

# The health of UK civilians deployed to Iraq

Nicola T. Fear<sup>1</sup>, Daniel Meek<sup>2</sup>, Paul Cawkill<sup>3</sup>, Norman Jones<sup>1</sup>, Neil Greenberg<sup>1</sup>, Simon Wessely<sup>1</sup>

1 Academic Department of Military Mental Health, King's College London, London, UK

2 South London and Maudsley NHS Foundation Trust, Denmark Hill, London, UK

3 Defence Science & Technology Laboratory (Dstl), Human Systems Group, MoD, Hants, UK

**Correspondence:** Daniel Meek, South London and Maudsley NHS Foundation Trust, Southwark and Central IPTT, Maudsley Hospital, Denmark Hill, London SE5 8AZ, UK, Tel: +7824393119, Fax: 0203 228 2514, e-mail: djmeek@doctors.org.uk

**Background:** Modern military operations have incorporated deployed civilians in a variety of roles (e.g. diplomats, private security staff). Many of these roles expose individuals to potentially dangerous or traumatic events. Evidence has shown that such exposures can cause psychological health problems in military personnel. It is likely that the same would be seen among civilians working in such environments. There is however limited research into the health of civilians deployed to war zones. This study compared health outcomes and related behaviours among UK regular and reserve Army personnel with UK civilian personnel deployed in direct support of the UK military in Iraq. **Methods:** The study sample comprised of 159 Ministry of Defence civilians, 1542 Army regulars and 408 Army reservists, all of whom served in non-combat roles. Data were gathered by questionnaires which asked about deployment experiences, lifestyle factors and health outcomes [i.e. post-traumatic stress disorder (PTSD), general health, multiple physical symptoms and alcohol use]. **Results:** Fewer deployed UK civilians smoked than regular Army personnel (adjusted OR 0.83 95% CI 0.70–0.98). UK civilians had better overall health and were less likely to report multiple physical symptoms compared with reservists (adjusted ORs 0.64 95% CI 0.44–0.93 and 0.60 95% CI 0.39–0.93, respectively). **Conclusions:** Overall, the psychological health of deployed civilians appears to be better than that of Army personnel deployed in non-combat roles. Civilians are also less likely to engage in some risky behaviours.

## Introduction

The UK Ministry of Defence (MoD) deploys civilian personnel in direct support of overseas military operations, in roles such as technicians, scientists, media and political advisors.<sup>1</sup> Some roles may involve exposure to potentially traumatic incidents. It is well known that such experiences can cause psychological health problems in military personnel.<sup>2–4</sup> While studies of journalists, diplomats and contractors have been conducted, few studies have examined the impact of deployment on civilians.<sup>5–8</sup>

War journalists have been found to have higher rates of alcohol misuse, post-traumatic stress disorder (PTSD), major depressive disorder and stress than non-war journalists.<sup>5</sup> Diplomats posted to Iraq or Afghanistan report statistically significantly higher levels of probable PTSD than diplomats who have never worked in Iraq or Afghanistan, or diplomats posted to environments with similar challenging employment conditions.<sup>6</sup> Private contractors, deployed to support military forces, have been shown to have similar if not worse mental health outcomes than military personnel, experiencing higher rates of depression, PTSD and alcohol misuse.<sup>7</sup> In USA, civilians can be deployed in a more integrated role than contractors, through the Department of Army Civilians arrangements (DAC).<sup>8</sup> As such DACs have less control over hours worked and may be exposed to more risky roles.<sup>9</sup> The majority of DACs deployed to Iraq and Afghanistan felt under threat during deployment and a significant number experienced such threats several times a month.<sup>8</sup> Those with higher rates of perceived life threatening events were shown to have more psychiatric symptoms and there were concerns this would result in long-term mental illness.<sup>8</sup>

For deployed US civilians, there appears to be a significant association between deployment and poorer psychological health; for deployed UK civilians however, there is a paucity of data. To investigate the psychological effect of deployment, data were collected from UK civilians deployed to Iraq in tandem with a larger survey

of the health and well-being of UK military personnel.<sup>3,4</sup> This article compares the socio-demographic and deployment characteristics, health behaviours and health outcomes of MoD civilians with UK Army combat service support personnel (non-combat roles) deployed to Iraq between 2003 and 2005 with the aim of gaining greater understanding of the health of UK civilians deployed to areas of conflict.

## Methods

### Participants

This study used data from the first phase of a cohort study of the health and wellbeing of UK military personnel in service at the time of the 2003 Iraq War (Operation TELIC—the codename for British operations in Iraq).<sup>3</sup> About 4722 regular and reserve personnel deployed on TELIC 1 (the initial war-fighting phase of the 2003 Iraq War from January to April 2003), and 5550 regular and reserve personnel not deployed on TELIC 1, completed a survey which explored military and deployment experiences, lifestyle factors and health outcomes.

A shorter non-military version of the questionnaire was mailed to 284 MoD civilians who deployed to Iraq between January 2003 and July 2005. The list of deployed civilians was generated by the MoD and made available to the research team.

### Measures used

#### Socio-demographic characteristics

Occupational social class was assigned to civilians based on their reported occupation on deployment using the Standard Occupational Classification.<sup>9–11</sup> For Army personnel rank was used to assign social class.<sup>12</sup>

## In-theatre characteristics

Participants were asked whether, during their deployment, they ever: thought they might be killed; saw personnel wounded or killed; handled bodies; gave aid to the wounded; came under small arms fire; came under mortar/artillery fire; experienced a landmine strike or experienced hostility from civilians.<sup>13</sup>

## Health behaviours

Alcohol consumption potentially harmful to health was defined as having a score of  $\geq 16$  on the 10-item Alcohol Use Disorders Identification Test (AUDIT).<sup>14,15</sup> Risky driving was defined as sometimes, seldom or never wearing a seatbelt; or driving >10 miles per hour (mph) above the limit [10 mph is equivalent to 16 kilometres per hour (kph)] in a built-up area, or >20 mph above the limit on a motorway (20 mph is equivalent to 32 kph). Questions on seatbelt usage and speeding were adapted from the study by Bell et al.<sup>16,17</sup> Smoking status was defined as current smoker, with responder answering yes or no.

## Health outcomes

The 12-item General Health Questionnaire (GHQ-12) was used to measure symptoms of common mental disorder over the past month.<sup>18,19</sup> The 17-item National Centre for Post-Traumatic Stress Disorder Checklist (PCL-C) was used to measure symptoms of PTSD.<sup>20</sup> General well-being was assessed using the general health-perception question of the 36-item Short Form health survey (SF-36).<sup>21,22</sup> The cut-off values for caseness on the mental health measures was a score of 4 or more for the GHQ-12; a score of 50 or more for the PCL-C and a self-description of one's health as *poor* or *fair* on the SF-36.<sup>3,18–21</sup> A checklist of 53 symptoms was used to report physical symptoms. A cut off of 18 or more symptoms represented caseness of multiple physical symptoms.<sup>3</sup>

## Sample

To maximize response rate, surveys were mailed out at least 3 times. About 159 out of 284 MoD civilians (56%) completed the survey and 5 (2%) declined to participate. About 120 MOD civilians (42%) did not respond. About 6603 (59%) Army personnel completed the questionnaire.<sup>3</sup> Deployed MoD civilians were compared separately to both deployed Army regular personnel and deployed Army reserve personnel. Only Army personnel who served in wholly non-combat roles [termed combat service support (CSS)] were included for comparison, as CSS roles more closely reflect the roles undertaken by MoD civilians. Army personnel deployed in these roles have responsibilities for general support of operations, with a primarily logistical or combat enabling function (e.g. engineers, military police and administrative personnel). We also excluded medical personnel from the current study as these individuals experience increased exposure to the injury or deaths of others.<sup>23,24</sup> These exclusions led to comparisons of 159 MoD civilians with 1542 regular and 408 reserve Army CSS personnel.

## Data analysis

Analyses were conducted in STATA 10 (Stata Corporation, College Station, TX). Test statistics were generated to examine socio-demographic differences (*t*-tests were used for continuous and  $\chi^2$ -tests for categorical data). Multivariable logistic regression analyses were performed to compare the demographic and in-theatre characteristics, health behaviours and health outcomes of deployed MoD civilians and Army CSS personnel. Odds ratios with 95% confidence intervals (CI), and two-sided *P* values were generated; statistical significance was defined as  $P < 0.05$ . Analyses were adjusted for phase of TELIC, age (in years), sex and educational status. Odds ratios were not generated for comparison of deployment likelihood of civilian vs. regulars or reserves as these

differences are known and reflect changes in operational mission and deployment policy.

## Results

Compared with regular Army CSS personnel, civilians were older, more likely to be female, to have attained higher educational qualifications and to be of a higher social class (table 1). Similar differences were observed between civilians and Army CSS reserve personnel. The roles MoD civilians had while deployed were primarily fire fighters, police officers, administrators, researchers and policy advisors (data not shown).

Of the MoD civilians, 20.1% deployed on TELIC 1, with the remaining 70.9% deploying on subsequent TELIC operations. About 77.7% of regulars and 82.1% of reservists deployed on TELIC 1, with the remaining 22.3% regulars and 17.9% reservists deploying on subsequent TELIC operations (table 2). Adjusting for demographic differences and for stage of TELIC deployment, civilians were more likely to report coming under mortar/artillery fire and less likely to report experiencing hostility from local civilians compared with Army regulars and reservists.

The prevalence of all health outcomes and risky behaviours were lower among MOD civilians than both Army regulars and reservists (table 3). Once socio-demographic differences were accounted for, only smoking remained statistically significantly lower among civilians compared with regulars (adjusted OR 0.83 95% CI 0.70–0.98); while poorer general health and multiple physical symptom levels were lower among civilians compared with reservists (adjusted ORs 0.64 95% CI 0.44–0.93 and 0.60 95% CI 0.39–0.93, respectively). Civilians reported fewer multiple physical symptoms compared with regulars (adjusted ORs 0.77 95% CI 0.59–1.00) and less heavy drinking than reservists (adjusted ORs 0.59 95% CI 0.34–1.01), however, these results are of borderline statistical significance. Adjustment for traumatic experiences had no notable effect on the results (data available from authors).

## Discussion

The main finding in this study is that for mental health outcomes there was no statistically significant difference between deployed MoD civilians and their armed forces counterparts. MoD civilians were though less likely to report having multiple physical symptoms and poor/fair general health compared with their reservist colleagues. MoD civilians were also less likely to be smokers than their regulars colleagues. MoD deployed civilians also reported differences in deployment experiences compared with their Army colleagues (regular and reserve), perceiving significantly higher levels of indirect fire and less hostility from local civilians.

### Comparison with other studies

Feinstein and colleagues work has demonstrated that war journalists have higher rates of psychiatric difficulties and are less likely to receive treatment than non-war journalists.<sup>5</sup> Journalists exposed to higher levels of work-related trauma (e.g. witnessing mass casualties, child abuse/cruelty, murder) have been shown to be significantly more likely to suffer higher levels of PTSD symptoms and trauma-related guilt cognitions than journalists exposed to lower levels of trauma.<sup>25</sup> Psychiatric morbidity was higher in war journalists than rates found in MoD civilians in this study, with 28.6% reporting PTSD and 21.4% reporting depression, although different measures of psychological symptoms were used.<sup>5</sup>

Rates of psychopathology among contractors appear to vary but generally they have been shown to have similar if not worse mental health outcomes than those in the military.<sup>7</sup> A study of 79 contractors working in war zones found 20.0% reached cut off for depression, 17.0% for high alcohol intake and 33.3% for PTSD. A different study in 2007 found that 24.0% of employees of a defence

**Table 1** Socio-demographic characteristics for MoD civilians, Army regulars and Army reserves [Means [and standard deviations (SD)], number (*n*<sup>a</sup>) [and percentage (%)] and test statistics (*t*-test or  $\chi^2$ ), degrees of freedom (df) and *P* values]

	Civilians ( <i>n</i> =159)	Regulars ( <i>n</i> =1542)	Reserves ( <i>n</i> =408)	Civilians vs. regulars	Civilians vs. reserves
	Mean (SD)	Mean (SD)	Mean (SD)	<i>t</i> -test statistic, df, <i>P</i> values	<i>t</i> -test statistic, df, <i>P</i> values
Age (years)	41.54 (8.61)	31.88 (6.98)	38.17 (6.97)	-16.14, 1697, <0.0001	-4.80, 563, <0.0001
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	$\chi^2$ statistic, df, <i>P</i> values	$\chi^2$ statistic, df, <i>P</i> values
Sex					
Male	124 (78.0)	1416 (91.8)	366 (89.7)	32.23, 1, <0.0001	13.39, 1, <0.0001
Female	35 (22.0)	126 (8.2)	42 (10.3)		
Marital status					
Married/co-habiting	118 (74.7)	1167 (76.0)	299 (73.8)	0.16, 2, 0.923	4.19, 2, 0.123
Single	29 (18.4)	272 (17.7)	57 (14.1)		
Divorced/separated/widowed	11 (7.0)	97 (6.3)	49 (12.1)		
Educational attainment					
No qualifications	12 (8.2)	130 (9.0)	42 (11.5)	114.98, 3, <0.0001	32.83, 3, <0.0001
O-levels or equivalent	38 (26.0)	705 (49.0)	148 (40.6)		
A-levels or equivalent	30 (20.6)	430 (29.9)	101 (27.7)		
Degree	66 (45.2)	174 (12.1)	74 (20.3)		
Social class					
I-II	86 (57.3)	213 (13.9)	45 (11.1)	183.10, 2, <0.0001	136.76, 2, <0.0001
III	64 (42.7)	1086 (71.0)	310 (76.4)		
IV	0 (0.0)	230 (15.0)	51 (12.6)		

<sup>a</sup>*n* may not add up to denominator due to missing data.

**Table 2** In-theatre characteristics for MoD civilians, Army regulars and Army reserves [Number (*n*—may not add up to denominator due to missing data); percentage (%); adjusted odds ratios (OR); 95% confidence intervals (CI)]

	Civilians ( <i>n</i> =159)	Regulars ( <i>n</i> =1542)	Reserves ( <i>n</i> =408)	Civilians vs. regulars	Civilians vs. reserves
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	Adjusted <sup>a</sup> OR (95% CI)	Adjusted <sup>a</sup> OR (95% CI)
Phase of TELIC					
TELIC 1	32 (20.1)	1198 (77.7)	335 (82.1)		
TELIC 2+	127 (79.9)	344 (22.3)	73 (17.9)		
Thought you might be killed	102 (64.6)	924 (60.4)	269 (67.1)	1.05 (0.91–1.21)	1.04 (0.79–1.35)
Saw personnel wounded or killed	51 (32.1)	600 (39.0)	158 (38.8)	1.05 (0.91–1.22)	1.02 (0.78–1.33)
Handled bodies	12 (7.6)	109 (7.1)	20 (4.9)	1.07 (0.83–1.39)	1.13 (0.68–1.86)
Gave aid to the wounded	15 (9.4)	153 (9.9)	35 (8.6)	1.10 (0.88–1.38)	0.84 (0.55–1.28)
Came under small arms fire	51 (32.1)	522 (33.9)	129 (31.7)	1.10 (0.95–1.27)	1.04 (0.79–1.37)
Came under mortar/artillery fire	118 (74.2)	830 (53.9)	246 (60.4)	1.47 (1.26–1.70)	1.90 (1.42–2.53)
Experienced a landmine strike	1 (0.6)	66 (4.3)	15 (3.7)	0.65 (0.32–1.29)	0.53 (0.17–1.67)
Experienced hostility from civilians	49 (30.8)	791 (51.4)	190 (46.7)	0.73 (0.63–0.85)	0.66 (0.51–0.87)

<sup>a</sup>Adjusted for phase of TELIC, age (in years), sex and educational status.

contractor showed signs of depression or PTSD.<sup>26,27</sup> Conversely a UK study of contractors demonstrated that while contractors are often exposed to stressors which can increase the risk of mental illness no clinically significant level of mental illness was detected and multiple protective factors (camaraderie, having a sense of personal strength, leave) were demonstrated.<sup>28</sup>

In a study on 660 private contractors conducted by the RAND corporation (Research and Development, a non-profit think tank that undertakes research on US armed forces) 25.0% met criteria for PTSD, 18.0% for depression and 50.0% for alcohol misuse.<sup>7</sup> While rates of depression were similar to MoD civilians in this study rates of alcohol misuse and PTSD were considerably higher, although again different tools were used.<sup>6</sup> The RAND study found that rates of psychiatric morbidity varied depending on country of origin and role, which was thought to be attributable to varying levels of combat exposure, deployment length and perceived preparedness. Even after taking this into account UK contractors in the RAND study demonstrated higher rates of PTSD (4–7%) and alcohol abuse (10.0%) than MoD civilians.<sup>7</sup> Rates of poor physical health were similar between contractors and MoD civilians, with 11.0% of contractors rating their health as fair/poor, although 16.0% of UK contractors reported physical health problems attributed to deployment compared with 9.5% of MoD civilians.<sup>7</sup>

While there was no significant difference between civilians and military personal reporting they thought they were going to die, MoD civilians were more likely to report coming under indirect fire than their Armed Forces colleagues. It is, however, unlikely that civilians experienced more indirect fire than their Army colleagues. This result is likely to be due to recall bias as civilians who are unfamiliar with deployment and combat are more likely to report exposure and less likely to be able to make an objective assessment of danger than their regular and reserve colleagues.<sup>29</sup> Reservists have been shown to report more traumatic experiences on deployment than their regular counterparts, likely for the same reason.<sup>29</sup> Similar high levels of subjective perception of threat were demonstrated in a study of 404 US DACs deployed to Afghanistan or Iraq, with over 2/3 experiencing a sense of threat during deployment and over 1/3 feeling their life was threatened at least a few times a month.<sup>8</sup>

In this study, reservists were more likely than civilians to report fair/poor health and to report more physical symptoms. Research shows that reservists who deployed on TELIC operations reported more ill-health than their regular counterparts.<sup>29</sup> This has been attributed to their perceived higher exposure to traumatic experiences and difficulties on returning from deployment.<sup>29</sup> In regards to preparation and support for deployment civilians mobilised in this

**Table 3** Health behaviours and health outcomes for MoD civilians, Army regulars and Army reserves [number (*n*—may not add up to denominator due to missing data); percentage (%); adjusted odds ratios (OR); 95% confidence intervals (CI)]

	Civilians ( <i>n</i> =159)	Regulars ( <i>n</i> =1542)	Reserves ( <i>n</i> =408)	Civilians vs. regulars	Civilians vs. reserves
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	Adjusted <sup>a</sup> OR (95% CI)	Adjusted <sup>a</sup> OR (95% CI)
<b>Health behaviours</b>					
Current smoker	28 (18.0)	547 (35.8)	102 (25.3)	0.83 (0.70–0.98)	0.90 (0.66–1.23)
Heavy drinker	6 (3.9)	263 (17.2)	50 (12.5)	0.85 (0.61–1.17)	0.59 (0.34–1.01)
Risky driver	11 (7.0)	348 (23.4)	68 (17.3)	0.87 (0.69–1.10)	0.75 (0.50–1.12)
<b>Health outcomes</b>					
GHQ case	29 (18.5)	284 (18.6)	95 (23.5)	1.04 (0.87–1.24)	0.82 (0.60–1.12)
PCL case	3 (1.9)	56 (3.7)	26 (6.5)	1.07 (0.68–1.68)	0.58 (0.29–1.16)
Poor/fair general health	15 (9.5)	192 (12.6)	77 (19.0)	0.89 (0.71–1.10)	0.64 (0.44–0.93)
Multiple physical symptoms	9 (5.7)	189 (12.3)	61 (15.0)	0.77 (0.59–1.00)	0.60 (0.39–0.93)

<sup>a</sup>Adjusted for phase of TELIC, age (in years), sex and educational status.

study had the same pre-operation briefings and preparation as reservists and also had a dedicated doctor who could see them when they de-mobilised. While on deployment Civilians also had access to a Field Mental Health Team. At the time of this study civilians were not offered decompression but this has subsequently been implemented.

### Strengths and limitations

Data from civilians were collected concurrently with the military data collection. Use of similar questionnaire measures allowed direct comparisons to be made. The response rate of 56% among civilian participants is similar to that achieved among Army personnel (59%). The small number of civilians studied meant that some comparisons performed may be inadequately powered to detect significant differences. All data analysed in this study were derived from self-reported questionnaires, often completed sometime after deployment which raises the possibility of recall bias.<sup>30</sup>

### Conclusion

This study investigated the health of UK civilians deployed in the Iraq War and compared them to Army Combat Service Support personnel. The psychological health of deployed civilians appears to be, in general, relatively similar to that of Army personnel in non-combat roles. However, MoD civilians were less likely to report having multiple physical symptoms and poor/fair general health than reservists and were less likely than regular Army CSS personnel to be smokers. The UK Armed Forces are currently undergoing changes in line with Future Force 2020.<sup>31</sup> MoD civilians and contractors are a recognised and integral part of the Whole Force.<sup>31</sup> They are likely to have an increasing role in future UK deployments and operations overseas. This article highlights the health and wellbeing of deployed civilians to date and further research is necessary to monitor this as the Armed Forces undergo further changes.

### Acknowledgements

We thank the UK MoD for their cooperation in this study; and in particular, the Surgeon General's Department, Defence Statistics, the single Services, the Armed Forces Personnel Administration Agency and the Veterans Policy Unit.

### Funding

This work was supported by the UK MoD (grant number R&T/1/0078). The funders had no input into the analysis, the results, or the interpretation of the results. S.W. is partially funded by the South London and Maudsley NHS Foundation Trust/Institute of

Psychiatry, Psychology and Neuroscience National Institute of Health Research (NIHR) Biomedical Research Centre.

### Conflicts of interest

S.W. is Honorary Civilian Advisor in Psychiatry to the British Army (unpaid) and a Trustee of the charity, Combat Stress. N.J. is a full-time reserve member of Defence Medical Services seconded to King's College London; although paid by the MoD, he was not directed in any way by the MoD in relation to this article. P.C. is a member of Dstl, and was formerly seconded to King's College London on a part-time basis. All other authors declare they have no conflicts of interest.

### Key points

- Deployed civilians have similar health outcomes to non-combat Army personnel and better outcomes than reservists.
- Deployed civilians are more likely to have healthier lifestyle habits than armed forces personnel.
- With reductions in regular armed forces personnel there will be an increasing role for civilian and reservists deployment. This article highlights the health and wellbeing of deployed civilians to date.

### References

- 1 Gov.uk. Working for SU. Opportunities to work with the Stabilisation Unit. Available at: <https://MoD.gov.uk/government/organisations/stabilisation-unit/about/recruitment> 2015 (23 March 2015, date last accessed)
- 2 Tanielian T, Jaycox LH. Invisible Wounds of War Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery [pdf] RAND Corporation. Available at: [http://MoD.rand.org/content/dam/rand/pubs/monographs/2008/RAND\\_MG720.pdf](http://MoD.rand.org/content/dam/rand/pubs/monographs/2008/RAND_MG720.pdf) (7 March 2015, date last accessed)
- 3 Hotopf M, Hull L, Fear NT, Browne T. The health of UK military personnel who deployed to the 2003 Iraq war: a cohort study. *Lancet* 2006;367:1731–41.
- 4 Fear NT, Jones M, Murphy D, et al. What are the consequences of deployment to Iraq and Afghanistan on the mental health of the UK armed forces? A cohort study. *Lancet* 2010;375:1695–709.
- 5 Feinstein A, Owen J, Blair NA. A hazardous profession: war, journalists, and psychopathology. *Am J Psychiatry* 2002;159:1570–5.
- 6 Hibberd J, Greenberg N. Coping with the impact of working in a conflict zone: a comparative study of diplomatic staff. *J Occup Environ Med* 2011;53:352–7.
- 7 Dunigan M, Farmer CM, Burns RM, et al. Out of the Shadows The Health and Well-Being of Private Contractors Working in Conflict Environments 2013 [pdf]

- RAND Corporation. Available at: [http://MoD.rand.org/pubs/research\\_reports/RR420.html](http://MoD.rand.org/pubs/research_reports/RR420.html) (20 September 2014, date last accessed)
- 8 Bierman A, Kely R. The threat of war and psychological distress among civilians working in Iraq and Afghanistan. *Soc Psychol Q* 2014;77:27–53.
  - 9 Surveys Office for Population Censuses and (1990) Standard Occupational Classification, vol. 1 (ed. Office for Population Censuses and Surveys). London: HMSO.
  - 10 Surveys Office for Population Censuses and (1990) Standard Occupational Classification, vol. 2 (ed. Office for Population Censuses and Surveys). London: HMSO.
  - 11 Surveys Office for Population Censuses and (1990) Standard Occupational Classification, vol. 3 (ed. Office for Population Censuses and Surveys). London: HMSO.
  - 12 Yoong SY, Miles D, McKinney P, et al. A method of assigning socio-economic status classification to British Armed Forces personnel. *J R Army Med Corps* 1999;145:140–2.
  - 13 Iversen AC, Fear NT, Ehlers A, et al. Risk factors for post-traumatic stress disorders among Armed Forces personnel. *Psychol Med* 2008;38:511–22.
  - 14 Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro M. *AUDIT: The Alcohol Use Disorders Identification Test. Guidelines for Use in Primary Care*. Geneva, World Health Organisation Switzerland, 2001.
  - 15 Fear NT, Iversen A, Meltzer H, et al. Patterns of drinking in the UK Armed Forces. *Addiction* 2007;102:1749–59.
  - 16 Bell NS, Amoroso PJ, Yore MM, et al. Self-reported risk-taking behaviours and hospitalization for motor vehicle injury among active duty army personnel. *Am J Prevent Med* 2000;18:85–95.
  - 17 Fear NT, Iversen AC, Chatterjee A, et al. Risky driving among regular armed forces personnel from the United Kingdom. *Am J Prevent Med* 2008;35:230–6.
  - 18 Goldberg D, Williams P. *A Users' Guide to the General Health Questionnaire*. Windsor: NFER-Nelson, 1988.
  - 19 Goldberg DP, Gater R, Sartorius N, et al. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med* 1997;27:191–7.
  - 20 Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA. Psychometric properties of the PTSD checklist (PCL). *Behav Res Ther* 1996;34:669–73.
  - 21 McHorney CA, Ware JE, Raczek AE. The MOS 36-Item Short-Form Health Survey (SF-36). Psychometric and clinical-tests of validity in measuring physical and mental-health constructs. *Med Care* 1993;31:247–63.
  - 22 Ware JE, Sherbourne CD. The MOS 36-Item Short-Form Health Survey (SF-36). Conceptual-framework and item selection. *Med Care* 1992;30:473–83.
  - 23 Carson MA, Paulus LA, Lasko NB, et al. Psychophysiological assessment of posttraumatic stress disorder in Vietnam nurse veterans who witnessed injury or death. *J Consult Clin Psychol* 2000;68:890–7.
  - 24 Jones M, Fear NT, Greenberg N, et al. Do medical services personnel who deployed to the Iraq war have worse mental health than other deployed personnel? *Eur J Public Health* 2008;18:422–42.
  - 25 Browne T, Evangeli M, Greenberg N. Trauma-related guilt and posttraumatic stress among journalists. *J Trauma Stress* 2012;25:207–10.
  - 26 Feinstein A, Botes M. The psychological health of contractors working in war zones. *J Trauma Stress* 2009;22:102–5.
  - 27 Miller M. The other victims of battlefield stress; Defense contractors' mental health neglected. Available at: [MoD.propublica.org/article/injured-contractors-the-other-victims-of-battlefield-stress-224](http://MoD.propublica.org/article/injured-contractors-the-other-victims-of-battlefield-stress-224) 2010 (2 February 2015, date last accessed).
  - 28 Messenger K, Farquharson L, Stallworthy P, et al. The experiences of security industry contractors working in Iraq: an interpretative phenomenological analysis. *J Environ Occup Med* 2012;54:859–67.
  - 29 Browne T, Hull L, Oded MOD, et al. Explanations for the increase in mental health problems in UK reserve forces who have served in Iraq. *Br J Psychiatry* 2007;190:484–9.
  - 30 Raphael K. Recall bias: a proposal for assessment and control. *Int J Epidemiol* 1987;16:167–70.
  - 31 Gov.uk. Reserves in the Future Force 2020: Valuable and Valued. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/210470/Cm8655-web\\_FINAL.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/210470/Cm8655-web_FINAL.pdf) (4 October 2015, date last accessed)