delayed onset' PTSD group, as this reflects incidence of PTSD. Incidence: -		**Life threatening war** OR: 1.90 [1.08 3.35] (combat stress reaction) OR: 0.95 [0.64 1.43] (no combat stress reaction) **Unit atmosphere** OR: 1.08 [1.00 1.17] (combat stress reaction) OR: 1.02 [0.96 1.09] (no combat stress reaction) **Social support** OR: 0.58 [0.25 1.31] (combat stress reaction) OR: 0.66 [0.29 1.53] (no combat stress reaction)
26. Karstoft, 2015 [44]	Name: - Design: Prospective longitudinal Follow-up period: 1, 2 and 20 years post-war.	n= 675 (369 who were diagnosed with a combat stress reaction and 306 without) Country= Israel %Female= 0% Age= 25.8(4.7) Type of job/company= Combat veterans who were on active duty in the Lebanon war. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 1983 Exposure categories: Exposures such as the severity of battles, life threatening war, coping were assessed.	Type of symptoms: PTSD Way of assessment: Self-reported using the PTSD inventory, using DSM-3 criteria. Latent growth modelling was used to identify PTSD subgroups. For the current review we only assessed the 'delayed onset' PTSD group, as this reflects incidence of PTSD. Incidence: -	-	**Severity of battles** OR: 1.01 [0.67 1.35] (combat stress reaction) OR: 0.87 [0.57 1.32] (no combat stress reaction) **Life threatening war** OR: 1.91 [1.07 3.24] (combat stress reaction) OR: 1.01 [0.68 1.50] (no combat stress reaction) **Locus of control** OR: 1.12 [0.93 1.35] (combat stress reaction) OR: 0.88 [0.73 1.05] (no combat stress reaction) **Problem-focused coping**

						OR: 1.72 [0.80 3.73] (combat stress reaction) OR: 3.11 [1.16 8.38] (no combat stress reaction) **Emotion-focused coping** OR: 0.60 [0.26–1.35] (combat stress reaction) OR: 0.28 [0.09–0.93] (no combat stress reaction)
27. Kim, 2014 [45]	Name: - Design: Retrospective longitudinal Follow-up period: -	n= 980 Country= Korea %Female= 0% Age= Most participants were in their 40s. Type of job/company= Subway drivers employed by a public company in Seoul Inclusion/exclusion= Participants currently on sick leave and female drivers were excluded.	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Person under train experiences and other work-related exposures were assessed.	Type of symptoms: PTSD (1 year and lifetime prevalence). Way of assessment: The Korean version of the Composite International Diagnostic Interview (K-CIDI) was administered to diagnose PTSD, using DSM-4 criteria. Incidence: 1.6% (one year prevalence)	Multi-variate analyses with all other exposures and age. For 1 year prevalence (model 1) and lifetime prevalence (model 2).	**Person under train experience** No OR: Ref OR: Ref Yes OR: 1.54 [0.52 4.55][1] OR: 2.06 [0.94 4.55][2] **Number of person under train experiences** 0 experiences OR: Ref OR: Ref 1 experience OR: 1.77 [0.31 4.47][1] OR: 1.45 [0.55 3.85][2] ≥2 experiences OR: 2.36 [0.57 9.70][1] OR: 3.57 [1.32 3.65][2] **Severity of victim's injury** Alive OR: Ref OR: Ref Death OR: 2.49 [0.27 23.27][1]

						OR: 1.39 [0.40 4.82][2] **Person under train experience** <u>>5 years ago</u> OR: Ref OR: Ref <u>≤5 years</u> OR: 1.01 [0.11 9.06][1] OR: 0.33 [0.03 2.63][2] **Conflict with passengers** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 3.21 [1.14 9.03][1] OR: 3.32 [1.55 7.12][2] **Sudden stop** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 3.66 [0.82 16.4][1] OR: 7.53 [1.77 32.02][2] **Near accident** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u> OR: 8.81 [1.96 39.3][1] OR: 6.36 [2.40 16.90][2] **Breakdown** <u>No</u> OR: Ref.[1] OR: Ref.[2] <u>Yes</u>

						OR: 1.71 [0.48 6.14][1] OR: 1.89 [0.75 4.75][2] **Person under train experience of colleague** No OR: Ref.[1] OR: Ref.[2] Yes OR: 0.55 [0.12 2.47][2] OR: 2.84 [1.32 6.12][2]
28. Levin-Rector, 2018 [46]	Name: Defence Manpower Data Center (DMDC), Career History and Archival Medical Personnel System (CHAMPS), and the Expeditionary Medical Encounter Database (EMED) Design: Prospective longitudinal Follow-up period: 35-43 months.	n= 332,093 (marine) and 773,359 (army) Country= USA %Female= 7% (marine) and 17% (army) Age= 20.0 (3.9) (marine) and 21.7 (2.1) (army) Type of job/company= All service members who went into the army or navy between 2001 and 2011. Inclusion/exclusion= -	Exposure assessment: Military databases Year of assessment: 2001-2011 Exposure categories: Personal and deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed PTSD obtained from military records. Incidence: 4.3% (marine); 7.6% (army).	Adjusting for clustering within units.	**Sex** Female HR: Ref. (marine) HR: Ref. (army) Male HR: 0.40 [0.36 0.44] (marine) HR: 0.57 [0.55 0.59] (army) **Age at accession** HR: 0.99 [0.98 1.00] (marine) HR: 1.01 [1.00 1.01] (army) **Race** White HR: Ref. (marine) HR: Ref. (army) Non-white HR: 0.95 [0.91 1.00] (marine) HR: 0.96 [0.94 0.98] (army) **Ethnicity** Non-Hispanic HR: Ref. (marine) HR: Ref. (army) Hispanic HR: 0.80 [0.75 0.84] (marine) HR: 0.86 [0.84 0.89] (army)

						Prior substance abuse disorder diagnosis HR: 3.10 [2.92 3.30] (marine) HR: 2.05 [2.00 2.10] (army) **Waiver status** No waiver HR: Ref. (marine) HR: Ref. (army) Received medical waiver HR: 1.13 [1.07 1.20] (marine) HR: 1.02 [0.99 1.05] (army) Received other waiver HR: 1.12 [1.08 1.16] (marine) HR: 1.12 [1.10 1.15] (army) **Marital status** Single HR: Ref. (marine) HR: Ref. (army) Divorced/widowed HR: 1.21 [1.06 1.39] (marine) HR: 1.18 [1.12 1.24] (army) Married HR: 1.31 [1.24 1.38] (marine) HR: 1.20 [1.18 1.23] (army) **Rank** Enlisted HR: Ref. (marine) HR: Ref. (army) Officer HR: 0.16 [0.13 0.21] (marine) HR: 0.20 [0.15 0.26] (army) **Occupation**

						Combat specialist HR: Ref. (marine) HR: Ref. (army) Communications/intelligence HR: 0.54 [0.48 0.62] (marine) HR: 0.73 [0.70 0.77] (army) Craft/repair specialist HR: 0.46 [0.40 0.54] (marine) HR: 0.62 [0.60 0.65] (army) Functional support/other HR: 0.46 [0.41 0.51] (marine) HR: 0.56 [0.53 0.59] (army) Service and supply HR: 0.77 [0.68 0.87] (marine) HR: 0.84 [0.80 0.88] (army) Healthcare specialist HR: 1.03 [0.98 1.08] (army) **Cumulative years deployed** HR: 2.04 [1.93 2.15] (marine) HR: 1.74 [1.71 1.76] (army) **Unit cumulative high deployment stress rate (per 100)** HR: 1.04 [1.03 1.05] (marine) HR: 1.05 [1.04 1.06] (army) **Unit stability** HR: 1.11 [0.92 1.33] (marine) HR: 0.69 [0.64 0.74] (army)
29. MacGregor, 2015 [47]	Name: Defence Manpower Data Center (DMDC) Design: Prospective	n= 8,064 (3,416 health care profession, 4,648 no health care profession) Country= USA	Exposure assessment: Self-reported. Year of assessment: 2001-2008	Type of symptoms: PTSD Way of assessment: Diagnosed, according to ICD-9-CM criteria,	Univariate (model 1) and multivariate (model 2) adjusting for all remaining exposures	**Health Care Occupation** No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes

	longitudinal Follow-up period: Up to 60 days.	%Female= 0% Age= Ranging from 27.9 (5.7) to 30.2 (7.0) in various participating groups. Type of job/company= Navy personnel with one, two or three deployments in Iraq and/or Afghanistan. Inclusion/exclusion= Participants who completed a health assessment within 60 days post-deployment were included. Women were excluded	Exposure categories: military occupation, combat rank, deployment specific variables	from inpatient and outpatient databased. Incidence: Ranging from 1.9% to 17.9% for various participating groups.		OR: 2.02 [1.45 2.80][1] (1 deployment) OR: 2.27 [1.26 4.08][1] (2 deployments) OR: 4.37 [1.25 15.28][1] (3 deployments) **Age** OR: 0.97 [0.94 0.99][1] (1 deployment) OR: 0.97 [0.93 1.02][1] (2 deployments) OR: 0.94 [0.86 1.03][1] (3 deployments) **Rank** Enlisted OR: Ref. OR: Ref. Officer OR: 0.35 [0.18 0.65][1] (1 deployment) OR: 0.54 [0.12 2.47][1] (2 deployments) **Married** No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes OR: 0.93 [0.67 1.30][1] (1 deployment) OR: 0.54 [0.32 0.89][1] (2 deployments) OR: 0.96 [0.36 2.56][1] (3 deployments)

						Some College No OR: Ref. (1 deployment) OR: Ref. (2 deployments) OR: Ref. (3 deployments) Yes OR: 1.61 [0.97 2.68][1] (1 deployment) OR: 0.66 [0.22 1.97][1] (2 deployments) OR: 0.41 [0.04 3.92][1] (3 deployments) **Medical utilization** Low OR: Ref. OR: Ref. OR: Ref. Moderate OR: 6.64 [3.50 12.60][1] (1 deployment) OR: 3.40 [1.64 7.06][1] (2 deployments) OR: 13.84 [1.69 113.49][1] (3 deployments) High OR: 34.52 [19.35 61.59][1] (1 deployment) OR: 15.25 [7.89 29.49][1] (2 deployments) OR: 46.96 [5.98 368.58][1] (3 deployments) **Deployment location** Afghanistan/Iraq OR: Ref.

						OR: Ref. OR: Ref. <u>Kuwait</u> OR: 0.78 [0.55 1.10][1] (1 deployment) OR: 0.81 [0.44 1.48][1] (2 deployments) OR: 1.32 [0.94 1.82][1] (3 deployments) **Number of combat exposures** OR: 1.62 [1.46 1.79][1] (1 deployment) OR: 1.37 [1.17 1.61][1] (2 deployments) OR: 1.30 [0.94 1.82][1] (3 deployments) **Current Deployment Time** OR: 1.00 [1.00 1.01][1] (1 deployment) OR: 1.00 [1.00 1.01][1] (2 deployments) OR: 1.00 [0.99 1.01][1] (3 deployments) **Previous deployment time** OR: 1.00 [1.00 1.01][1] (2 deployments) OR: 1.00 [0.99 1.01][1] (3 deployments) **Previous dwell time** OR: 1.00 [1.00 1.00][1] (2 deployments) OR: 1.00 [1.00 1.00][1] (3

						deployments) *Only health care occupation below* **Felt in great danger of being killed** No OR: Ref.[1] OR: Ref.[2] Yes OR: 4.14 [3.13 5.46][1] OR: 3.44 [2.50 4.72][2] **Engaged in direct combat and discharged weapon** No OR: Ref.[1] OR: Ref.[2] Yes OR: 3.43 [2.42 4.87][1] OR: 1.67 [1.15 2.44][2] **Exposed to wounded/dead civilians** No OR: Ref.[1] Yes OR: 1.51 [1.16 1.96][1] **Exposed to wounded/dead friendly forces** No OR: Ref.[1] OR: Ref.[2] Yes OR: 1.99 [1.52 2.60][1] OR: 1.53 [1.13 2.07][2]

						Exposed to wounded/dead enemy No OR: Ref.[1] Yes OR: 1.79 [1.38 2.34][1]
30. MacGregor, 2012 [48]	Name: Defence Manpower Data Center (DMDC) Design: Prospective longitudinal Follow-up period: 4 years	n=65,704 Country= USA %Female= - Age= 22 (19-53) Type of job/company= Marine corps personnel deployed to Iraq or Kuwait. Inclusion/exclusion= Deployments between 4 and 8 months were considered. Special forces and participants with earlier mental health issues were excluded. Only those with more than one deployment were analysed.	Exposure assessment: Deployment adminstration Year of assessment: 2003-2007 Exposure categories: Dwell-to-deployment ratios were categorised into <1:1, 1:1 and 2:1.	Type of symptoms: PTSD Way of assessment: Diagnosed PTSD with ICD-9-CM criteria were obtained from impatient and outpatient registers Incidence: 1.5%	Adjustment for age and military rank	**Dwell to deployment ratio** <1:1 OR: Ref. 1:1 OR: 0.83 [0.60 1.13] 2:1 OR: 0.47 [0.32 0.70]
31. Maguen, 2012 [49]	Name: Department of Veterans Affairs (VA) database	n= 968 Country= USA %Female= 12%	Exposure assessment: Department of Veterans Affairs administrative data (including self-reports)	Type of symptoms: PTSD Way of assessment: Using the self-	Univariate (model 1) and multivariate (model 2), adjusting for age, sex, race, marital status, unit,	**Number of exposures** None OR: Ref. OR: Ref. One

	Design: Retrospective longitudinal Follow-up period: 11 days	Age= 30.3(8.4) years Type of job/company= War veterans who have been deployed in Iran and Afghanistan. Inclusion/exclusion= Participants with either no head injury or a head injury with traumatic brain injury were included, but not those with head injury without brain damage.	Year of assessment: 2007-2010 Exposure categories: Exposure to traumatic brain injury mechanisms	reported Primary Care PTSD Screen (PC-PTSD) screening instrument Incidence: -	branch of service, rank and number of deployments.	OR: 4.93 [3.3 7.3][1] OR: 4.67 [3.1 7.1][2] Two + OR: 6.96 [5.1 9.6][1] OR: 6.15 [4.4 8.7][2] **Type of exposure** None OR: Ref. OR: Ref. Blast only OR: 5.13 [3.2 8.2][1] OR: 4.72 [2.9 7.7][2] Blast plus OR: 7.45 [5.4 10.3][1] OR: 6.52 [4.6 9.3][2] 1 Non blast OR: 4.53 [2.4 8.6][1] OR: 4.60 [2.4 8.8][2] 2+ Non blast OR: 2.94 [1.17 7.4][1] OR: 3.36 [1.32 8.6][2]
32. Maguen, 2010 [50]	Name: Department of Veterans Affairs (VA) database Design: Retrospective longitudinal Follow-up period: -	n= 329,049 Country= USA %Female= 12% Age= 31.2(9.0) Type of job/company= War veterans who have been deployed in Iran and Afghanistan. Inclusion/exclusion= -	Exposure assessment: Deployment data Year of assessment: 2001 Exposure categories: Demographic and military service data.	Type of symptoms: PTSD Way of assessment: PTSD obtained from medical health records of those who visited veteran facilities from 2002 to 2008. Diagnosis was done with ICD-9-CM criteria. Incidence: 17% among females, 22% among	Univariate models were conducted for females (model 1) and males (model 2) separately.	**Age** 16–24 RR: Ref. RR: Ref. 25–29 RR: 1.05 [0.99 1.11][1] RR: 0.96 [0.94 0.97][2] 30–39 RR: 1.24 [1.17 1.32][1] RR: 0.98 [0.96 0.99][2] 40–71 RR: 1.21 [1.13 1.30][1] RR: 0.79 [0.77 0.81][2] **Race/Ethnicity**

				males.		White RR: Ref. RR: Ref. Black RR: 0.95 [0.86 0.98][1] RR: 0.98 [0.96 1.00][2] Hispanic RR: 0.95 [0.88 1.01][1] RR: 0.89 [0.88 0.92][2] Other RR: 0.97 [0.86 1.10][1] RR: 1.02 [0.98 1.07][2] **Marital status** Married RR: Ref. RR: Ref. Never married RR: 0.97 [0.92 1.02][1] RR: 0.82 [0.80 0.83][2] Divorced/separated/widowed RR: 1.15 [1.08 1.22][1] RR: 1.08 [1.06 1.10][2] **Component type** Active duty RR: Ref. RR: Ref. Reserve/National Guard RR: 0.90 [0.86 0.94][1] RR: 0.74 [0.73 0.75][2] **Branch of service** Army RR: Ref. RR: Ref. Marine

						RR: 0.94 [0.85 1.05][1] RR: 0.95 [0.93 0.97][2] Navy RR: 0.45 [0.41 0.49][1] RR: 0.33 [0.32 0.34][2] Air Force RR: 0.45 [0.41 0.49][1] RR: 0.26 [0.25 0.27][2] **Rank** Enlisted RR: Ref. RR: Ref. Officer RR: 0.69 [0.63 0.77][1] RR: 0.51 [0.49 0.54][2] **Number of deployments** One RR: Ref. RR: Ref. More than one RR: 1.14 [1.09 1.19][1] RR: 1.15 [1.13 1.16][2]
33. Martindale, 2018 [51]	Name: - Design: Prospective longitudinal Follow-up period: Between 6 and 9 years.	n= 19 Country= USA %Female= 16% Age= 39.0(9.4) years. Type of job/company= Military personnel deployed in Afghanistan or Iraq	Exposure assessment: Self-reported Year of assessment: 2007-2010 Exposure categories: Blast exposure, traumatic brain injury and re-deployment were assessed.	Type of symptoms: PTSD Way of assessment: Via a structured interview, the Structured Clinical Interview for DSM-4 Axis I Disorders (SCID Incidence: 6/19 and 5/19 had current PTSD at T1 and T2,	-	Only individual participant data were presented, showing associations between the exposures and PTSD.

		Inclusion/exclusion= Participants with a history in traumatic brain injury or other neurological or mental disorders were excluded.		respectively.		
34. Nagamine, 2018 [52]	Name: - Design: Prospective longitudinal, with baseline measurements one month post-deployment. Follow-up period: 6 and 12 months post-deployment.	n= 56,753 Country= Japan %Female= 3% Age=- Type of job/company= Members of the ground defence force at 2011 Great East Japan Earthquake. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: - Exposure categories: Information on personal attributes and mission duties.	Type of symptoms: PTSD symptoms (using a cut-off: >- 25) Way of assessment: Self-reported with the Impact of Event Scale-Revised (IES-R). Incidence: 2283/56753=4%	Multivariate model	**Age** OR: 1.39 [1.27 1.52] **Sex** Male OR: Ref. Female OR: 1.61 [1.29 2.00] **Rank** Enlisted/private OR: Ref. Officer OR: 0.77 [0.67 0.88] Administrative official OR: 1.24 [0.82 1.87] **Deployment length** < 1 month OR: Ref. 1–3 months OR: 1.53 [1.37 1.70] ≥ 3 months OR: 2.64 [2.33 2.99] **Personally affected** No OR: Ref. Yes OR: 2.19 [1.95 2.44]

						Body recovery duties No OR: Ref. Yes OR: 1.37 [1.25 1.51] **Duties with radiation exposure risk** No OR: Ref. Yes OR: 1.08 [0.97 1.20] **Timing of post-deployment leave** Within two weeks OR: Ref. Over two weeks OR: 1.34 [1.22 1.47] No leave taken OR: 1.50 [1.29 1.75] **Post-deployment overwork** No OR: Ref. Yes: < 3 months OR: 1.39 [1.26 1.53] Yes: ≥ 3 months OR: 2.02 [1.78 2.29] **Post-deployment relocation** No OR: Ref. Yes OR: 1.12 [0.98 1.28]
35. Osorio, 2018 [53]	Name: Secondary analyses on the	n= 1,635	Exposure assessment: Self-reported	Type of symptoms: PTSD symptoms (re-	Nine different models	**Violent combat** No

	Battlemind RCT. Design: Prospective longitudinal Follow-up period: 4-6 months post deployment.	Country= UK %Female= 2% Age= 39% was younger than 25 years. Type of job/company= Members of three branches of the army forces, returning from deployment in Afghanistan. Inclusion/exclusion= -	Year of assessment: 2009 Exposure categories: Violent combat situations, proximity to wounding or death and encountering explosive devices.	experience is extracted for this review - in the paper also: avoidance, numbing, arousal and anxious is reported) Way of assessment: Using the National Center for Posttraumatic Stress Disorders Checklist – Civilian Version (PCL-C). PTSD in general, but also avoiding, numbing and arousal behaviour were reported. For this review we only extracted PTSD. Incidence: 34%	Model 1: Unadjusted Model 2: Adjusted Model 3: Adjusted for proximity to wounding or death. Model 4: Adjusted for encountering explosive devices. Model 5: adjusted for PTSD re-experiencing, avoidance, numbing, or arousal. Model 6: Adjusted for distress. Model 7: Adjusted for alcohol. Model 8: Ranks, deployment and gender. Model 9: Adjusted for violent combat, proximity to wounding or death, encountering explosive devices, PTSD re-experiencing, avoidance, numbing, arousal, distress, alcohol consumption, rank, gender, reserves, deployment.	RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 2.43 [1.95 3.02][1] RR: —[2] RR: 1.56 [1.21 2.01][3] RR: 2.04 [1.62 2.58][4] RR: 1.81 [1.43 2.29][5] RR: 2.63 [2.10 3.31][6] RR: 2.32 [1.85 2.89][7] RR: 2.36 [1.89 2.95][8] RR: 1.35 [1.01 1.81][9] **Proximity to wounding or death** No RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 3.01 [2.42 3.74][1] RR: 2.42 [1.89 3.11][2] RR: —[3] RR: 2.62 [2.08 3.31][4]

						RR: 2.02 [1.59 2.56][5] RR: 3.03 [2.42 3.80][6] RR: 2.94 [2.36 3.67][7] RR: 3.01 [2.41 3.75][8] RR: 1.67 [1.25 2.23][9] **Encountering explosive devices** No RR: Ref.[1] RR: Ref.[2] RR: Ref.[3] RR: Ref.[4] RR: Ref.[5] RR: Ref.[6] RR: Ref.[7] RR: Ref.[8] RR: Ref.[9] Yes RR: 2.14 [1.71 2.67][1] RR: 1.66 [1.30 2.10][2] RR: 1.54 [1.21 1.95][3] RR: —[4] RR: 1.70 [1.33 2.16][5] RR: 2.17 [1.72 2.73][6] RR: 2.01 [1.60 2.52][7] RR: 2.06 [1.65 2.59][8] RR: 1.26 [0.95 1.66][9]
36. Pihl-Thingvad, 2019 [54]	Name: Everyday violence project Design: Prospective longitudinal Follow-up period: 12 months	n= 1,763 Country= Denmark %Female= 78% Age= 48.7 (9.4) years. Type of job/company=	Exposure assessment: Self-reported. Year of assessment: 2016-2017 Exposure categories: Patient-initiated violence.	Type of symptoms: PTSD Way of assessment: Self-reported using the International Trauma Questionnaire, with ICD-11 criteria.	Crude model adjusting for age and gender (model 1), additionally adjusting for BMI, alcohol, years of experience, critical incidents outside of work, posttraumatic	**Frequency of violence** No violence OR: Ref. OR: Ref. OR: Ref. Low frequency OR: 4.4 [1.3 14.8][1] OR: 3.0 [0.90 10.4][2] OR: 4.0 [1.0 16.3][3]

		Social educators working with disabled adults. Inclusion/exclusion= Participants in leadership position and with PTSD at baseline were excluded.		Incidence: 3.5%	stress disorder symptom level at baseline, trauma coping self-efficacy, workplace social capital linking, and training (model 2). In model 3, additional for frequency and severity of violence was done.	Medium frequency OR: 6.3 [1.8 22.9][1] OR: 3.7 [1.0 13.8][2] OR: 5.9 [1.4 24.2][3] High frequency OR: 10.2 [2.9 36.3][1] OR: 4.2 [1.1 15.9][2] OR: 6.5 [1.6 25.6][3] **Severity of violence** No violence OR: Ref. OR: Ref. OR: Ref. Max. mild violence OR: 2.3 [0.2 22.8][1] OR: 2.3 [0.2 24.4][2] OR: 3.8 [0.3 46.2][3] Max. threats of violence OR: 5.1 [1.5 17.5][1] OR: 3.6 [1.0 12.4][2] OR: 5.4 [1.2 24.2][3] Max. moderate violence OR: 4.1 [1.1 14.5][1] OR: 2.1 [0.6 8.1][2] OR: 2.6 [0.6 10.8][3] Max. severe violence OR: 13.7 [3.1 37.1][1] OR: 5.3 [1.5 19.5][2] OR: 6.5 [1.6 26.0][3]
37. Polusny, 2011 [55]	Name: Readiness and Resilience in National Guard Soldiers. Design: Prospective	n= 426 Country= USA %Female= 12% Age= Mostly younger	Exposure assessment: Self-reported Year of assessment: 2006 Exposure categories:	Type of symptoms: Probable PTSD (new onset) Way of assessment: Self-reported using the PCL checklist, with	Adjusting for all other pre-deployment factors (model 2), additionally adjusting for deployment	**Baseline PTSD symptoms** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 0.73 [0.34 1.58][1]

	longitudinal Follow-up period: 2 months	than 30. Type of job/company= National Guard soldiers Inclusion/exclusion= Those with PTSD at baseline were excluded.	Psychosocial risk, protective factors and deployment exposures.	DSM-4 criteria. Incidence: 14%	exposures (model 2) and additionally adjusting for post-deployment factors (model 3).	OR: 0.79 [0.34 1.85][2] OR: 0.69 [0.27 1.79][3] **Military preparedness** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 0.58 [0.39 0.87][1] OR: 0.62 [0.40 0.95][2] OR: 0.77 [0.48 1.25][3] **Concerns about life/family disruptions** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 1.38 [0.97 1.97][1] OR: 1.31 [0.88 1.95][2] OR: 1.12 [0.71 1.77][3] **Unit support** No OR: Ref.[1] OR: Ref.[2] OR: Ref.[3] Yes OR: 1.43 [0.95 2.15][1] OR: 1.15 [0.73 1.79][2] OR: 1.15 [0.70 1.89][3] **Combat experiences** No OR: Ref.[2]

						OR: Ref.[3] Yes OR: 2.19 [1.40 3.41][2] OR: 2.35 [1.41 3.92][3] **Exposure to aftermath of battle** No OR: Ref.[2] OR: Ref.[3] Yes OR: 1.62 [1.04 2.53][2] OR: 1.81 [1.08 3.06][3] **Perceived life threat** No OR: Ref.[2] OR: Ref.[3] Yes OR: 1.21 [0.81 1.81][2] OR: 1.01 [0.63 1.64][3] **Post-deployment social support** No OR: Ref.[3] Yes OR: 0.31 [0.19 0.50][3] **Post-deployment life stressors** No OR: Ref.[3] Yes OR: 1.96 [1.17 3.28][3]
38. Reijnen, 2015 [56]	Name: -	n= 994	Exposure assessment: Self-reported	Type of symptoms: PTSD symptoms	-	**Deployment** Pre-deployment

	Design: Prospective longitudinal with baseline measurements 1 month prior to deployment Follow-up period: 2 years post deployment.	Country= Netherlands %Female= 9% Age= 28.5 (9.0) Type of job/company= Dutch military personnel who were deployed to Afghanistan Inclusion/exclusion=-	Year of assessment: 2005-2008 Exposure categories: Different categories of time since deployment (compared to pre-deployment)	Way of assessment: Self-reported with the Dutch Self-Rating Inventory for PTSD, using DSM-4 cut-off values Incidence: 8.9%		OR: Ref 1 month post-deployment OR: 2.12 [1.4 3.3] 6 months post-deployment OR: 2.18 [1.4 3.4] 1 year post-deployment OR: 1.62 [1.0 2.6] 2 years post-deployment OR: 1.33 [2.8 5.8]
39. Shea, 2013 [57]	Name: - Design: Prospective longitudinal Follow-up period: 6 months post deployment.	n= 238 Country= USA %Female= 8% Age= 33.5 (9.5) years. Type of job/company= Members of the National Guard units recently returned from deployment to Iraq and Afghanistan. Inclusion/exclusion= -	Exposure assessment: Self-reported Year of assessment: 2006-2009 Exposure categories: Personal characteristics, pre-deployment and deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed during a CAPS structured interview. Incidence: 13%	Adjusting for demographics (model 1), additionally adjusting for pre-deployment characteristics (model 2), additionally adjusting for deployment-related variables (model 3), and additionally adjusting for post-deployment characteristics (model 4).	It is unclear what the reference group is for the below associations **Gender** OR: 1.03 [0.12 8.89][1] OR: 0.46 [0.04 5.14][2] OR: 0.94 [0.03 28.56][3] OR: 1.12 [0.03 38.70][4] **Ethnicity** OR: 0.33 [0.04 2.64][1] OR: 0.17 [0.02 1.61][2] OR: 0.08 [0.00 1.45][3] OR: 0.07 [0.00 1.18][4] **Age** OR: 1.09 [0.69 1.72][1] OR: 1.01 [0.60 1.72][2] OR: 0.7 [0.34 1.41][3] OR: 1.12 [0.31 1.45][4] **Negative temperament** OR: 2.95 [1.66 5.23][2] OR: 2.23 [1.18 4.22][3]

						OR: 1.46 [0.69 3.09][4] **Pre-deployment life events** OR: 1.92 [1.19 3.10][2] OR: 1.78 [1.00 3.19][3] OR: 1.1 [0.56 2.18][4] **Preparation and training** OR: 0.89 [0.52 1.55][2] OR: 1.41 [0.68 2.91][3] OR: 1.99 [0.83 4.62][4] **Life and family concerns** OR: 2.77 [1.34 5.75][3] OR: 2.77 [1.28 6.01][4] **Deployment environment** OR: 1.44 [0.68 3.05][3] OR: 1.31 [0.58 2.99][4] **Unit support** OR: 1.03 [0.56 1.90][3] OR: 1.15 [0.58 2.30][4] **Combat exposure** OR: 1.88 [1.01 3.50][3] OR: 2.00 [1.01 3.97][4] **Post-deployment support** OR: 0.36 [0.15 0.87][4] **Post-deployment life events** OR: 1.82 [0.98 3.39][4]
40. Soo, 2011 [58]	Name: FDNY-WTC-MMP Design:	n= 11,006 Country= USA	Exposure assessment: Demographics and work status and number of colleagues who died	Type of symptoms: Probable PTSD Way of assessment:	Univariate (model 1 & 3) and adjusted for all other exposures (model 2	**Arrival group** Group 3 and 4 HR: Ref[1] HR: Ref[2]

	Prospective longitudinal Follow-up period: 9 years, with follow-up measurements every 18 months.	%Female= 0% Age= 39.5 (7.4) years Type of job/company= New York firefighters involved in the 9/11 WTC attacks. Inclusion/exclusion= Firefighters who arrived at the site more than 14 days before the close of the WTC site were included. Women were excluded.	were obtained from databases. Other variables were self-reported. Year of assessment: 2002 Exposure categories: Exposure to the WTC sites	Self-reported using the PCL-C checklist. Incidence: 8% (after the first follow-up).	& 4), for those with PTSD at baseline (model 1 & 2) and without (model 3 & 4).	HR: Ref[3] HR: Ref[4] Group 1 HR: 0.76 [0.58-1.00][1] HR: 0.74 [0.56-0.99][2] HR: 2.21 [1.80-2.70][3] HR: 1.38 [1.12-1.70][4] Group 2 HR: 0.97 [0.75-1.25][1] HR: 0.85 [0.66-1.11][2] HR: 1.16 [0.98-1.39][3] HR: 0.90 [0.75-1.08][4] **≥1 death at firehouse on 9/11** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.84 [0.71-1.00][1] HR: 0.87 [0.73-1.04][2] HR: 1.31 [1.12-1.54][3] HR: 1.11 [0.95-1.31][4] **Received counselling during year 1** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.89 [0.76-1.04][1] HR: 0.98 [0.83-1.15][2] HR: 2.02 [1.74-2.35][3]

						HR: 1.59 [1.36-1.85][4] **Each concurrent aerodigestive symptom** <u>No</u> HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] <u>Yes</u> HR: 0.87 [0.84-0.90][1] HR: 0.89 [0.86-0.93][2] HR: 1.62 [1.56-1.67][3] HR: 1.45 [1.40-1.51][4] **Concurrent alcohol intake** <u>No increase since 9/11</u> <u>Increased since 9/11</u> HR: 0.77 [0.53-1.12][1] HR: 0.83 [0.56-1.22][2] HR: 5.85 [4.56-7.52][3] HR: 3.43 [2.67-4.43][4] <u>Increased since 9/11, now back to pre-9/11 levels</u> HR: 0.95 [0.76-1.18][1] HR: 1.01 [0.81-1.27][2] HR: 2.95 [2.46-3.55][3] HR: 2.06 [1.71-2.47][4] **Concurrent exercise** <u>No change since last questionnaire</u> <u>Decreased since last questionnaire</u> HR: 0.74 [0.62-0.88][1] HR: 0.76 [0.63-0.92][2] HR: 2.65 [2.27-3.09][3]

						HR: 1.69 [1.44-1.97][4] Decreased since last questionnaire for health reasons HR: 0.38 [0.28-0.52][1] HR: 0.56 [0.41-0.78][2] HR: 4.20 [3.53-4.99][3] HR: 3.19 [2.64-3.86][4] Increased since last questionnaire HR: 0.95 [0.77-1.18][1] HR: 0.92 [0.74-1.14][2] HR: 1.13 [0.91-1.41][3] HR: 0.92 [0.74-1.14][4] **Concurrent smoking status** Never Current HR: 1.03 [0.81-1.32][1] HR: 1.04 [0.81-1.33][2] HR: 1.13 [0.90-1.42][3] HR: 1.07 [0.85-1.35][4] Former HR: 0.91 [0.76-1.08][1] HR: 0.95 [0.79-1.15][2] HR: 1.24 [1.07-1.43][3] HR: 1.23 [1.06-1.42][4] **Experience with prior disaster** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.82 [0.69-0.96][1]

						HR: 0.86 [0.73-1.02][2] HR: 1.29 [1.13-1.48][3] HR: 1.11 [0.96-1.27][4] **Non-white race/ethnicity** No HR: Ref.[1] HR: Ref.[2] HR: Ref.[3] HR: Ref.[4] Yes HR: 0.98 [0.70-1.36][1] HR: 1.05 [0.75-1.46][2] HR: 1.20 [0.94-1.54][3] HR: 1.37 [1.07-1.75][4] **Age on 9/11** HR: 1.02 [1.01-1.04][2] HR: 1.00 [0.99-1.01][4]
41. Stevelink, 2018 [59]	Name: HERRICK cohort Design: Retrospective longitudinal Follow-up period: -	n=8,093 Country= UK %Female= 13% and 8% for those who were deployed and not Age= 40.0 (13.0) and 40.2 (9.4) for those who were not and were deployed, respectively. Type of job/company= Military personnel that were and were not deployed in Iraq.	Exposure assessment: Deployment administration Year of assessment: 2014-2016 Exposure categories: Deployment and service status.	Type of symptoms: Probable PTSD Way of assessment: Self-reported with the PCL-C checklist. Incidence: 5.2% and 6.9% for those who were not deployed and deployed, respectively.	Unadjusted (model 1) and adjusted for age, gender, marital status, education, service and rank (model 2).	**Deployment** *Regulars* Not deployed OR: Ref[1] OR: Ref[2] Deployed OR: 1.34 [1.00 1.78][1] OR: 1.41 [1.04 1.90][2] *Reservists* Not deployed OR: Ref[1] OR: Ref[2] Deployed OR: 2.25 [1.14 4.46][1] OR: 2.48 [1.20 5.16][2] **Serving status**

		Inclusion/exclusion= -				Not serving OR: Ref[1] OR: Ref[2] Serving OR: 1.60 [1.25 2.06][1] OR: 1.73 [1.25 2.40][2] **Role during last deployment** *Serving regulars* No combat OR: Ref[1] OR: Ref[2] Combat OR: 1.70 [1.08 2.67][1] OR: 1.58 [0.98 2.55][2] *Ex-serving regulars* No combat OR: Ref[1] OR: Ref[2] Combat OR: 3.39 [2.25 5.11][1] OR: 2.53 [1.60 3.99][2]
42. Wittchen, 2012 [60]	Name: PIT-PTSD+ study Design: Retrospective longitudinal Follow-up period: On average 12 months post-deployment.	n= 1,483 Country= Germany %Female= - Age= - Type of job/company= Soldiers deployed in Afghanistan, and those who have not been deployed.	Exposure assessment: Deployment administration Year of assessment: 2010 Exposure categories: Deployment characteristics.	Type of symptoms: PTSD Way of assessment: Diagnosed with a structured interview using DSM-4 criteria. Incidence: 12 month incidence: 2.1% and 0.2% in the deployed and non-deployed group ,respectively.	Unadjusted	**Population** Control group OR: Ref. (12 month diagnosis) OR: Ref. (12 month incidence) OR: Ref. (lifetime prevalence) Deployed soldiers OR: 2.5 [1.1 5.6] (12 month diagnosis) OR: 4.2 [0.7 24.5] (12 month incidence) OR: 1.7 [0.96 3.1] (lifetime prevalence) **Deployed soldiers**

		Inclusion/exclusion= -				Control soldiers OR: Ref. (12 month diagnosis) OR: Ref. (12 month incidence) OR: Ref. (lifetime prevalence) Kunduz OR: 2.1 [0.8 5.8] (12 month diagnosis) OR: 6.6 [1.03 41.9] (12 month incidence) OR: 1.7 [0.8 3.6] (lifetime prevalence) Combat units OR: 3.3 [0.5 23.7] (12 month diagnosis) OR: - (12 month incidence) OR: 2.6 [0.7 9.4] (lifetime prevalence)
OR = Odds ratio RR = Relative risk HR = Hazard ratio						

Supplementary file 4. Risk of bias of included articles. The risk of bias (i.e. low, moderate and high risk of bias) in six domains (i.e. study participation, study attrition, prognostic factor (i.e. exposure), outcome, study confounding and statistical analysis) is depicted, while also sum scores are shown.

	First author, year of publication	Participation	Attrition	Prognostic factor	Outcome	Confounding	Analysis/reporting
1	Armed Forces Health Surveillance Center, 2011	Moderate	Moderate	Moderate	Low	High	High
2	Andersen, 2019	Moderate	Moderate	Moderate	Moderate	Low	Low
3	Anderson, 2019	Low	Moderate	Moderate	Moderate	Low	Low
4	Berninger, 2010	High	High	Low	Moderate	Low	Low
5	Brownlow, 2018	Moderate	Moderate	Moderate	Moderate	High	Low
6	Brundage, 2015	Low	Low	Low	Low	High	High
7	Cameron, 2019	Low	Low	Low	Low	Low	Low
8	Chiu, 2011	Low	Moderate	Moderate	Moderate	Low	Low
9	Ciarleglio, 2018	Low	Moderate	Moderate	Low	Low	Low
10	Cone, 2015	High	High	Moderate	Moderate	Low	Low
11	Connorton, 2011	Moderate	Moderate	High	High	Moderate	Low
12	Cukor, 2011	Low	Moderate	Moderate	Moderate	Low	Low
13	Fear, 2010	High	High	Low	Moderate	Low	Low
14	Ferrajao, 2016	High	High	Moderate	Moderate	High	Low
15	Fichera, 2015	High	High	Moderate	Moderate	Low	Low
16	Fink, 2016	High	High	Moderate	Moderate	High	Low
17	Goodwin, 2012	Low	Low	Moderate	Moderate	Low	Low
18	Green, 2016	Moderate	Moderate	Moderate	Low	High	Low
19	Hansen, 2017	High	Moderate	Moderate	Moderate	Low	Low
20	Harvey, 2012	High	Moderate	Low	Moderate	Low	Low
21	Horesh, 2011	Moderate	Moderate	Moderate	Moderate	High	Moderate
22	Hourani, 2012	Moderate	High	Moderate	Moderate	High	High
23	Ikeda, 2017	Moderate	Moderate	Moderate	Moderate	Low	Low
24	Joseph, 2014	Moderate	Moderate	Moderate	Moderate	Low	Low
25	Karstoft, 2013	Moderate	Low	Moderate	Moderate	High	Low
26	Karstoft, 2015	Moderate	Low	Moderate	Moderate	High	Low
27	Kim, 2014	Low	Low	Moderate	Low	Low	Low
28	Levin-Rector, 2018	Low	Low	Low	Low	Moderate	Low
29	MacGregor, 2015	Moderate	Moderate	Low	Low	Low	Low
30	MacGregor, 2012	Low	Low	Low	Low	Low	Low
31	Maguen, 2012	Moderate	Moderate	Moderate	Moderate	Low	Low
32	Maguen, 2010	Moderate	Moderate	Low	Low	High	Low
33	Martindale, 2018	High	Moderate	Moderate	Low	High	High
34	Nagamine, 2018	Moderate	Moderate	Moderate	Moderate	High	Low
35	Osorio, 2018	High	High	Moderate	Moderate	Low	Low
36	Pihl-Thingvad, 2019	Low	Low	Moderate	Moderate	Low	Low
37	Polusny, 2011	Moderate	Moderate	Moderate	Moderate	Low	Low
38	Reijnen, 2015	High	High	Moderate	Moderate	High	Low
39	Shea, 2013	Moderate	Moderate	Moderate	Low	Low	Low
40	Soo, 2011	Moderate	Moderate	Moderate	Moderate	Low	Low
41	Stevelink, 2018	High	High	Moderate	Moderate	Low	Low
42	Wittchen, 2012	Moderate	Moderate	Moderate	Low	High	Low

Supplementary file 5. Risk of bias of included studies.

First author, Year;	Item	Risk of bias	Reason
1. Armed Forces Health Surveillance Center, 2011 [21]	Participation	Moderate	All armed forces were eligible, but no non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Although prognostic factors were self-reported, no substantial bias can be expected from self-reports of the current prognostic factors
	Outcome	Low	Outcomes were diagnosed in a hospital
	Confounding	High	No confounding analysis has been conducted
	Analysis/reporting	High	No proper analysis has been conducted, only descriptives were presented.
2. Andersen, 2019 [19]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
3. Anderson, 2019 [20]	Participation	Low	86% of eligible participants, participated at baseline
	Attrition	Moderate	60% of the participants were filled out their follow-up questionnaires
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
4. Berninger, 2010 [22]	Participation	High	There were differences (e.g. in PTSD status) between participants and non-participants
	Attrition	High	Participants without follow-up data were excluded. The above therefore also holds for those lost at follow-up
	Prognostic factor	Low	Prognostic factors were self-reported and from registers
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
5. Brownlow, 2018 [23]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	Only univariate analyses were reported

	Analysis/reporting	Low	Adequate analyses were used
6. Brundage, 2015 [24]	Participation	Low	It appears as if all eligible participants were analysed.
	Attrition	Low	It appears as if all eligible participants were analysed.
	Prognostic factor	Low	Deployment records were used
	Outcome	Low	Outcomes were diagnosed (it appears).
	Confounding	High	No confounding adjustment were done
	Analysis/reporting	High	Only descriptive statistics were provided
7. Cameron, 2019 [25]	Participation	Low	It appears as if all eligible participants were analysed.
	Attrition	Low	It appears as if all eligible participants were analysed.
	Prognostic factor	Low	Deployment records were used
	Outcome	Low	Outcomes were diagnosed
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
8. Chiu, 2011 [26]	Participation	Low	There were some differences between responders and non-responders.
	Attrition	Moderate	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Both self-reports and employer data were used
	Outcome	Moderate	Outcomes were self-reported using a validated questionnaire
	Confounding	Low	Confounding adjustment was performed.
	Analysis/reporting	Low	Adequate analyses were used
9. Ciarleglio, 2018 [27]	Participation	Low	11% non-response
	Attrition	Moderate	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Both self-reports and employer data were used
	Outcome	Low	Outcome was diagnosed
	Confounding	Low	Multivariate analyses were done with all available exposures
	Analysis/reporting	Low	Adequate analyses were used
10. Cone, 2015 [28]	Participation	High	There are substantial differences between responders and non-responders.
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
11. Connorton, 2011 [29]	Participation	Moderate	No non-participant analysis has been presented by the authors.
	Attrition	Moderate	No loss to follow-up analyses were presented by the authors.
	Prognostic factor	High	Prognostic factors were self-reported and it is unclear how
	Outcome	High	Outcomes were self-reported and it is unclear how

	Confounding	Moderate	Multivariate analyses are not reported and it is unclear what was done
	Analysis/reporting	Low	Adequate analyses were done.
12. Cukor, 2011 [30]	Participation	Low	There was 86% participation
	Attrition	Moderate	There was 67% participation at follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Moderate	Outcomes were self-reported and obtained from interviews, with interview data used for exposure-outcome associations.
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
13. Fear, 2010 [31]	Participation	High	There are substantial differences between responders and non-responders.
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Low	Deployment administrative data were used
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
14. Ferrajao, 2016 [32]	Participation	High	Unclear but probably low participation rate
	Attrition	High	Since data were gathered retrospective, participation and attrition are similar.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	No adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
15. Fichera, 2015 [33]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
16. Fink, 2016 [34]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	High	No adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
17. Goodwin, 2012 [35]	Participation	Low	There were no substantial differences between responders and non-responders.
	Attrition	Low	There were no substantial differences between responders and non-responders (including

			those lost to follow-up).
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
18. Green, 2016 [36]	Participation	Moderate	There was a substantial non-response (20%)
	Attrition	Moderate	There was a substantial loss to follow-up (39%)
	Prognostic factor	Moderate	Prognostic factors were self-reported.
	Outcome	Low	Outcome was diagnosed in an interview
	Confounding	High	No confounding adjustment was conducted
	Analysis/reporting	Low	Appropriate analyses were used.
19. Hansen, 2017 [37]	Participation	High	There was a substantial amount of non-responders and no non-responder analysis.
	Attrition	Moderate	There was a substantial amount of participants lost to follow-up and no loss to follow-up analysis.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
20. Harvey, 2012 [38]	Participation	High	There were substantial differences (e.g. in age and gender) between responders and non-responders.
	Attrition	Moderate	No loss to follow-up analysis were reported
	Prognostic factor	Low	Prospective factors were determined based on deployment characteristics
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
21. Horesh, 2011 [39]	Participation	Moderate	No non-responder analysis was performed
	Attrition	Moderate	No loss to follow-up analysis was performed
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No confounding analyses were conducted
	Analysis/reporting	Moderate	The description of the analysis is unclear
22. Hourani, 2012 [40]	Participation	Moderate	No non-responder analysis was performed
	Attrition	High	There was substantial loss to follow-up in this study
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported

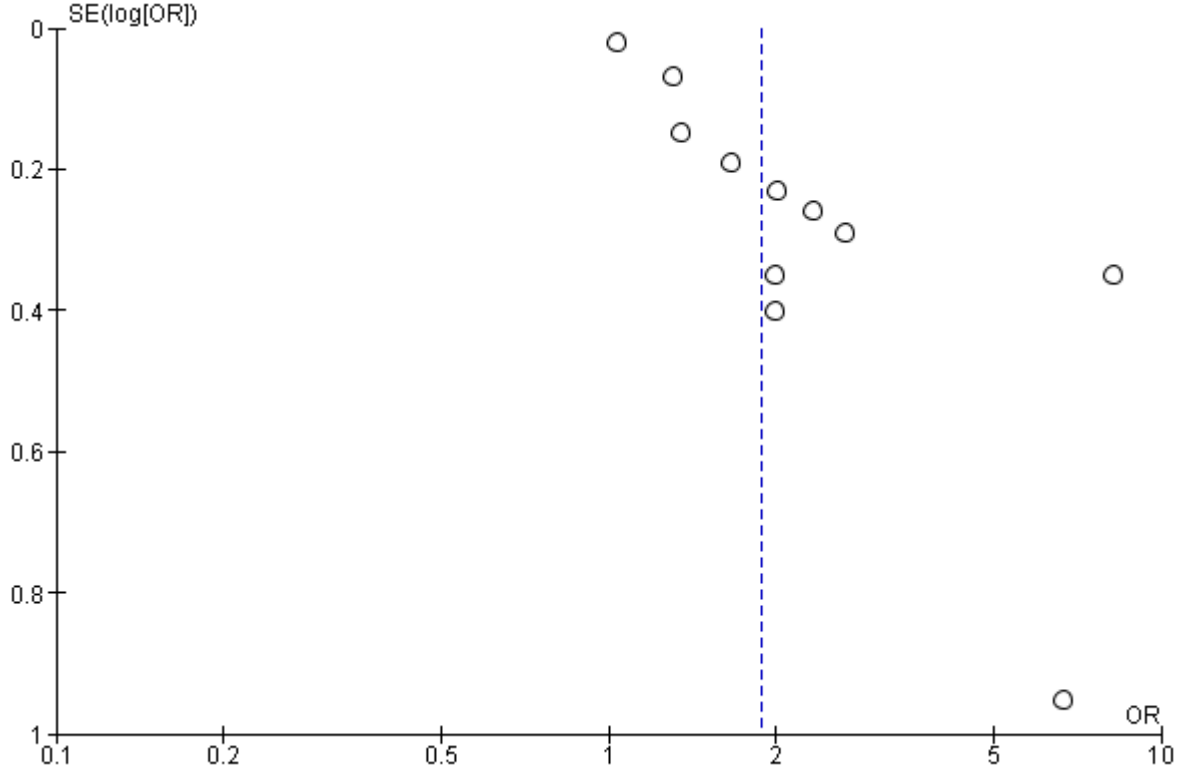
	Confounding	High	No confounding analyses were conducted (at least, not for the exposure-outcome associations)
	Analysis/reporting	High	Only descriptive statistics were reported (at least, for the exposure-outcome associations)
23. Ikeda, 2017 [41]	Participation	Moderate	About 15% non-response.
	Attrition	Moderate	There was substantial loss to follow-up with differences between those who were and were not lost.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
24. Joseph, 2014 [42]	Participation	Moderate	There was a substantial non-response
	Attrition	Moderate	There was a substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding was properly adjusted for
	Analysis/reporting	Low	Appropriate analyses were used.
25. Karstoft, 2013 [43]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Low	Loss to follow-up analyses indicated no substantial differences between those who remained in the cohort or not.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding were performed
	Analysis/reporting	Low	Adequate statistical analyses were conducted
26. Karstoft, 2015 [44]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Low	Loss to follow-up analyses indicated no substantial differences between those who remained in the cohort or not.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding were performed
	Analysis/reporting	Low	Adequate statistical analyses were conducted
27. Kim, 2014 [45]	Participation	Low	Very high >99% participation rate
	Attrition	Low	Very high >99% participation rate in follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcome was diagnosed during an interview
	Confounding	Low	Adjustment for confounding was performed

	Analysis/reporting	Low	Adequate analyses were conducted
28. Levin-Rector, 2018 [46]	Participation	Low	Responders comprised >90% of the eligible population
	Attrition	Low	Participants during follow-up comprised >90% of the cohort
	Prognostic factor	Low	Prognostic factors were obtained from database information
	Outcome	Low	Outcomes were obtained from diagnosed register information
	Confounding	Moderate	Only adjustment for clustering within units was done
	Analysis/reporting	Low	Adequate statistical analyses were conducted
29. MacGregor, 2015 [47]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Low	Prognostic factors were obtained from register data
	Outcome	Low	Outcomes were obtained from register data and were diagnosed.
	Confounding	Low	Adjustment for confounding has been conducted
	Analysis/reporting	Low	Adequate statistical analyses were used.
30. MacGregor, 2012 [48]	Participation	Low	All eligible participants were analysed.
	Attrition	Low	All eligible participants were analysed.
	Prognostic factor	Low	Register data were used
	Outcome	Low	Diagnosed register data were used
	Confounding	Low	Adjustment for confounding has been conducted
	Analysis/reporting	Low	Adequate statistical analyses were used.
31. Maguen, 2012 [49]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
32. Maguen, 2010 [50]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Low	Prognostic factors were obtained from company data.
	Outcome	Low	Outcome was diagnosed
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
33. Martindale, 2018 [51]	Participation	High	No non-responder analyses were presented, with substantial non-response.
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were obtained from an interview
	Outcome	Low	Outcome was diagnosed during an interview

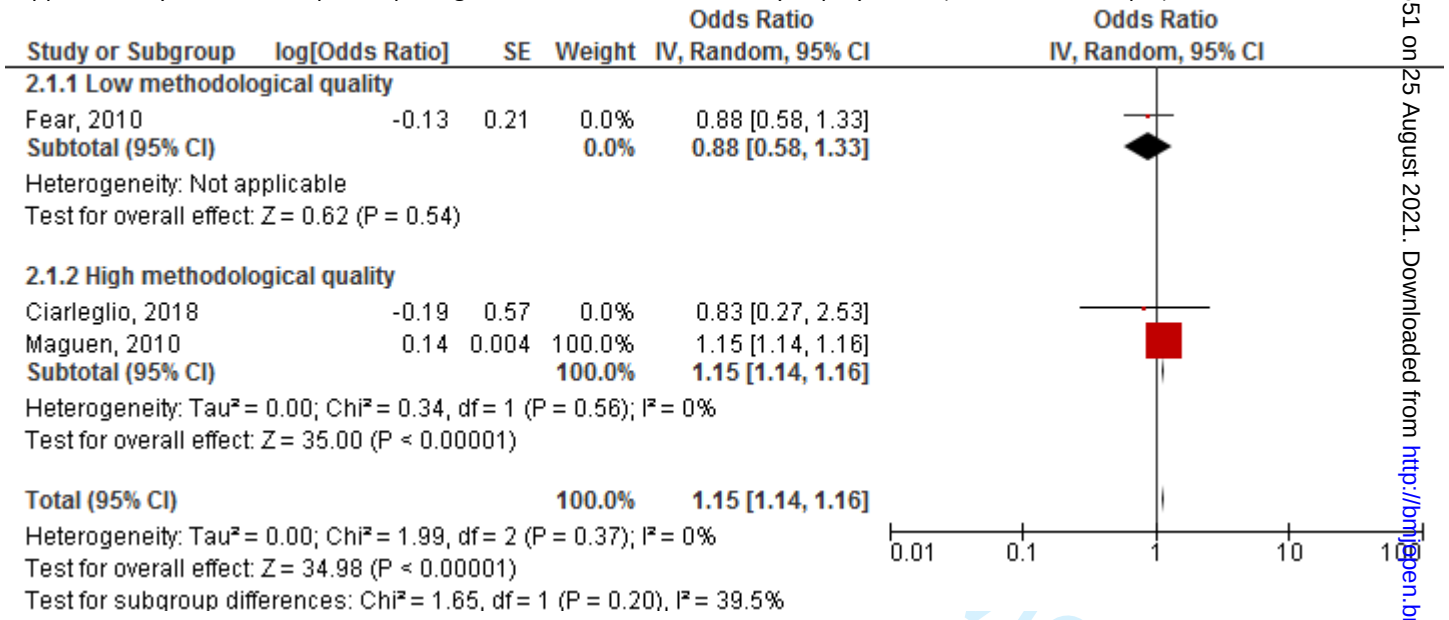
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	High	No statistical analysis was done on the exposure-outcome association (only other analysis).
34. Nagamine, 2018 [52]	Participation	Moderate	No non-responder analyses were presented
	Attrition	Moderate	No loss to follow-up analyses were presented
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No adjustment for confounding was done
	Analysis/reporting	Low	Adequate analyses were used
35. Osorio, 2018 [53]	Participation	High	A substantial amount of eligible participants did not participate. No non responder analysis was conducted.
	Attrition	High	A substantial amount of participants were lost in the follow-up. No loss to follow-up analysis was conducted.
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
36. Pihl-Thingvad, 2019 [54]	Participation	Low	Responders and non-responders did not differ substantially from one another (only in age)
	Attrition	Low	Variables that predicted loss to follow-up (e.g. baseline PTSD) were adjusted for
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
37. Polusny, 2011 [55]	Participation	Moderate	There were slight differences between responders and non-responders
	Attrition	Moderate	There were slight differences between those with and without follow-up data
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
38. Reijnen, 2015 [56]	Participation	High	There were substantial differences (e.g. in mental health) between responders and non-responders.
	Attrition	High	Participants without follow-up data were excluded. The above therefore also holds for those lost at follow-up
	Prognostic factor	Moderate	Prospective factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	High	No confounding adjustment was conducted

	Analysis/reporting	Low	Appropriate analyses were used.
39. Shea, 2013 [57]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcome was diagnosed during a structured interview.
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
40. Soo, 2011 [58]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcome was self-reported
	Confounding	Low	Confounding analyses were conducted
	Analysis/reporting	Low	Adequate statistical analyses were performed.
41. Stevelink, 2018 [59]	Participation	High	There was substantial non-response
	Attrition	High	There was substantial loss to follow-up
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Moderate	Outcomes were self-reported
	Confounding	Low	Adjustment for confounding was performed.
	Analysis/reporting	Low	Adequate analyses were conducted
42. Wittchen, 2012 [60]	Participation	Moderate	It is unclear what the non-response in this study was
	Attrition	Moderate	It is unclear what the loss to follow-up in this study was
	Prognostic factor	Moderate	Prognostic factors were self-reported
	Outcome	Low	Outcomes was diagnosed during a structured interview
	Confounding	High	No adjustment for confounding was performed
	Analysis/reporting	Low	Adequate analyses were conducted

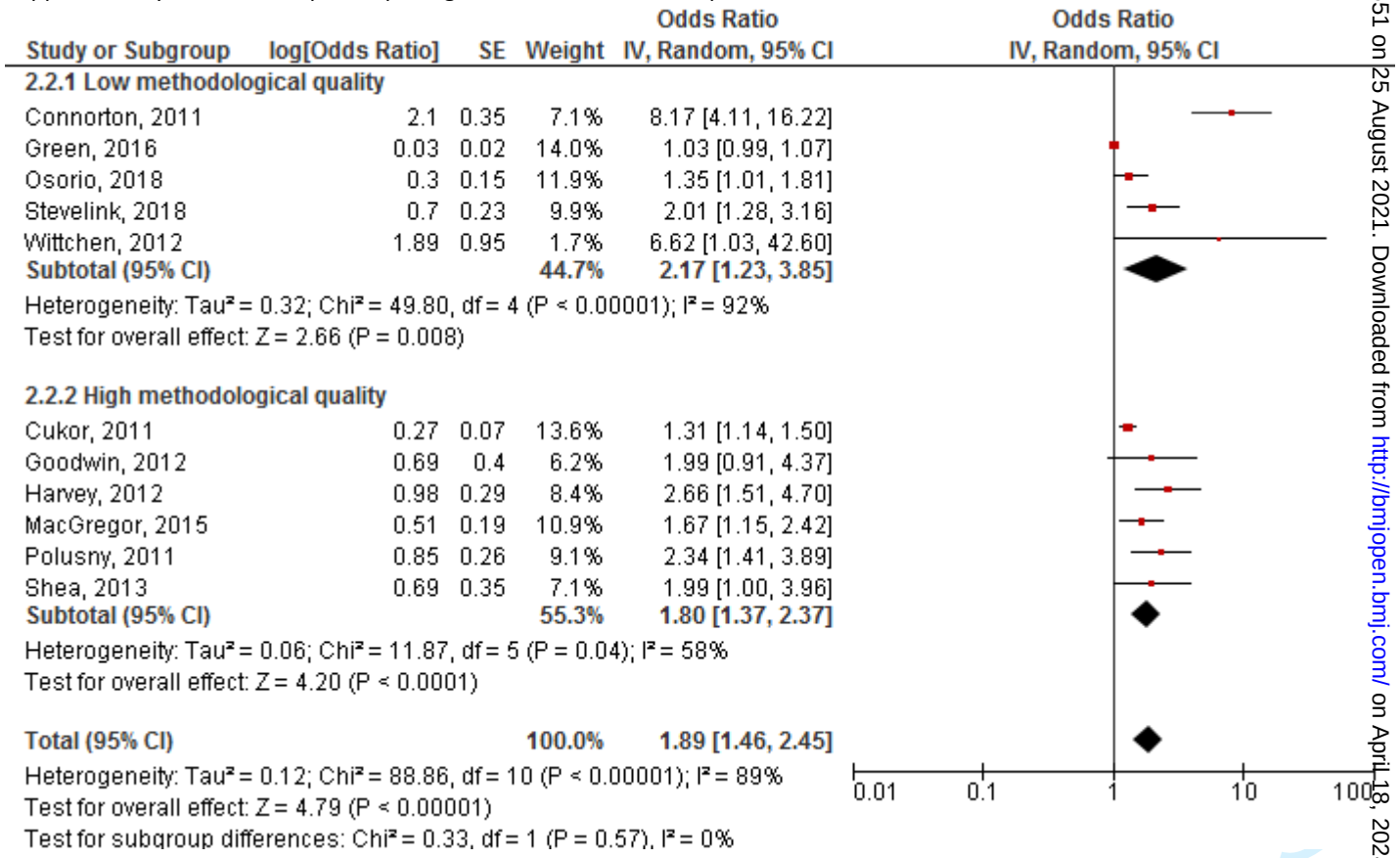
Supplementary file 6. Funnel plot, depicting the effect of combat exposure on PTSD.



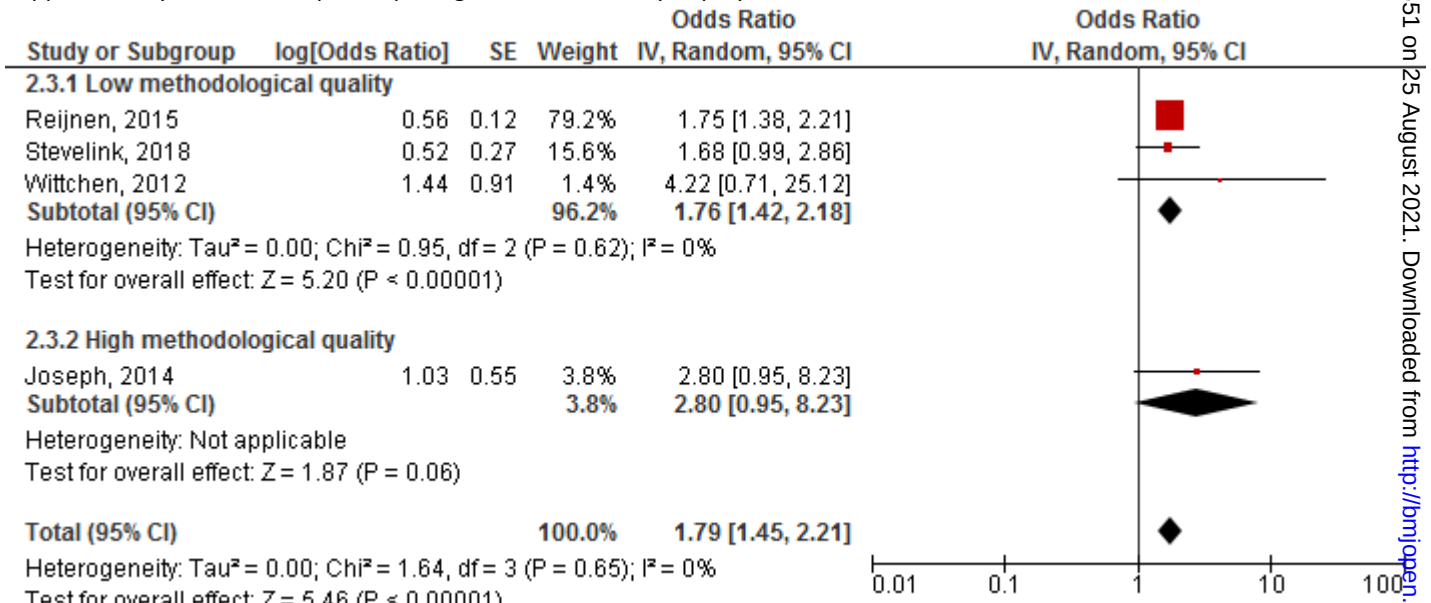
Supplementary file 7. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for risk of bias.



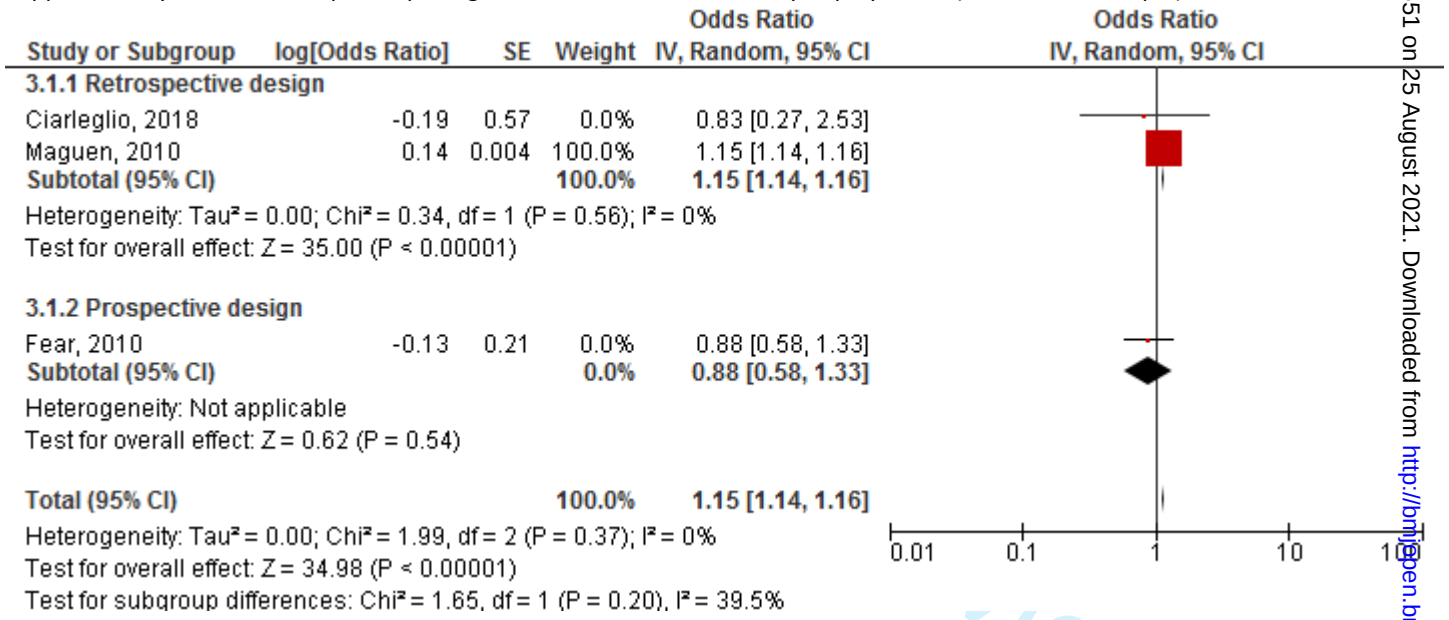
Supplementary file 8. Forest plot depicting the effect of combat exposure with PTSD, stratified for risk of bias.



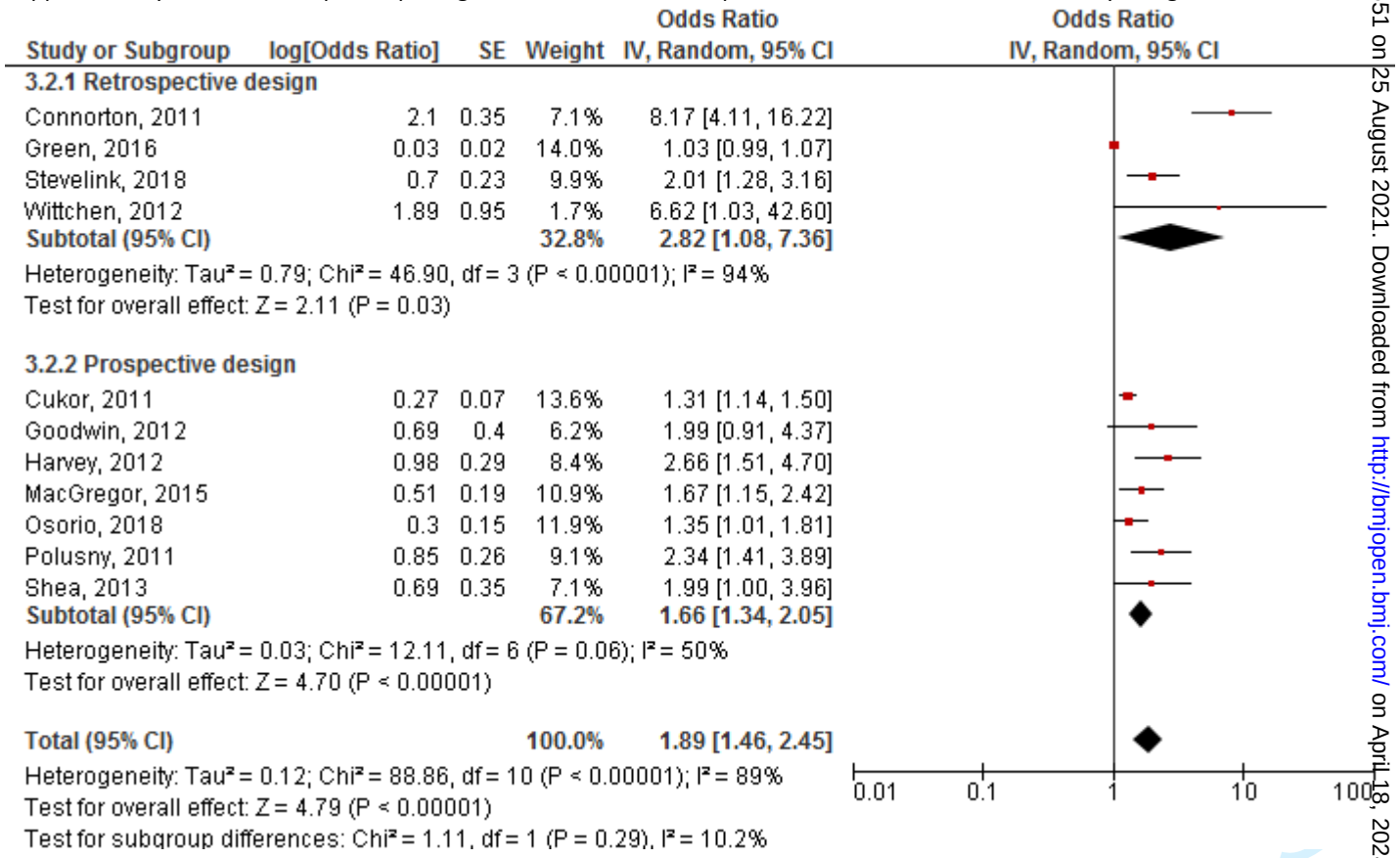
Supplementary file 9. Forest plot depicting the effect of army deployment with PTSD, stratified for risk of bias.



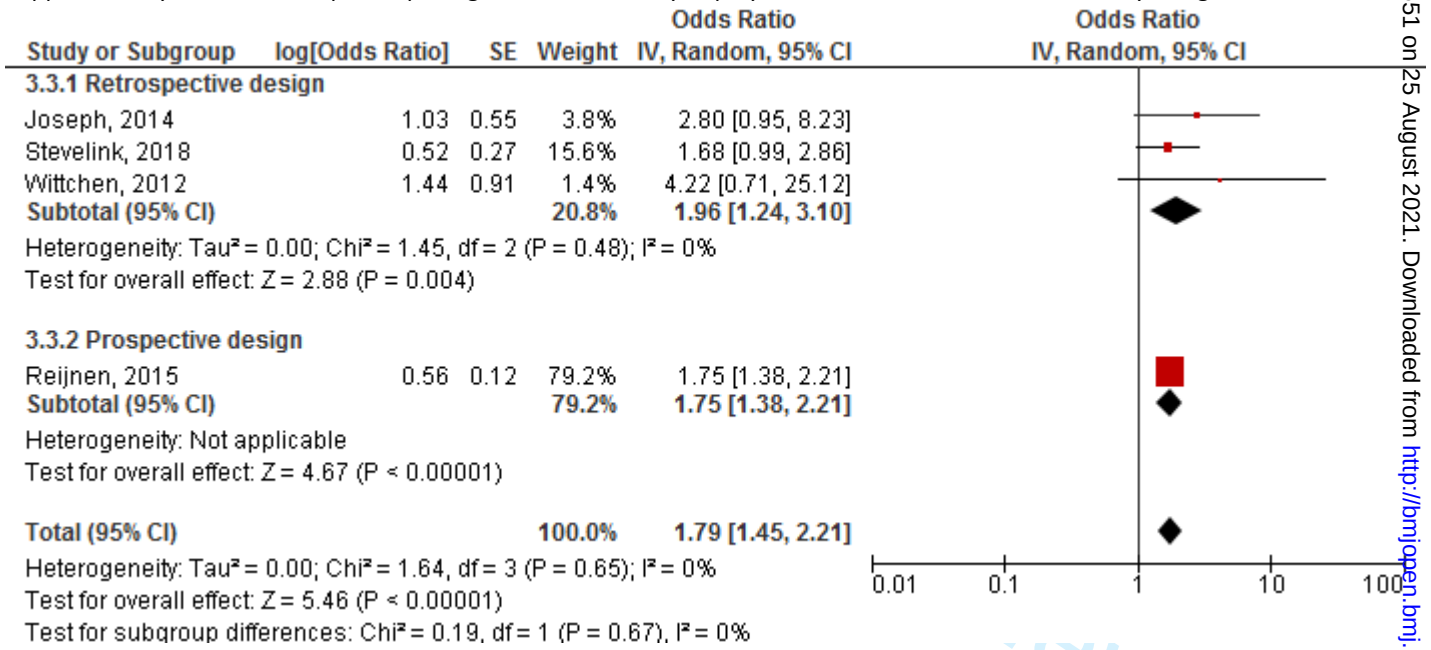
Supplementary file 10. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for study design.



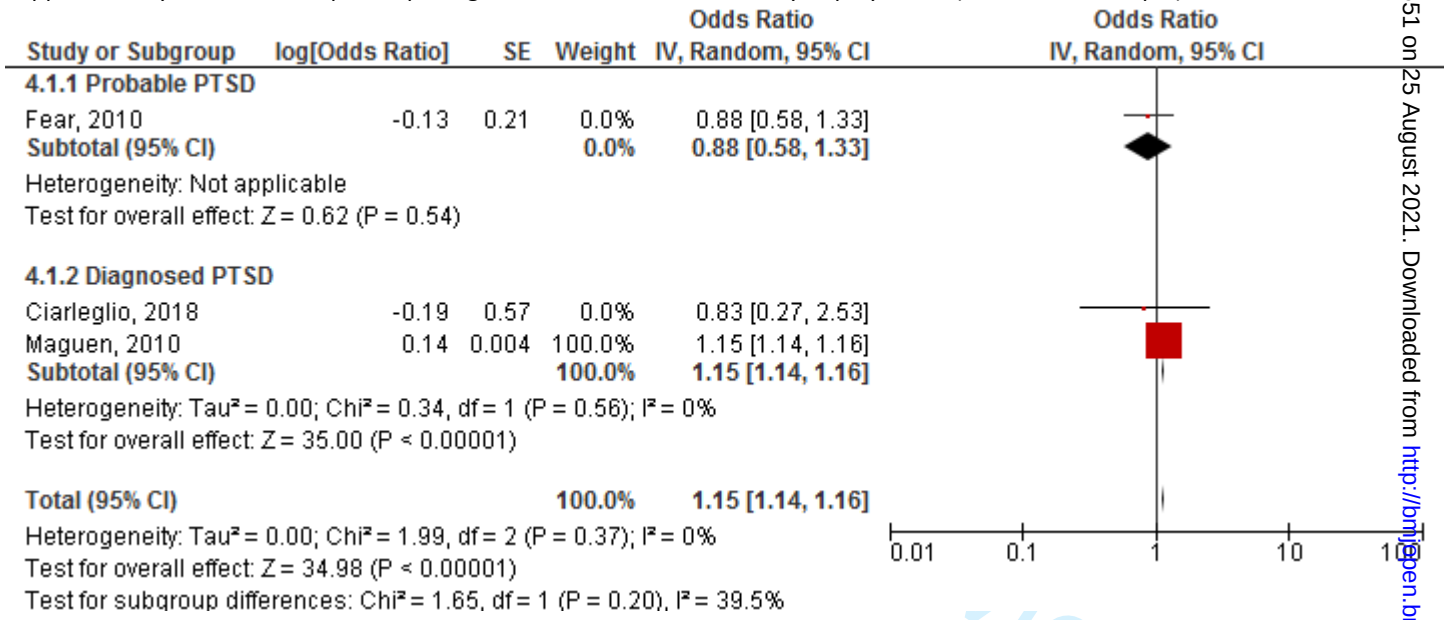
Supplementary file 11. Forest plot depicting the effect of combat exposure with PTSD, stratified for study design.



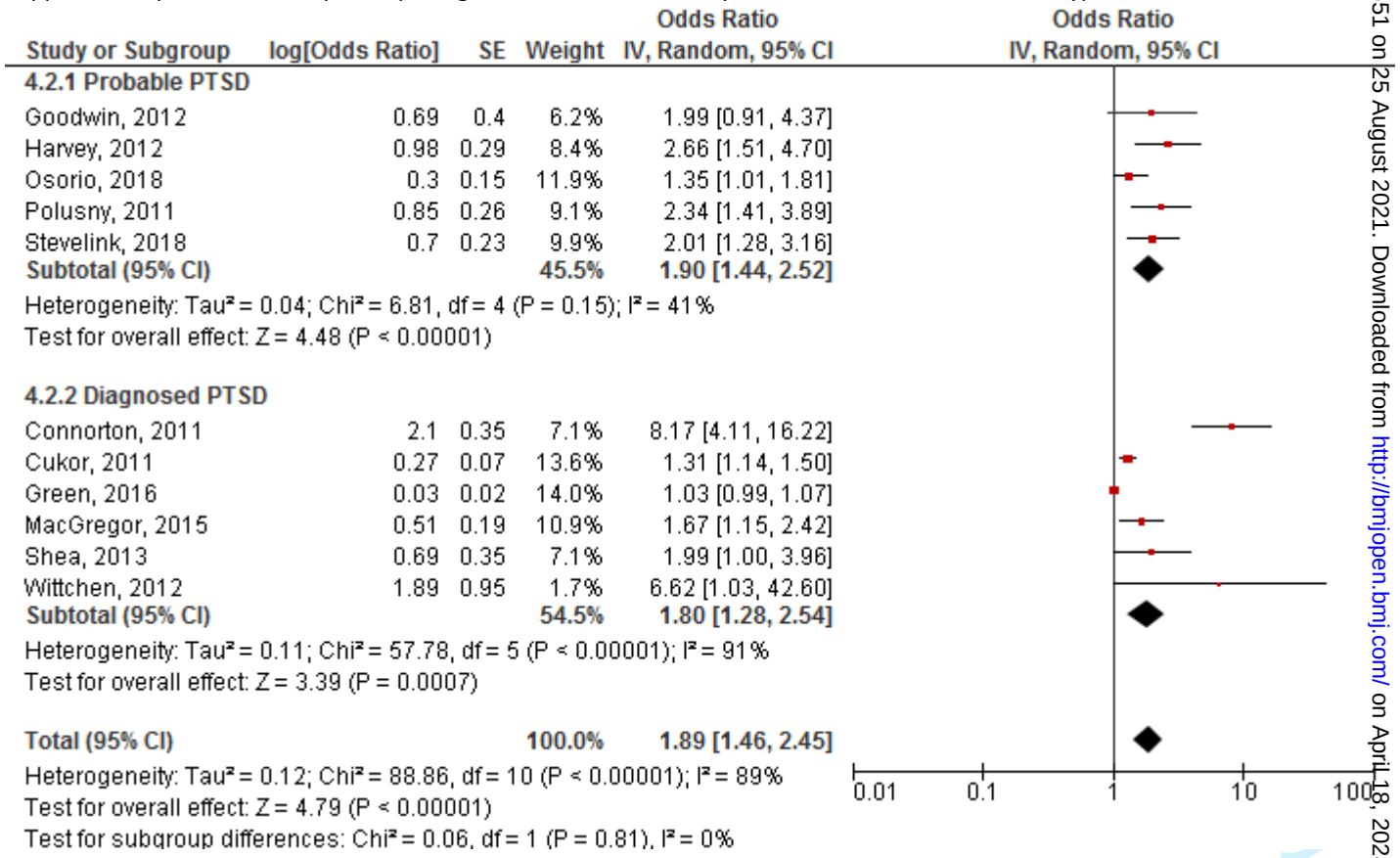
Supplementary file 12. Forest plot depicting the effect of army deployment with PTSD, stratified for study design.



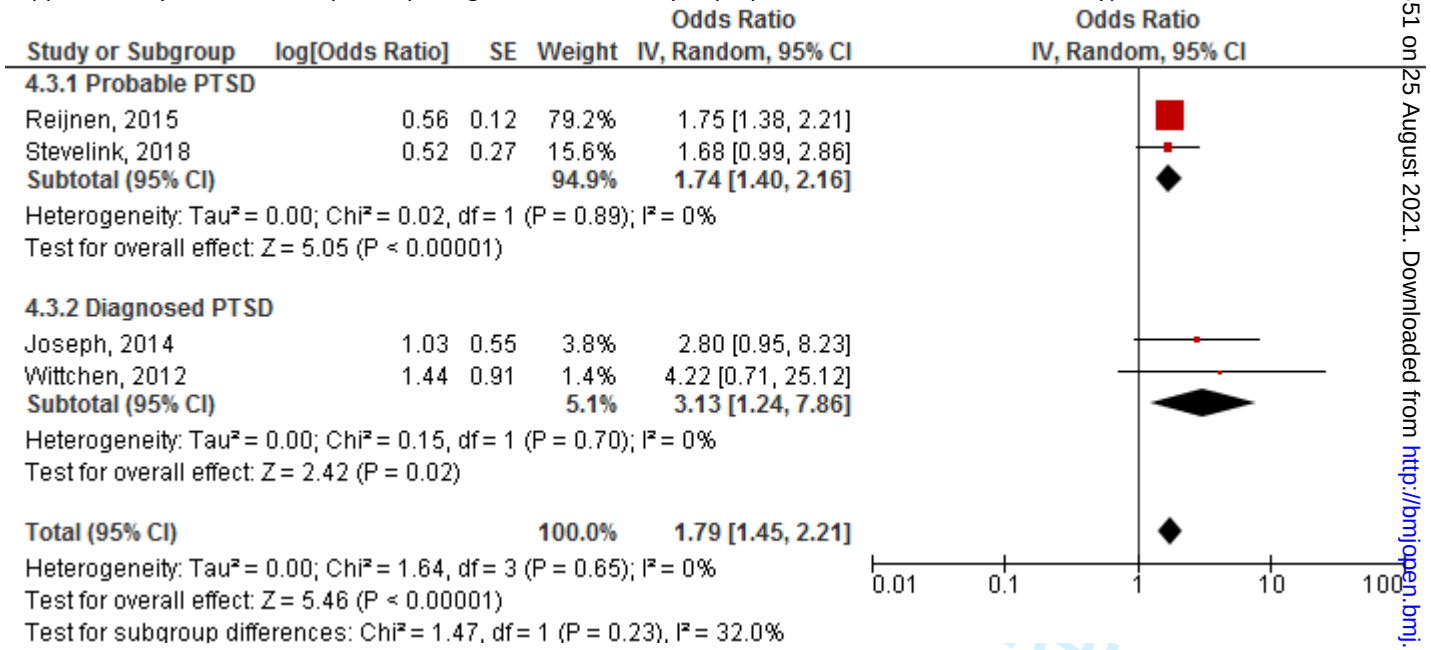
Supplementary file 13. Forest plot depicting the effect of number of army deployments (one versus multiple) with PTSD, stratified for type of PTSD ascertainment.



Supplementary file 14. Forest plot depicting the effect of combat exposure with PTSD, stratified for type of PTSD ascertainment.

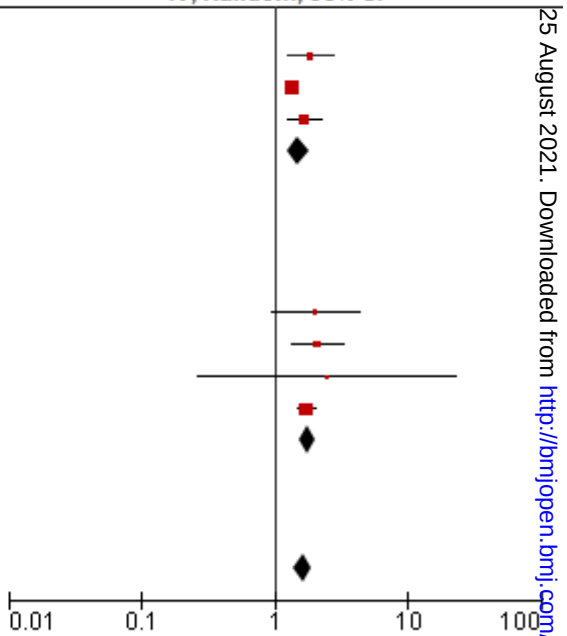


Supplementary file 15. Forest plot depicting the effect of army deployment with PTSD, stratified for type of PTSD ascertainment.

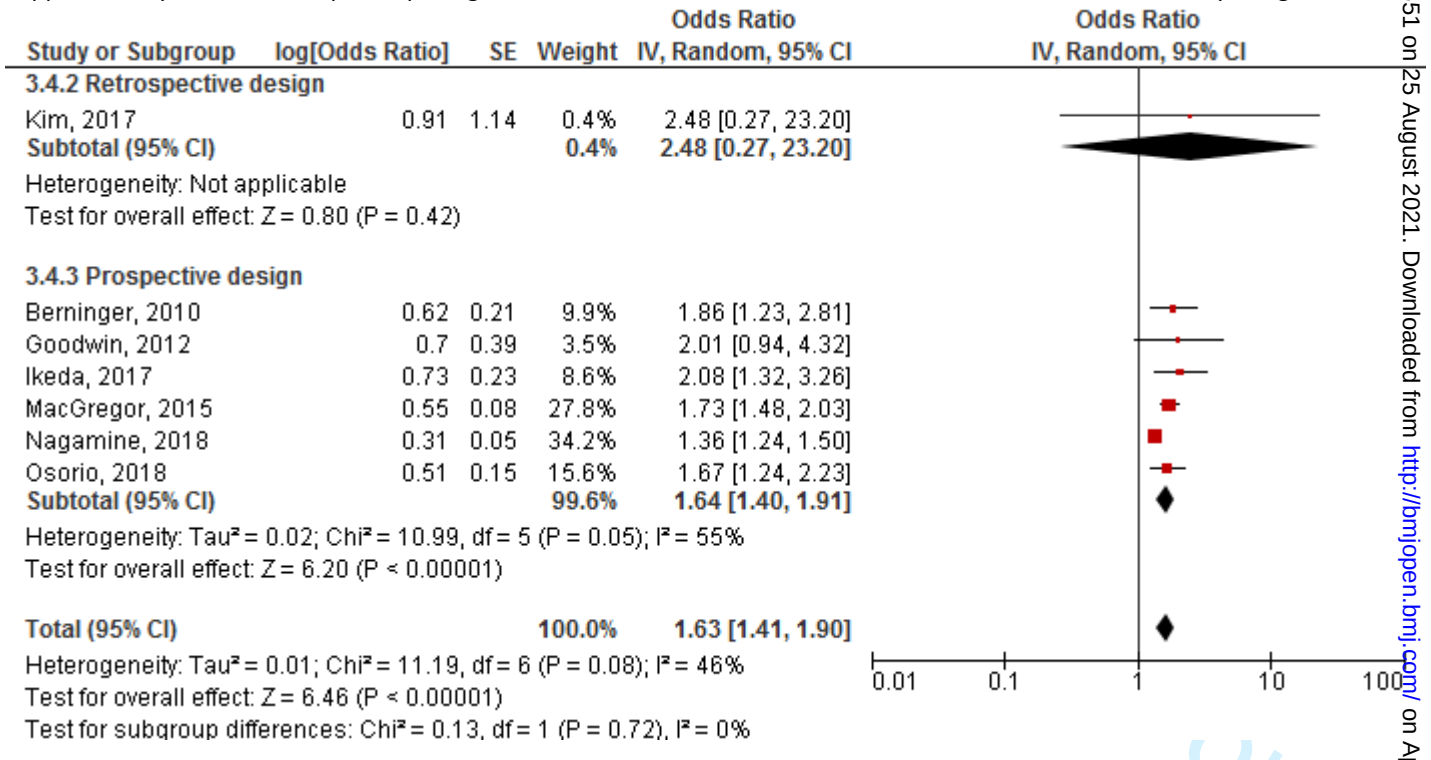


Supplementary file 16. Forest plot depicting the effect of confrontation with death with PTSD, stratified for risk of bias.

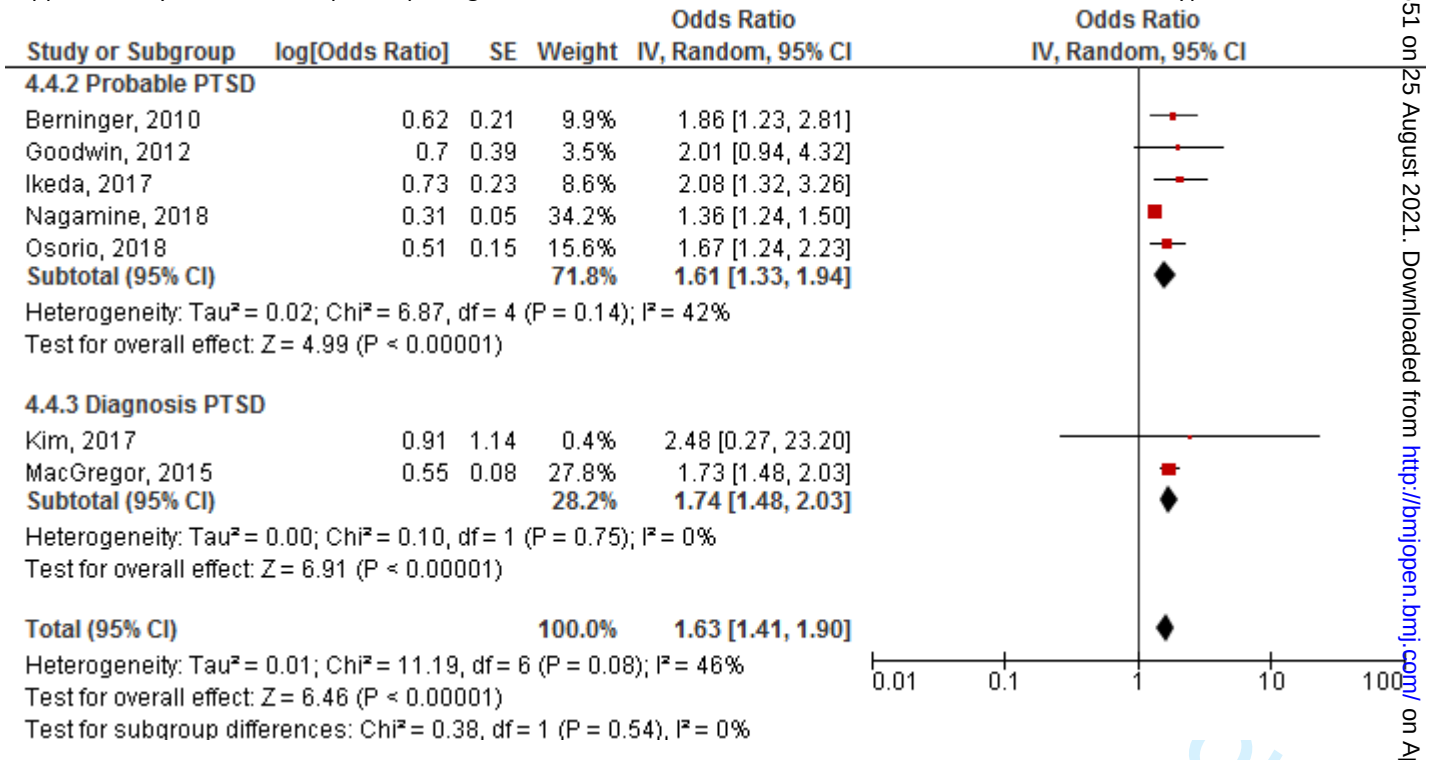
Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Random, 95% CI
2.4.2 Low methodological quality				
Berninger, 2010	0.62	0.21	9.9%	1.86 [1.23, 2.81]
Nagamine, 2018	0.31	0.05	34.2%	1.36 [1.24, 1.50]
Osorio, 2018	0.51	0.15	15.6%	1.67 [1.24, 2.23]
Subtotal (95% CI)			**59.7%**	**1.50 [1.25, 1.80]**
Heterogeneity: Tau² = 0.01; Chi² = 3.41, df = 2 (P = 0.18); I² = 41%				
Test for overall effect: Z = 4.40 (P < 0.0001)				
2.4.3 High methodological quality				
Goodwin, 2012	0.7	0.39	3.5%	2.01 [0.94, 4.32]
Ikeda, 2017	0.73	0.23	8.6%	2.08 [1.32, 3.26]
Kim, 2017	0.91	1.14	0.4%	2.48 [0.27, 23.20]
MacGregor, 2015	0.55	0.08	27.8%	1.73 [1.48, 2.03]
Subtotal (95% CI)			**40.3%**	**1.78 [1.54, 2.06]**
Heterogeneity: Tau² = 0.00; Chi² = 0.74, df = 3 (P = 0.86); I² = 0%				
Test for overall effect: Z = 7.78 (P < 0.00001)				
Total (95% CI)			**100.0%**	**1.63 [1.41, 1.90]**
Heterogeneity: Tau² = 0.01; Chi² = 11.19, df = 6 (P = 0.08); I² = 46%				
Test for overall effect: Z = 6.46 (P < 0.00001)				
Test for subgroup differences: Chi² = 2.01, df = 1 (P = 0.16), I² = 50.3%				



Supplementary file 17. Forest plot depicting the effect of confrontation with death with PTSD, stratified for study design.



Supplementary file 18. Forest plot depicting the effect of confrontation with death with PTSD, stratified for type of PTSD ascertainment.



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	4
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	5-6
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	7
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	7
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	7-9
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	7-9
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	7-9
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	7-9
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	10-11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	13

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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