

**Recent military fatalities in Afghanistan by cause and nationality:
(PERIOD 12b: 20 September to 28 November 2010; PLUS overview on
twelve 20-week reporting PERIODS from 1 May 2006 to 28 November 2010)**

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Summary

a) During the 10 weeks of PERIOD 12b (20 September to 28 November 2010, which followed UK's hand-over on 20 September 2010 to US personnel of military control of Sangin), there were 144 coalition military fatalities in Afghanistan (US 117, UK 8, Canada 0, other nations 19) versus 165 fatalities in PERIOD 12a (US 117, UK 23, Canada 2, other nations 23).

*b) A surge of 30,000 US troops had been deployed to Afghanistan to facilitate Operation Moshtarak which began in 2010. By PERIOD 11b, US deployment of 90,000 by province was reckoned as **20,000** to Helmand, **NK2** to Kandahar and **NK3** elsewhere.*

*c) Operational changes notwithstanding, US military fatality rates in Afghanistan in PERIOD 12b were exactly as in the two previous 10 week periods: US – **6.8** fatalities per 1,000 personnel-years in PERIOD 12b (95% CI: 5.5 to 8.0; based on 117 deaths in 17,308 pys). By contrast, UK troops' fatality rate decreased from versus **17** (95% CI: 11 to 25) and **12** fatalities per 1,000 personnel-years (95% CI: 8 to 18) in PERIODS 11b and 12a respectively to **4** fatalities per 1,000 personnel-years (95% CI: 2 to 8) in PERIOD 12b; with the Canadian decrease having occurred even earlier - **15** fatalities per 1,000 personnel-years (95% CI: 6 to 29) in PERIOD 11b versus **2** fatalities per 1,000 personnel-years (95% CI: 0.2 to 7) during PERIOD 12.*

*d) In the 80 weeks of PERIODS 9 to 12, there were **396** fatal IED-only incidents in Afghanistan, which caused 545 military deaths (that is: mean of 1.4 deaths per fatal IED-only incident). {Included are **54** fatal IED-only incidents, which caused 72 military deaths, in the 10 weeks of PERIOD 12b}. For the 80 weeks of PERIODS 9 to 12, the proportion of hostile deaths due to IEDs was **57%** (545/962; 95% CI: 53% to 60%).*

*e) The proportion of fatal IED (only) incidents which claimed **more than two lives** declined slightly, but significantly (chi-square on 2df = 6.27, $p < 0.05$), between PERIODS 5+6+7+8 (18/144, 12.5%), PERIODS 9+10 (18/183, 10%) and PERIODS 11+12 (11/213, 5%).*

*f) UK fatality rates in Afghanistan had essentially doubled when comparing the initial 160 weeks from 1 May 2006 (PERIODS 1 to 8: **160 weeks**) and the more recent 60-weeks (18 May 2009 to 11 July 2010) of PERIODS 9+10+11, to which revealing summaries for the 10-weeks of PERIOD 12a (12 July to 19 September 2010; pre-hand-over and pre-winter) and PERIOD 12b (20 September to 28 November 2010; post-hand-over but winter-started) can now both be added:*

PERIODS 1 to 8: 7.4 per 1,000 pys (95%CI: 6 to 9, based on 152 fatalities in 20,476 pys)
PERIODS 9+10+11: 14.1 per 1,000 pys (95%CI: 12 to 16, based on 155 fatalities in 10,962 pys)
PERIOD 12a: 12 per 1,000 pys (95%CI: 8 to 18, based on 23 fatalities in 1,923 pys)
PERIOD 12b: 4 per 1,000 pys (95%CI: 2 to 8, based on 8 fatalities in 1,923 pys).

g) In the 20 weeks of PERIODS 11b+12a, US troops in Helmand outnumbered UK's military personnel in Afghanistan by 2:1, with 45+45 = 90 US military fatalities in Helmand to UK's

32+23 = 55 deaths in Afghanistan. Importantly, the US in Helmand and UK in Afghanistan military fatality rates were **not** significantly different in PERIODS 11b+12a:

US in Helmand: 12 per 1,000 pys (95% CI: 9 to 14, based on 90 fatalities in 7,692 pys)
UK troops: 14 per 1,000 pys (95% CI: 11 to 18, based on 55 fatalities in 3,846 pys).

h) Following UK's changed area of operations in Afghanistan from 20 September 2010, some reduction in UK's military fatality rate was expected, vis-à-vis US troops in Helmand, in the upcoming 30 weeks from 20 September 2010 to 17 April 2011. And, indeed, their rates were significantly different from each other in PERIOD 12b (chi-square on 1df = 5.67, $p < 0.02$), with the UK rate sufficiently low in PERIOD 12b that, if continued into winter PERIOD 13a, UK fatalities in 2010, although likely to exceed UK's worst year in Northern Ireland (1972: 102 fatalities), may not exceed the toll in Afghanistan for 2009 (108):

US in Helmand: 10 per 1,000 pys (95% CI: 7 to 13, based on 39 fatalities in 3,846 pys)
UK troops: 4 per 1,000 pys (95% CI: 2 to 8, based on 8 fatalities in 1,923 pys).

*i) For the first time, we relate **hostile deaths** of UK military personnel who served in the Royal Logistics Corps (unless in an Air Assault Support Regiment) or Royal Engineers (unless in a Field Squadron) – presumed Explosive Ordnance Disposal (EOD) personnel - to the number of IED attacks that claimed the lives of UK military personnel. The calendar year pattern of hostile deaths in Afghanistan among UK's presumed EOD personnel (1, 4, 11 in 2006+2007+2008, 2009 and 2010 to 28 November 2010 respectively) is apparently discordant with the rate at which UK's IED-only military fatalities increased in Afghanistan in the same calendar periods (namely 43, 76, 53: chi-square on 2df = 11.2, $p < 0.01$); and similarly when we focus on IED-only fatalities among presumed EOD personnel (1, 4, 8: chi-square on 2df = 6.06, $p < 0.05$) - the difference being two deaths due to hostile fire and one to small arms fire.*

1. Background

Since 1 May 2006 we have reported every 20 weeks on military fatalities in Afghanistan and Iraq by cause and nationality. Our analyses^{5,3} rely on icasualties.org, to which we make acknowledgement. Date and cause of fatalities on icasualties.org are subject to change as well as to updating. For example, in late July 2009, military fatalities in Afghanistan in the first half of PERIOD 9 were shown as 119, but now as 120.

Because the initial phase of Panther's Claw, a major counter-insurgency operation in the run-up to elections in Afghanistan, ended mid-way through PERIOD 9, unusually we reported a mid-point analysis: please see **Journal of the Royal United Services Institute 2009; 154: 30-38 & 40-45**^{35, 36}.

With two mid-point exceptions – determined by UK's withdrawal from Basra City and, as above, the initial phase of Panther's Claw having ended - our analyses, until 2010, have related to 140-day PERIODS: see below.

As of PERIOD 11a (22 February to 2 May 2010), we initiated 10-weekly reporting. Reasons included: that our PERIOD 11b followed UK's parliamentary election on 6 May 2010, and change to coalition government; but, more importantly, even in the 10 weeks

of PERIOD 11a that overlapped the end of the Afghan winter, UK military fatalities in Afghanistan had averaged two per week so that, in 2010 and while in military control of Sangin, UK could expect at least as many military fatalities in 10 weeks in Afghanistan as in 20 weeks in 2006. Throughout 2010/11, we therefore make interim 10-weekly reports so that our intensity of monitoring keeps pace with the intensity of combat which UK forces encounter in Afghanistan.

On 20 September 2010 (which marks the start of PERIOD 12b), UK forces in Helmand handed over responsibility for counter-insurgency operations in Sangin to US troops.

PERIOD	From	To
1	01 May 2006	17 September 2006
2	18 September 2006	04 February 2007
3	05 February 2007	24 June 2007
4 (mid-point)	25 June 2007	2 September 2007 11 November 2007
5	12 November 2007	30 March 2008
6	31 March 2008	17 August 2008
7	18 August 2008	04 January 2009
8	05 January 2009	17 May 2009
9 (mid-point)	18 May 2009	26 July 2009 04 October 2009
10	05 October 2009	21 February 2010
11 (mid-point)	22 February 2010 (UK election: 6 May)	2 May 2010 11 July 2010
12 (mid-point)	12 July 2010	19 September 2010 28 November 2010
13 (mid-point)	29 November 2010	6 February 2011 17 April 2011

2. Methods briefly

We report fatality rates per 1,000 personnel-years. Four thousand troops in a theatre of operation for 3 months contribute 1,000 personnel-years (pys). So too do 1,000 personnel in theatre for one year. Analytically, we characterise “major combat” by a military fatality rate of 6 or more per 1,000 pys.

We analyse the lethality of IED (only) incidents. As in Bird and Fairweather⁵, we exclude from this analysis multiply-ascribed deaths, such as IED and small arms fire or IED and rocket propelled grenade/grenades. A singleton fatal IED attack in Iraq during PERIOD 5 in which a suicide vehicle was used has been coded as ‘suicide bomb’ rather than IED; and similarly a suicide car bomb-IED attack in PERIOD 9 in Afghanistan. Unusually, triple hostile fire US fatalities in Afghanistan and a UK singleton SAS death in PERIOD 6 were coded as ‘explosion’; and likewise the death of a UK lance corporal in PERIOD 7. We have **not** counted them as IED deaths.

We need to track changes in deployment. In PERIOD 11a, there was some debate about the totality of UK’s deployment to Afghanistan. We continue to show UK’s deployment as 10,000 troops, although BBC’s Today programme on 14 May 2010 cited 10,500.

History: In PERIOD 5, UK's deployment to Iraq reduced below 5,000 troops⁶⁻¹² and to Afghanistan was to have increased to 7,700, but seems to have remained at around 7,000¹⁰ until PERIOD 6¹³⁻¹⁵. Withdrawal of some 20,000 US combat troops from Iraq during PERIOD 5 was announced by President Bush: we have assumed that their number has effectively stood at 155,000 throughout PERIOD 5¹⁶⁻¹⁹ whereas US troops in Afghanistan have been reckoned at 31,000¹⁶ throughout PERIOD 5. In PERIOD 6 (7), US troop numbers have been reckoned as 150,000 (149,000) in Iraq and 35,000 in Afghanistan^{16, 20} despite some reports that both UK and US troop numbers were around 10% lower in Afghanistan²¹⁻²³, and as 139,000 and 39,000 in PERIOD 8 with the UK tallies maintained as in PERIOD 7²⁴⁻³⁴. In PERIOD 9, US and UK troop numbers have been taken as 57,000 and 9,000 respectively. By PERIOD 10, US troops were reckoned to be around 100,000 in Iraq and around 90,000 in Afghanistan after a further uplift of around 30,000 personnel was announced by President Obama

(<http://www.cnn.com/2009/POLITICS/12/01/obama.afghanistan/index.html>;
http://news.google.co.uk/news?hl=en&q=spectre+of+endless+wars&um=1&ie=UTF-8&ei=QIqHS9CZJoz00gS0rZDGCw&sa=X&oi=news_group&ct=title&resnum=1&ved=0CAsQsQQwAA
) following a review of military strategy in Afghanistan which was led by General Petraeus
(<http://news.bbc.co.uk/1/hi/8527266.stm>; http://news.bbc.co.uk/1/hi/world/south_asia/8389351.stm).

Meanwhile, UK and Canadian troops had increased to 9,500 (which does not include mooted 500 "special forces", see Straight Statistics (<http://www.straightstatistics.org/article/helicopter-numbers-do-we-have-lift>) and 2,800 respectively in Afghanistan (see CBC News, 24 February 2010: "Brace yourself, Canada, our big fight is just ahead").

3. Results

3.1 Fatalities in Afghanistan in PERIODS 1 to 12

TABLE 1 summarises coalition military fatalities by nationality in Afghanistan where US personnel accounted for **49%** of all military fatalities in PERIODS 1+2+3+4 (**180/367**; 95% CI: 44% to 54%), for **52%** in PERIODS 5+6+7+8 (**220/420**; 95% CI: 48% to 57%), but for **67%** in PERIODS 9+10+11+12 (**718/1,076**; 95% CI: 64% to 70%). Indeed, in the most recent 10 weeks of PERIOD 12b, US personnel accounted for **81%** of all military fatalities (117/144; 95% CI: 75% to 87%, including a large cluster of nine US deaths in a non-hostile helicopter crash).

Non-hostile causes: Unchanged from PERIODS 5+6+7+8, **TABLE 1** also shows that, in PERIODS 9+10+11+12, non-hostile causes accounted only 114/1,076 military fatalities in Afghanistan (**11%**; 95% CI: 9% to 13%). But a quarter of these 114 deaths - 28 - occurred in the course of 11 helicopter (or aircraft) accident/crashes [1, 1, 1, 1, 2, 3, 3, 3, 4, 7, 9]. More detail follows: 10 (1UK+9US) occurred in two separate helicopter accident/crashes in PERIOD 12, eight (3Australian + 1UK + 3US + 1USaircraft) in four helicopter/aircraft accident/crashes in PERIOD 11, while 11 (7US + 4US) occurred in two separate helicopter crashes in PERIOD 10, and six (2+3+1) in three helicopter/airplane crashes in PERIOD 9.

In PERIODS 5+6+7+8, non-hostile causes had accounted for 49/420 military fatalities in Afghanistan (**12%**; 95% CI: 8% to 15%) but for 88/367 fatalities in preceding 80 weeks of PERIODS 1+2+3+4 (**24%**; 95% CI: 20% to 28%).

By nationality: Military fatality rates in Afghanistan have been notably different by nationality, as indicated by non-overlapping 95% confidence intervals below, and consistently so in the first and second 80-week-summary. In the most recent **60-weeks of PERIODS 9+10+11**, UK and Canadian fatality rates were not differentiated. Both were very significantly higher than for US troops, for whom the overall fatality rate in

PERIODS 9+10+11, although up by nearly a fifth on PERIODS 1 to 8, had remained just below the ‘major combat’, which we define analytically as 6 fatalities per 1,000 pys. Important decreases in military fatality rate became evident in PERIOD 12 for both Canadian and UK troops which, for Canadian troops, occurred from the start of PERIOD 12: see summaries below, **TABLE 1** and **Discussion**.

Notice that US fatality rate has been escalating across **PERIODS 1 to 8; PERIODS 9+10+11; PERIOD 12** and, as such, differently from both UK and Canadian forces.

Summary for PERIODS 1+2+3+4:

Canadians: 15.7 per 1,000 pys (95%CI: 12 to 20, based on 56 fatalities in 3,564 pys)
UK forces: 8.9 per 1,000 pys (95%CI: 7 to 11, based on 76 fatalities in 8,580 pys)
US forces: 4.9 per 1,000 pys (95%CI: 4.2 to 5.6, based on 180 fatalities in 36,577 pys).

Summary for PERIODS 5+6+7+8:

Canadians: 12.2 per 1,000 pys (95% CI: 9 to 16, based on 47 fatalities in 3,848 pys)
UK forces: 6.4 per 1,000 pys (95% CI: 5 to 8, based on 76 fatalities in 11,896 pys)
US forces: 4.1 per 1,000 pys (95% CI: 3.6 to 4.7, based on 220 fatalities in 53,388 pys).

Summary for PERIODS 9+10+11+12:

Canadians: 8.1 per 1,000 pys (95% CI: 5 to 11, based on 34 fatalities in 4,194 pys)
UK forces: 7.6 per 1,000 pys (95% CI: 6.5 to 8.7, based on 186 fatalities in 24,322 pys)
US forces: 5.8 per 1,000 pys (95% CI: 5.3 to 6.2, based on 718 fatalities in 124,581 pys).

Summary for PERIODS 1+2+3+4+5+6+7+8: 160 weeks

Canadians: **13.9** per 1,000 pys (95% CI: 11 to 17, based on 103 fatalities in 7,412 pys)
UK forces: **7.4** per 1,000 pys (95% CI: 6 to 9, based on 152 fatalities in 20,476 pys)
US forces: **4.4** per 1,000 pys (95% CI: 4.0 to 4.9, based on **400** fatalities in 89,965 pys)

Summary for PERIODS 9+10+11: 60 weeks

Canadians: **10.3** per 1,000 pys (95% CI: 7 to 15, based on 32 fatalities in 3,116 pys)
UK forces: **14.1** per 1,000 pys (95% CI: 12 to 16, based on 155 fatalities in 10,962 pys)
US forces: **5.3** per 1,000 pys (95% CI: 4.8 to 5.8, based on **484** fatalities in 91,154 pys)

Summary for PERIOD 12: 20 weeks

Canadians: **1.9** per 1,000 pys (95% CI: 0.2 to 7, based on 2 fatalities in 1,078 pys)
UK forces: **8.1** per 1,000 pys (95% CI: 5 to 11, based on 31 fatalities in 3,846 pys)
US forces: **6.8** per 1,000 pys (95% CI: 5.9 to 7.6, based on **234** fatalities in 34,616 pys)

The combined US/UK/Canadian military fatality rate, which had been **3.4** per 1,000 personnel-years (95% CI: 2.6 to 4.3, based on **68** fatalities in 19,769 pys) in PERIOD 11a, more than doubled to (post-winter) **7.9** (95% CI: 6.7 to 9.2, based on **157** fatalities in 19,769 pys) in PERIOD 11b and was likewise **7.2** (95% CI: 6.0 to 8.4, based on **142** fatalities in 19,770pys) in PERIOD 12a, dropping back only slightly - and not significantly - to **6.3** (95% CI: 6.0 to 8.4, based on **125** fatalities in 19,770pys) in (winter-proximal) PERIOD 12b.

3.2 Fatal IED (only) incidents: variations

TABLE 2 shows military fatalities in IED (only) incidents, hereafter IED incidents, in Afghanistan. For Iraq, see APPENDIX.

Afghanistan: In Afghanistan, the number of fatal IED incidents roughly doubled from 12 in PERIOD 3 to 27 in PERIOD 4 ($p < 0.02$), with thereafter $29+39+42+34 = 144$ fatal IED incidents in PERIODS 5+6+7+8 (0.26 per day). Lethality per fatal IED incident in PERIODS 5+6+7+8 was 216 fatalities in 144 fatal IED incidents in Afghanistan, a mean of 1.5 deaths per fatal IED (only) incident {sd = 0.83}, and consistent with Iraq.

In 560 days of PERIODS 9+10+11+12, fatal IED incidents nearly tripled to $94+89+101+112 = 396$ fatal IED incidents (0.71 per day). These 396 fatal IED incidents cost the lives of $136+120+129+160 = 545$ military personnel, a mean of 1.4 deaths per fatal IED (only) incident. {In PERIOD 12b, a similar pattern had persisted with 54 fatal IED incidents in 70 days, which cost the lives of 72 military personnel, as in PERIOD 12a}. Across the 80 weeks of PERIODS 9 to 12, the proportion of hostile deaths due to fatal IEDs (only) incidents was **57%** ($545/962$; 95% CI: 53% to 60%).

The proportion of fatal IED (only) incidents which claimed *more than two lives* declined slightly, but significantly (chi-square on 2df = 6.27, $p < 0.05$), between PERIODS 5+6+7+8 (18/144, 12.5%), PERIODS 9+10 (18/183, 10%) and PERIODS 11+12 (11/213, 5%).

3.3 Explosive Ordnance Disposal and IEDs.

Below we list UK military fatalities since 1 May 2006 whose regiment/unit suggests to us that they may have served as explosives experts. We list these 19 men by date and cause of death, rank, surname and regiment with a further 12 listed whose duties just possibly included Explosive Ordnance Disposal (EOD).

Deciding whether to detonate or dismantle a detected IED is influenced by the need to prevent casualties to military personnel or civilians, likely damage to property, the desire to track whether bomb-makers' materials or techniques have changed, and professional curiosity. However, unless bomb-makers alter their techniques and sources with high frequency, the learning to be gained from dismantling must be weighed against the risk to EOD personnel whose lives and skills we can ill afford to expend, and who may be vulnerable to hostile fire while they work.

By calendar year, the following table summarises IED-only fatalities (by our definition) that occurred among UK military personnel together with i) hostile deaths by any cause and ii) IED-only fatalities among UK's presumed EOD personnel. The data display a significantly enhanced rate of i) hostile deaths for UK's presumed EOD personnel in 2010 (chi-square on 2 degrees of freedom of 11.2, $p < 0.01$); and also ii) when particularised to IED-only fatalities (chi-square on 2 degrees of freedom of 6.06, $p < 0.05$).

IED-only fatalities among UK's presumed EOD personnel have increased *more than* the rate at which UK's IED-only fatalities increased – when we might have expected them to hold steady, precisely because the dismantling of a threshold number of IED for learning purposes can be achieved via a higher detonation rate when there are more IEDs to deal with. Instead, we observe that presumed EOD personnel were 1/43 (2%) and 4/76 (5%) of UK's IED-only fatalities in 2006+2007+2008 and 2009 respectively, but 8/53 (15%) in 2010 (to 28 November 2010).

Calendar year	UK IED-only fatalities	i) Hostile death of UK presumed EOD personnel {expectations by trend in IED-only fatalities}	ii) IED-only death of UK presumed EOD personnel {expectations by trend in IED-only fatalities}
2006+2007+2008	1+12+30 = 43	1 {4.00}	1 {3.25}
2009	76	4 {7.07}	4 {5.74}
2010: to 28 Nov.	53	11 {4.93}	8 {4.01}
Total	172	16 chi-square on 2df = 11.2, p<0.01	13 chi-square on 2df = 6.06, p<0.05

Date of death	Cause of death	Rank	Surname	Regiment
30 Oct 2010	Hostile fire	Sapper	Blanchard	Engineer Regiment (EOD)
19 Oct 2010	IED attack	Acting Corporal	Barnsdale	33 Engineer Regiment (EOD)
18 Sept 2010	IED attack	Sergeant	Jones	Royal Engineers
26 July 2010	IED attack	Sapper	Smith	36 Engineer Regiment
17 July 2010	IED attack	Staff Serg.	Linley	Royal Logistic Corps: 11 EOD* Regiment
27 June 2010	Small arms fire	Corporal	Kirkpatrick	101 Engineer Regiment (EOD)
3 May 2010	NH* vehicle accident	Lance Corporal	Buxton	21 Engineer Regiment
3 May 2010	IED attack	Sapper	Roy	21 Engineer Regiment
26 Feb 2010	IED attack	Not reported	Fox	28 Engineer Regiment
15 Feb 2010	IED attack	Sapper	Mellors	36 Engineer Regiment: Counter-IED Task Force
8 Feb 2010	IED attack	Warrant Off. 2	Markland	36 Engineer Regiment
11 Jan 2010	Hostile fire	Captain	Read	Royal Logistics Corps: 11 EOD Regiment
31 Dec 2009	IED attack	Sapper	Watson	33 Engineer Regiment (OED): Royal Engineers
15 Nov 2009	IED attack	Corporal	Marlton-Thomas	33 Engineer Regiment: Royal Engineers
31 Oct 2009	IED attack	Staff Serg.	Schmid	Royal Logistics Corps
20 July 2009	IED attack	Captain	Shepherd	Royal Logistics Corps: 11 EOD Regiment
6 July 2009	NH helicopter crash	Captain	Babington-Browne	22 Engineer Regiment: Royal Engineers
10 Sept 2008	IED attack	Warrant Off. 2	O'Donnell	Royal Logistics Corps: 11 EOD Regiment
9 Aug 2006	NH vehicle accident	Private	Reeves	Royal Logistics Corps

25 Sept 2010	IED attack	Corporal	Thomas	Royal Electrical & Mechanical Engineers (Special Forces Support Group)
13 Aug 2010	Small arms fire	Sapper	Gurung	21 Engineer Regiment: 69 Gurkha Field Squadron
13 Aug 2010	Small arms fire	Sapper	Foster	21 Engineer Regiment
2 Sept 2009	IED attack	Lance Corporal	Brandon	Corps of Royal Electrical & Mechanical Engineers (REME)
4 Aug 2009	IED attack	Craftsman	Lombardi	Royal Electrical & Mechanical Engineers (REME)
23 May 2009	IED attack	Sapper	Rossi	38 Engineer Regiment: 5 Field Squadron
21 Dec 2008	IED attack	Corporal	Deering	Commando Logistics Regiment
12 Dec 2008	Suicide bomber	Marine	Davies	Commando Logistics Regiment
27 June 2008	NH vehicle accident	Warrant Off. 2	Shirley	Royal Logistics Corps: 13 Air Assault Support Regiment
9 Nov 2007	NH vehicle accident	Lance Corporal	Alderton	36 Engineer Regiment: 20 Field Squadron
17 Sept 2007	IED attack	Lance Corporal	Violini	36 Engineer Regiment: 20 Field Squadron
6 Aug 2006	Small arms fire	Private	Cutts	Royal Logistics Corps: 13 Air Assault Support Regiment

* EOD = Explosive Ordnance Disposal; NH = non-hostile

3.4 Suicide bombings and senior ranks.

Suicide bombings: In the 160+80 weeks since 1 May 2006 to 28 November 2010, 33 suicide bombings have caused 63 military fatalities (out of 1,863 deaths in 240 weeks: 3.4%). The mean has been **1.9 military fatalities per suicide bombing** in Afghanistan (15 single fatalities, 12 pairs, three triple fatalities, and single incidents of 4, 5, and 6 deaths).

Of these 63 military deaths in suicide bombings, there were four (1+3) in PERIOD 12b, none in PERIOD 12a, eight fatalities in PERIOD 11b (2+6), one death in PERIOD 11a, six fatalities (4 + 2) in PERIOD 10 and seven (1+2+1+3) in PERIOD 9. There were thus 26 military fatalities in 11 suicide bombing incidents in the 80 weeks of PERIODS 9+10+11+12, of whom 24 were US/UK/Canadian personnel (in 144,771 pys) – a clearly low US/UK/Canadian military fatality rate by suicide bomb of **17 per 100,000 pys**. Of the earlier 37 military fatalities in 22 suicide bombing incidents in the 160 weeks of PERIODS 1 to 8, 25 were US/UK/Canadian in 117,853 pys, a similarly low rate of **21 per 100,000 pys**.

Senior ranks: In the 160+80 weeks since 1 May 2006, there have been 17 military fatalities at the senior rank of Lieutenant Colonel or Colonel: nine in PERIODS 1 to 8 (8US + Italy), seven in PERIODS 9 to 12 (4US + US in helicopter crash + UK + Canadian + Georgian in IED attack which killed four Georgians in total). Twenty-two majors also died: 13 in PERIODS 1 to 8 (9US + UK + 2Canada + Denmark), and nine in PERIODS 9 to 12 (3US + UK + Canada + Germany; US in helicopter crash and UK in RPG attack; and US in NH helicopter crash that killed 9 US personnel in total).

The reason that we first drew attention to these fatalities in PERIOD 11b was *data-inspired*: on 18 May 2010, a suicide car bombing in Kabul claimed six coalition military lives, four of them ranked Lieutenant Colonel/Colonel. This one incident claimed the lives of a US colonel, a Canadian colonel and two US Lieutenant Colonels as well as US Specialist and US Staff Sergeant. *Prior to this major incident in Kabul*, suicide bombings had caused the death of only one other person ranked Major/Lieutenant Colonel/Colonel – a US Lieutenant Colonel who died on 26 May 2009 (in PERIOD 9): that is one out of 30 *prior* fatalities ranked Major/Lieutenant Colonel/Colonel (3%) was by suicide bombing, no different from the all-ranks rate.

4. Discussion

Operations. A major counter-insurgency operation began in Afghanistan in June 2009 which ended its initial phase midway through PERIOD 9. US operational changes occurred during PERIODS 9+10. These impacted on the Canadians' deployment in Kandahar and, in addition to better air support, may have contributed to the altered fortunes of the Canadians. Operation Moshtarak began in the second half of PERIOD 10 once US reinforcements of some 30,000 troops had been deployed. By the start of PERIOD 11b, 20,000 US troops had deployed to Helmand province. At the start of PERIOD 12b, UK forces in Helmand handed over responsibility for counter-insurgency operations in Sangin to US troops.

Fatality rates in Afghanistan had doubled in PERIOD 9 relative to PERIOD 8 but between PERIODS 9 and 11a reduced progressively by a factor of two-thirds for US military personnel; and nearly halved for UK/Canadian forces. However, major hostilities by the Taliban resumed (post-winter, post-planting) in PERIOD 11b during which the UK/Canadian fatality rate was **16 per 1,000 pys** (95% CI: 11 to 22) - as high as in PERIOD 9 - and the US rate of **6.8** (95% CI: 5.5 to 8.0) also represented major combat.

In Afghanistan, quite substantial winter-related decreases had been evident pre-surge, see PERIODS 2 and 5, so that the observed decreases in fatality rates in PERIODS 10+11a could not be attributed to the surge alone. In particular, PERIOD 11a ended in early May before the anticipated renewal of major hostilities, which were only too evident in PERIODS 11b+12a.

Winter may also have contributed in part to the stay in IED escalation, but other explanations include greater availability and use of air transport, better armoured road transport, better disruption of the enemy's supply routes or more IED-detections which are not routinely reported – although now Wiki-leaked. **As winter ended, so too did the let-up in fatal IED incidents.** However, when comparing across PERIODS 5+6+7+8, PERIODS 9+10 and PERIODS 11+12, there is some evidence that the proportion of fatal IED (only) incidents that claim *more than two lives* has decreased from 12.5% (18/144) to 5% (11/213).

Deployment. Insight on differential deployment to provinces within Afghanistan of now substantially more US personnel, is gleaned **by comparing the provincial locations of 718 US military fatalities in PERIODS 9+10+11+12 (see below).** Expectations shown in brackets *in italics* assume a common-provincial-distribution of US military fatalities across PERIODS 9+10, an hypothesis which the data do not conform to (comparison of observed versus expected fatalities by location gives χ^2 on 2 degrees of freedom of 24.7, $p < 0.001$). There is thus circumstantial evidence that US operational changes occurred during PERIODS 9+10, and that these impacted on the Canadians' deployment in Kandahar and probably contributed to their altered fortunes.

By contrast, the observed deaths of US personnel are consistent with a common-provincial-distribution of US military fatalities across PERIODS 11a+11b (see expectations in ***bold italics***), which persisted throughout PERIOD 12.

Location of US military fatalities	Helmand	Kandahar	Elsewhere in Afghanistan/NA	US TOTALS
PERIOD 9	39 <i>{47.2}</i>	18 <i>{30.5}</i>	127 <i>{106.4}</i>	184
PERIOD 10	43 <i>{34.8}</i>	35 <i>{22.5}</i>	58 <i>{78.6}</i>	136
PERIOD 11a	16 <i>{17.5}</i>	7 <i>{5.7}</i>	24 <i>{23.8}</i>	47
PERIOD 11b	45 <i>{43.5}</i>	13 <i>{14.3}</i>	59 <i>{59.2}</i>	117
PERIOD 12a	45	25	47	117
PERIOD 12b	39	23	55	117
Total	227	121	370	718

Helmand: In PERIOD 11b+12a, there were some 20,000 US troops in Helmand who outnumbered UK military personnel in Afghanistan by 2:1, and there were 90 US fatalities in Helmand versus 55 UK deaths in Afghanistan. Thus, US troops' fatality rate in Helmand province of **12** per 1,000 pys (95% CI: 9 to 14, based on 90 deaths in 7,692

pys) was not significantly different from UK's PERIOD 11b+12a fatality rate in Afghanistan of **14** (95% CI: 10 to 18, based on 55 fatalities in 3,846 pys).

However, in PERIOD 12b, having handed-over responsibility for counter-insurgency operations in Sangin, UK's military fatalities reduced to eight in 10 weeks and its rate to 4 per 1,000 pys (95% CI: 2 to 8) while the military fatality rate for US troops in Helmand held up, as summarised below:

PERIOD 11b+12a

US in Helmand:	12 per 1,000 pys (95% CI: 9 to 14, based on 90 fatalities in 7,692 pys)
UK troops:	14 per 1,000 pys (95% CI: 11 to 18, based on 55 fatalities in 3,846 pys)

PERIOD 12b

US in Helmand:	10 per 1,000 pys (95% CI: 7 to 13, based on 39 fatalities in 3,846 pys)
UK troops:	4 per 1,000 pys (95% CI: 2 to 8, based on 8 fatalities in 1,923 pys).

Deaths of UK's presumed EOD personnel: We have attempted to identify deaths in Afghanistan among UK military personnel who have been engaged in EOD. We list 16 hostile deaths, 13 by IED-only attack, and three non-hostile deaths which we presume to fall into this category. The hostile death rate (and IED-only fatality rate) by calendar period for presumed EOD personnel exceeded the rate of increase in UK's IED-only fatalities, when we should have expected it to hold steady if more IEDs meant a greater proportion of them being able to be dealt with by detonation. Either this logic (ours) is not being applied, or EOD personnel are being specifically targeted by the Taliban (such as by IED-placements which inhibit safe detonation, or by small arms fire), or the bomb-makers have devised mechanisms that are more challenging for our EOD personnel to circumvent, or UK's presumed EOD personnel safeguard other troops besides our own so that seeking for trend against *only* UK's IED fatalities is insufficient. We have not attempted to identify, from their regiments, other nations' EOD personnel. However, the sort of analysis that we have outlined could be applied by others for EOD personnel from other nations to discover if our UK-signals hold more generally, or are a specious alert.

Future beyond the surge: As previously raised, we consider that there is a pressing need for similar, public, periodic monitoring of the numbers of the Afghan National Army's (ANA) ISAF-trained deployed personnel and their fatalities, who are listed (even by ANA serial-number, if names might endanger villages) neither on icasualties.org nor by UK's Ministry of Defence in the case of ANA-personnel who work alongside UK troops. We hope that, before PERIOD 14 which begins on 18 April 2011, UK will give a lead within ISAF on so doing.

Notes of caution. If we have over-estimated US's deployment to Afghanistan since PERIODS 10, shown as 90,000 personnel, then US fatality rates may be slightly under-estimated thereby; and UK's fatality rate slightly over-estimated if UK deployment were as high as 10,500.

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TABLE 1a (Afghanistan): Coalition military deaths in Afghanistan and estimated fatality rates per 1,000 personnel-years in consecutive 140-day periods

Theatre	Afghanistan							
Period	1	2	3	4	5	6	7	8
Dates	1 May 2006 to 17 Sept 2006	18 Sept 2006 to 4 Feb 2007	5 Feb 2007 to 24 June 2007	25 June 2007 to 11 Nov 2007	12 Nov 2007 to 30 Mar 2008	31 Mar 2008 to 17 Aug 2008	18 Aug 2008 to 4 Jan 2009	5 Jan 2009 to 17 May 2009
Total fatalities (non-hostile)	117 (41)	40 (4)	96 (27)	114 (16)	59 (10)	136 (20)	123 (6)	102 (13)
US deaths* (troops) personnel-years	54 (23,300) 8,962	18 (22,000) 8,462	50 (24,800) 9,538	58 (25,000) 9,615	25 (31,000) 11,923	88 (35,000) 13,425	53 (35,000 or 31,000 ²¹) 13,425	54 (39,000) 14,615
UK deaths (troops) personnel-years	33*** (4,500) 1,726	6 (up to 5,250) 2,014	15 (5,250 to 6K to 6,900) 2,186	22 (6,900) 2,654	8 (7,000) 2,692	24 (8,000) 3,068	23 (8K or 7,300) 3,068	21 (8,000) 3,068
Canadian deaths (troops) personnel-years	17 (2,250) 865	12 (2,250) 865	16 (2,500) 962	11 (2,500) 962	10 (2,500) 962	9 (2,500) 962	16 (2,500) 962	12 (2,500) 962
Other deaths	13	4	15	2	16	15	31**	15
<i>Estimated fatality rates per 1,000 personnel-years (95% Poisson uncertainty)</i>								
US	6 (4.6 to 7.9)	2 (1.3 to 3.4)	5 (3.8 to 6.7)	6 (4.5 to 7.6)	2.1 (1.3 to 2.9)	6.6 (5.2 to 7.9)	4.0 [@] (2.9 to 5)	3.7 (2.7 to 4.7)
UK	19 (13 to 27)	3 (1 to 6)	7 (4 to 11)	8 (5 to 11)	3 (1 to 6)	8 (5 to 11)	7 [@] (5 to 11)	7 (4 to 10)
Canada	20 (11 to 31)	14 (7 to 24)	17 (9 to 27)	9 (3 to 16)	10 (5 to 19)	9 (3 to 16)	17 (9 to 27)	12 (6 to 22)
UK/Canada	19 (14 to 25)	6 (4 to 11)	10 (7 to 14)	8.2 (5.4 to 11)	4.9 (2.9 to 7.8)	8.2 (5.4 to 11)	9.7 (7 to 13)	8.2 (5.6 to 11)
US/UK/Canada	9.0 (7 to 11)	3.2 (2 to 4)	6.4 (5 to 8)	6.9 (5.5 to 8.3)	2.8 (1.9 to 3.6)	6.9 (5.7 to 8.2)	5.3 (4.2-6.3)	4.7 (3.7 to 5.6)

* For PERIODS 1- 4, US deployments were ascertained retrospectively from Department of Defense Active Duty Military Personnel Strengths (309A): with acknowledgement to Olivier Grouille, RUSI.

** includes large cluster of 10 French fatalities in hostile fire

*** large cluster of 14 Nimrod deaths

@ US fatality rate in Afghanistan in PERIOD 7 would be 4.4 (3.2 to 5.6) and UK rate would be 8 (5 to 12) if their troop numbers were 31,000 {and hence 11,923 pys} and 7,300 {and hence 2,808 pys} rather than as shown in Table 1.

TABLE 1b (Afghanistan): Coalition military deaths in Afghanistan and estimated fatality rates per 1,000 personnel-years in consecutive 70-day (a/b) or 140-day periods.

Theatre	Afghanistan						
Period	9 UPLIFT	10 SURGE	11a SURGE	11b SURGE	12a SURGE	12b SURGE	
Dates	18 May 2009 to 4 Oct 2009	5 Oct 2009 to 21 Feb 2010	22 Feb 2010 to 2 May 2010	3 May 2010 to 11 July 2010	12 July 2010 to 19 Sept 2010	20 Sept 2010 to 28 Nov 2010	
Total fatalities (non-hostile)	293 (33)	213 (25 ^{11H})	79 (9 ^{4H/A})	182 (20 ^{4H})	165 (9 ^H)	144 (18 ^{9H})	
US deaths* (troops) personnel- years	184 (57,000) 21,923	136 (90,000) 34,615	47 (90,000) 17,308	117 (90,000) 17,307	117 (90,000) 17,308	117 (90,000) 17,308	
UK deaths (troops) personnel- years	60 (9,000) 3,462	44 (9,500) 3,654	19 (10,000) 1,923	32 (10,000) 1,923	23 (10,000) 1,923	8 (10,000) 1,923	
Canadian deaths (troops) personnel- years	13 (2,500) 962	9 (2,800) 1,077	2 (2,800) 538	8 (2,800) 539	2 (2,800) 539	0 (2,800) 539	
Other deaths	36	24	11	25	23	19	
<i>Estimated fatality rates per 1,000 personnel-years (95% Poisson uncertainty)</i>							
US	8.4 (7.2 to 9.6)	3.9 (3.3 to 4.6)	2.7 (1.9 to 3.5)	6.8 (5.5 to 8.0)	6.8 (5.5 to 8.0)	6.8 (5.5 to 8.0)	
UK	17.3 (13 to 22)	12.0 (8 to 16)	9.9 (6 to 15)	16.6 (11 to 25)	12.0 (8 to 18)	4.2 (2 to 8)	
Canada	13.5 (7 to 23)	8.4 (4 to 16)	3.7 (0.5 to 13)	14.8 (6 to 29)	1.9 (0.2 to 7)		
UK/Canada	16.5 (13 to 20)	11.2 (8 to 14)	8.5 (5 to 13)	16.2 (11 to 22)	10.2 (7 to 15)	3.2 (1 to 7)	
US/UK/ Canada	9.8 (8.5-10.9)	4.8 (4.1 to 5.5)	3.4 (2.6 to 4.3)	7.9 (6.7 to 9.2)	7.2 (6.0 to 8.4)	6.3 (5.2 to 7.4)	

11H Total of 25 non-hostile deaths in PERIOD 10 includes 11 US fatalities (7+4) in two helicopter crashes.

4H /A PERIOD 11a includes 4 US fatalities (3+1) in helicopter + aircraft crashes.

4H PERIOD 11b includes 3 Australian + 1 US fatalities (3+1) in 2 helicopter crashes.

1H PERIOD 12a includes 1 UK fatality in a helicopter accident.

9H PERIOD 12b includes cluster of 9 US fatalities in a helicopter crash.

TABLE 2a (Afghanistan): IED (only) fatalities in Afghanistan

Theatre	Afghanistan								
Period	Baseline (A)	3	4	5	6	7	8	9	10
Dates	1 Oct 2001 to 4 Feb 2007	5 Feb 2007 to 24 June 2007	25 June 2007 to 11 Nov 2007	12 Nov 2007 to 30 Mar 2008	31 Mar 2008 to 17 Aug 2008	18 Aug 2008 to 4 Jan 2009	5 Jan 2009 to 17 May 2009	18 May 2009 to 4 Oct 2009	5 Oct 2009 to 21 Feb 2010
Duration	1,953 days	140 days	140 days	140 days	140 days	140 days	140 days	140 days	140 days
Deaths in fatal IED incidents	76 in 46 fatal IEDs	22 in 12 fatal IEDs	44 in 27 fatal IEDs	37 in 29 fatal IEDs	62 in 39 fatal IEDs	62 in 42 fatal IEDs	55 in 34 fatal IEDs	136 in 94 fatal IEDs	120 in 89 fatal IEDs
Number of fatalities in a fatal IED incident									
<i>Fatalities, x, in IED incident</i>	<i>By period: frequency of fatal IED incidents with x fatalities</i>								
<i>1</i>	28	8	19	22	25	29	20	71	70
<i>2</i>	11	1	3	6	8	7	9	11	13
<i>3</i>	2	2	3	1	3	5	3	7	3
<i>4</i>	5	0	1		3	1	2	4	2
<i>5</i>	0	0	0					0	
<i>6+</i>	0	1	1					1	1*
TOTAL fatal IED incidents	46	12	27	29	39	42	34	94	89
Fatal IED incidents per day	0.02	0.1	0.2	0.2	0.3	0.3	0.2	0.7	0.6
Mean deaths per fatal IED incident	1.7	1.8	1.6	1.3	1.6	1.5	1.6	1.45	1.35

* Seven fatalities in apparently a single IED incident – the highest per-incident toll in Afghanistan to date.

TABLE 2b (Afghanistan): IED (only) fatalities in Afghanistan

Theatre	Afghanistan								
Period	9+10	11a	11b	12a	12a				
Dates	18 May 2009 to 21 Feb 2010	22 Feb 2010 to 2 May 2010	3 May 2010 to 11 July 2010	12 July 2010 to 19 Sept 2010	20 Sept 2010 to 28 Nov 2010				
Duration	280 days	70 days	70 days	70 days	70 days				
Deaths in fatal IED incidents	256 in 183 fatal IEDs	34 in 31 fatal IEDs	95 in 70 fatal IEDs	88 in 58 fatal IEDs	72 in 54 fatal IEDs				
Number of fatalities in a fatal IED incident									
<i>Fatalities, x, in IED incident</i>	<i>By period: frequency of fatal IED incidents with x fatalities</i>								
1	141	28	51	38	41				
2	24	3	16	15	10				
3	10	0	1	1	1				
4	6	0	1	3	2				
5	0	0	1	1	0				
6+	2*	0	0	0	0				
TOTAL fatal IED incidents	183	31	70	58	54				
Fatal IED incidents per day	0.65	0.4	1.0	0.8	0.8				
Mean deaths per fatal IED incident	1.4	1.1	1.4	1.5	1.3				

Consistent with our methodology⁵, excluded from the above analysis of PERIOD 9 are 11 multiply-ascribed IED-related deaths in four IED + small arms fire incidents (2, 1, 2, 1 fatalities) and in three IED + rocket propelled grenade incidents (1, 1, 3 fatalities). In PERIOD 11b, there were two IED+RPG incidents (1, 1). In PERIOD 12a, there was one New Zealand fatality in an IED+RPG+small arms fire incident. In PERIOD 12b, there was one US fatality and four Italian fatalities in two separate IED attack+small arms fire incidents.

APPENDIX for REFERENCE re IRAQ

Iraq: For detail on military fatalities in Iraq in PERIODS 1 to 8, please see **Journal of the Royal United Services Institute 2009; 154: 30-38 & 40-45^{35,36}**. By PERIOD 9, UK's deployment to Iraq had effectively ceased. All 52 military fatalities in PERIOD 9 in Iraq were US personnel: 21 deaths were non-hostile, 21 occurred in fatal IED (only) incidents, and 10 were from other hostile causes. In PERIOD 10, all 30 military fatalities in Iraq were US personnel: 24 deaths were non-hostile, one occurred in an IED (only) incident, two from small arms fire, and one from IED and small arms fire, a US military fatality rate of **0.8** per 1,000 personnel-years (95% CI: 0.5 to 1.1). In PERIOD 11, all 34 military fatalities in Iraq were US personnel: 22 were non-hostile, two deaths were from hostile fire, six in four fatal IED incidents, one in RPG, one small arms fire, one indirect fire and one in mortar attack. In PERIOD 12a, there were 8 US fatalities in Iraq (2 non-hostile, 2 by small arms fire, 1 indirect fire, 1 by grenade, 1 by IED) and **7 US fatalities in Iraq (2 non-hostile, 1 by small arms fire, 1 NH vehicle roll-over, and 3 apparently non-hostile but also attributed to small arms fire).**

TABLE 2 (Iraq): IED (only) fatalities in Iraq.

Theatre	Iraq								
Period	Baseline (I)	2	3	4	5	6	7	8	9
Dates	1 Jan 2001 to 17 Sept 2006	18 Sept 2006 to 4 Feb 2007	5 Feb 2007 to 24 June 2007	25 June 2007 to 11 Nov 2007	12 Nov 2007 to 30 Mar 2008	31 Mar 2008 to 17 Aug 2008	18 Aug 2008 to 4 Jan 2009	5 Jan 2009 to 17 May 2009	18 May 2009 to 4 Oct 2009
Duration	260 days	140 days	140 days	140 days	140 days	140 days	140 days	140 days	140 days
Deaths in fatal IED incidents	271 in 183 fatal IEDs	217 in 135 fatal IEDs	280 in 155 fatal IEDs	136 in 86 fatal IEDs	78 in 48 fatal IEDs	62 in 49 fatal IEDs	11 in 10 fatal IEDs	15 in 12 fatal IEDs	21 in 12 fatal IEDs
Number of fatalities in a fatal IED incident									
<i>Fatalities, x, in IED incident</i>	<i>By period: frequency of fatal IED incidents with x fatalities</i>								
1	128	88	97	57	35	39	9	11	7
2	33	23	22	13	4	8	1	0	2
3	14	14	20	12	4	1		0	2
4	5	9	10	3	3	1		1	1
5	3	1	1	1	1				
6+			5		1				
TOTAL fatal IED incidents	183	135	155	86	48	49	10	12	12
Fatal IED incidents per day	0.7	1.0	1.1	0.6	0.34	0.35	0.07	0.09	0.08
Mean deaths per fatal IED incident	1.5	1.6	1.8	1.6	1.6	1.3	1.1	1.3	1.7

There was a single IED (only) fatality in PERIOD 10 in Iraq; **6 IED (only) fatalities in four IED attacks (2+1+1+2) in PERIOD 11 in Iraq;** and one IED (only) fatality in a single IED attack in PERIOD 12a.