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Annual UK regular Armed Forces Land Transport Accident Deaths 1 January 2008- 31 December 2012

INTRODUCTION

1. This annual Official Statistic is the first in a new series providing summary statistics on Land Transport Accident deaths whilst in Service in the five-year period 2008-2012 among the UK regular Armed Forces. This report will be published in March each year reporting on the previous calendar year. The next report will be published on 27th March 2014.
2. This report provides information on demographic, Service and vehicle types associated with Land Transport Accident deaths (LTA) and information on comparisons to the UK general population. 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 report 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 5 year period. Tables presenting the number of LTA deaths since 1984 by year and duty status (Table A1) can be found in Annex A.
3. The National Statistic on 'Deaths in the UK regular Armed Forces' is published in March each year. The notice published in March 2013 has shown that Land Transport Accident deaths were the second largest cause of death between 2008 and 2012 in the UK Armed Forces, after deaths due to Hostile Action. This report is being released to advise MOD and the public of the loss of life by LTA and developed in response to requests from the MOD road safety and health promotion areas for detailed analysis and to contribute to MOD's commitment to release information where possible.
4. The information shown has been compiled from data held by Defence Statistics on 4 March 2013.
5. The data are presented for the Naval Service (Royal Navy and Royal Marines), the Army (including the Gurkhas), the Royal Air Force, and on a Tri-Service basis. Non-regular members (for example Reservists) of the UK Armed Forces who died whilst deployed on operations are included in the data presented.

KEY POINTS

6. In the five year period 2008-2012 124 deaths occurred among the UK regular Armed Forces as a result of Land Transport Accidents, the second largest cause of death among Armed Forces personnel after deaths as a result of hostile action.
7. Between 2008 and 2012, the highest number of LTA deaths were among Army personnel with 92 deaths at a rate of 16 per 100,000. There were 17 deaths at a rate of 9 per 100,000 in the Naval Service and 15 deaths in the RAF at a rate of 9 per 100,000. There was no statistical difference between the rate of LTA deaths in the Army, RAF and Naval Service (tested for significance by identifying 95% confidence intervals that do not overlap, see paragraph 29).
8. In the latest calendar year, 2012 :
 - a total of 15 LTA deaths occurred among the UK regular Armed Forces, of which 2 were serving in the Naval Service, 12 in the Army, and 1 in the RAF.
 - the overall LTA mortality rate was 8 per 100,000, whilst in the Naval Service the rate was 6, the Army 11 and the RAF 9 per 100,000 strength.
9. The rate of LTA deaths among UK regular Armed Forces personnel has shown a downward trend following a peak in 2004-2006. In 2012 the rate was at the lowest since 1984 at 8 per 100,000.
10. Between 2008-2012, for the regular UK Armed Forces:
 - 120 (97%) of LTA deaths were among males;
 - Off-duty accidents accounted for 100 (81%) of LTA deaths.
 - 120 (97%) of deaths occurred amongst other ranks.
 - 76 deaths (61%) occurred among personnel previously deployed to Iraq

- and/or Afghanistan;
- Motor Vehicle accidents were the single largest cause of LTA deaths: 59 deaths (48%);
- Motorcycle accidents were the second largest cause of LTA deaths: 34 deaths (27%);
- Pedestrian accidents accounted for 19 LTA deaths (15%);
- Occupation Specific accidents accounted for 12 LTA deaths (10%).

11. In 2012, motor vehicle accidents accounted for 27% of all LTA deaths and motorcycles accounted for 40%. The proportion of pedestrian deaths has risen over the last five years and accounts for 27% of all LTA deaths in 2012.

12. Between 2008 and 2012, a significantly higher rate of death as a result of motor vehicle accidents was observed in those aged under 30 (10 per 100,000) compared to those aged 30 years and over (2 per 100,000). The risk of dying as a result of motorcycle and pedestrian accidents was the same for both age groups.

13. Overall, for the five-year period 2008-2012 the UK regular Armed Forces were at a 62% increased risk of dying as a result of a LTA compared to the UK general population (SMR =162, 95% CI: 135-193). This result was statistically significant (tested for significance by identifying 95% confidence intervals that do not encompass 100, see paragraph 32).

14. For the period 2008-2012, the Army were at a significantly higher risk of dying as a result of a LTA compared to the UK population. The risk of dying for Naval Service and RAF was the same as the UK population.

DATA SOURCES & METHODS

Data Sources

15. 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 NHS central registry.

16. 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.

17. 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 occupational specific vehicles (specific to the UK Armed Forces) irrespective of where the accident took place. Road traffic accidents refer only to accidents on a public road. Subsequent analysis presented in this report includes motor vehicle, motorcycle and pedestrian related accidental deaths. The following deaths have been excluded: All deaths related to vehicles that have been given either a suicide or open verdict by a coroner (n= 2) and any LTA deaths that did not involve a motor vehicle eg. pedal cycles, animal riders and rail related incidents (n= 7).

18. Defence Statistics 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 Northern Ireland Statistics and Research Agency (NISRA) who handle the official information on behalf of the Northern Ireland Office. 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 vehicle incident deaths are included in this report until a coroner's verdict is received confirming cause of death as due to a suicide or open verdict when it will then be removed from this report. However, one

UK Armed Forces death in 2003 returned as an open verdict by the Procurator Fiscal for Scotland has been classified as an LTA in this report as it was a vehicle related incident involving multiple deaths and a MOD Board of Inquiry found all the deaths to be the result of an operational accident.

19. Defence Statistics maintains a database of individual deployment records from November 2001. Data prior to April 2007 was derived from the single services Operation Location tracking (OPLOC) systems^a and data since April 2007 is obtained from the Joint Personnel Administration (JPA) system. The data covers deployments on Operation TELIC (Iraq) (2003-2011) and Operations HERRICK and VERITAS (Afghanistan) (2001-present).

20. The deployment data presented in this report represent deployments to the theatre of operation and not deployment to a specific country i.e. deployment to Op TELIC includes deployment to Iraq and other countries in the Gulf region such as Kuwait and Oman. Therefore, this data cannot be compared to data on personnel deployed to a specific country such as Iraq.

21. Deployment markers were assigned using the criteria that an individual was recorded as being deployed to the Iraq and/or Afghanistan theatres of operation if they had deployed to these theatres prior to their death. Person level deployment data for Afghanistan was not available between 1 January 2003 and 14 October 2005. Therefore, it is possible that some UK Armed Forces personnel who were deployed to Afghanistan during this period and subsequently died have not been identified as having deployed to Afghanistan in this report but have been captured in the overall figures for LTA deaths. Please note: this report compares those who had been deployed before their death with those who have not been identified as having deployed before their death.

22. Operation TELIC is the name for UK operations in Iraq which started in March 2003 and finished on 21 May 2011. UK Forces were deployed to Iraq to support the Government's objective to remove the threat that Saddam posed to his neighbours and his people and, based on the evidence available at the time, disarm him of his weapons of mass destruction. The Government also undertook to support the Iraqi people in their desire for peace, prosperity, freedom and good government.

23. Operation VERITAS is the name for UK operations in Afghanistan which started in October 2001. The UK was involved in Afghanistan alongside Coalition forces, led by the US under Operation Enduring Freedom (OEF), from the first attacks in October 2001.

24. Operation HERRICK is the name for UK operations in Afghanistan which started in April 2006. UK Forces are deployed to Afghanistan in support of the UN authorised, NATO led International Security Assistance Force (ISAF) mission and as part of the US-led Operation Enduring Freedom (OEF).

Data Coverage

25. The information on deaths presented here are for the regular Armed Forces, including all trained and untrained personnel and non-regulars who died on deployment are also included since they are classified as 'regular' personnel for the duration of their overseas deployment.

26. The data here exclude the Home Service of the Royal Irish Regiment, full time reservists, Territorial Army and Naval Activated Reservists since 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.

Methods

27. In order to compare time trends and to take into account the different age and gender structures of their respective single Service strengths, rates have been age and gender standardised. In order to facilitate comparisons with previously published reports data has been standardised to the 2012 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 and gender structure as the standard population (the 2012 Armed Forces

^a Around 4% of data obtained prior to April 2007 could not be fully validated for a number of reasons including data entry errors, personnel not recording on the system in the theatre of operation, records of contractors or personnel from other Government Departments. However research carried out by the King's Centre for Military Health Research on a large Tri-Service sample of personnel deployed during the first phase of Op TELIC in 2003, who were identified from Defence Statistics' deployment database, reported a cohort error rate of less than 0.5 per cent.

population).

28. Time trend analysis has been aggregated to give three year moving averages. This eliminates some of the random year on year variation that can occur and provides a clearer picture of possible trends. Due to the smaller numbers involved in sub-group analysis, five year moving averages have been presented.

29. 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 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.

30. The effects of standardisation may, on occasion, lead to unexpected results particularly where small numbers are involved. Standardised rates can also be strongly influenced by variations in the age and gender structure of the deaths concerned, even when totals may remain the same. 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 2020^b, 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. As seen in 2012 for the RAF overall rate of deaths, caused by the reduction in recruitment of personnel under 20 years of age.

31. 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.

32. 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 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.

33. 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.

34. 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. 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 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 calculations in line with the SMR calculations for other years.

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

35. The UK general population data for 2011 and 2012 was not available for this report to calculate standard mortality ratios (SMRs), therefore, Defence Statistics has used the 2010 data as an estimate for the 2011 and 2012 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 2011 and 2012 data becomes available.

Strengths and weaknesses of data presented in this notice

36. 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 fatalities presented are accurate. However, some causes of death 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 other accidents whilst waiting for final cause of death to be determined. This can lead to revisions in the number of deaths as a result of LTA when these verdicts are returned (see paragraph 41 for more information about the extent of these revisions).

37. In addition, death certificates for 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 cause of death information.

38. 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 compromise the operational security of UK Armed Forces personnel nor that risk breaching the rights of the families of the deceased personnel (for which the MOD has a residual duty of care).

RESULTS

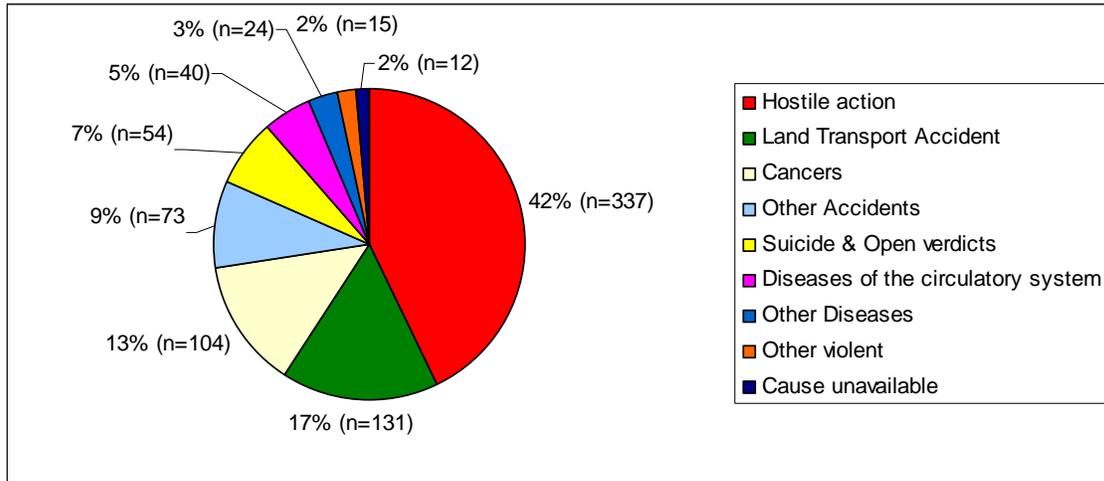
39. The National Statistic 'Deaths in the UK Regular Armed Forces 2012' has shown Land Transport Accidents (LTA) accounted for 17% (n=131) of all deaths among UK regular Armed Forces personnel^c between 2008 and 2012. LTA's were the second largest cause of death during this period after deaths due to hostile action.

40. Analysis of LTA deaths within the UK general population have identified certain demographic characteristics of being at risk for different vehicle types. Therefore, the analysis in this report provides demographic, Service and vehicle type breakdowns to support the identification of risk groups within the Armed Forces for targeting of road safety initiatives and campaigns.

Overall numbers and rates

41. **Figure 1** presents the causes of death for the UK Armed Forces for the period 2008-2012.

Figure 1: UK regular Armed Forces: Causes of death, 2008-2012, numbers¹ and percentages²



1 LTA deaths include 7 deaths which did not involve a motor vehicle (see paragraph 19).

2 Percentages may not add up to 100% due to rounding.

42. LTA's were the second single largest cause of death following hostile action deaths for each year between 2008 and 2011, however, in the most recent annual data for 2012 the number of LTA deaths fell resulting in it being ranked the fourth largest cause of death behind hostile action, cancer and other accidental deaths.

43. **Table 1** presents the number and annualised rate of LTA deaths by Service and year.

Table 1 : UK regular Armed Forces LTA deaths by Service, 2008-2012, number, age and gender standardised rate¹ per 100,000 strength per year

Year	All		Naval Service ²		Army		RAF	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
2008	26	13	8	21	17	15	1	1
2009	26	13	2	4	17	13	7	19
2010	34	17	3	8	26	21	5	15
2011	23	12	2	6	20	18	1	3
2012	15	8	2	6	12	11	1	9

1 Rates have been age and gender standardised to the 2012 UK Armed Forces population, expressed per 100,000 strength.

2 Naval Service includes Royal Navy and Royal Marines

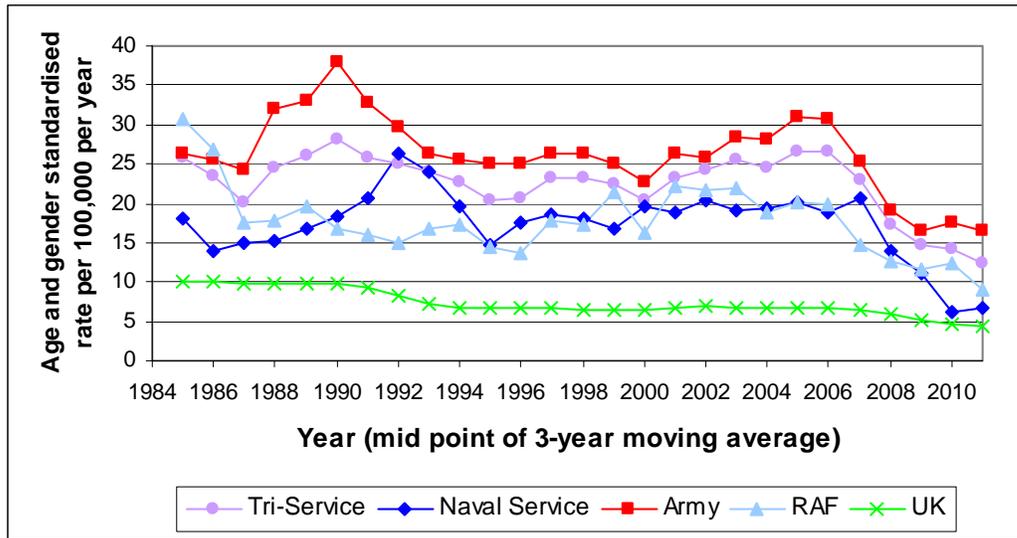
44. In 2012, the overall rate of LTA deaths for the UK Armed Forces was 8 per 100,000, the lowest annual rate in the latest five-year period. This was a 53% decrease on the highest rate in the five-year period of 17 per 100,000 seen in 2010.

^c National Statistics Notice: "Deaths in the UK regular Armed Forces" available at www.dasa.mod.uk

45. During the latest five year period (2008-2012) the rate of LTA deaths among Army personnel was 16 per 100,000. This was higher than the rate of LTA deaths among Naval Service personnel (9 per 100,000) and RAF personnel (9 per 100,000), but the differences observed between the three single Services were not significantly different. The total number of deaths in the RAF remained the same for 2012 as in 2011 (one death) but a reduction in the number of RAF personnel on strength, particularly in the under 20 age group has led to an increase in the age and gender standardised mortality rate from 3 per 100,000 in 2011 to 9 per 100,000 in 2012 (see paragraph 32 for further details).

46. **Figure 2** illustrates changes in LTA mortality rates by Service since the start of data collection in 1984. Rates are presented as a three-year moving average to smooth out annual fluctuations and to highlight long term trends (see paragraph 28). The age and gender standardised rate for LTA deaths in the UK general population is also presented.

Figure 2: UK regular Armed Forces , UK general population LTA deaths by Service, 1984-2012, three-year moving average age and gender standardised rates per 100,000 strength¹



¹ Rates have been age and gender standardised to the 2012 UK Armed Forces population, expressed per 100,000 strength.
² Naval Service includes Royal Navy and Royal Marines.

47. **Figure 2** shows for the whole period 1984 to 2012, the overall rate of LTA among the UK regular Armed Forces and each Service was higher than the rate for the UK general population. A study of UK military personnel^d has shown those who join the military may be more likely to be risk-takers and 19% of personnel studied were defined as risky drivers. This suggests they exhibit the same behavioural factors such as reckless behaviour, aggressive driving and loss of control which play an important role in vehicle accident deaths within the UK^e.

48. **Figure 2** also shows two peaks in UK Armed Forces LTA rate of death in 1989-1991 and in 2004-2006. One incident in 1989 which claimed eight lives and the loss of ten deaths which occurred during Op GRANBY (1990/91 Gulf conflict) contributed to the peak of 28 per 100,000 in 1989-1991. There is no single contributing cause to the second peak in 2004-2006 of 27 per 100,000. Since 2004-2006, there has been a downward trend and for the latest period, 2009-2011, the rate is at the lowest rate since 1984 at 12 per 100,000. This may be in part be due to safety improvements in vehicles and roads as well as an increase in campaigns on road safety both within the UK general population and the Armed Forces. In 2000, the Government targeted a 40% reduction in people killed or seriously injured in road accidents to be achieved by 2010^e, with campaigns continuing to run. In addition, the following MOD road safety campaigns were launched :

^d Fear et al., (2008) Risky Driving Among UK Regular Armed Forces Personnel from the United Kingdom, *American Journal of Preventative Medicine*, 35, 230-236.

^e Ward et al., (2007) *Road Safety Research Report No. 76, Trends in Fatal Car-Occupant Accidents*, Department of Transport : London. Available at : <https://www.gov.uk/government/publications/road-safety-research-and-statistical-reports>

- i. 'Ride it Right' targeting motor cycle riders was launched in 2006 and again in 2007 following a rise in the number of off-duty motorcycle deaths
- ii. 'Grim Reaper' video shown to personnel returning from operational deployment since 2007 who are shown to have an increased likelihood of being involved in an accident.
- iii. 'You're tough but you're not invincible' series of British Forces Broadcasting Services (BFBS) television and radio commercials began in 2008 aimed at young soldiers returning from operational deployment with the message that whilst soldiers may have survived their tour of duty in Afghanistan, they are not invincible and are still at risk of being involved in a road traffic accident.
- iv. A poster campaign aimed at mitigating against the risk of off duty service personnel attempting to walk home after a night out by making taxi funds available was developed in 2012 following a number of Service personnel pedestrian deaths which occurred whilst walking home after a night out.

49. In addition, **figure 2** shows the rate among Army personnel was higher throughout the period than the Naval Service and RAF, with the exception of 1984-1986 when 20 RAF personnel lost their life in a coach crash. This Army trend links to the study on risky driving among UK regular Armed Forces which reported risky driving as more common among Army personnel compared to Naval Service and RAF personnel^e.

50. During the latest five years, based on three-year moving averages from start to end of the time period:

- The rate of LTA deaths among Naval Service personnel has decreased by 68%.
- The rate of LTA deaths among Army personnel has decreased by 35%.
- The rate of LTA deaths among RAF personnel has decreased by 39%.

In comparison, the rate of LTA deaths in the UK general population has decreased by 32% over the last five years.

51. **Table 2** provides a summary of the key characteristics for LTA deaths for the five-year period 2008-2012.

Table 2: UK regular Armed Forces LTA deaths, key characteristics by Service, 2008-2012, numbers and percentages¹

	All		Naval Service		Army		RAF	
	n	%	n	%	n	%	n	%
All	124	100	17	100	92	100	15	100
Gender								
Male	120	97	17	100	89	97	14	93
Female	4	3	0	0	3	3	1	7
Age Band								
Under 20	13	10	2	12	10	11	1	7
20-24	47	38	4	24	38	41	5	33
25-29	26	21	5	29	19	21	2	13
30-34	14	11	2	12	8	9	4	27
35-39	13	10	2	12	9	10	2	13
40+	11	9	2	12	8	9	1	7
Rank								
Officers	4	3	1	6	2	2	1	7
Other Ranks	120	97	16	94	92	98	14	93
Duty Status								
On Duty	24	19	6	35	16	17	2	13
Off Duty	100	81	11	65	76	83	13	87
Deployment History²								
On deployment	8	6	0	0	6	7	2	13
Previously deployed	76	61	9	53	58	63	9	60
Not previously deployed	40	32	8	47	28	30	4	27
Vehicle								
Motor Vehicle	59	48	8	47	47	51	4	27
Motorcycle	34	27	6	35	20	22	8	53
Pedestrian	19	15	2	12	15	16	2	13
Occupation Specific ³	12	10	1	6	10	11	1	7

1 Percentages may not add to 100% due to rounding.

2 To Iraq and/or Afghanistan (see paragraphs 19-24).

3 Vehicles specific to the UK Armed Forces : 12 deaths as a result of accidents in the following vehicles : Land Rover, WMIK, Rover, Ridgeback, Mastiff, Seddon Atkinson truck.

52. During the 5 year period 2008-2012, of the 124 UK regular Armed Forces personnel who died as a result of a LTA:

- 97% (n=120) of LTA deaths occurred among males.
- 69% (n=86) of LTA deaths occurred among those aged under 30.
- 97% (n=120) of LTA deaths were among Other ranks
- 81% (n=100) of LTA deaths occurred whilst the individual was off duty.
- 61% (n=76) of LTA deaths occurred among personnel previously deployed to Iraq and/or Afghanistan.
- 48% (n=59) of LTA deaths occurred as a result of a motor vehicle accident.

53. **Table 3** provides a breakdown of the number and an annualised rate of LTA deaths for the five-year period 2008-2012 by whether the deceased personnel had previously deployed to Iraq and/or Afghanistan and by year of in which the death occurred.

Table 3: LTA deaths in the UK regular Armed Forces, by deployment status to Iraq and/or Afghanistan^{1,2}, 2008-2012, number³ and rate per 100,000 strength per year

Year of death	Deployed to Iraq and/or Afghanistan ^{1,2}		Not Previously Deployed to Iraq and/or Afghanistan ²	
	number	rate	number	rate
All	76	13	40	10
2008	14	12	11	13
2009	18	15	8	10
2010	18	15	10	13
2011	16	13	6	8
2012	10	8	5	7

1 Deployment to the wider theatre of operation (see paragraph 20).

2 Data for Afghanistan between 1 January 2003 and 14 October 2005 were not available for person level deployment (see paragraph 21).

3 Excludes eight LTA deaths which occurred whilst on deployment.

54. Overall for the five-year period 2008 to 2012 and for each individual year with the exception of 2008, the rate of LTA deaths was higher among those previously deployed to Iraq and/or Afghanistan than those who had not previously deployed there. A study of UK military personnel^e found one factor associated with risky driving in the Armed Forces was being previously deployed to Iraq. Defence Statistics will investigate for the next release of this report, the period of time for which personnel returning from deployment are most at risk of LTA death.

55. As multiple deaths occurred in the same incident on several occasions during the five year period 2008-2012, **Table 4** provides details of the number of separate incidents and the number of individual deaths, by year of occurrence, for all Land Transport Accidents.

Table 4: UK regular Armed Forces LTA deaths¹ in the: by Service, 2008-2012, numbers and incidents

Year	All		Naval Service		Army		RAF	
	Deaths	Incidents*	Deaths	Incidents	Deaths	Incidents	Deaths	Incidents
All	124	114	17	17	92	82	15	15
2008	26	25	8	8	17	16	1	1
2009	26	23	2	2	17	14	7	7
2010	34	30	3	3	26	22	5	5
2011	23	21	2	2	20	18	1	1
2012	15	15	2	2	12	12	1	1

* In some instances, personnel from more than one Service have been killed in the same incident, therefore, the data for single Services may not add up to the total provided in the 'All incidents' column.

¹Includes operational deaths as a result of LTA

56. For the period 2008-2012, there were 114 LTA incidents resulting in 124 deaths among UK Armed Forces personnel. The number of deaths and incidents in 2012 was the lowest in the five-year period (n=15). The maximum number of deaths in one incident resulted in the deaths of four Army personnel when a vehicle overturned whilst on duty in 2010 .

57. **Table 5** provides a breakdown of the number of deaths by vehicle type and year for the five-year period 2008-2012.

Table 5: UK regular Armed Forces LTA deaths by vehicle type and year of death, 2008-2012, number and percentage¹

Year	All		Motor Vehicle deaths		Motorcycle deaths		Pedestrian deaths		Occupation Specific deaths ²	
	n	%	n	%	n	%	n	%	n	%
All	124	100	59	48	34	27	19	15	12	10
2008	26	100	18	69	3	12	2	8	3	12
2009	26	100	12	46	11	42	3	12	0	0
2010	34	100	17	50	8	24	4	12	5	15
2011	23	100	8	35	6	26	6	26	3	13
2012	15	100	4	27	6	40	4	27	1	7

¹ Percentages may not add to 100% due to rounding.

² Vehicles specific to the UK Armed Forces : Land Rover, WMIK, Rover, Ridgeback, Mastiff, Seddon Atkinson truck.

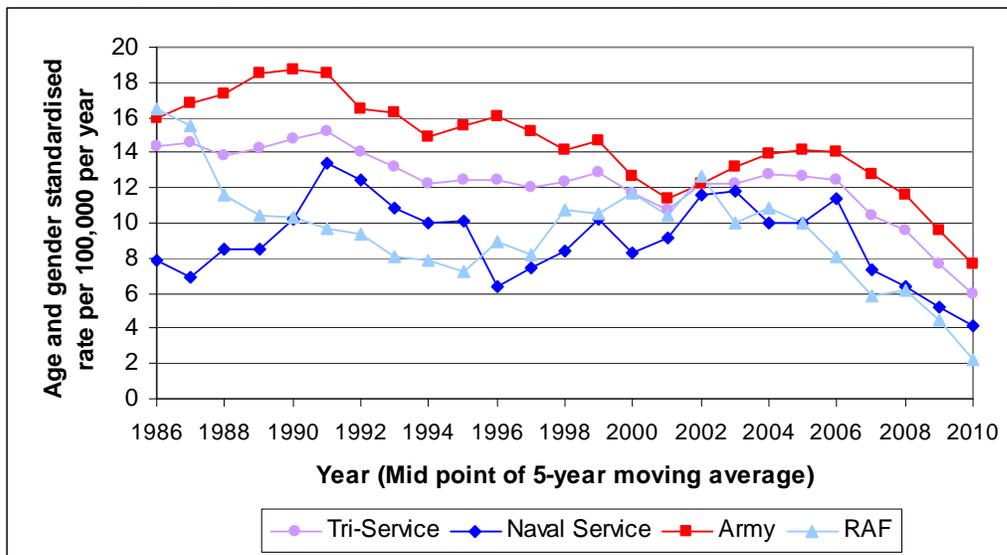
58. Pedestrian deaths in 2012 accounted for 27% of all LTAs, showing a steady rise throughout the last five years as the proportion of deaths as a result of motor vehicles has decreased.

59. For 2012, motorcycle deaths account for 40% of all LTA deaths. It should be noted that within the UK general population, despite forming only 1% of road traffic, motorcyclist deaths accounted for 18% of road deaths and serious injuries^f. Defence Statistics do not hold information on road usage among UK Armed Forces personnel; however it would appear this finding in the UK general population is also seen among the military.

60. The number of deaths seen in occupation specific vehicles over the five-year period 2008-2012 was at it's highest in 2010 (n=five) when one on-duty incident involving a vehicle overturning accounted for four deaths.

61. Differences are observed in the number of deaths by vehicle type between each Service. **Figures 3, 4 and 5** illustrate changes in LTA mortality rates by vehicle type and Service since the start of data collection in 1984. Due to the small numbers involved, occupation specific vehicles have been excluded and the remaining data has been aggregated to give five year moving averages (see paragraph 28). This eliminates some of the random year on year variation that can occur and provides a clearer picture of possible trends.

Figure 3: UK regular Armed Forces motor vehicle accident deaths, by Service, 1984-2012, five-year moving average age and gender standardised rates per 100,000 strength¹



¹ Rates have been age and gender standardised to the 2012 UK Armed Forces population, expressed per 100,000 strength.

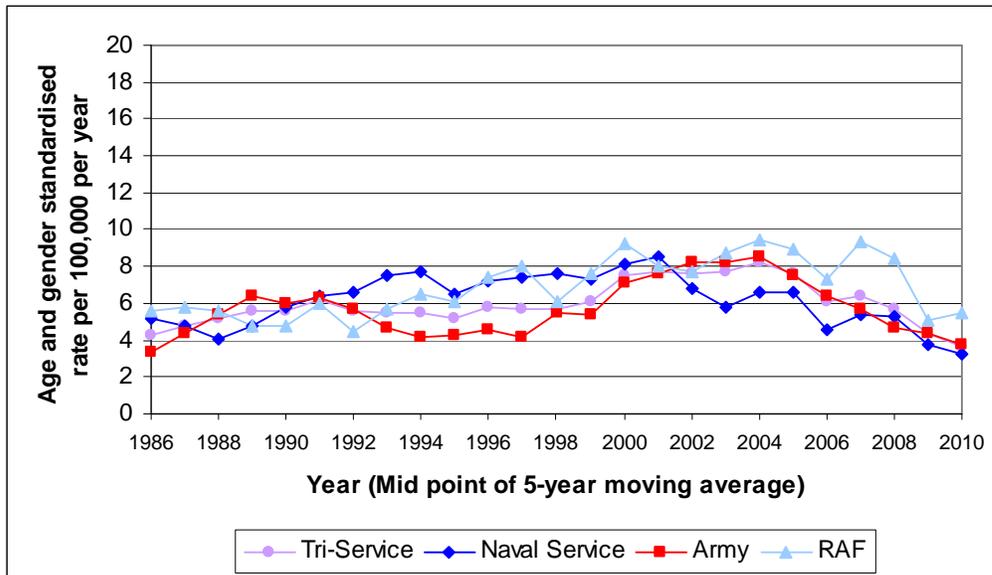
^f ROSPA (2006) Motorcycling Safety Policy Paper available at : <http://www.rosipa.com/roadsafety/policy/statements/motorcycling.aspx>

62. The five-year moving average rates of motor vehicle accident deaths has been consistently higher in the Army compared to the Naval Service and the RAF with the exception of 1984-1988 when one coach crash claimed the lives of 20 RAF personnel in Germany (Figure 3).

63. The Naval Service five year average motor vehicle rate peaked in 1989-1993 at 13 per 100,000, in 2002-2006 at 12 per 100,000 and again in 2004-2008 at 11 per 100,000. Since 2004-2008 there has been a downward trend, falling to a low of 4 per 100,000 in 2008-2012. The Army rate peaked in 1988-1992 at 19 per 100,000, partly due to the loss of eight lives in one incident in 1989 and the loss of ten lives on Op GRANBY in 1990/91. Following a further peak at 14 per 100,000 in 2003-2005, it has since shown a downward trend, falling to a low of 8 per 100,000 in 2008-2012. The RAF motor vehicle rate showed two peaks; in 1984-1988 the rate was 16 per 100,000 and in 2000-2004 was 13 per 100,000. It has since fallen to a low of 2 per 100,000 in 2008-2012.

64. During the last five years (using five-year moving averages):
- i. Among Naval Service personnel there was a 60% decrease in the rate of motor vehicle accident deaths (from 10 per 100,000 in 2003-2007 to 4 per 100,000 in 2008-2012) (Figure 3).
 - ii. Among Army personnel there was a 43% decrease in the rate of motor vehicle accident deaths (from 14 per 100,000 in 2003-2007 to 8 per 100,000 in 2008-2012) (Figure 3).
 - iii. Among RAF personnel there was a 80% decrease in the rate of motor vehicle accident deaths (from 10 per 100,000 in 2003-2007 to 2 per 100,000 in 2008-2012) (Figure 3).

Figure 4: UK regular Armed Forces motorcycle accident deaths, by Service, 1984-2012, five-year moving average age and gender standardised rates per 100,000 strength¹



¹ Rates have been age and gender standardised to the 2012 UK Armed Forces population, expressed per 100,000 strength.

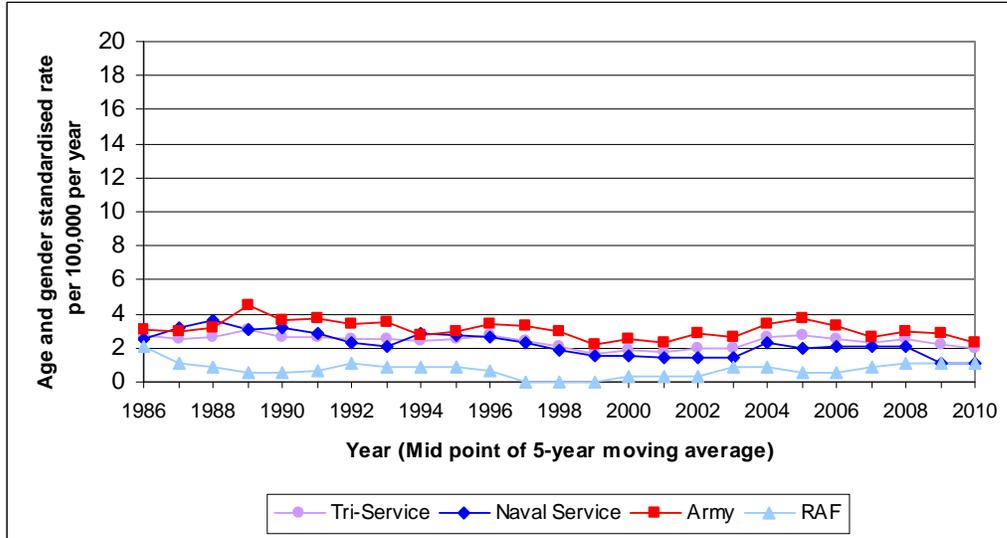
65. Since 2001-2005, the five year average rate of motorcycle deaths was higher among RAF personnel compared to Naval Service and Army.

66. The Naval Service five year average motor cycle rate rose steadily from 1986-1990 to a peak in 1999-2003 of 9 per 100,000. It then fell to a low of 3 per 100,000 in 2010-2012. The Army rate peaked in 1987-1991 at 6 per 100,000 before falling to 4 per 100,000 in 1992-1996. After 1995-1999, the rate rose sharply to a high in 2002-2006 of 9 per 100,000, before showing a downward trend, falling to a low of 4 per 100,000 in 2008-2012. The RAF motor cycle rate peaked at 9 per 100,000 in 2002-2006, falling to a low of 5 per 100,000 in 2007-2011.

67. During the last five years (using five-year moving averages from the start to the end of the timer period):
- ii. Among Naval Service personnel there was a 57% decrease in the rate of motorcycle accident deaths (from 7 per 100,000 in 2003-2007 to 3 per 100,000 in 2008-2012) (Figure 4).

- iii. Among Army personnel there was a 43% decrease in the rate of motorcycle accident deaths (from 7 per 100,000 in 2003-2007 to 4 per 100,000 in 2008-2012) (Figure 4).
- iv. Among RAF personnel there was a 44% decrease in the rate of motorcycle accident deaths (from 9 per 100,000 in 2003-2007 to 5 per 100,000 in 2008-2012) (Figure 4).

Figure 5: UK regular Armed Forces pedestrian accidental deaths, by Service, 1984-2012, five-year moving average age and gender standardised rates per 100,000 strength¹



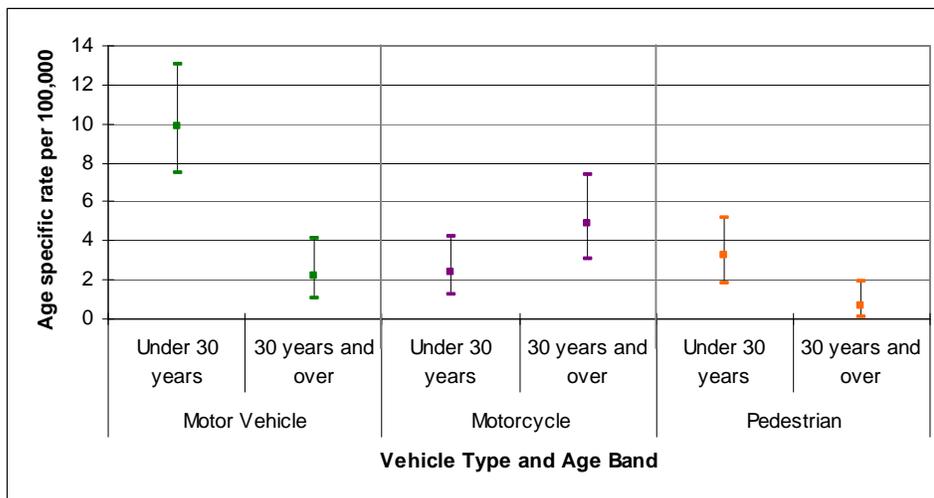
1 Rates have been age and gender standardised to the 2012 UK Armed Forces population, expressed per 100,000 strength.
 2 Naval Service includes Royal Navy and Royal Marines personnel.

68. Since 1987-1991, the five-year moving average rate of pedestrian accidental deaths has been higher among Army personnel than the Naval Service and the RAF (Figure 5).

69. Due to the small number of deaths there has been little change in the rates for all three Services over the period 1984-2012.

70. Figure 6 shows the age-specific rates for deaths between 2008 and 2012 by age group and vehicle type. As the numbers of deaths by vehicle type are small and to enable comparison to UK general population results, two age groups are presented; those aged under 30 and those aged 30 and over.

Figure 6: LTA deaths in the UK regular Armed Forces, by vehicle type and age group, 2008-2012, age-specific rates¹(95% CI) per 100,000 strength per year



1 Rates have been age and gender standardised to the 2012 UK Armed Forces population, expressed per 100,000 strength.

71. **Figure 6** illustrates significantly higher rates were observed for motor vehicle deaths in those aged under 30 compared to those aged 30 years and over. The rate for deaths as a result of motor vehicle accidents for those aged under 30 years was 10 per 100,000 compared to 2 per 100,000 in those aged 30 years and over. For pedestrian deaths, higher rates were also observed among those those aged under 30 years (3 per 100,000) compared to those aged 30 and over (1 per 100,000), however this difference was not significant.

72. For motorcycle deaths, those aged 30 and over had a higher rate of death (5 per 100,000) than those aged under 30 (2 per 100,000), however this difference was not significant.

73. The findings for age-related risk of motor vehicle and motorcycle deaths reflect those seen in the UK general population^{e,f}. Deaths in motor vehicles in the UK general population are predominately among young drivers aged between 16 and 29 years^e (see **Table 6** for a more detailed comparison between Service personnel and UK general population). It is suggested that young male car drivers are more likely to choose higher speed, drive more recklessly, as well as have a lower seatbelt wearing rate and have a tendency to drive older cars. Conversely, motorcyclist deaths in the UK population are higher in those aged over 30 years^f and may be a result of older drivers returning to the road on more powerful machines (see **Table 7** for a more detailed comparison between Service personnel and UK general population). Excessive speed and lack of judgement of their own path are related factors in UK general population motorcycle deaths. Defence Statistics do not currently have access to off-duty accident information which would enable identification of contributing factors in accidents among Armed Forces personnel.

74. The finding illustrated in **Figure 6** that older pedestrians are at higher risk of death among UK Service personnel did not reflect that seen in the UK general population^g which shows a higher proportion of deaths among those aged 25-59 years than those aged 16 to 24 (see **Table 8** for a more detailed comparison between Service personnel and UK general population).

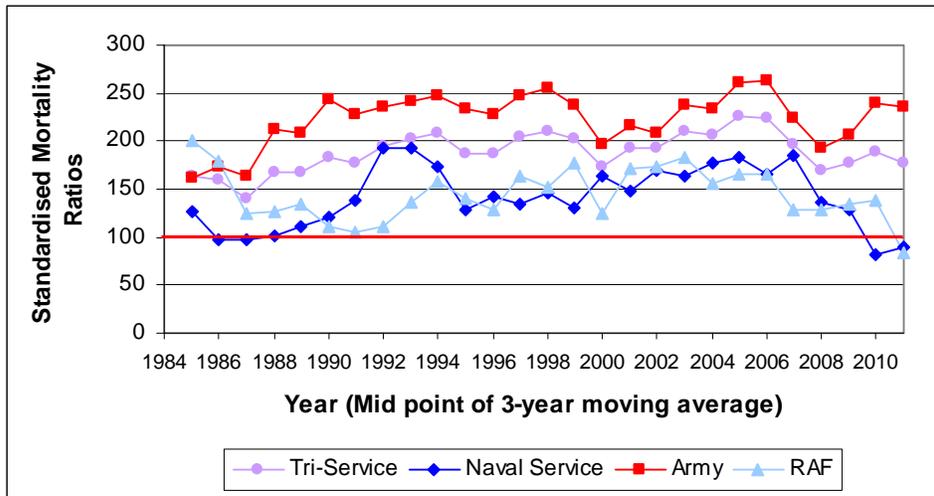
Comparisons with the UK general population

75. To enable comparisons with LTA 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. If the 95% confidence interval does not encompass 100, then this difference is statistically significant. The width of the confidence interval gives us some idea about how uncertain we are about the reported statistic. The small numbers in some of the sub-group analysis presented in **Figure 8 and Tables 6,7 and 8** may result in wide confidence intervals. The impact of this is that the range in which we expect the true value of that statistic to lie is large and there is a risk of misinterpreting a chance occurrence for a true finding

76. **Figure 7** illustrates changes in LTA Standardised Mortality Ratios by Service since the start of data collection in 1984. SMR's are presented as a three-year moving average to eliminate some of the random year on year variation (see paragraph 28).

⁹ Reported Road Accident Statistics (2013) House of Commons Library. Available at : http://www.apccs.police.uk/fileUploads/APCC_Group_Emails/Road_accident_statistics.pdf

Figure 7: UK regular Armed Forces LTA deaths by Service, 1984-2012, three-year moving average standardised mortality ratios^{1,2}



¹Standardised for age, gender and calendar year.

²The red line indicates the value expected if the number of observed LTA deaths in the UK Armed Forces was the same as the number expected based on the age and gender structure of the UK population.

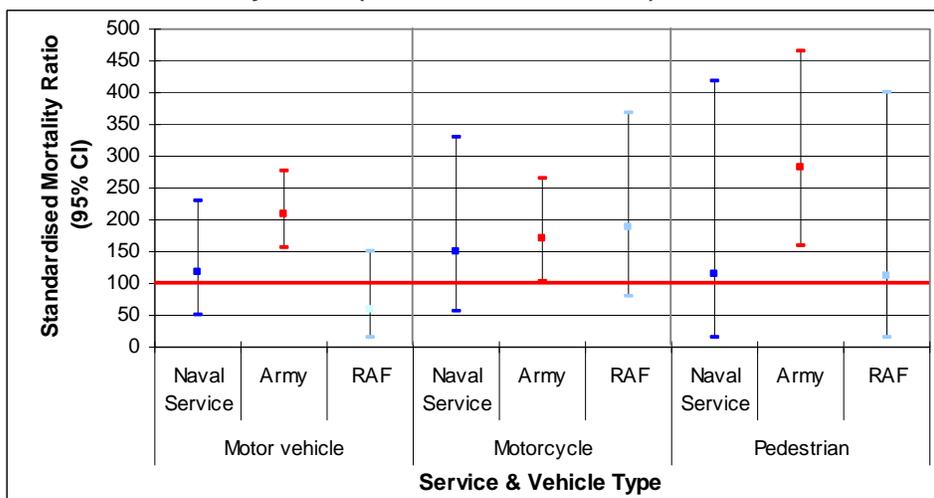
77. Overall, in the last 29 years, the UK regular Armed Forces were at a greater risk of dying as a result of an LTA compared to the UK general population.

78. Each Service was at a greater risk of dying of an LTA than the UK population in all years with the exception of the period 2009-2011, where the Naval Service were at a lower risk of dying compared to the UK for the first time and for the period 2010-2012 where the RAF were at a lower risk of dying than the UK population for the first time since 1984.

79. **Figure 7** shows that with the exception of 1985-1986, the SMR for the Army was higher than that of the RAF and Naval Service.

80. **Figure 8** provides a comparison between each Service and the UK general population for the five-year period 2008-2012 by Service and vehicle type.

Figure 8: UK regular Armed Forces LTA deaths, by Service and vehicle type, 2008-2012, standardised mortality ratio^{1,2} (95% confidence interval)



¹Standardised for age, gender and calendar year.

²The red line indicates the value expected if the number of observed LTA deaths in the UK Armed Forces was the same as the number expected based on the age and gender structure of the UK population.

81. **Figure 8** shows Army personnel are at a higher risk of motor vehicle accident, motor cycle and pedestrian compared to the UK general population (SMR: 208, 95% CI: 156-277; SMR: 171, 95%

CI: 104-264 and SMR: 282, 95% CI: 158-465 respectively). These results were statistically significant. The Naval Service and RAF were at no different risk of death compared to the UK general population for any vehicle type.

82. **Table 6** provides a comparison of motor vehicle deaths between each Service and the UK general population for the last five years by age group. As the number of deaths by Service are small and to enable comparison to UK general population results, two age groups are presented; those aged under 30 and those aged 30 and over.

Table 6: UK regular Armed Forces motor vehicle accident deaths, by Service and age, 2008-2012, numbers and SMR^{1,2} (95% CI)

	All			Naval Service			Army			RAF		
	n	SMR	(95%CI)	n	SMR	(95%CI)	n	SMR	(95%CI)	n	SMR	(95%CI)
2008-2012	59	163	(126-210)	8	117	(50-230)	47	208	(156-277)	4	59	(16-151)
Under 30	49	188	(142-249)	7	148	(59-304)	39	227	(166-311)	3	72	(15-212)
30+	10	98	(47-180)	1	47	(1-263)	8	147	(63-289)	1	38	(1-210)

¹ Standardised mortality ratios have been standardised for age, gender and calendar year.

² Due to small numbers these findings are volatile and should be viewed with caution.

83. **Table 6** shows, for motor vehicle deaths in the last five years:

- The overall risk to the Armed Forces of dying in a motor vehicle accident was significantly higher than the UK general population (SMR:163, 95% CI: 126-210).
- The risk of dying for the Naval Service was the same as the UK population (SMR: 117, 95% CI: 50-230).
- Army personnel had a 108% increased risk of dying in a LTA compared to the UK population (SMR: 208, 95% CI: 156-277). This result was statistically significant.
- The risk of dying for the RAF was the same as the UK population (SMR: 59, 95% CI: 16-151).

84. Overall, those aged under 30 were at a significantly higher risk of dying as a result of a motor vehicle accident compared to the UK general population (SMR: 188, 95% CI: 142-249) for the period 2008 to 2012. This result was statistically significant. See paragraph 75 for explanation of possible factors contributing to differences in risk by age group.

85. During the last five years Naval Service personnel and RAF personnel in both age groups were at no different risk of dying as a result of a motor vehicle accident compared to the UK general population (**Table 6**).

86. During the last five years Army personnel aged under 30 were at a 127% increased risk of dying as a result of a motor vehicle accident compared to the UK general population (SMR: 227; 95% CI: 166-311). This result was statistically significant.

87. Army personnel aged 30 and over were at a no different a risk of dying as a result of a motor vehicle accident compared to the UK general population (SMR: 147; 95% CI: 63-289) (**Table 6**).

88. **Table 7** provides a comparison of motor cycle accident deaths between those aged under 30 and those aged 30 and over in each Service and the UK general population for the last five years.

Table 7: UK regular Armed Forces motorcycle accident deaths, by Service and age, 2008-2012, numbers and SMR^{1,2} (95% CI)

	All			Naval Service			Army			RAF		
	n	SMR	(95% CI)	n	SMR	(95% CI)	n	SMR	(95% CI)	n	SMR	(95% CI)
2008-2012	34	170	(122-238)	6	151	(55-328)	20	171	(104-264)	8	187	(81-368)
Under 30	12	116	(60-202)	1	52	(1-290)	8	119	(51-234)	3	174	(36-508)
30+	22	230	(144-348)	5	243	(79-567)	12	241	(125-421)	5	196	(64-458)

¹ Standardised mortality ratios have been standardised for age, gender and calendar year.

² Due to small numbers these findings are volatile and should be viewed with caution.

89. **Table 7** shows, for motorcycle deaths in the last five years:

- The overall risk to the Armed Forces of dying in a motor cycle accident was higher than the UK general population. This result was statistically significant (SMR:170, 95% CI: 122-238).
- The risk of dying for the Naval Service was the same as the UK population (SMR: 151, 95% CI: 55-328).
- Army personnel had a 71% increased risk of dying compared to the UK population. This result was statistically significant (SMR: 171, 95% CI: 104-264).
- The risk of dying for the RAF was the same as the UK population (SMR: 187, 95% CI: 81-368).

90. Overall, those aged 30 and over were at a significantly higher risk of dying as a result of a motorcycle accident compared to the UK general population (SMR: 230, 95% CI: 144-348) for 2008 to 2012. See paragraph 75 for explanation of possible factors contributing to differences in risk by age group.

91. During the last five years Army personnel aged 30 and over were at a 141% increased risk of dying as a result of a motorcycle accident compared to the UK general population (SMR: 241; 95% CI: 125-421). This result was statistically significant.

92. During the last five years Naval Service and RAF personnel aged 30 and over risk of dying as a result of a motorcycle accident was the same as the UK general population (**Table 7**).

93. During the last five years Naval Service, Army and RAF personnel aged under 30 risk of dying as a result of a motorcycle accident was the same as the UK general population (**Table 7**).

94. **Table 8** provides a comparison of pedestrian accident deaths between the different age groups of each Service and the UK general population for the last five years. Due to the small number of pedestrian deaths an SMR for each Service and age group has not been calculated.

Table 8: UK regular Armed Forces pedestrian accident deaths, by Service and age, 2008-2012, numbers and SMR^{1,2} (95% CI)

	All			Naval Service	Army	RAF
	n	SMR	(95%CI)	n	n	n
2008-2012	19	215	(129-335)	2	15	2
Under 30	16	302	(172-490)	2	13	1
30+	3	85	(17-247)	0	2	1

¹ Standardised mortality ratios have been standardised for age, gender and calendar year.

² Due to small numbers these findings are volatile and should be viewed with caution.

95. Overall, UK Service personnel were at a 115% increased risk of dying as a result of a pedestrian accident compared to the UK general population (SMR: 215; 95% CI 129-335) (**Table 8**). This result was statistically significant. See paragraph 76 for information on the differences between UK Service personnel and UK general population risk groups by age.

96. During the last five years all Service personnel aged under 30 were at a 202% increased risk of dying as a result of a pedestrian accident compared to the UK general population (SMR: 302; 95% CI: 172-490). This result was statistically significant (**Table 8**).

97. During the last five years all Service personnel aged 30 and over risk of dying as a result of a pedestrian accident was the same as the UK general population (SMR: 302; 95% CI: 172-490) (**Table 8**).

Annex A - UK Armed Forces Land Transport Accident Deaths 1984-2012, additional tables

Table A1: UK Armed Forces LTA deaths by year and on/off duty, 1984 - 2012, numbers

Year	All	On Duty	Off Duty
All	1,817	421	1,396
1984	120	19	101
1985	116	38	78
1986	79	21	58
1987	100	20	80
1988	74	19	55
1989	120	32	88
1990	101	24	77
1991	89	24	65
1992	84	24	60
1993	74	13	61
1994	60	14	46
1995	54	13	41
1996	42	4	38
1997	54	10	44
1998	62	29	33
1999	43	13	30
2000	44	6	38
2001	47	11	36
2002	63	10	53
2003	49	9	40
2004	57	13	44
2005	51	7	44
2006	60	10	50
2007	50	14	36
2008	26	8	18
2009	26	0	26
2010	34	9	25
2011	23	6	17
2012	15	1	14