



SUICIDE AND OPEN VERDICT DEATHS IN THE UK REGULAR ARMED FORCES 1984-2015

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INTRODUCTION

1. This annual Statistical Notice provides summary information on suicides and open verdict deaths that have occurred among serving UK regular Armed Forces during the 20-year period 1996-2015. This information updates previous notices and includes new data for 2015. The notice provides numbers and rates for the latest 20-year period with all time trend graphs presenting rates since the start of data collection in 1984 (see 'Data Sources and Methods').
2. This notice includes both coroner-confirmed suicides and open verdict deaths in line with the definition used by the Office for National Statistics (ONS) in the publication of National Statistics. In accordance with ONS practice, throughout this notice, the term 'suicide' should be understood to include all suicide and open verdict deaths. To ensure the highest accuracy of information and that all cases previously recorded as 'awaiting verdict' were followed up, Defence Statistics carry out an annual update with data held by the ONS and other authorities (refer to 'Data Sources & Methods' and 'Changes in previously published data').
3. The data are presented for the Naval Service (Royal Navy and Royal Marines), the Army (including the Gurkhas), and the Royal Air Force.
4. Due to the low numbers of suicides among female Service personnel since 1996 (n=17), the analysis in this notice has been restricted to **males** only, aged 16-59 years.
5. Details of the data sources and methods used to collect and analyse the data and additional information not provided in this notice are available in the background quality report on the Gov.uk website. A summary can be found in the '**Data Sources & Methods**' section.

KEY POINTS

6. For the 20-year period 1996-2015, 349 suicides and open verdicts occurred among UK regular Armed Forces personnel: 332 among males, and 17 among females. This represents an addition of three waiting verdict deaths in 2014 that have now been given a suicide or open verdict and five suicides in 2015.
7. The UK Armed Forces and each of the three Services have seen a declining trend in suicide rates since the 1990s.
8. For the 20-year period 1996-2015, the overall UK regular Armed Forces male suicide rate was 9 per 100,000 personnel at risk :
 - the Naval Service suicide rate was 8 per 100,000
 - the Army rate was 10 per 100,000
 - the RAF rate was 6 per 100,000.
9. Male suicide rates for the UK regular Armed Forces was statistically significantly lower than the UK general population (tested for significance by identifying 95% confidence intervals that do not overlap, see paragraph 27).
10. The only age group with a statistically significant increased risk of suicides compared to the UK general population over the latest 20-year period, were Army males aged less than 20, who had an 57% significantly increased risk (SMR=157, 95% CI:112-220). However, in each of the five year periods since 1999, there was no significant difference in the risk of suicide among Army males aged under 20 years compared to the UK general population.
11. The most common methods used to commit suicide in UK Armed Forces were:
 - hanging, strangulation and suffocation (48% of suicides)
 - firearms and explosives (18% of suicides)
 - poisoning by gases in domestic use/other gases and vapours (10% of suicides)
 Suicide rates using these methods have fallen since the 1990's.

DATA SOURCES & METHODS

Data Sources

12. Defence Statistics receive weekly notifications of all UK regular Armed Forces deaths from the Joint Casualty and Compassionate Centre (formerly the Single Service Casualty Cells). Defence Statistics also receive cause of death information from military medical sources in the single Services and the Defence Inquest Unit. At the end of each calendar year, Defence Statistics cross-reference the in-Service deaths notifications it holds against publicly available death certificate information available from the NHS to ensure accuracy of final cause of death. Regarding suicides and open verdicts, to ensure the highest accuracy of information and that all cases previously recorded as 'awaiting verdict' have been followed up, Defence Statistics carry out an annual audit of MOD data with that held by the Office for National Statistics (ONS) and other authorities, including the General Register Office (GRO) and Northern Ireland Statistics and Research Agency (NISRA).
13. Defence Statistics are currently working with NHS and ONS to access death certificate data, if there are any amendments to cause of death they will be provided in the next release of this statistical publication.
14. Defence Statistics regularly check all deaths against the information held on the Armed Forces Memorial Database (AFMDB) owned by the Joint Casualty and Compassionate Centre (JCCC).
15. This notice includes both coroner-confirmed suicides and open verdict deaths in line with the definition used by the ONS in the publication of National Statistics. In accordance with ONS practice, throughout this notice, the term 'suicide' should be understood to include all suicide and open verdict deaths.
16. Defence Statistics also regularly check all deaths for information on coroner's verdicts (England & Wales) and the results of investigations by the Procurator Fiscal for Scotland where possible. For Northern Ireland, Defence Statistics liaise with the NISRA who handle the official information on behalf of the Northern Ireland Office. In this notice, all these sources of information are referred to as "coroner's verdicts". There is an obligation for all accidental deaths, and those resulting from violent action, to be referred to these officials. Inquests are usually held within a few months of the death, but occasionally a few years may elapse, therefore some recent deaths may not have clearly defined causal information. In these cases, deaths are identified as awaiting verdicts and are not analysed in the main body of this notice.
17. Defence Statistics have undertaken a review of the deaths for which a verdict was outstanding (awaiting verdict), as a proportion of those reported in this notice occurred a number of years ago and in some instances the deaths occurred overseas. Following investigations with ONS and the Defence Inquest Unit, Defence Statistics have been unable to trace nine male awaiting verdicts prior to 2007 for males and have deemed it unlikely that the final outcome of these deaths (such as inquests) will be traced. The awaiting verdicts that Defence Statistics were aware of prior to 2007 were for deaths that occurred to Service personnel overseas. As such Defence Statistics have identified that the earliest death still awaiting a coroner's inquest occurred in 2007. Thus the awaiting verdicts identified in **Table 1** cover the period 2007-2015, these records will be updated once the result of the coroner inquests are made available.
18. One UK Armed Forces death in 1994 and one in 2003 given an open verdict by a coroner have been classified as hostile action deaths and not a suicide and open verdict death as confirmed by the MOD. There was an additional death in 2003 returned as an open verdict by the Procurator Fiscal for Scotland, which has been classified as an RTA, as it was an incident involving multiple deaths and an MOD Board of Inquiry found all the deaths to be the result of an operational accident. Thus all three deaths have been excluded from the notice.
19. One UK Armed Forces death in 1995 was given an open verdict death by a coroner; this original verdict was quashed following a high court ruling in October 2014 and is pending further investigation. This change has been annotated with 'r' within Tables A1 and A2 under 'waiting verdict'. Therefore figures may change as a result of any new verdict.
20. Deaths data in England and Wales are supplied by and used with the permission of ONS. Deaths in Northern Ireland are supplied by and used with the permission of NISRA and GRO supply deaths in Scotland.
21. For a detailed description of the sources of data used in this notice and their analysis refer to the 'References' section.

Data coverage

22. Deaths presented here are for the UK regular Armed Forces. The dataset includes all trained and untrained regular Service personnel. Non-regular Service personnel that were deployed on operations at the time of

their death are also included. The data here exclude the Home Service of the Royal Irish Regiment, full time reservists, Army Reserves and Naval Activated Reservists who were not deployed on operations at the time of their death, as Defence Statistics do not receive routine notifications of all deaths among reservists and non-regulars, and because reliable denominator data to produce interpretable statistics are not available.

23. In February 2013, Defence Statistics undertook an external consultation to ensure these statistics continue to meet user needs. The outcome of the six week consultation period was to change the information in the notice to present time trend graphs since the start of data collection in 1984 and all tables and remaining graphs as numbers and rates aggregated for the latest 20 year period. As suicide is a rare event, this will provide a balance between presenting analysis for a sufficient time period from which to provide meaningful data with the need to monitor the impact of MOD policy and initiatives.

Methods

Calculating a rate

24. Rates enable comparisons between groups and over time, taking account of the number of personnel in a group (personnel at risk) at a particular point in time. The number of events (ie. deaths) is divided by the number of personnel at risk and multiplied by 100,000 to calculate the rate.
25. In order to compare time trends and to take into account the different age structures of their respective single Service strengths, rates have been age standardised. In order to facilitate comparisons with previously published reports data has been standardised to the 2015 Armed Forces population. For this direct standardisation process, Defence Statistics have estimated the rates that would have been observed if each study population (i.e. each of the single Services) had the same age structure as the standard population (the 2015 male Armed Forces population).
26. Suicide remains a rare event in the UK regular Armed Forces; as a result some of the numbers presented in this notice are small. As such, when presenting standardised rates and mortality ratios over time, the results can be affected when there are changes to the population at risk (the denominator). With the recent changes to the Armed Forces population through redundancy programmes, changes in recruitment patterns and the move to the new employment model and the new structures required to meet Future Force 2020¹, there will be an impact on the trends presented as the Armed Forces population shrinks and the age and gender profile of the serving population changes. This may, on occasion, lead to unexpected results particularly where small numbers are involved. Standardised rates and mortality ratios can be strongly influenced by variations in the age and gender structure of the deaths concerned, even when totals may remain the same, as seen in 2015 for the Naval Service overall rate of suicides, caused by the reduction in recruitment of personnel less than 20 years of age.
27. In order to understand if a difference in rates is statistically significant, 95% confidence intervals are used. Statistical significance indicates that a finding is not due to chance. The 95% confidence interval for a rate provides the range of values within which we expect to find the real value of the indicator under study, with a probability of 95%. If a 95% confidence interval around a rate excludes the comparison value, then a statistical test for the difference between the two values would be significant at the 0.05 level. If two confidence intervals do not overlap, a comparable statistical test would always indicate a statistically significant difference. The small number of deaths in some of the sub-group analysis may result in wide confidence intervals in the corresponding rate or ratios. The impact of this is that the range in which we expect the true value of that statistics to lie is much larger, making it harder to interpret the true underlying trend.

Calculating Standardised Mortality Ratios (SMR)

28. To enable comparisons with deaths in the UK population, Standardised Mortality Ratios (SMR), adjusted for age, gender and year, were calculated. An SMR is defined as the ratio of the number of deaths *observed* in the study population to the number of deaths *expected* if the study population had the same age- and gender-specific rates as the standard population in each specific year multiplied by 100 by convention. An SMR over (or under) 100 indicates a higher (or lower) number of observed deaths than expected (based on standard population rates). An SMR of 100 implies that there is no difference in rates when comparing the UK regular Armed Forces population with the UK population.
29. The 95% confidence interval for a SMR provides the range of values within which we expect to find the real value of the indicator under study, with a probability of 95%. If the confidence interval for an SMR does not include 100, the result is deemed to be statistically significant. The small number in some of the sub-group analysis may result in wide confidence intervals in the corresponding ratio. The impact of this is that the range in which we expect the true value of that statistic to lie is much larger, making it harder to interpret the

¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62487/Factsheet5-Future-Force-2020.pdf

true underlying trend.

30. The UK population estimates used to calculate SMR refer to the usually resident population on 30 June of each year. The usually resident population is defined by the standard United Nations definition for population estimates and includes people who reside in the area for a period of at least 12 months whatever their nationality. ONS mid-year population estimates are based on updates from the most recent census, allowing for births, deaths, net migration and ageing of the population.
31. The UK general population data for 2015 was not available for this report to calculate standard mortality ratios (SMRs), therefore, Defence Statistics has used the 2014 data as an estimate for the 2015 figures as there is little year on year variation for the UK figures. Thus, any patterns reported here may be subject to minor fluctuations when the 2015 data becomes available.
32. In 2006 the ONS changed from reporting the number of deaths that occurred in each year to the number of deaths that were registered in each year. A major driver for this change was that for an annual extract of death occurrences to be acceptably complete, it must be taken some months after the end of the data year to allow for late death registrations. This change has little effect on annual totals but allows the output of more timely mortality data. The UK death figures reported are based on deaths registered in the data year and therefore the year in which a death is registered may not correspond to the year in which the death occurred. Therefore the UK death data used by Defence Statistics up to and including 2005 is based on deaths that occurred in the year. The UK death data used by Defence Statistics for 2007 onwards is based on deaths that were registered in the year. To produce the UK death data for 2006 Defence Statistics have followed advice provided by the ONS and use deaths that both occurred and were registered in the year. Using UK population deaths that both occurred and were registered in year resulted in an increased denominator population for the 2006 SMR calculation and has therefore resulted in a lower SMR for 2006 (when compared with the 2006 SMR reported in publications before this change in methodology). Users should note that this revised corrected methodology has brought the 2006 SMR findings in line with the SMR findings for other years.
33. In 2016 ONS modified their definition of Suicide to include deaths from intentional self harm in 10-14 year old children, in addition to deaths from intentional self harm and events of undetermined intent in people aged 15 and over. This change has no impact on this report since data used to calculate the overall age-standardised rates for the UK general population and SMRs are for those aged 16-59 years only.
34. Whilst values are presented to two decimal places in the graphs in this report for accuracy, the values presented in the text are as whole values to assist in clarity due to the small numbers of suicide and open verdict deaths.

Strengths and weaknesses of data presented in this notice

35. A strength of this publication is that considerable validation is undertaken against military and public records to ensure that the information provided is complete and accurate and users of this publication should be confident that the numbers of suicide and open verdict deaths presented are accurate.
36. However, Suicide and Open Verdict deaths require a Coroner's report before the cause of death can be formally classified and there is often a time lag between when the death occurred and when the Coroner's inquest takes place. This can result in final cause of death information not being timely and complete for recent years and these deaths are reported as 'accidents' whilst waiting for final cause of death to be determined (and thus not included in this report beyond capturing the number of awaiting verdicts in Table 1). This can lead to revisions in the cause of death categories when these verdicts are returned (see paragraph 44 for more information about the extent of these revisions).
37. In addition, deaths certificates for Service personnel who die overseas are issued by the MOD and if buried overseas, are not always subject to a coroner's inquest to certify cause of death. Users should be aware of this when using the information presented in this notice.
38. A further strength of this report is the use of the ONS definition of suicide to include all coroner confirmed suicides and open verdict deaths, providing comparable data with the UK general population. However, since 2004, there has been an increased number of narrative verdicts where the coroner may not indicate clearly if an injury was accidental or if there was deliberate intent to self-harm, or if intent could not be determined. ONS continue to monitor the impact of narrative verdicts on UK population suicide rates and any ONS changes to definitions will be also reflected by Defence Statistics. Paragraph 46 presents the number of narrative verdicts among UK Armed Forces personnel since 2004.
39. The release of the information in this notice is controlled by the statistics code of practice as outlined in the Statistics and Registration Act, 2007. This stipulates that statistics in their final form cannot be released prior

to a publication. Thus because suicides are a rare event in the UK Armed Forces and it can take many months or even years for a coroner's inquest, Defence Statistics do not update the numbers in between the publication of this notice, to ensure there is no breach the code of practice. Any requests for information on suicides among the UK Armed Forces not presented in this publication, will provided using the underlying dataset used to compile this notice in accordance with the code of practice.

40. The information presented in this publication has been structured in such a way to release sensitive deaths information into the public domain in a way that contributes to the MOD accountability to the British public but which doesn't risk inadvertently revealing individual identities and therefore breaching the rights of the families of the deceased personnel (for which the MOD has a residual duty of care). Defence Statistics are regularly asked to release information such as date of death, location of death, deaths within a unit or rank held by the deceased, however, these requests are assessed on a case by case basis to ensure the information presented is aggregated to a level to ensure individual's cannot be identified.
41. The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.
42. Designation can be broadly interpreted to mean that the statistics:
 - meet identified user needs;
 - are well explained and readily accessible;
 - are produced according to sound methods; and
 - are managed impartially and objectively in the public interest.
43. Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

CHANGES IN PREVIOUSLY PUBLISHED DATA

44. In preparing this document, Defence Statistics carried out a review of the data recorded on deaths to Service personnel to ensure the highest accuracy of information and that all cases previously recorded as 'awaiting verdict' have been followed up with the ONS and other authorities:
 - **Three** deaths in 2014 previously reported as awaiting verdicts have now been confirmed by the coroner as suicides :
 - **One** Army female open verdict death in 1995 has been changed to awaiting verdict (Annex A Table A1 and A2) following a high court ruling (see paragraph 19). This death is subject to further investigation.

REFERENCES

- i. Blatchley, N. F., Ward, V. R., & Fear, N. T. (2004). Suicide and open verdict deaths among males in the UK regular Armed Forces, 1984-2003. DASA; Enleigh, Bath.
- ii. Ward, V. R., & Fear, N. T. (2004). Suicide and open verdict deaths among males in the UK regular Armed Forces, 1984-2002: Methods used to commit suicide. DASA; Enleigh, Bath.

RESULTS

45. In order to provide a balance between presenting analysis for a sufficient time period from which to provide meaningful data with the need to monitor the impact of MOD policy, this notice presents time trend graphs since the start of data collection in 1984 and all tables and remaining graphs as numbers and rates aggregated for the latest 20 year period. Tables presenting the number of suicide and open verdicts (**Table A1 & A2**) and Army SMR for the under 24 age groups since 1984 (**Table A3**) can be found at **Annex A**.

46. Since the introduction of narrative verdicts in 2004, there has been an increase in the number returned by coroners in England and Wales². Defence Statistics have investigated the impact of narrative verdicts on the numbers of suicide and open verdict deaths reported for the UK Armed Forces. As there have only been **nine** narrative verdicts between 2004 and 2015 where the mechanism of injury indicated possible suicide, Defence Statistics do not believe there has been an impact on the numbers and rates reported in this notice.

Overall Numbers by verdict

47. For the 20-year period 1996-2015, there were 349 suicides and open verdicts in the UK regular Armed Forces. A further 12 deaths have been referred to a coroner (or, for Scotland, the Procurator Fiscal) since 2007, where the mechanism of injury indicated possible suicide, which may be returned as suicides or open verdicts (five of which occurred in 2015).

48. Only 17 cases (5%) occurred among female personnel during the period 1996-2015. Details of the verdicts by gender between 1996 and 2015 are shown in **Table 1**.

Table 1: UK regular Armed Forces Suicide, open verdict and awaiting verdict deaths¹ by Service² and gender, numbers and percentages³

Verdict	All			Naval Service						Army				RAF				
	All		Male		Female		Male		Female		Male		Female		Male		Female	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Suicide	259	100	246	95	13	5	44	17	3	1	164	63	6	2	38	15	4	2
Open	90	100	86	96	4	4	17	19	1	1	56	62	3	3	13	14	0	0
Waiting Verdicts ¹	12	100	11	92	1	8	2	17	0	0	8	67	1	8	1	8	0	0

Source: Defence Statistics (Health)

¹Awaiting verdicts since 2007. See paragraph 17

²Naval Service includes Royal Navy and Royal Marines.

³Percentages (%) have been rounded to the nearest whole number. For percentages greater than 0, but less than 1, "<1" is shown. Percentages may not add to 100% due to rounding.

49. Due to the small number of suicides among UK Armed Forces females, all subsequent analysis, tables and graphs in this notice focus on suicides and open verdicts deaths, referred to jointly as 'suicides', among males aged 16-59 years only.

Trends over Time (1984-2015)

50. In order to compare trends in the rates for each Service over the period 1984-2015 and take into account the different age structures of the three Services, rates have been age-standardised. **Figure 1** illustrates these trends as a three-year moving average to eliminate some of the random year on year variation in rates due to the small numbers of suicides and to give a clearer picture of possible trends.

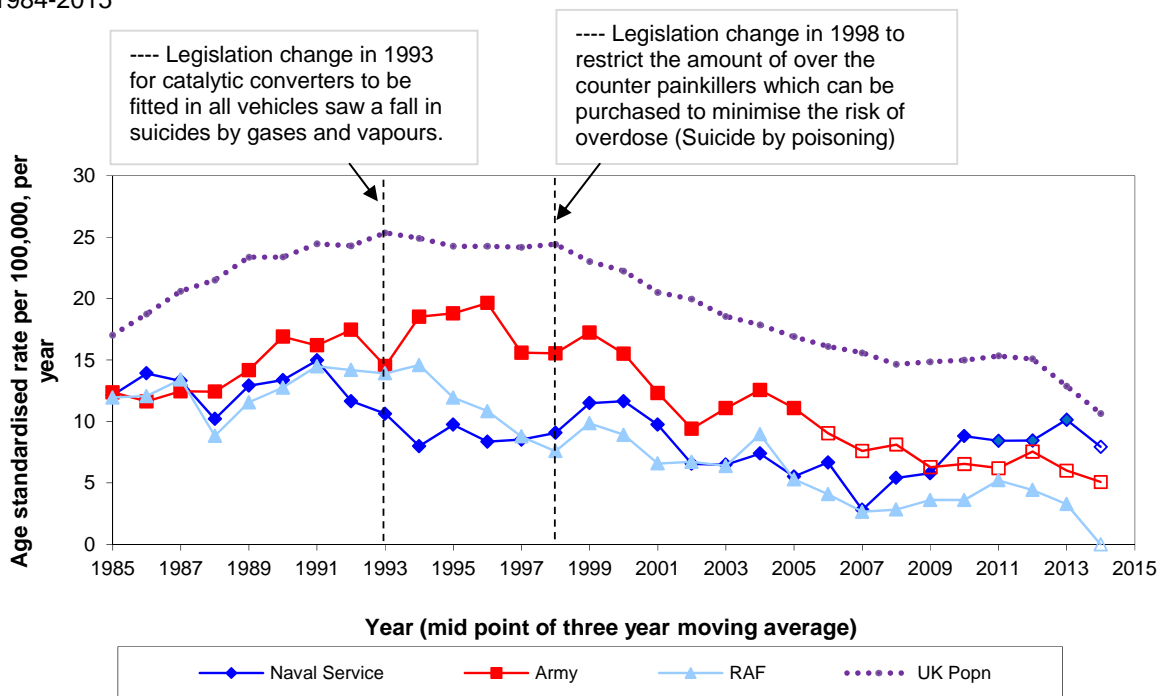
51. Suicide rates across the Services show a declining trend since the 1990's, similar to that seen in the UK general population. Rates among the UK regular Armed Forces were lower than the UK general population³ throughout the period presented. The male suicide rate in the UK general population in 2014 was 16.8 per 100,000 compared to a UK Armed Forces Tri-Service rate of 4 per 100,000.

52. It should be noted that the rates presented for each Service may change when outstanding coroner verdicts are returned on deaths that have occurred since 2007 (see **Table 1 and Figure 1**).

² Office for National Statistics (2012) Suicide Rates in the United Kingdom, 2006 to 2010.

³ Suicides in the United Kingdom 2013 Registrations, release 4 February 2016, ONS.

Figure 1: UK regular Armed Forces male suicide rates by Service¹ and three year time period², age-standardised³ rates per 100,000 personnel at risk^{4,5} 1984-2015



Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

² The year shown is the mid-point of a three-year average, e.g. 1985 refers to the period 1984-1986.

³ Rates have been age standardised to the 2015 Armed Forces population, expressed per 100,000 personnel at risk.

⁴ If there are any awaiting verdicts in the 3 year period, the data point is shown as hollow.

⁵ Values presented to two decimal places

53. For the majority of the period presented in Figure 1, Naval Service and the RAF have lower rates of male suicides compared to the Army. The changing structure of the Naval Service population (the denominator) resulted in an increase in the reported rate and the latest three-year rate for Naval Service personnel in 2013-2015 was 8 per 100,000 in (n=7), higher than the Army and RAF but the difference was not statistically significant.

20-year rate by Service and Age

54. The overall rate of suicide among the UK Armed Forces for the latest 20-year period, 1996-2015 was 9 per 100,000.

55. **Figure 2** (page 8) illustrates that for the 20-year period 1996-2015, the Army had a significantly higher age-standardised suicide rate (10 per 100,000, 95% CI: 9-12), than the RAF (6 per 100,000, 95% CI: 5-8) (tested for significance by identifying 95% confidence intervals that do not overlap, see paragraph 27). The Naval Service age standardised rate of suicide was not significantly different to either the Army or RAF (8 per 100,000, 95% CI: 6-11).

56. **Figure 3** (page 8) shows for the latest 20-year period, suicide rates for the Army in all age groups with the exception of those aged 35-39 and 45-49, were higher compared to the same age groups in the Naval Service and RAF, however these differences were not significant.

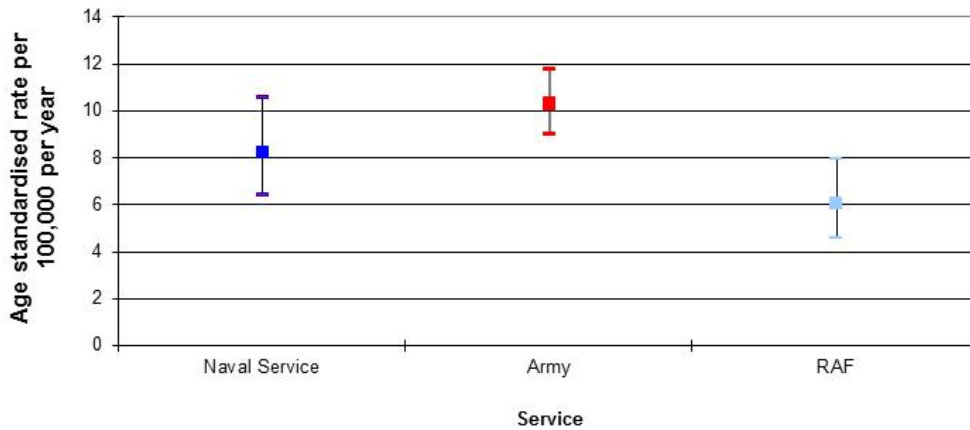
57. **Figure 3** shows for the 20-year period 1996-2015 :

- rates in the Naval Service increased with age up to 40-44 years with the exception of those aged 20-24.
- the Army rate of suicide decreased with age.
- RAF personnel show no differences in the rate of suicide for those aged under 40. For personnel aged over 40 years, rates decreased with each age band.

In the UK general population, rates of suicide in 2014 were highest among those aged 40-59 years for a second year in a row. Please note that the confidence intervals presented in **Figure 3** were large for the under 20 age group and those in age bands over 40 years as this reflects the small numbers of Armed

Forces personnel observed in these groups (see paragraph 27 for more information).

Figure 2: UK regular Armed Forces male suicide rates and 95% confidence intervals by Service¹, age-standardised² rates per 100,000 personnel at risk³ 1996-2015



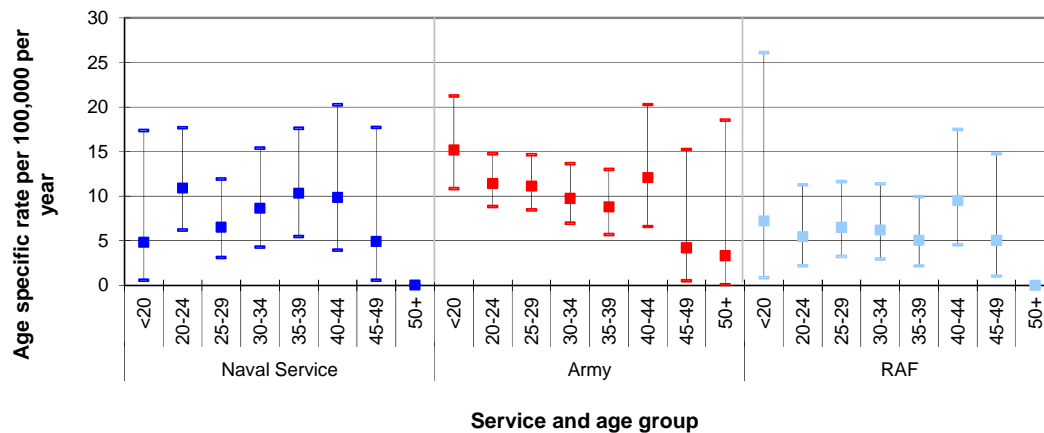
Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

² Rates have been age standardised to the 2015 Armed Forces population, expressed per 100,000 strength

³ Values presented to two decimal places

Figure 3: UK regular Armed Forces male suicide rates and 95% confidence intervals by Service¹ and age group, age-specific rates per 100,000 personnel at risk^{2,3} 1996-2015



Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

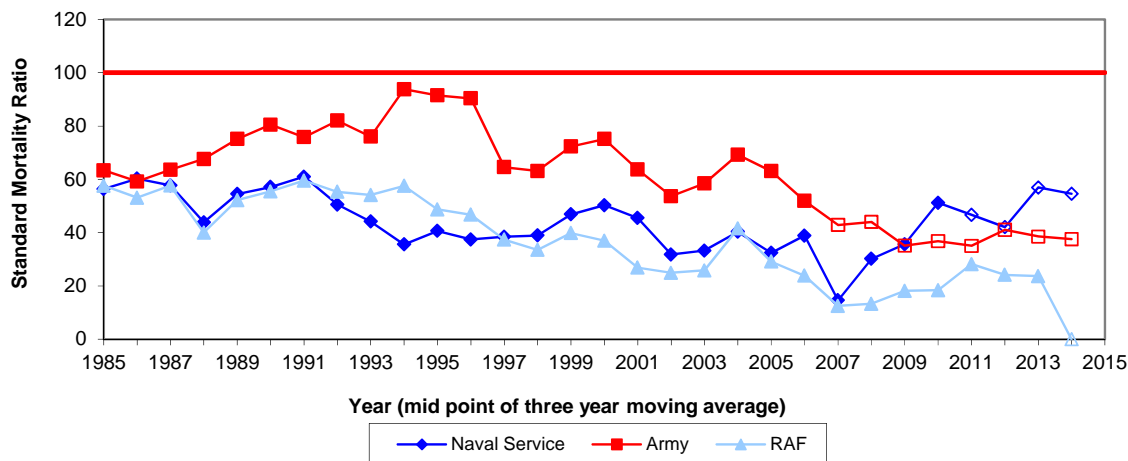
² Rates have been age standardised to the 2015 Armed Forces population, expressed per 100,000 strength.

³ Values presented to two decimal places.

Comparisons with the UK General Population

58. In order to compare suicides among the UK regular Armed Forces with those among the UK general population, Standardised Mortality Ratios (SMR) have been calculated for each Service for the 32-year period 1984-2015 (shown in **Figure 4**) and age specific mortality ratios for each Service for the latest 20-year period (shown in **Table 2**). Yearly changes in the UK general population have been taken into account in these calculations. An SMR value less than 100 indicates lower rates in that particular group than in the corresponding group in the UK general population. An SMR value of greater than 100 indicates higher rates in that particular group than in the same group in the UK general population. If the 95% confidence interval does not encompass 100, then this difference is statistically significant. See the 'Data Sources & Methods' section for further details.

Figure 4: UK regular Armed Forces male suicides by Service¹ and three-year time period^{2,3,4}, Standard Mortality Ratios⁵ 1984-2015



Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

² The year shown is the mid-point of a three-year average, e.g. 1985 refers to the period 1984-1986.

³ Ratios have been standardised for age and calendar year.

⁴ If there are any awaiting verdicts in the 3 year period, the data point is shown as hollow.

⁵ the red line indicates the value expected if the number of observed suicides in the UK Armed Forces was the same as the number expected based on the age structure of the UK population (para 28).

59. Since 1984, based on a three-year moving average, each of the three Services had suicide rates lower than would be expected if the UK Armed Forces had the same age profile overtime as the UK general population (**Figure 4**).

60. The declining trend in suicide rates for each Service since the peak in the 1990's (illustrated in **Figure 1**) can also be seen in the mortality ratios in **Figure 4**, demonstrating a decreasing risk of suicide for each Service compared to the rate expected in the UK general population. The change in the Naval Service mortality ratio from 15 per 100,000 (85% decreased risk of suicide) in 2006-2008 to 55 per 100,000 (42% decreased risk) in 2013-2015 was the result of a change in the structure of the Naval Service population (see paragraph 26) and not the result of an increase in the annual number of suicides in the Naval Service during this period (see **Table A1**).

Table 2: UK regular Armed Forces male suicides by Service¹ and age group, numbers, SMR² and age-specific mortality ratios³ 1996-2015

Age	All		Naval Service		Army		RAF	
	n	SMR (95%CI)	n	SMR (95%CI)	n	SMR (95%CI)	n	SMR (95%CI)
All	332	46 (41-51)	61	41 (32-53)	220	56 (49-64)	51	28 (21-37)
Under 20	38	134 (97-184)	2	49 (6-178)	34	157 (112-220)	2	74 (9-266)
20-24	82	58 (47-72)	16	62 (35-100)	59	64 (50-83)	7	31 (12-63)
25-29	72	45 (35-56)	10	31 (15-58)	51	54 (41-72)	11	31 (15-55)
30-34	55	38 (29-49)	11	38 (19-67)	34	43 (31-61)	10	27 (13-49)
35-39	46	35 (26-46)	13	44 (23-75)	25	38 (25-56)	8	21 (9-42)
40-44	31	45 (32-65)	7	42 (17-87)	14	52 (28-87)	10	41 (19-75)
45-49	7	22 (9-45)	2	22 (3-81)	2	19 (2-70)	3	23 (5-67)
50+	1	6 (0-34)	0	-	1	17 (0-94)	0	-

Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

² Ratios have been standardised for age and calendar year.

³ Ratios have been standardised for calendar year.

61. For each Service and for the UK regular Armed Forces as a whole, the overall SMR shows that the suicide rate for the period 1996-2015 was statistically significantly lower than would be expected if the Armed

Forces had the same age profile over time as the UK general population. **Table 2 shows :**

- Naval Service males were at a **59% decreased risk** of suicide compared to the UK general population (SMR=41, 95% CI:32-53);
- Army males were at a **44% decreased risk** of suicide compared to the UK general population (SMR=56, 95% CI:49-64)
- RAF males were at a **72% decreased risk** of suicide compared to the UK general population (SMR=28, 95% CI:21-37).

62.The mortality ratios for each Service age group over the age of 20 years were also significantly lower than expected, with the exception of those aged 20-24 years in the Naval Service who were at the same risk as the UK general population (**Table 2**).

63.Army males aged less than 20 years were at a 57% significantly increased risk of suicide (SMR=157, 95% CI:112-220) compared to the UK general population. The increased risk among this group may be due to the Army recruitment of younger males compared to the other Services, often straight from school and from inner cities. Lower educational attainment and lower socio-economic background are associated with higher levels of mental health⁴.

64.The low SMR and age-specific mortality ratios in those aged over 20 years may partially be explained by the 'healthy worker effect' often observed in occupational studies. This is deemed to occur when 'workers' are found to have lower mortality or other adverse health outcome rates than the general population due to the fact that certain groups of people are excluded from employment, particularly those who are ill or who have disabilities. This is to be expected in studies of Armed Forces mortality, as they are generally a highly selected group of individuals who are likely to have higher than usual levels of fitness and possibly lower levels of ill-health.

65.A number of other factors, specific to Service life both on and off duty, may also play a role in reducing the risk of suicide reflected in these low SMR. This may include the strong group loyalty, bonding and mutual dependence encouraged at all levels in the Services, particularly in small combat units. Unemployment and economic hardship⁵ in middle aged men within the UK general population is considered a high risk factor for suicide, this is in contrast to the UK Armed Forces, who are employed, thus this is considered a protective factor for these personnel.

66.Some known suicide risk factors identified from academic research into the general population or other specific occupation groups remain unexplored at present. Defence Statistics are engaged in collaborative work with external academic colleagues in order to address some of these issues, such as psychiatric and physical morbidity.

67.To further investigate the changing trends in Army suicides and the potential impact this may have had on the population at risk (young Army males), **Table 3** presents the trends over time for Army males in the under 20 and 20-24 age groups. It provides information on 20 years of male Army data in successive periods of five calendar years.

Table 3: Male suicides in UK regular Army personnel aged less than 25 years by five year time period & age group, SMR¹ and age-specific mortality ratios²

Time period	Under 20		20-24	
	n	SMR (95%CI)	n	SMR (95%CI)
1996-2015	34	157 (112-220)	59	64 (50-83)
1996-2000	14	178 (97-298)	28	90 (60-130)
2001-2005	14	201 (110-337)	14	55 (30-92)
2006-2010	4	92 (25-235)	8	40 (17-78)
2011-2015	2	83 (10-298)	9	61 (28-116)

Source: Defence Statistics (Health)

⁴ Meltzer H, Singleton N, Lee A et al (2002). The social and economic circumstances of adults with mental disorders, *Her Majesty's Stationery Office (HMSO):London*.

⁵<http://www.samaritans.org/sites/default/files/kcfinder/files/press/Men%20Suicide%20and%20Society%20Research%20Report%20151112.pdf>

¹ Ratios have been standardised for calendar year.

68. The downward trend for suicides among Army males as a whole (illustrated in **Figure 1**) was reflected in the age specific mortality ratios for the under 20 and 20-24 age groups. Army personnel aged 20-24 were at a significantly decreased risk of suicide compared to the UK general population for the five year periods 2001-2005 and 2006-2010 and were at no different risk in 2011-2015.

69. The numbers presented in **Table 3** may be subject to change as deaths awaiting verdicts may be returned as suicides or open verdicts. For the time period 2011-2015, there were three deaths to Army males aged 20-24 years and no deaths to Army males aged under 20 years awaiting coroner verdicts.

Methods used to commit suicide

70. **Table 4** provides details of the methods used to commit suicide by personnel in all three Services over the period 1996-2015.

71. The following three methods account for 76% of all cases; hanging, strangulation and suffocation (48% of all cases); firearms and explosives (18% of all cases); and poisoning by gases in domestic use/other gases and vapours (10% of all cases). This finding is broadly consistent with the most common methods of suicide in the male UK general population for 2014³ where hanging, strangulation and suffocation accounted for 55% of male suicides and poisonings accounted for 19%. The use of firearms and explosives as a method of suicide among UK regular Armed Forces personnel is likely to be the result of ease of access to weapons.

Table 4: UK regular Armed Forces male suicides by Service¹ and method, numbers and percentages² 1996-2015

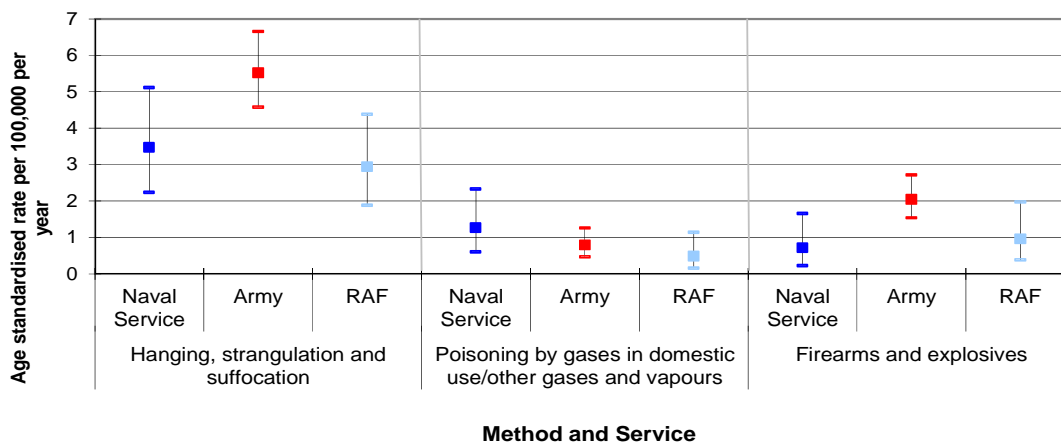
	All		Naval Service		Army		RAF	
	n	%	n	%	n	%	n	%
All	332	100	61	100	220	100	51	100
Hanging, Strangulation and Suffocation	159	48	25	41	110	50	24	47
Firearms and explosives	60	18	5	8	48	22	7	14
Gases and Vapours	33	10	10	16	18	8	5	10
Poisoning by solid or liquid substances	22	7	4	7	15	7	3	6
Other and unspecified means	15	5	3	5	9	4	3	6
Falling or jumping from high place	14	4	6	10	6	3	2	4
RTA	13	4	4	7	7	3	2	4
Rail accidents	9	3	2	3	3	1	4	8
Submersion (Drowning)	3	<1	1	2	2	<1	0	0
Cutting and piercing instruments	2	<1	1	2	0	0	1	2
Air transport incident	2	<1	0	0	2	<1	0	0

Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

² Percentages (%) have been rounded to the nearest whole number. For percentages greater than 0, but less than 1, "<1" is shown. Percentages may not add to 100% due to rounding.

Figure 5: UK regular Armed Forces male suicide rates and 95% confidence intervals by Service¹ and method, age-standardised rates² per 100,000 strength³ 1996-2015



Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

² Rates have been age standardised to the 2015 Armed Forces population, expressed per 100,000 strength

³ Values on graph presented to two decimal places

72. **Figure 5** illustrates that for suicides from hanging, strangulation and suffocation there was a significant difference in the suicide rates between the Services. Army males had significantly higher rates (6 per 100,000, 95% CI: 5-7) than RAF males (3 per 100,000, 95% CI 2-4). There was no significant difference between Army males and the Naval Service males (3 per 100,000, 95% CI 2-5).

73. For the method of poisoning by gases in domestic use/other gases and vapours, there was no significant difference in the suicide rates between the three Services. (Naval Service: 1 per 100,000, 95% CI: 1-2; Army: 1 per 100,000, 95% CI: 0-1; RAF: 0 per 100,000, 95% CI: 0-1).

74. For the method of firearms and explosives, there was no significant difference in the suicide rates between the Services (Naval Service: 1 per 100,000, 95% CI 0-2, Army 2 per 100,000, 95% CI: 2-3, RAF: 1 per 100,000, 95% CI 0-2).

75. **Figures 6, 7 and 8** illustrate the changes in the use of these three methods over the period 1984-2015. Due to small numbers involved, the data have been aggregated to give five year moving averages. This eliminates some of the random variation that can occur and provides a clearer picture of trends.

76. **Figure 6** illustrates that the use of hanging, strangulation and suffocation increased in all three Services from the early 1990s to the years 1996-2000 (from 3 per 100,000 in 1990-1994 to 8 per 100,000 in 1996-2000 in the Army). There has since been a declining trend in the use of this method for the Army and RAF. Naval Service rates have risen from a low of 1 per 100,000 in 2006-2010 to 5 per 100,000 in 2011-2015. This rise was based on an increase in the cumulative effect in the number of Naval Service suicides, from two deaths in the period 2006-2010 to seven deaths in the period 2011-2015, however the annual number of Naval Service suicides remains small (less than five per year) and therefore this finding should be treated with caution. The reduction in Naval Service population and the changing age structure may also have had an impact on these rates. Army rates are subject to change following updates from awaiting verdicts.

77. **Figure 7** illustrates that use of firearms and explosives in the Naval Service and RAF have remained low throughout the period 1984-2015. It is worth noting that the rise for the RAF in the period 2001-2005 has been affected by the very small numbers (three cases in 2003 and one case in 2004), therefore this rise is likely due to a chance variation rather than the appearance of a new trend. Similarly, the small rise in the Naval Service rate in 2008-2012 involves one case in 2009 and two in 2010. Use of firearms and explosives appears to have changed noticeably in the Army: increasing from the beginning of the period to the mid-1990s, followed by a clear fall since then from 6 per 100,000 in the period 1992-1996 to 1 per 100,000 in the period 2011-2015.

78. **Figure 8** illustrates that use of poisoning by gases in domestic use/other gases and vapours has been on the decline in all three Services since the early 1990s. Single Service rates which were between 4 and 8 per 100,000 during the period 1986-1990 have fallen to less than one per 100,000 in 2011-2015.

Figure 6: UK regular Armed Forces male suicide rates by the use of hanging, strangulation and suffocation by Service¹ and five year time period², age-standardised³ rates per 100,000 strength^{4,5}. 1984-2015

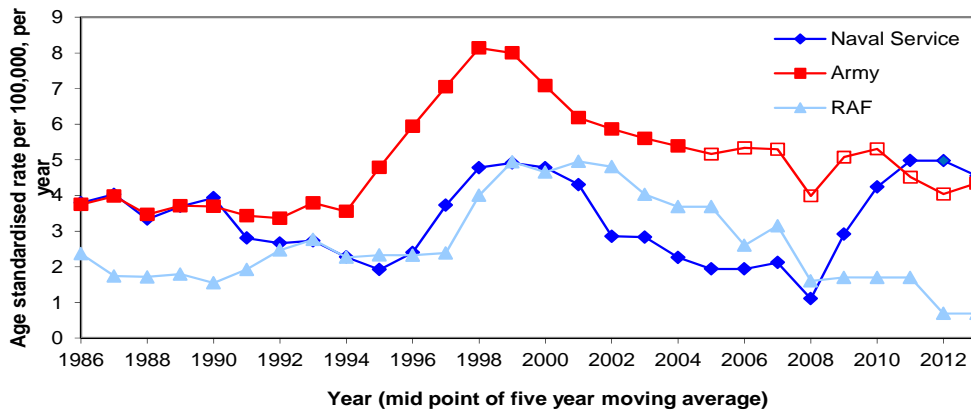


Figure 7: UK regular Armed Forces male suicide rates by the use of firearms and explosives by Service¹ and five year time period², age-standardised³ rates per 100,000 strength^{4,5}. 1984-2015

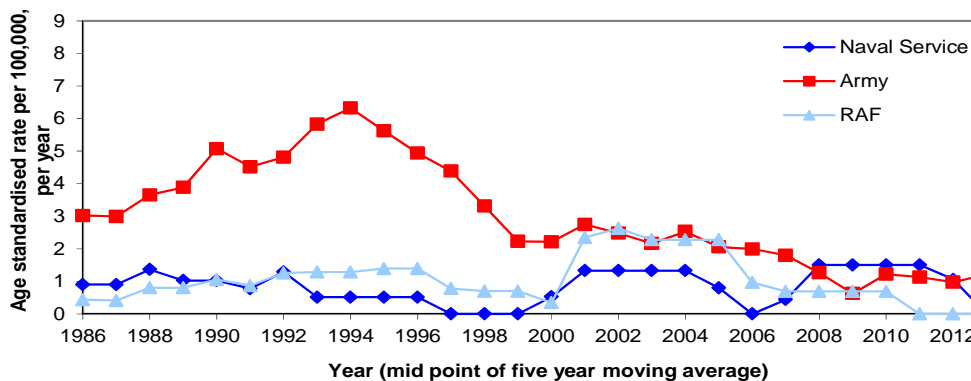
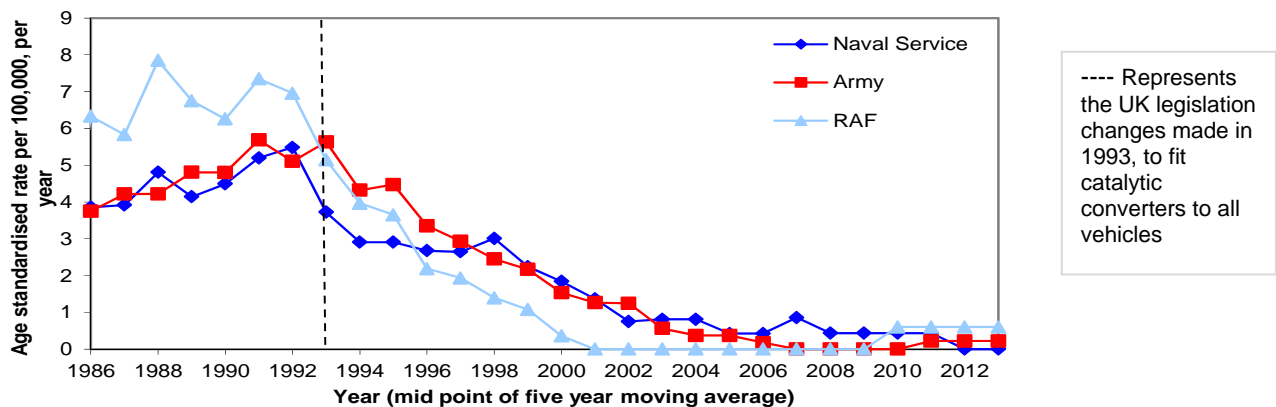


Figure 8: UK regular Armed Forces male suicide rates by the use of poisoning by gases in domestic use/other gases and vapours by Service¹ and five year time period², age-standardised³ rates per 100,000 strength^{4,5}. 1984-2015



Source: Defence Statistics (Health)

¹ Naval Service includes Royal Navy and Royal Marines

² The year shown is the mid-point of a five-year average, e.g. 1986 refers to the period 1984-1988.

³ Rates have been age standardised to the 2015 Armed Forces population, expressed per 100,000 strength.

⁴ If there are any awaiting verdicts in the five year period, the data point is shown as hollow.

⁵ Values presented to two decimal places.

79. The likelihood of committing suicide depends to some extent on the ease of access to, and knowledge of, an effective method. Three main types of method, hanging, strangulation and suffocation; firearms and explosives and poisoning by gases were used in 76% of the suicides reported in this notice (see paragraph 71). Firearms and explosives were used mostly in the Army (Army firearms and explosives suicide deaths accounted for 80% of all firearms and explosives suicide deaths). This reflects the greater access to firearms and explosives in that particular Service.
80. It is clearly important to understand the link between access to means and trends over time as this may aid policy makers to introduce preventative measures with the aim of reducing the incidence of suicides in the Services. The increase in the use of hanging, strangulation and suffocation across all three Services in the 1990s (illustrated by **Figure 6**) may have partly been a response to the new difficulties presented by the use of poisoning by gases in domestic use/other gases and vapours.
81. All three Services appear to show a decline in hanging, strangulation and suffocation over time; however Naval Service rates have increased for the latest five-year period 2011-2015. Caution should be taken in interpreting this finding as a rise in rates of hanging, strangulation and suffocation were based on a small number of suicides and may be influenced by the changing structure of the population within each Service.
82. The changes in policy on the use of and access to firearms in the Army (illustrated by **Figure 7**), particularly the steep decline since 1992-1996 (from 6 per 100,000 to 1 per 100,000 by 2011-2015) has contributed to the overall decline in the Army rates shown in **Figure 1**.
83. The reduction in suicides by the use of poisoning by gases in domestic use/other gases and vapours across all three Service since the early 1990s (illustrated by **Figure 8**) is thought to reflect the change to catalytic converters on cars, the size of exhaust pipes and odour in natural gas used in domestic situations (for example gas cookers). This declining trend is also seen among the use of this method in suicides in the UK general population.

CONCLUSIONS

84. This is the fourth publication of this notice based on the overall number of suicides in the UK regular Armed Forces over the latest twenty year period. Findings are similar to those published in 2014 covering the period 1995-2014.
85. The analyses provided here are based on small numbers. This is evidenced by the wide range in the confidence intervals presented in this publication and we strongly recommend caution in reading too much into past trends and to continue to do so in the future.
86. This notice shows a declining trend for all three Services, particularly in the suicide rates among young Army males and in the use of hanging, strangulation and suffocation, poisoning by gases in domestic use/other gases and vapours and the use of firearms and explosives.
87. There has been an increase in rates of Naval Service suicide since 2007, however, due to the small numbers involved, it remains to be seen if this is due to chance variation rather than an appearance of a new trend.

Annex A – UK regular Armed Forces Suicides 1984-2015, additional tables

Table A1 : UK regular Armed Forces¹ Suicide and open verdict deaths by year, gender and Service², numbers
1984 to 2015

Year	Gender			Service		
	All	Male	Female	Naval Service	Army	RAF
All	808	784	24	140	496	172
1984	27	26	1	3	15	9
1985	30	29	1	8	17	5
1986	44	44	0	9	20	15
1987	27	26	1	5	14	8
1988	41	40	1	8	25	8
1989	36	35	1	4	25	7
1990	50	49	1	10	24	16
1991	48	48	0	9	29	10
1992	37	37	0	6	22	9
1993	43	42	1	5	25	13
1994	34	34	0	6	20	8
1995	42	42	0 ^r	2	31 ^r	9
1996	32	31	1	7	19	6
1997	26	26	0	4	17	5
1998	19	19	0	2	13	4
1999	30	29	1	6	20	4
2000	37	36	1	6	23	8
2001	16	16	0	2	12	2
2002	15	13	2	4	11	0
2003	25	23	2	3	15	7
2004	20	18	2	2	16	2
2005	22	22	0	5	13	4
2006	12	12	0	0	10	2
2007	10	9	1	4	6	0
2008	10	9	1	0	8	2
2009	15	15	0	3	10	2
2010	7	6	1	4	2	1
2011	15	13	2	4	10	1
2012	16	15	1	2	10	4
2013	8	7	1	3	5	0
2014	9	8	1	4	4	1
2015	5	5	0	0	5	0

Source: Defence Statistics (Health)

¹Figures are for regular personnel and only those reservists who have died whilst on operational deployment. Figures include male and female personnel.

²Naval Service includes Royal Navy and Royal Marines

³^r annotates where there has been an amendment to a previously published figure. This figure may change as a result of an inquest result.

Table A2: UK regular Armed Forces Suicide, open verdict and awaiting verdict¹ deaths by Service^{2,3} and gender, numbers and percentages⁴
1984-2015

Verdict	All						Naval Service				Army				RAF			
	All		Male		Female		Male		Female		Male		Female		Male		Female	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Suicide	628	100	608	97	20	3	98	16	3	<1	381	61	10	2	129	21	7	1
Open	180	100	176	98	4	2	38	21	1	<1	102	57	3	2	36	20	0	0
Waiting Verdicts*	12	100	11	92	1	8	2	17	0	0	8	67	1	8	1	8	0	0

Source: Defence Statistics (Health)

¹ Awaiting verdicts since 2007. See paragraph 17.

² Naval Service includes Royal Navy and Royal Marines

³ Army figure has been amended from previously published figures. This figure may change as a result of an inquest result.

⁴ Percentages (%) have been rounded to the nearest whole number. For percentages greater than 0, but less than 1, "<1" is shown. Percentages may not add to 100% due to rounding.

Table A3: Male suicides in UK regular Army personnel aged less than 25 years by five year time period & age group, SMR¹ and age-specific mortality ratios² 1984-2015

Time period	Under 20		20-24	
	n	SMR (95%CI)	n	SMR (95%CI)
1984-2015	73	144 (115-182)	168	81 (70-95)
1984-1988	10	71 (34-130)	33	73 (52-102)
1989-1993	23	184 (117-276)	49	94 (71-124)
1994-1998	15	235 (132-388)	40	110 (80-149)
1999-2003	15	178 (99-293)	24	86 (55-128)
2004-2008	7	135 (54-277)	11	51 (25-91)
2011-2015	2	83 (10-298)	9	61 (28-116)

Source: Defence Statistics (Health)

¹ Ratios have been standardised for calendar year.