Ministry of Defence

A study of deaths among UK Armed Forces personnel deployed to the 1982 Falklands Campaign: 1982 to 2013

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INTRODUCTION

1. This Statistical Notice provides summary statistics on the causes of deaths that occurred among the UK Armed Forces veterans of the 1982 Falklands Campaign between 14 June 1982 (end of hostilities) and 31 December 2013. These statistics are based on deaths in this time period that were reported to the Ministry of Defence (MOD) by 1 February 2014. Information on deaths that may have occurred during the period 14 June 1982 to 31 December 2013 but are reported to the MOD after the release of this publication will be included in future publications.

2. In total, 25,948 UK Armed Forces personnel received the South Atlantic medal, awarded for service in the 1982 Falklands Campaign. Of these, 237 UK Armed Forces personnel died during the campaign (of which 86 were Royal Navy, 27 were Royal Marines, 123 were Army and one was RAF).

3. In addition to the 237 UK Armed Forces deaths during the campaign, four personnel from the Royal Fleet Auxiliary, six from the Merchant Navy and eight Hong Kong sailors and three Falkland islanders also died. This statistical notice does not include any follow up for these populations who also served as part of the UK task force during the Falklands campaign.

4. The purpose of this statistical notice is to compare the deaths records of the 25,713 UK Service personnel who survived the Falklands campaign over the last 31 years with the UK civilian population and the cohort of veterans who deployed to the Gulf 1 campaign in 1991.

5. Details of UK Service personnel excluded from the study have been provided in the section ‘Data, Definitions and Methods’.

KEY POINTS

6. As at 31 December 2013: 21,360 (85%) Falkland veterans were flagged by either NHSIC or GRO; 1,478 (6%) had died; 376 (2%) had emigrated; and 1,808 (7%) were lost to follow up.
7. As at 31 December 2013 there were 1,478 deaths among the Falkland veterans. This is fewer that would be expected compared to similar age and gender specific mortality rates in the UK population (estimated 2,228 deaths).
8. Of the 1,478 Falkland veteran deaths 1,171 (79%) were the result of disease related causes, 266 (18%) were the result of external causes of injury.
9. The risk of dying was lower or the same as the UK general population for all causes of death and for each year, with the exception of 1989 when there was an excess of transport accident deaths amongst Falkland veterans compared to the UK population.
10. The largest group of deaths due to external causes was due to intentional self-harm and events of undetermined intent (suicides and open verdict deaths) with 101 deaths (7% of all deaths). Thus the statement that ‘more Falkland veterans have taken their own lives since the South Atlantic conflict ended than the number of Servicemen killed in action’ (n = 237) has not been supported by the evidence presented.
11. Thus the MOD can confirm that there was no excess in the rates of suicide in Falkland veterans compared to the UK general population.

BACKGROUND

12. The Falklands Campaign began on Friday 2 April 1982, when Argentine forces invaded and occupied the Falkland Islands and South Georgia. The British government dispatched a task force to retake the islands. The resulting conflict lasted 74 days and ended with the Argentine surrender on 14 June 1982, which returned the islands to British control.

13. In 2002, at the time of the 20th anniversary of the conflict the Daily Mail ran a story which included the line 'more veterans have taken their own lives since the South Atlantic conflict ended than the number of Servicemen killed in action'. The article was prompted by the tragic death by suicide of Charles 'Nish' Bruce, a veteran of the Falklands. The Daily Mail quoted SAMA 82, the South Atlantic Medal Association 1982, as believing 'some 264 veterans have now taken their own lives'.

14. The quotes from the Daily Mail have since been promulgated in the wider press and on the internet, for example, sites such as Wikipedia. Although Wikipedia did recognise that there was no estimate available for the expected number of suicides that would have occurred anyway. In the same year the BBC quoted Denzil Connick (ex-paratrooper) as saying 'nobody knows the official figure for suicides – that is one of the problems. But we know for sure that we have lost an average of 10 veterans per year since the conflict ended. That makes 200 veterans who have committed suicide and that is bound to be a conservative effort'.

15. In 2012, at the time of the 30th anniversary of the conflict SAMA 82 were quoted in the press as stating the number of Falkland veterans who have committed suicide as currently around 300.

16. The MOD has been repeatedly accused of hiding the true cost of the conflict and of not recognising the difficulties faced by the veteran community.

17. In 2010, Defence Statistics were finally in a position to answer the question as to whether there was an excess of suicides amongst the Falkland veterans, compared to the UK civilian population. Defence Statistics approached the policy leads, who agreed to cover the NHS-IC costs for flagging the cohort and any subsequent death notifications.

DATA, DEFINITIONS & METHODS

18. The deployment records were sourced from information held by the MOD Medals Office and matched to the NHS Central Registry (NHS-CR), linked to the UK deaths registry, in order to obtain death certificates for any individuals in the cohort who have died since 14 June 1982. This data was then sent to Defence Statistics (Health) for analysis.

19. The findings include deaths that occurred to Falkland veterans whilst in Service and deaths that occurred after personnel had left the UK Armed Forces.

20. In order to conduct this study Defence Statistics obtained clearance from the MOD Ethics committee and from the NHS Ethics and confidentiality committee approval for access to patient identifiable without consent under section 251 of the NHS Act 2006 and the Health Service (Control of Patient Information) Regulations 2002 ('section 251 support'). This was required in order to flag and receive death certificates from the NHS without patient consent. It was not feasible for Defence Statistics to contact the 25,713 surviving Falkland veterans in order to obtain individual consent, due to the time lag between the end of the conflict and the start of the study resulting in many of the Service personnel having left Service and thus the lack of up to date location information for the cohort and due to the large number of individuals in the cohort.

21. The Falklands cohort consisted of UK Armed Forces personnel who received the South Atlantic Medal, both with and without rosette. The Medal with distinguishing rosette was awarded for 1 days' service in the Falkland Islands or their dependencies or in the South Atlantic, south of 35° South and north of 60° South, or for one operational sortie south of Ascension Island, between 2 April and 14 June 1982. The Medal alone was awarded for 30 days continuous or accumulated service in the South Atlantic, south of 7° South and north of 60° South, commencing between 2 April and 14 June 1982 and completing no later than 12 July 1982.

22. The cohort does not include civilian personnel employed by the MOD (including the Royal Fleet Auxiliary, the Merchant Navy, MOD civil servants), by other Government Departments, or civilians working for Defence Contractors, the media or charitable and humanitarian organisations. Members of the Falkland Islands Defence Force were also excluded.

23. Of the 25,948 UK Armed Forces personnel identified as having received the South Atlantic Medal, however, the following were excluded from the study: 643 Gurkhas, 46 Service personnel with no date of birth recorded and the 237 UK Service personnel who died during the conflict.

24. UK Army Gurkha personnel were excluded from the analysis for two reasons: firstly, the date of birth of Gurkhas in Service in 1982 was not routinely held on MOD administrative databases or they were given a default date of birth. Date of birth is required to flag an individual's record on NHS Central Registries. Secondly, immigration laws previously precluded Gurkha veterans from settling in the UK and thus death records would not have been available. Although immigration law has changed in the interim (on 21 May 2009, the British Home Secretary announced that all Gurkha veterans who had served four years or more in the British Army before 1997 would be allowed to settle in Britain. Gurkhas serving after 1997 had been given UK settlement rights in 2004), it would not be possible to collect complete cause of death information for Gurkhas from NHS systems, and therefore they were excluded from the analysis. Date of birth was not found for 46 UK Armed Forces personnel and thus could not be matched to the NHS registry and thus they were also excluded from the analysis.

Data sources

25. One of the major hurdles that had to be overcome was how to identify the cohort of UK Service personnel who deployed on the Falklands campaign. In 1982 there was no centralised electronic database to capture UK Armed Forces personnel data, with most of a Service persons military record being held in paper files. In 2009 Defence Statistics identified that the names and Service numbers for those UK Service personnel who deployed on the Falklands campaign were held by the MOD Medals Office. Over the course of 12 months staff in Defence Statistics (Health) transcribed 25,948 entries from paper records onto an electronic database.

26. Naval Service records were transcribed from an electronic print out; Army records were transcribed from hand written individual medal slips; RAF records were transcribed from hand written A4 note books. Each entry included surname, initials, medal awarded, date of award and the Ship, Regiment or Squadron in which they served during the Falklands campaign.

27. Defence Statistics (Health) then linked the 25,948 entries with databases held within MOD, including legacy manpower datasets in order to validate the information and to obtain date of birth and full name, both of which were necessary in order to facilitate matching by the Health and Social Care Information Centre (HSCIC).

28. The cohort was run against Defence Statistics deaths database in order to identify any deaths that had occurred in-Service or as part of the 1991 Gulf 1 and Era cohorts, as these death certificates would already be held by the MOD.

29. Defence Statistics receive weekly notifications of all regular Armed Forces deaths from the Joint Casualty and Compassionate Cell (formerly the single Service casualty cells). Defence Statistics also receive cause of death information from military medical sources in the single Services. At the end of each calendar year, Defence Statistics cross-reference the medical information it holds against publicly available death certificate information available from the HSCIC. For 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 held by the ONS and other authorities including the Defence Inquest Unit.

30. Defence Statistics receive annual updates of UK population and deaths data from the Office for National Statistics (ONS), General Registrars Office, Scotland (GRO) and Northern Ireland Statistics and Research Agency (NISRA) in order to make comparisons to mortality rates in the UK general population. The UK general population data and UK deaths data for 2013 were not available for this statistical release to calculate UK estimated mortality rates and standard mortality ratios (SMR). Thus Defence Statistics has used the 2012 data as an estimate for the 2013 figures as there is little year on year variation in the UK figures. Thus any patterns reported here may be subject to minor changes when the 2013 data becomes available. The trends will be updated in the next release of this statistical notice.

31. To record information on cause and circumstances of death, Defence Statistics uses the World Health Organisation's International Statistical Classification of Diseases and Health-related Problems 10th revision (ICD-10). In addition, Defence Statistics also record the casualty reporting categories used by the Joint Casualty and Compassionate Cell, used for reporting to the Chain of Command and for notifying the next of kin.

32. In line with the definitions in ICD-10 a land transport accident is defined as any accident involving a device that has been designed for, or is being used at the time for, the conveyance of either goods or people from one place to another on land. The scope of this definition covers incidents that occur on and off the public highways and incidents that involve non-motorised forms of transport. The definition therefore includes all military specific vehicles irrespective of where the accident took place. Road traffic accidents refer only to accidents on a public road.

33. For suicides Defence Statistics rely exclusively on the information provided by coroners (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. This ensures the Department's objectivity as 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.

34. The statistics provided include both coroner-confirmed suicides and open verdict deaths, in line with the definition used by the ONS, since research has shown that these deaths share many similarities with suicides except that in the case of open verdict deaths, the intention of the deceased to take their life has not been sufficiently proven to the satisfaction of the coroner.

35. In addition to the in-Service deaths, information on deaths was sourced from the HSCIC (England and Wales) and the General Register Office (GRO) for Scotland.

36. The Central Services Agency produce all coded death information for medical research in Northern Ireland. Defence Statistics plan to work with this organisation to identify any Falkland veterans in Northern Ireland, and thus receive updates on deaths, emigrations etc.

37. In order to calculate SMR by cause of death, additional UK death data by individual age, year, gender and cause of death were obtained from the ONS (deaths in England and Wales), GRO (deaths in Scotland) and NISRA (deaths in Northern Ireland). This data has been used for all calculations where the Falkland veterans are compared to the UK population (SMR and UK estimated mortality rates). 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 used 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 dominator population for the 2006 SMR calculation which 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.

Data Matching – HSCIC

38. Prior to sending the Falklands cohort to the HSCIC Defence Statistics checked other data sources for information already held by the MOD. Of the 25,948 Falkland veterans, the following records were excluded from the cohort that was sent to the NHS-CR for matching:
    - 237 records as died during the Falklands conflict
    - 140 records as they died in-Service
    - 643 records Gurkhas (no date of birth)
    - 46 records with no date of birth
    - 1,527 records already flagged as part of the 1991 Gulf 1 cohort
    - 1,462 records already flagged as part of the 1991 Era cohort

    Thus 21,893 records from the Falklands cohort were sent to the NHSIC for matching.

39. In order to receive updates from the HSCIC and GRO, the Falklands cohort was flagged by the HSCIC on the NHS Central Registry. First name, surname and date of birth of each member of the Falklands cohort were provided to the HSCIC. The HSCIC used this information to flag each cohort member on their MIDAS data system.

40. The Falkland veteran cohort was run through an electronic data matching protocol using the key variables date of birth, full first name and surname.

41. If no match was found using the automatic process using all three variables then the record was output to an operator for manual matching, using other data items supplied that were not part of the auto-matching criteria, along with cross-checking various other tracing databases. Any records still not matched were returned as no traces and thus were considered as 'lost to follow up'. Additional manual matching was carried out by the HSCIC to identify anyone in the Falklands cohort who died prior to 1991, as automatic matching would not pick up these individuals.

42. The HSCIC use the flags on their system to provide regular updates on the current status of each member of the Falklands cohort. Defence Statistics receive quarterly updates with the latest flagging status for cohort members. This shows whether an individual was:
    - Flagged (i.e. the individual was registered with a GP and alive at the time that data cut off was declared)
    - Dead
    - Emigrated (i.e. the individual has emigrated from the UK and no further notification will be received, unless they return to UK and register with a GP)
    - Lost to follow up (the HSCIC has no record of this individual and we will not be notified if this individual dies)

43. Of the 21,893 Falkland cohort who were sent to the HSCIC in 2012, 82% of the records were electronically matched, 10% were manually matched and 8% were lost to follow up (no trace).

44. As at 31 December 2013, of the 25,022[1] Falkland veterans:
    - 21,360 (85%) Falkland veterans were flagged by either HSCIC or GRO;
    - 1,478 (6%) had died
    - 376 (2%) had emigrated;
    - 1,808 (7%) were lost to follow up.

45. Table 1 provides a breakdown of the record status of the Falklands cohort by Service.

Table 1: Status of the Falklands Cohort[1] by Service, as at 31 December 2013, numbers

Status	All	Royal Navy	Royal Marines	Army	RAF
All	**25,022**	**12,978**	**3,795**	**6,241**	**2,008**
Flagged	**21,360**	11,199	3,134	5,335	1,692
Dead	**1,478**	767	205	381	125
Emigrated	**376**	205	66	79	26
Lost to follow up	**1,808**	807	390	446	165

[1] Original cohort 25,948 minus 237 died during conflict, 643 Gurkhas & 46 Service personnel with no date of birth

1. Defence Statistics receive quarterly updates with the latest flagging status for cohort members

46. Defence Statistics receive monthly updates of deaths from the HSCIC and GRO for individuals in the Falklands cohort. Sometimes Defence Statistics will be notified that an individual has died but will not be provided with a cause of death. These individuals are included in the category 'other deaths for which cause data are not yet available'. Defence Statistics regularly check with the HSCIC and GRO for updates on the cause of death for these records, any updates received on cause of death will be updated in the next release of this statistical notice.

Statistical methods

47. To enable comparisons with the UK general population, UK mortality rates have been calculated based on deaths and population data provided by the ONS (for England and Wales), GRO (for Scotland) and NISRA (for Northern Ireland). These UK mortality rates were applied to the age and gender profile of the Falklands and Gulf cohort to estimate comparable mortality rates for disease related deaths and deaths due to external causes (see **Figure 2** and **Figure 4**). The UK deaths data were also applied to the Falklands veterans to calculate the expected number of deaths in a similar sized cohort taken from the general UK population with the same age and gender profile as that of the Falkland cohort (see paragraph 74).

48. To enable statistical 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 Falkland veterans with the UK population.

49. The 95% confidence interval provides the range of values within which we expect to find the real underlying value of the study indicator, with a probability of 95%. If the confidence interval does not include 100, the result is deemed to be statistically significant. Thus if a 95% confidence interval around a value excludes the comparison value, then a statistical test for the difference between the two values is likely to be significant at the 0.05 level. If two confidence intervals do not overlap, a comparable statistical test would indicate a statistically significant difference.

50. Note that confidence intervals have been provided due to imprecision that arises, not as a result of sampling variation, but due to the 'natural' variation in Falkland cohort deaths. For the SMR calculations, it is the underlying difference between the Falkland and Gulf cohorts and the UK population that is of interest and the actual values observed in any one time period only give an imprecise estimate of this 'underlying risk'.

51. Due to the small number of deaths, 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. This means there is a greater range in the data which makes it more difficult to interpret the underlying trends.

52. Due to the length of time that has elapsed since the Falklands cohort and this study, and the difficulty in obtaining Service records from that era, it was not possible to construct an 'era' cohort with which to compare the Falkland veterans. An 'era' cohort would be defined as an equivalent sized age and gender matched sample from the UK Armed Forces population who were serving during the same period as the Falklands campaign but who did not deploy. However, Defence Statistics monitor deaths amongst the veterans of the 1991 Gulf 1 conflict. This cohort consists of 53,409 UK Service personnel deployed to any Gulf state between 1 September 1990 and 30 June 1991 and for the Navy afloat, all personnel aboard a ship east of the Suez canal during that period. Thus this cohort has been presented alongside the Falklands cohort as a comparator veteran population.

Data quality

53. Using HSCIC data matching protocols and central registries is the most comprehensive method to identify deaths within a particular cohort. However, the source data was gathered from paper records, which may have resulted in transcribing errors. In addition the records only recorded initials and not full first name, thus it is possible that some of the 1,808 individuals lost to follow up (that is were not found by the HSCIC) may in fact have either a GP registration or have died in the UK.

54. Defence Statistics however, have identified another source of deployment records for the Falklands cohort and thus will review the 1,808 records originally lost to follow up in 2012 and should more information, such as full name, become available, will work with the HSCIC and run a update on the flagging protocols. Defence Statistics will aim to report this in the next release of this statistical notice.

55. The information collated from the HSCIC does not include data held by the Northern Ireland Central Services Agency who produce all coded death information for medical research in Northern Ireland. It is hoped that Defence Statistics will be able to flag and receive regular updates for Northern Ireland in line with England and Wales, and Scotland.

56. The HSCIC have electronic records from 1991, prior to this date paper records have been searched for matches. Thus it is possible that a proportion of the 1,808 individuals initially lost to follow up in 2012 may not have been found in the manual matching phase.

57. Several findings in this Statistical Notice are based on small numbers. This is evidenced by the wide range of several confidence intervals presented in this statistical notice. We strongly recommend caution when interpreting some of the findings.

Strengths and weaknesses of data presented in this notice

58. NHS central registries provide the most comprehensive data on deaths in the UK. Whilst the MOD provided the cohort for flagging, the matching of the cohort to the registries was completed by the HSCIC thus ensuring that national protocols were followed.

59. However, there is evidence to suggest that the manual data matching conducted by the HSCIC for the years 1982 to 1990 may have missed flagging a number of the cohort. This was not unexpected due to the difficulties of linking information out with electronic systems and protocols; however, it has affected the interpretation of some of the early trends presented (particularly for deaths as a result of external causes of injury).

60. One of the strengths of this publication is that, as at 31 December 2013, 91% of surviving cohort members was currently flagged by the NHS, which means that Defence Statistics are still able to follow up and receive death notifications for a high proportion of the Falkland veterans.

61. Some records were excluded from the final Falklands cohort as we did not hold sufficient information for the HSCIC to flag the records e.g. Gurkhas and individuals with no date of birth available.

62. The data presented exclude any deaths to Falkland veterans which may have occurred in Northern Ireland.

63. Deaths where the inquest has been adjourned, or where the cause of death has not yet been provided mean the final cause of death information is not always timely and complete for recent years. This can lead to revisions in the cause of death categories when further information is received. Users should be aware of this weakness when using the information presented in this notice.

64. The information presented in this publication has been structured in such a way to release sensitive fatality information into the public domain in a way that contributes to the MOD's accountability to the British public but which doesn't risk breaching the rights of surviving Falkland veterans or of the families of deceased Service personnel and veterans, for which the MOD has a residual duty of care.

RESULTS

All deaths

65. **Table 2** provides details of the number of deaths to personnel who deployed to the Falklands campaign between 15 June 1982 and 31 December 2013, by cause of death.

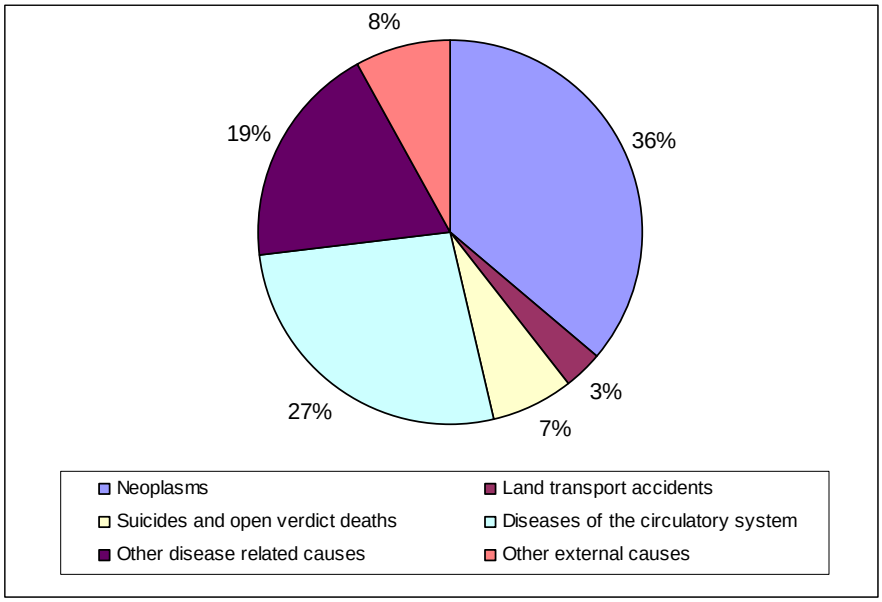
66. There were 1,478 deaths among the Falkland veterans up to 31 December 2013; of these 141 (10%) occurred whilst the Falkland veterans were still in-Service, of which one died whilst deployed on Op Granby (1991 Gulf 1 conflict) and four died whilst deployed on Op BANNER in Northern Ireland. Of the 141 in-Service deaths, 13 were confirmed by a coroner as suicide or open verdict deaths. 1,337 (90%) Falkland veterans have died since leaving the UK Armed Forces.

67. Of the 1,478 Falkland veteran deaths 1,171 (79%) were the result of disease related causes, whilst 266 (18%) were the result of external causes of injury.

68. **Table 2** shows that the largest group of deaths due to external causes was due to intentional self-harm and events of undetermined intent (suicides and open verdict deaths) with 101 deaths (7% of all deaths). Thus the statement that 'more Falkland veterans have taken their own lives since the South Atlantic conflict ended that the number of Servicemen killed in action' has not been supported by the evidence presented.

69. **Figure 1** presents the main causes of death for the Falklands cohort.

Figure 1: Deaths among the Falkland veterans by main cause of death, 1982 – 2013, percentages[1]



1. Percentages have been calculated using the total for all cause coded deaths.

Table 2: Deaths, UK Armed Forces personnel - Falkland veterans[1] by cause of death[2], 1982 - 2013, numbers

Cause of death	Number of deaths
All deaths	**1,478**
All cause coded deaths	**1,442**
Disease related causes	**1,171**
Certain infectious and parasitic diseases	14
Neoplasms	517
Mental and behavioural disorders	15
Diseases of the nervous system	41
Diseases of the circulatory system	382
Diseases of the respiratory system	79
Diseases of the digestive system	91
All other disease related causes	32
External causes of mortality	**266**
Transport accidents	71
Land transport accidents	50
Pedestrian injured in transport accident	7
Motorcycle rider injured in transport accident	10
Car occupant injured in transport accident	19
Other land transport accidents[4]	14
Water transport accident	1
Air and space transport accident	20
Other external causes of accidental injury	82
Falls	17
Exposure to inanimate mechanical forces	5
Accidental drowning and submersion and other accidental threats to breathing	14
Accidental poisoning by and exposure to noxious substances	9
Accidental exposure to other and unspecified factors	28
Other	9
Intentional self harm and events of undetermined intent[5]	101
Assault	3
Legal intervention and operations of war	2
Injury, poisioning and certain other consequences of external causes	7
Ill-defined and unknown causes of mortality[3]	**5**
Cause of death not yet available	**36**

1. UK Armed Forces and veteran UK Armed Forces personnel only.
2. Causes have been coded to the World Health Organisation's International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10), 1992.
3. Includes cases with insufficient information on the death certificate to provide a known cause of death.
4. Under ICD-10 coding if the death certificate does not specifically mention the type of vehicle that was involved in the accident, the death is coded to "motor- or non-motor vehicle accident, type of vehicle unspecified".
5. 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.

70. **Table 2** shows that the disease related deaths among Falkland veterans accounted for 79% of all deaths.

71. The main cause of disease related deaths amongst the Falkland veterans was neoplasms with 517 deaths (44% of all disease related deaths). **Table 3** provides further details on the specific cancer sites.

72. There were 382 deaths due to diseases of the circulatory system (including ischaemic heart disease and cerebrovascular disease) among Falkland veterans (33% of all disease related deaths).

Table 3: UK Armed Forces personnel - Falkland veterans, Deaths due to Neoplasms, 1982 - 2013, numbers [1]

Major cancer sites and specific sites with at least five deaths

ICD code	Cancer site	Number of deaths
C00-D48	**Neoplasms**	**517**
C00-C99	**Malignant Neoplasms (MN)**	**512**
C00-C14	**MN of lip, oral cavity and pharynx**	**18**
C09	MN of tonsil	5
C15-C26, C48	**MN of digestive organs and peritoneum**	**157**
C15	MN of oesophagus	34
C16	MN of stomach	20
C18	MN of colon	26
C20	MN of rectum	11
C22	Malignant neoplasm of liver and intrahepatic bile ducts	12
C25	MN of pancreas	32
C26	MN of other and ill-defined digestive organs	13
C30-C39, C45	**MN of respiratory and intrathoracic organs**	**115**
C34	MN of bronchus and lung	111
C40-C44, C47, C49-C50	**MN of bone, connective tissue, skin and breast**	**36**
C43	Malignant melanoma of skin	13
C45	Mesothelioma	12
C49	MN of other connective and soft tissue	6
C51-C68	**MN of genitourinary organs**	**54**
C61	MN of prostate	18
C64	MN of kidney, except renal pelvis	22
	MN of bladder	13
C69-C80	**MN of other and unspecified sites**	**92**
C71	MN of brain	31
C79	Secondary MN of other sites	30
C80	MN without specification of site	24
C81-C96	**MN of lymphatic and haematopoietic tissue**	**38**
C82-C85, C91.4, C96	Non-Hodgkin's lymphoma	20
C90	Multiple myeloma and malignant plasma cell neoplasms	8
C92	Myeloid leukaemia	10
C97	**Malignant neoplasms of independent (primary) multiple sites**	**2**
D00-D48	**In situ neoplasms, benign neoplasms and neoplasms of uncertain behaviour or unspecified nature**	**5**

1. Where major cancer sites are not shown, there were no deaths in the Falkland veterans

73. Please note that **Table 3** only presents specific cancer sites when there were five or more deaths in one of the cohorts. However, deaths were monitored for **all** cancer sites.

Comparison with UK General Population

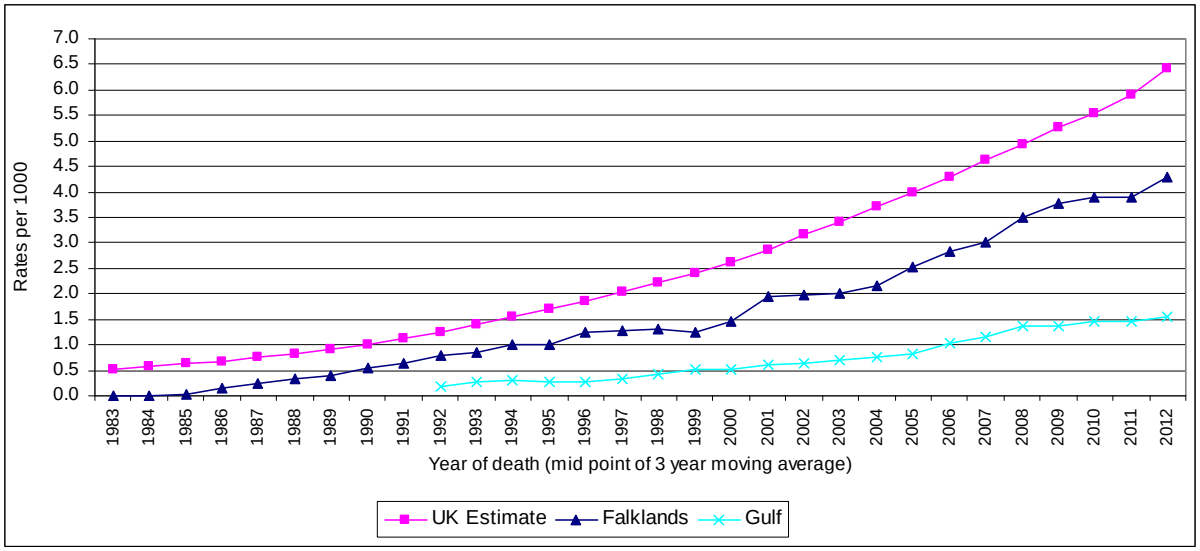
Standardised Rates

74. UK general population mortality rates were applied to the age and gender profile of the Falklands cohort to estimate comparable mortality rates. There would have been an estimated 2,228 deaths among Falkland veterans if they had experienced the age and gender specific mortality rates of the UK general population, compared to the 1,478 deaths that have actually occurred between 1982 and 2013, thus there were fewer than expected deaths among Falkland veterans than in the UK general population.

75. Mortality rates for disease related causes for both Falkland and Gulf veterans have gradually increased between 1982 (since 1991 for Gulf cohort) and 2013 (**Figure 2)**. These follow the trends in rates for disease related causes among the UK general population. This suggests that the increase in disease related deaths among Falkland and Gulf veterans over time reflects the natural ageing of the cohort. The mortality rates due to disease related causes for both Falkland and Gulf veterans were significantly lower than for the UK general population.

76. This is likely to be due to the 'healthy worker effect' which is often observed in occupational studies. Individuals in the UK Armed Forces would be expected to show lower levels of disease related mortality, as they were likely to have higher levels of fitness and lower levels of ill health than the general UK population.

Figure 2: Falkland and Gulf mortality rates for disease related causes, 3-year moving average rates per 1,000 personnel [1,2,3]

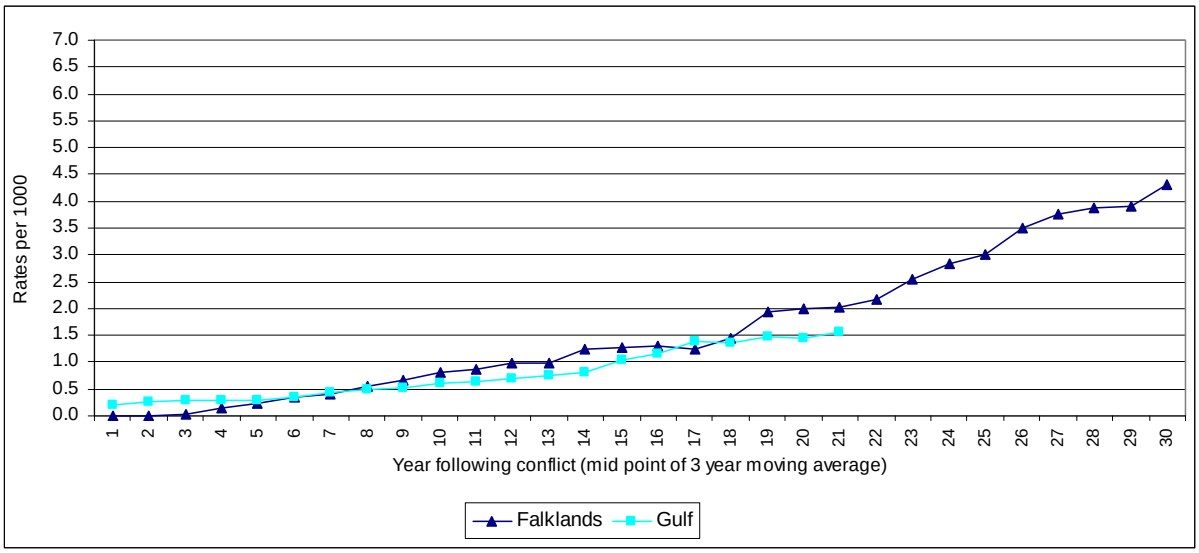


1. Data for 15 June – 31 December 1982 and 21 April – 31 December 1991 have been adjusted to a full year.
2. Disease related deaths increase with increasing age, thus year on year comparisons are not valid for Falkland and Gulf veterans, see paragraph 77.
3. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

77. The apparent difference between the Falkland and Gulf mortality rates presented in **Figure 2** is likely to be due to the different age demographics of the populations. The average age at deployment to the Falklands Campaign and the 1991 Gulf 1 Campaign were 25 years and 27 years respectively. Thus the apparent difference in the mortality rates between the two populations can be explained by the difference in their age profiles, with the Falkland veterans on average 12 years older that the Gulf veterans in each comparative year; for example mortality rates of Falkland veterans in 1992 should be compared to Gulf veteran mortality rates in 2004.

78. **Figure 3** presents Falkland and Gulf mortality rates for disease related deaths by the number of years following conflict. For each year following conflict, Falklands veterans were on average 2 years older than Gulf veterans. The Falklands and Gulf cohorts show the same trend for disease related deaths over time.

Figure 3: Falkland and Gulf mortality rates for disease related causes of mortality by year following conflict, 3-year moving average rates per 1,000 personnel[1,2]

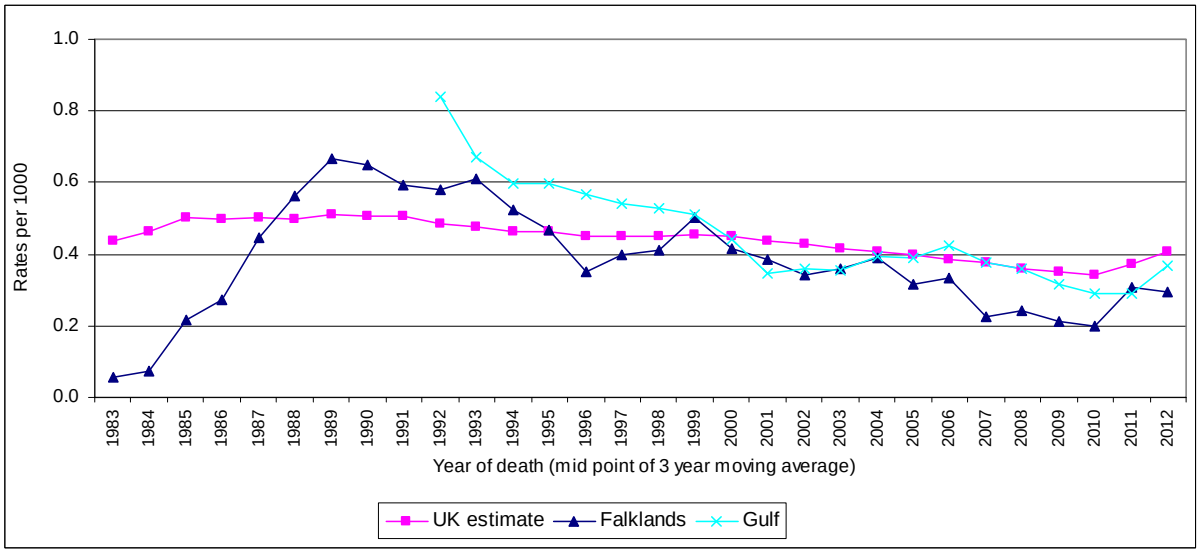


1. Data for year one have been adjusted to a full year.
2. Low number of deaths year 1-4 Falklands likely result of missed records due to manual matching of records by HSCIC

79. **Figure 4** presents the external cause of injury rates for the Falklands and Gulf cohorts compared o the UK estimate. The trend for the UK general population has stayed constant over the last 31 years. In contrast the Falkland veteran's mortality rate increased until 1990, but has since fallen to below the UK estimate.

80. In comparison the Gulf veteran's mortality rate was higher than the UK general population in the first few years after the Gulf conflict, but has fallen each year and since 1999 has shown the same trend as the UK general population.

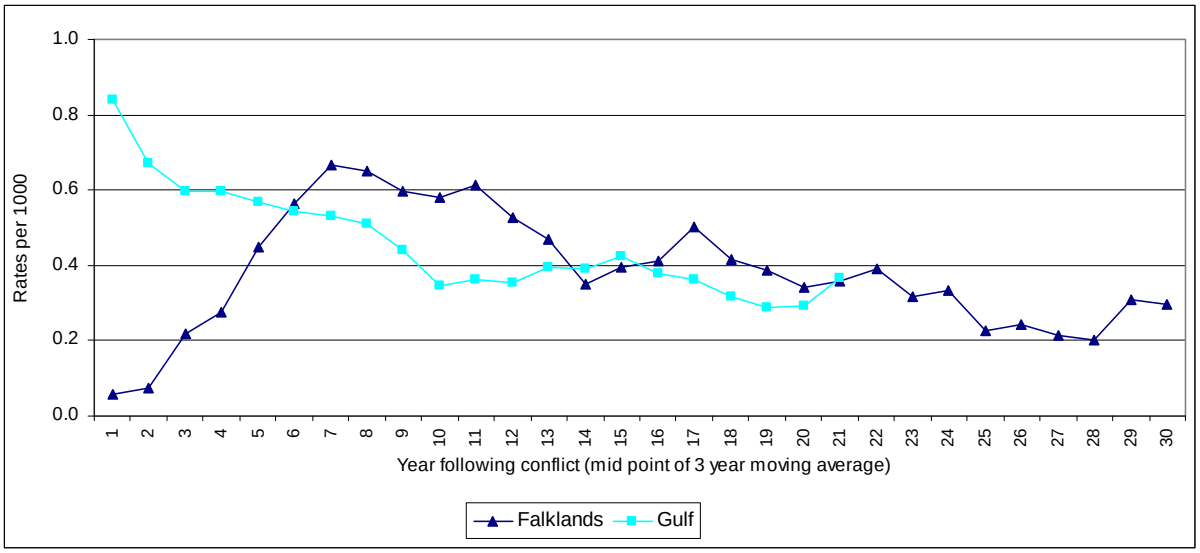
Figure 4: Falkland and Gulf mortality rates for external causes of mortality, 3-year moving average rates per 1,000 personnel [1,2]



1. Data for 15 June – 31 December 1982 and 21 April – 31 December 1991 have been adjusted to a full year.
2. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

81. **Figure 5** presents Falkland and Gulf mortality rates for external causes of death by the number of years following conflict. For each year following conflict, Falkland veterans were on average 2 years older than Gulf veterans.

Figure 5: Falkland and Gulf mortality rates for external causes of mortality by year following conflict, 3-year moving average rates per 1,000 personnel[1,2]



1. Data for year 1 have been adjusted to a full year.
2. Low number of deaths year 1-4 Falklands likely result of missed records due to manual matching of records by HSCIC

82. The apparent difference between the Falkland and Gulf cohorts for deaths due to external causes in the first four years post conflict was most likely due to the numbers of Falklands personnel lost to follow up due to manual matching of records by the HSCIC for the period 1982 to 1990 (paragraph 56 and 59).

Standardised Mortality Ratios (SMR)

83. In order to compare deaths among the Falklands and Gulf cohorts with those among the UK population, Standardised Mortality Ratios (SMR) have been calculated for each cohort. The year on year changes in the UK population have been taken into account in these calculations. An SMR below, equal to, or above 100 indicates that the rate for the Falkland cohort is respectively below, equal to, or higher than the rate in the UK population (see '**Data, Definition and Methods'** for further clarification).

84. 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.

85. Overall SMR were calculated for the Falkland cohort covering all reported deaths from 1982 to 2013. The SMR showed that Falkland veterans had a significant 34% decreased risk of dying (SMR=66, 95% CI:63-70) compared to the UK population (**Table 4**).

Table 4: Falkland veterans, Deaths by Cause, 1982-2013, numbers & standard mortality ratios (SMR)[1] and 95% confidence intervals

Cause of death	Number of deaths	SMR	95% CI
All causes	**1,478**	**66**	**(63 - 70)**
All disease related deaths	1,171	62	(58 - 65)
Neoplasms	517	73	(67 - 80)
Circulatory	382	59	(54 - 66)
All external causes	266	84	(74 - 94)
Suicide & open verdict	101	67	(55 - 82)
Transport accidents	71	96	(76 - 121)

1. Standardised mortality ratios have been age and gender standardised

86. Specific SMR were also calculated for the most common causes of death: neoplasms, diseases of the circulatory system, suicide and open verdicts and transport accidents (**Table 4**). For disease related deaths the Falklands veterans had a 38% significantly decreased risk of dying compared to the UK general population (SMR = 62, 95%CI=58-65). For deaths due to neoplasms (cancers) there was a 27% significant decreased risk of dying compared to the UK general population (SMR = 73, 95%CI=67-80).

87. For deaths due to external causes there was a 16% significant decreased risk of dying compared to the UK general population (SMR = 84, 95% CI=74-94). For deaths due to intentional self harm and events of underdetermined intent (suicide and open verdict deaths) there was a 33% significant decreased risk of dying compared to the UK general population (SMR = 67, 95%CI=55-82).

88. For transport accidents there was no difference between Falkland veterans and the UK general population (SMR = 96, 95%CI=76-121). This result was different to that reported in the 2014 National Statistic release on Gulf veterans where the risk of dying from a transport accident was statistically significantly higher than the UK general population (SMR = 186, 95%CI=163-213).

89. This difference may be due to the different composition of the Falkland and Gulf populations. A large proportion of the Falkland veterans were from the Naval Service (67%), whilst the Army had the highest proportion of veterans in the Gulf 1 conflict (70%).

Trends over time

90. **Table 5** provides the SMR for each year from 1982 to 2013. These show in each of the 31 years the Falkland veterans had the same risk of dying compared to the UK general population and for some years, notably the period 1982 to 1988 and again between 2003 and 2013 they have been at a significantly decreased risk of dying compared to the UK general population.

91. The numbers of deaths reported between 1982 and 1985 were very low, this is most likely due to the numbers of records that have not been successfully matched by the HSCIC due to the process of manual matching of records required for these years (paragraph 56 and 59).

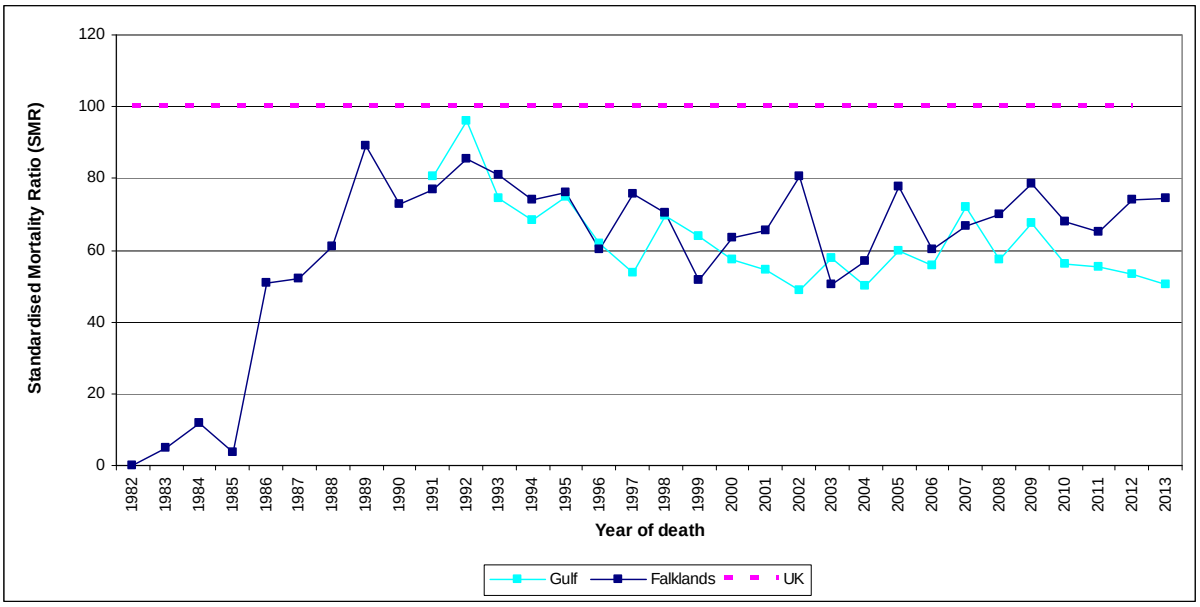
Table 5: Falkland veterans deaths by year, 1982-2013, numbers[1], standard mortality ratios (SMR)[2] & 95% Confidence Interval (CI)

Year	Number	SMR	95% CI
All years	**1,478**	**66**	**(63 - 70)**
1982	0	0	- - -
1983	1	5	(2 - 35)
1984	3	12	(2 - 35)
1985	1	4	(0 - 21)
1986	14	51	(28 - 86)
1987	15	52	(29 - 86)
1988	19	61	(37 - 95)
1989	29	89	(60 - 128)
1990	26	73	(48 - 107)
1991	29	77	(52 - 111)
1992	34	85	(61 - 119)
1993	35	81	(58 - 113)
1994	34	74	(53 - 104)
1995	38	76	(55 - 105)
1996	32	60	(43 - 85)
1997	42	76	(56 - 102)
1998	43	70	(52 - 95)
1999	34	52	(37 - 72)
2000	44	63	(47 - 85)
2001	49	66	(50 - 87)
2002	65	80	(63 - 103)
2003	44	50	(37 - 68)
2004	52	57	(43 - 75)
2005	76	78	(62 - 97)
2006	63	60	(47 - 77)
2007	73	67	(53 - 84)
2008	83	70	(57 - 87)
2009	96	79	(64 - 96)
2010	88	68	(55 - 84)
2011	87	65	(53 - 80)
2012	109	74	(61 - 89)
2013	120	74	(62 - 89)

1. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC
2. Standardised mortality ratios have been age and gender standardised

92. **Figure 6** shows the variation in the SMR trend each year compared to the UK general population. The Falkland and Gulf veterans show similar trends over the time period.

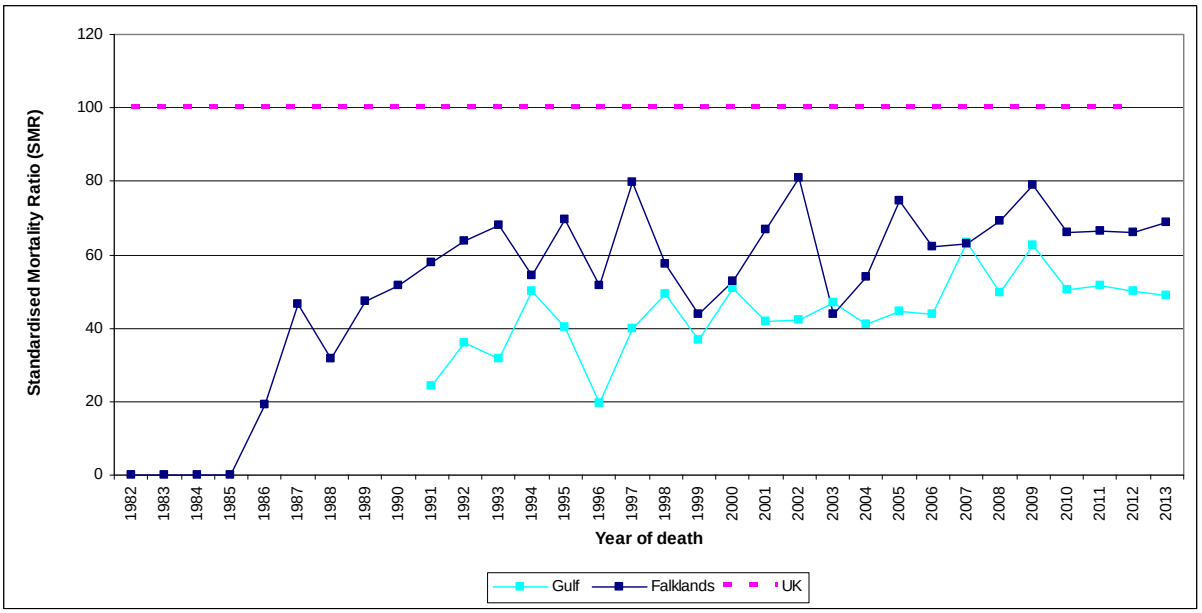
Figure 6: Falkland and Gulf veterans, All deaths by year, 1982 – 2013, standardised mortality ratios (SMR)[1,2,3]



1. Standardised mortality ratios have been age and gender standardised
2. The pink line indicates the value expected if the number of observed deaths in the veteran cohorts was the same as the number of expected deaths based on the age and gender structure of the UK population.
3. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

93. To further explore the trends over time, **Figures 7** and **9** present the SMR over time separately for disease related deaths and deaths due to external causes. **Figure 7** shows that the risk of dying due to disease related causes was significantly lower than the UK general population. In addition the trend for the Falkland veterans was very similar to that of Gulf veterans. Further supporting the potential impact of the healthy worker effect in relation to veterans of the UK Armed Forces.

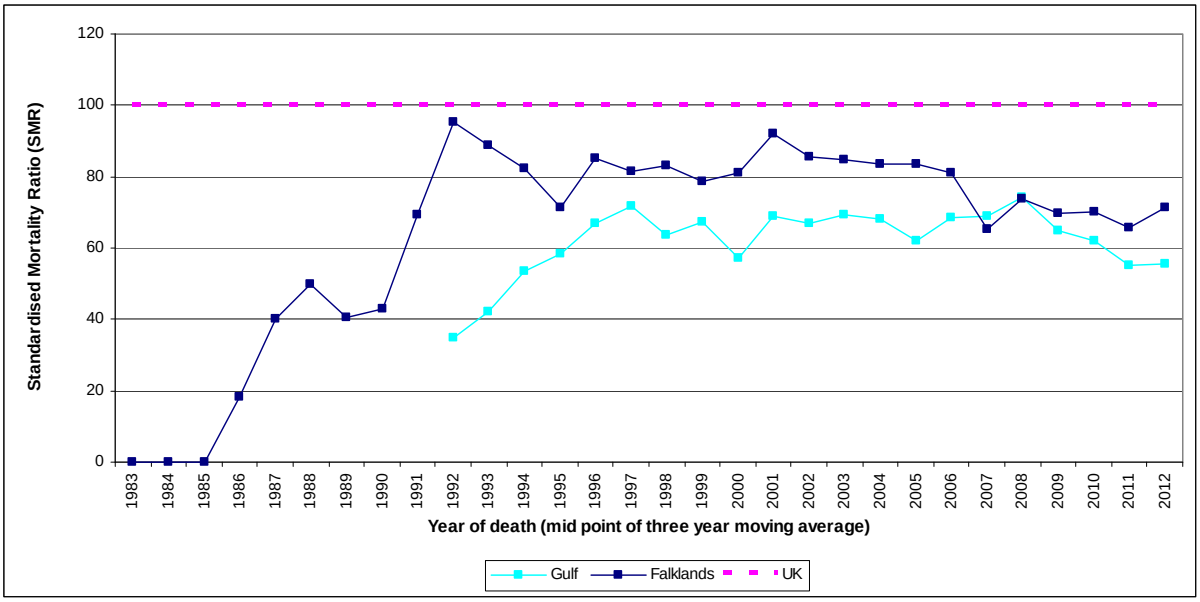
Figure 7: Falkland and Gulf veterans, disease related deaths by year, 1982 – 2013, standardised mortality ratios (SMR)[1,2,3]



1. Standardised mortality ratios have been age and gender standardised
2. The pink line indicates the value expected if the number of observed deaths in the veteran cohorts was the same as the number of expected deaths based on the age and gender structure of the UK population.
3. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

94. Cancers accounted for the largest cause of death amongst Falkland veterans (517 deaths in 31 years). SMR were calculated for each year from 1982 to 2013, to identify any trends over time for this cause of death. Due to the small number of deaths each year and the resulting fluctuation in SMR, three year moving averages have been calculated to smooth out the fluctuations and highlight trends over time (**Figure 8)**.

Figure 8: Falkland and Gulf veterans, Neoplasm (cancer) deaths by year, 1982 – 2013, standardised mortality ratios (SMR)[1,2,3,4]

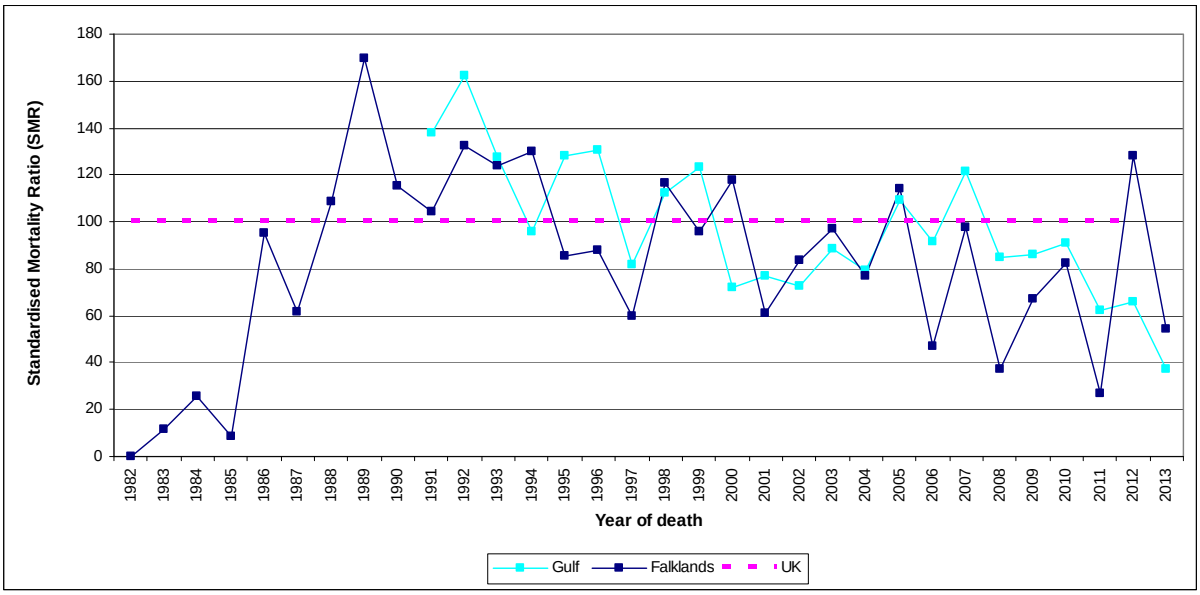


1. Standardised mortality ratios have been age and gender standardised
2. The pink line indicates the value expected if the number of observed deaths in the veteran cohorts was the same as the number of expected deaths based on the age and gender structure of the UK population.
3. Due to the small number of cancer related deaths over the 31 year period, 3 year moving averages have been presented to remove some of the random variation inherent in presenting small numbers.
4. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

95. **Figure 8** shows that for Falkland veterans the risk of dying from a cancer was the same as the UK general population. Between 2010 and 2012 the risk of dying from cancer as a Falkland veteran has been significantly lower than the UK general population. The Gulf cohort showed a similar trend.

96. **Figure 9** shows that the increase in deaths in the late 1980's, also presented in **Figures 4** and **6,** was due to an increase in the number of injury related deaths when compared to the UK general population. The trend for deaths due to external causes has changed over time: in the first four years post conflict the risk of dying from injury related deaths was low compared to the UK population, however please note that the most likely explanation for this finding is that records have not been matched due to manual data matching process for this time period (paragraphs 56 and 59). Since a peak in 1989 (the only year the difference was significantly higher) the trend has been decreasing, although since 1989 Falkland veterans risk of dying from an injury related death was no different to the UK general population.

Figure 9: Falkland and Gulf veterans, External cause of injury related deaths by year, 1982 – 2012, standardised mortality ratios (SMR)[1,2,3]



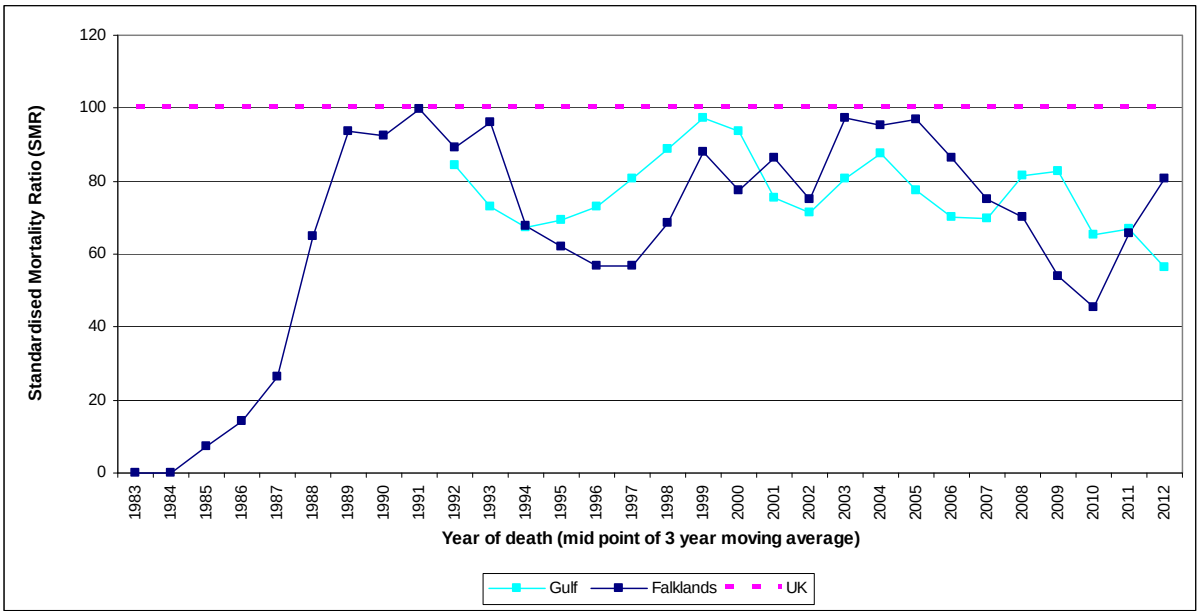
1. Standardised mortality ratios have been age and gender standardised
2. The pink line indicates the value expected if the number of observed deaths in the veteran cohorts was the same as the number of expected deaths based on the age and gender structure of the UK population.
3. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

97. The original interest in deaths for the Falkland veterans was surrounding suicide related deaths. To investigate further the impact of suicide deaths for the Falkland veterans the SMR were calculated for each year from 1982 to 2013, to identify any trends over time for this cause of death (**Figure 10**).

98. Due to the small numbers of suicide and open verdict deaths in the Falkland veterans, 101 deaths over the 31 year period, three year moving averages have been presented to remove some of the random variation that occurs when presenting small numbers over time. The number of deaths per year, including individual SMR and 95% confidence intervals has been provided in **Table A1** in the annex at the end of this statistical notice.

99. For each year between 1982 and 2013 there have been fewer than 10 deaths with a coroner confirmed suicide or open verdict. For the entire period, the risk of dying as a result of suicide for the Falkland veterans has been no different to that in the UK general population (**Figure 10**, **Table A1**). This finding was consistent with that reported for the 1991 Gulf veteran population (**Figure 10**).

Figure 10: Falkland and Gulf veterans, Suicide & open verdict deaths by year, 1982 – 2013, standardised mortality ratios (SMR)[1,2,3,4]



1. Standardised mortality ratios have been age and gender standardised
2. The pink line indicates the value expected if the number of observed deaths in the veteran cohorts was the same as the number of expected deaths based on the age and gender structure of the UK population.
3. Due to the small number of suicide & open verdict deaths over the 31 year period, 3 year moving averages have been presented to remove some of the random variation inherent in presenting small numbers.
4. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

100. Thus suicides do not account for the increase in injury related deaths in the late 1980's presented in **Figure 9**. SMR by year were calculated for transport accidents in the Falkland veterans. Due to the small numbers of deaths each year (71 deaths over 31 years) and the resulting fluctuations in SMR, three year moving averages have been calculated to smooth out the fluctuations and highlight trends over time. **Figure 11** shows the variation in the SMR deaths due to transport accidents in the Falkland veterans each year compared to the UK general population and the Gulf cohort.

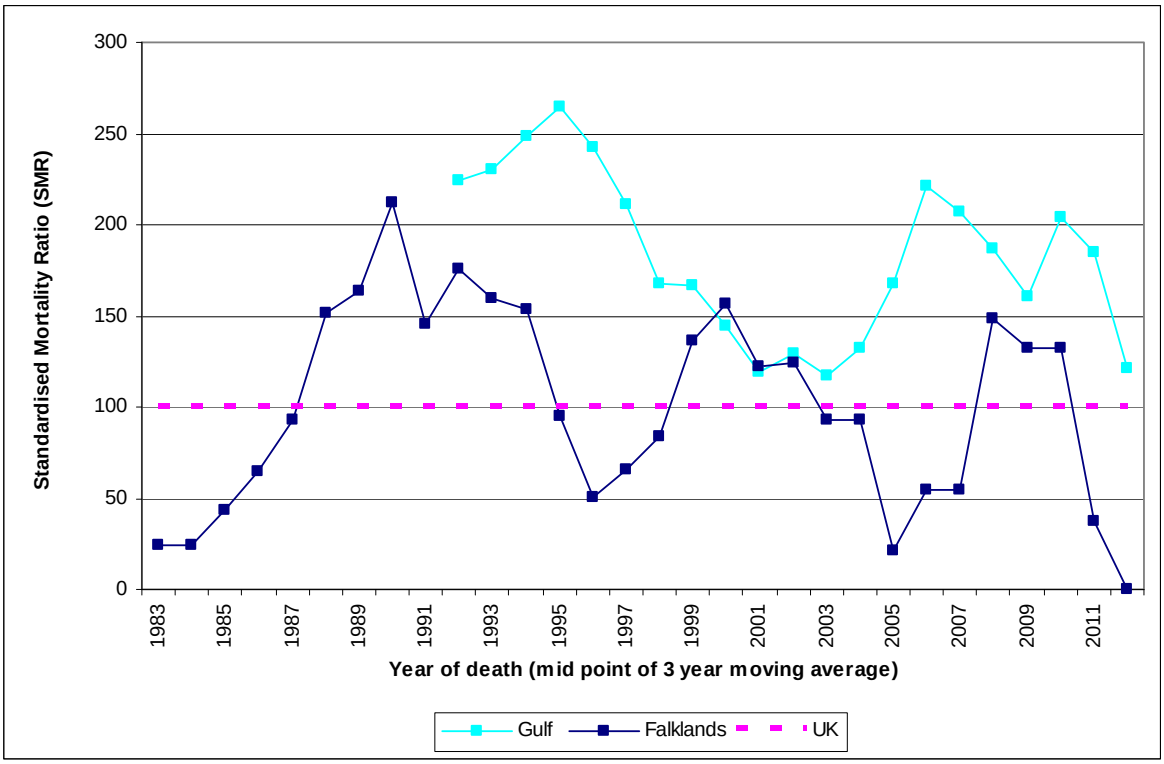
101. **Figure 11** shows that for Falkland veterans transport accident deaths were highest in 1989, and for this year only, the risk of dying from transport accidents was significantly higher than in the UK general population (SMR = 268, 95%CI=123-510). Since 1990 the risk of dying from a transport related accident has been the same as that in the UK general population.

102. This finding was different to that reported for the Gulf 1 cohort which resulted in a statistically significant increased risk of dying from a transport accident as at 31 December 2013 (**Figure 11**). This increase was thought to be due to an increase in risk taking behaviours following deployment as discussed by the research published by Kings College Centre for Military Health Research[2]. However, it should be noted that due to the difficulties already mentioned around manual data matching in the early years of the cohort this apparent difference may simple be due to missing data in the Falklands cohort rather than a real difference between the two military populations.

103. It is worth noting that for the period 1989 to 1991, there were 21 transport related deaths of which 16 occurred whilst Falkland veterans were still in-Service. MOD's Official Statistic notice on in-Service land transport deaths[3] identified that Serving personnel were at a significantly increased risk of dying from a transport accident compared to the UK general population.

[2] Kings Centre for Military Health Research: a ten year report, September 2006
[3] MOD Official Statistic: Annual UK Regular Armed Forces Land Transport Accident Deaths 1 January 2002 to 31 December 2013

Figure 11: Falkland and Gulf veterans, Transport accident deaths by year, 1982 – 2012, standardised mortality ratios (SMR)[1,2,3,4]



1. Standardised mortality ratios have been age and gender standardised
2. The pink line indicates the value expected if the number of observed deaths in the veteran cohorts was the same as the number of expected deaths based on the age and gender structure of the UK population.
3. Due to the small number of transport accidents over the 31 year period, 3 year moving averages have been presented to remove some of the random variation inherent in presenting small numbers.
4. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC

Acknowledgements

104. With thanks to Diane Pryce and her team at the NHS-CR (Southport) for their efforts in coordinating the various approvals and processes that were required for data matching. Thanks also to Simon Lott and Philip Barns: Simon for his sterling efforts in transcribing the 25,948 deployment records into an electronic format and Phil for entering all the NHS deaths information into the MOD database. And to the MOD Medals Office without whose assistance in supplying the original data this study would not have been possible.

Annex A:

Table A1: Falkland veterans, suicide & open verdict deaths, 1982-2013, numbers[1,2], SMR[3] & 95%CI

Year	Number	SMR	95% CI		
All years	**101**	**67**	**(55**	**-**	**82)**
1982	0	0	-	-	-
1983	0	0	-	-	-
1984	0	0	-	-	-
1985	0	0	-	-	-
1986	1	21.36171	(1	-	119)
1987	1	20.8548	(1	-	116)
1988	2	37.0673	(4	-	134)
1989	7	136.7882	(55	-	282)
1990	6	106.859	(39	-	233)
1991	2	33.73461	(4	-	122)
1992	9	158.8302	(73	-	301)
1993	4	75.0021	(20	-	192)
1994	3	54.85254	(11	-	160)
1995	4	72.9519	(20	-	187)
1996	3	58.50927	(12	-	171)
1997	2	39.31067	(5	-	142)
1998	4	72.9519	(20	-	187)
1999	5	92.81594	(30	-	217)
2000	5	98.67165	(32	-	230)
2001	2	40.39115	(5	-	146)
2002	6	119.9974	(44	-	261)
2003	3	64.4614	(13	-	188)
2004	5	107.8616	(35	-	252)
2005	5	112.8895	(37	-	263)
2006	3	70.07464	(14	-	205)
2007	3	75.69808	(16	-	221)
2008	3	79.27468	(16	-	232)
2009	2	55.33868	(7	-	200)
2010	1	27.04333	(1	-	151)
2011	2	54.21432	(7	-	196)
2012	5	115.7735	(38	-	270)
2013	3	71.94496	(15		210)

1. Of the 101 suicide or open verdicts deaths, 13 occurred in-Service
2. Low number of deaths 1982-1985 likely result of missed records due to manual matching of records by HSCIC
3. Standardised mortality ratios have been age and gender standardised