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# Suicide among male regular UK Armed Forces personnel, 1984–2007

N T Fear,<sup>1</sup> V R Ward,<sup>2</sup> K Harrison,<sup>2</sup> L Davison,<sup>2</sup> S Williamson,<sup>2</sup> N F Blatchley<sup>2</sup>

<sup>1</sup> Academic Centre for Defence Mental Health, Institute of Psychiatry, King's College London, London, UK; <sup>2</sup> Defence Analytical Services Agency (DASA) (Health), Bath, UK

Correspondence to: Nicola Fear, Academic Centre for Defence Mental Health, Institute of Psychiatry, King's College London, Weston Education Centre, Cutcombe Road, London SE5 9RJ, UK; nicola.fear@iop.kcl.ac.uk

## Statement of independence:

This work was carried out under the protocols of the Government Statistical Service as a National Statistics Publication. National Statistics are produced to high professional standards set out in the National Statistics Code of Practice ([http://www.statistics.gov.uk/about/national\\_statistics/cop/downloads/StatementFRD.pdf](http://www.statistics.gov.uk/about/national_statistics/cop/downloads/StatementFRD.pdf)). They undergo regular quality assurance reviews. They are produced free from political influence. The views expressed here are those of the authors and not necessarily the UK Ministry of Defence.

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## ABSTRACT

**Objective:** To examine the number of suicide and open verdict deaths in the regular UK Armed Forces and to make comparisons with the UK general population.

**Methods:** Age and calendar year-adjusted standardised mortality ratios (SMRs) and 95% CI were calculated to compare the number of suicides among the UK Armed Forces with the general population of the UK.

**Results:** Between 1984 and 2007, there were 694 suicide and open verdict deaths among male UK Armed Forces personnel. The UK Armed Forces had statistically significantly fewer suicides than expected compared with the UK general population (SMR = 58, 95% CI 54 to 63, based on 694 deaths). This was evident for each of the three Services (Naval Service, Army and Royal Air Force). For each age group, the number of suicides in each Service was lower than the number expected based on UK general population rates, except for Army males under 20 years of age, where there were 1.5 times more deaths than expected (SMR = 150, 95% CI 118 to 190, based on 68 deaths).

**Conclusion:** The UK Armed Forces are subject to a number of unique occupational stressors, so it is reassuring that they experience lower than expected numbers of suicides in comparison with the UK general population. This is true for each Service and all age groups except young Army males.

Suicide among UK Armed Forces personnel has been the subject of much public and media interest, scrutiny by Parliament and in-depth inquiries sponsored by the UK Ministry of Defence. This has resulted in the publication of approximately 20 different reports (eg, The Deepcut Review<sup>1</sup> and the House of Commons Defence Committee Report on Duty of Care<sup>2</sup>).

Three publications, based on routinely collected death certification data, have shown that the UK Armed Forces had similar rates of suicide to the general population, after taking age and gender into account.<sup>3–5</sup> However, as UK death certificates code any type of military occupation and branch of Service (eg, Naval Service, Army, Royal Air Force (RAF)) as “Armed Forces”, no analyses by Service branch have been undertaken.

This article examines all the suicide and open verdict deaths among UK regular male Armed Forces personnel between 1984 and 2007 and makes comparisons with the UK general population. Each Service is considered separately and age-specific results are presented. Suicide rates among the UK Armed Forces have been published before by the Defence Analytical Services Agency (DASA).<sup>6–12</sup>

## METHODS

### Definition of suicide

The Office for National Statistics (ONS) presents data for coroner-confirmed (or Procurator Fiscal for Scotland) suicides and open verdicts combined,<sup>13</sup> as open verdicts are “...likely to be deaths where harm was self-inflicted but there was insufficient evidence to prove that the deceased deliberately intended to kill themselves”.<sup>14</sup> Throughout this article, the term “suicide” is used to denote suicide and open verdict deaths combined.

In accordance with the ONS, the following International Classification of Disease (ICD) codes were used: E950–E959 and E980–E989 from ICD-9,<sup>15</sup> and X60–X84 and Y10–Y34 from ICD-10.<sup>16</sup>

### UK regular Armed Forces

#### Population data

Annual population data, for the period 1984–2007, were obtained for the UK regular Armed Forces from DASA.

#### Death data

DASA Health is notified of all deaths that occur among regular Service personnel. For all these deaths DASA then obtains cause of death information from casualty notification signals, Boards of Inquiry, the ONS, coroners (for deaths occurring in England, Wales and Northern Ireland) and the Procurator Fiscal (for deaths occurring in Scotland).

For the purposes of this study, all deaths occurring between 1984 and 2007 that were notified to DASA Health as suicides were extracted from DASA's deaths database. Deaths for which an inquest had yet to be completed were also noted.

### UK general population

Data on the age and gender composition of the UK population and the number of suicides broken down by age, gender and calendar year were obtained from the ONS, the General Register Office for Scotland and the Northern Ireland Statistics and Research Agency for 1984–2006. Population data for 2007 were extrapolated from 2006 figures.

### Statistical methods

The current study was restricted to males aged 16–59 years, as there were no suicides among older personnel and only a small number of suicides among females (n = 18).

To enable comparisons with the UK general population, standardised mortality ratios (SMRs) adjusted for calendar year (1984, 1985, ..., 2007) and age group (16–19, 20–24, 25–29, ..., 50–59

years old) were calculated.<sup>17</sup> SMRs were calculated overall and by Service (Naval Service, Army and RAF) and age group (<20, 20–24, ..., 45–49, 50+). Furthermore, to aid in the interpretation of the results, SMRs were calculated by 5-year time period and single years of age for Army males aged 16–24 years for 1986–2007 only, as data for the size of the UK Armed Forces by single year of age for 1984–1985 were unavailable.

For each SMR, 95% CIs were derived directly from the Poisson distribution<sup>18</sup> except where the number of observed events was more than 30 when they were calculated based on the Normal approximation.

## RESULTS

Overall, during the 24-year period, 1984–2007, 712 Service personnel committed suicide, of which 694 were male. Of the 694 male suicides, 51 (7%) occurred among officers, who formed 12% of the overall strength during this period.

Table 1 shows that, overall, males in the UK Armed Forces had statistically significantly fewer suicides than expected compared with the UK general population (SMR = 58, 95% CI 54 to 63, based on 694 deaths). This was evident for each of the three Services.

Table 1 also shows SMRs below 100 for each age group in the Naval Service and the RAF, implying that there were fewer suicides than expected within each age group. This was also seen in the Army, except among Army males aged under 20 years, where there were 1.5 times more suicides than expected.

Table 2 presents the SMRs by 5-year time period for those aged under 20 and 20–24 years. SMRs for both age groups increased from 1984–1988 to peak during 1994–1998, after which they fell. This pattern has been maintained in the most recent 5-year period (2003–2007).

Table 3 provides details on the number of observed and expected suicides by single year of age for Army males aged 16–24 years. These analyses show that more suicides were observed than expected among those aged 17, 18, 19 and 20 years. With the exclusion of those aged 16 years, there is a significant inverse trend between SMR and age ( $p < 0.0001$ ).

The inclusion of deaths for which a verdict is awaited did not have a noticeable effect on the results presented here (data not shown).

## DISCUSSION

### Principal findings

This paper presents SMRs to allow comparisons to be made between the UK Armed Forces and the UK general population. There are two principal findings:

- ▶ Overall, for the 24-year period 1984–2007, the UK Armed Forces had statistically significantly fewer suicides than expected.
- ▶ The Army had statistically significantly more suicides than expected among those under 20 years of age. During the 22-year period, 1986–2007, for those aged 16–24 years, there was a statistically significant inverse trend between SMR and age.

### Comparison with other studies

Other studies using UK death certification data to identify cases have shown that the UK Armed Forces have similar rates of suicide to the general population.<sup>3–5</sup> However, these studies would not have been able to identify all suicides among UK Armed Forces personnel and did not examine Service or age-specific data. Other nations have made similar comparisons and these studies have also shown lower rates of suicide in the military compared with the general population, with increased rates among young military men.<sup>19 20</sup>

### Explanations for findings

The low SMRs may be partially explained by the “healthy worker effect”, which is often observed in occupational studies. This is when “workers” exhibit lower mortality or morbidity rates than the general population because certain groups of people are excluded from employment, particularly those who are ill or disabled.<sup>21</sup> This would be expected in studies of the Armed Forces since they are, in general, a highly selected group of individuals who are likely to have higher than usual levels of fitness and possibly lower levels of ill health. Furthermore, the Services are reputed to display strong group loyalty, bonding and mutual dependence. This may reduce the risk of suicide among Service personnel. The effect of bonding and comradeship may build up over time, thus accounting for the steadily declining trend seen in the SMRs with each increase in year of age among 17 to 24 year olds and the low SMRs in the older age groups. However, it is not known what happens to those who leave the UK Armed Forces early. This is currently being investigated using data from the National Confidential Inquiry into Suicide and Homicide by People with Mental Illness (<http://www.national-confidential-inquiry.ac.uk>).

The finding that young Army males (those aged <20 years) have significantly more suicides than expected appears to run contrary to these explanations. Due to small numbers and the limited availability of other data, it is not possible, at present, to determine why young Army males appear to be at an increased risk. The role of differential selection procedures across the

**Table 1** Number of suicides (No), standardised mortality ratio\* (SMR) and 95% CI by Service and age group, 1984–2007

Age group (years)	Total		Service									
			Naval Service†			Army			RAF			
	No	SMR	95% CI	No	SMR	95% CI	No	SMR	95% CI	No	SMR	95% CI
<20	81	124	100 to 155	7	63	25 to 129	68	150	118 to 190	6	69	25 to 150
20–24	214	71	62 to 81	29	48	32 to 70	153	87	75 to 102	32	47	34 to 67
25–29	147	52	44 to 61	23	39	25 to 59	83	57	46 to 70	41	52	38 to 70
30–34	104	49	40 to 59	22	46	29 to 69	50	49	37 to 65	32	50	35 to 70
35–39	87	50	40 to 61	24	57	37 to 85	43	55	40 to 74	20	37	22 to 56
40–44	42	51	37 to 68	8	43	19 to 85	16	52	30 to 85	18	53	31 to 84
45–49	16	39	22 to 63	4	42	11 to 107	8	59	26 to 117	4	22	6 to 56
50≥	3	13	3 to 38	0	–	–	0	–	–	3	29	6 to 83
Overall	694	58	54 to 63	117	47	39 to 56	421	70	64 to 77	156	46	39 to 54

\*Standardised by calendar year (1984, 1985, ..., 2007) and age (16–19, 20–24, ..., 50–59). †Includes the Royal Navy and the Royal Marines. RAF, Royal Air Force.

**Table 2** Number of suicides (No), standardised mortality ratio\* (SMR) and 95% CI for Army males aged 16–24 years and for all ages, by 5-year time period, 1984–2007

Time period	All ages			16–19 years old			20–24 years old		
	No	SMR	95% CI	No	SMR	95% CI	No	SMR	95% CI
1984–1988	88	62	50 to 76	10	71	34 to 130	33	73	52 to 102
1989–1993	124	80	67 to 95	23	184	117 to 276	49	94	71 to 124
1994–1998	99	78	64 to 95	15	236	132 to 390	40	111	81 to 151
1999–2003	74	66	53 to 83	14	167	91 to 281	22	81	51 to 123
2003–2007	52	63	48 to 82	8	154	67 to 304	15	76	42 to 125
Overall	421	70	64 to 77	68	150	118 to 190	147	87	75 to 102

\*Standardised by calendar year (1984, 1985, ..., 2007).

Services may be important, since the entry criteria differ across the Services, particularly for the non-officer ranks, reflecting the differing roles and requirements of each Service. Generally, the Naval Service and the RAF recruit individuals with a higher educational status, as well as possibly coming from a more affluent background.

It is known that individuals with access to an effective means of suicide (eg, veterinarians, farmers, doctors, pharmacists) have a higher risk of suicide than the general population.<sup>5–22</sup> Data on the UK Armed Forces show that Army males have higher rates of suicide using firearms than the other two Services and the UK general population.<sup>7–9–12</sup>

### Strengths and limitations

Previous publications<sup>3–5</sup> were based purely on occupational data recorded on death certificates. These data are usually provided by the next of kin and are known to be subject to bias.<sup>23</sup> Furthermore, when using standard occupational classifications,<sup>24</sup> the three Services (and all age groups) were combined. This may be questionable for the UK Armed Forces where each Service has different tasks and activities. In this paper, we have been able to examine each Service and age group separately. This has led to the identification of a higher number of suicides than expected among young male Army personnel.

These analyses are based on relatively small numbers and we have performed a number of analyses, hence increasing the possibility of associations arising by chance. We have not made adjustments for multiple comparisons in line with the concerns of Rothman<sup>25</sup> and have interpreted the results accordingly.

Data on other explanatory and confounding factors<sup>26</sup> are currently limited, including social class<sup>27</sup> and geographical area.<sup>28</sup> It is problematic when examining the Armed Forces to adequately adjust for social class; the Armed Forces fell into a dedicated social class category<sup>24</sup> when based on the Registrar General's Social Class making social class-adjusted comparisons

**Table 3** Observed (O) and expected\* (E) number of suicides, standardised mortality ratio\* (SMR) and 95% CI for Army males aged 16–24 years, 1986–2007

Age (years)	O	E	SMR	95% CI
16	–	1.33	–	–
17	14	7.77	180	99 to 302
18	27	16.08	168	111 to 244
19	27	22.37	121	80 to 176
20	32	29.11	110	78 to 155
21	28	32.13	87	58 to 126
22	31	33.19	93	66 to 133
23	25	34.42	73	47 to 107
24	24	31.39	76	49 to 114

\*Standardised by calendar year (1986, 1987, ..., 2007).

with national data meaningless. The recently introduced National Statistics Socio-Economic Classification<sup>29</sup> classifies the Armed Forces alongside other occupations making social class adjustments potentially possible. There are known variations in the rate of suicide between (and within) England, Wales, Scotland and Northern Ireland and the use of UK-based data takes some of this variation into account. However, whether an individual Serviceman's risk of suicide is associated with their country of birth, usual area of residence or area of death is being investigated.

We did not have access to the medical records of these personnel so were unable to assess the role of comorbidity or past history of deliberate self-harm, factors that have been associated with suicide.<sup>30–32</sup> However, Hawton (K Hawton, personnel communication, 2007) has shown that among military cases of deliberate self-harm the level of suicide intent is very often low.

### Prevention of suicide

In the National Suicide Prevention Strategy for England,<sup>33–34</sup> one of the key goals is to “reduce the availability and lethality of suicide methods”. This goal includes the reduction of firearm deaths.<sup>33–34</sup> Another goal is to reduce the risk of suicide in key high-risk groups, which includes high-risk occupational groups, for example, farmers, pharmacists, medical practitioners, and dental practitioners.<sup>3–5</sup> Armed Forces personnel have not been included here, as they are not a high-risk occupational group when compared with the UK general population.<sup>3–12</sup>

Nevertheless, the UK Ministry of Defence is strongly committed to reduce the number of suicides amongst Service

### Main messages

- ▶ Suicide among the UK Armed Forces is a topic of political, media and public interest.
- ▶ Overall, during the period 1984–2007, each Service had fewer deaths from suicide than expected when compared with the UK general population.
- ▶ However, young Army males had more deaths from suicide than expected.

### Policy implication

A number of factors potentially related to the increase seen among young Army males have been suggested, but further work is needed.

personnel and has implemented a range of measures in recent years, including restricting access to the means of suicide and increased supervision of young personnel thought to be at risk.

## CONCLUSION

The UK Armed Forces are subject to a number of unique occupational stressors. It is reassuring that they experience lower than expected numbers of suicides in comparison with the UK general population. This is true for each Service and all age groups except young Army males.

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**Competing interests:** NTF works for the Academic Centre for Defence Mental Health at King's College, London which receives funding from the UK Ministry of Defence. VRW, KH, LD, SW and NFB are (or were) employees of the Defence Analytical Services Agency, which is the statistical agency of the UK Ministry of Defence.

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