

Bridging the Gulf: 'Gulf War Syndrome' - what we know and what we don't

Despite considerable efforts it is likely that we will never know the full story of what has become known, albeit erroneously, as the 'Gulf War Syndrome' (GWS). However, some 16 years since the 1991 Gulf War, 44% of all United States (US) Gulf War veterans receive some form of disability payments, costing \$1 billion annually, and over 10% of United Kingdom (UK) Gulf veterans are in receipt of war pensions. So what is GWS and what might be its causes?

The ground phase of 1991 Gulf War lasted just four days and was a resounding military and medical military success. Traditional causes of non-battle casualties such as heat stroke and dehydration were rare. However, shortly after the war ended, reports emerged, initially from the US, of previously fit veterans developing unusual illnesses and symptoms. Media organisations quickly fuelled the emerging concerns by reporting increasing numbers of veterans having children with birth defects. Subsequently the US, and then the UK, began to conduct formal epidemiological research.

Initial studies used data from US health registries which provided systematic clinical evaluations; the process was subsequently repeated in the UK. Analysis of pooled data from over 100,000 programme attendees did not suggest any unusual pattern of illness, instead medically unexplained symptoms and syndromes were the most common diagnoses.^{1,2} However because programme attendees are self selecting the data obtained is only of limited scientific value. Nonetheless, if service during the 1991 Gulf War was associated with either a novel disease process or a dramatic elevation of a recognised but previously rare condition, then this would have been detected. Neither has happened. Furthermore, although the media reported an increase in the mortality rate in Gulf War veterans, numerous comprehensive analyses of the US and UK cohorts have not confirmed this other than an increase in accidental death, (US and UK) or suicide (US only) as observed in the aftermath of other conflicts.^{3,4}

Epidemiological reports of increased rates of symptom reporting in a cohort of US Gulf veterans found that symptom-defined conditions including chronic fatigue syndrome, depression, and post traumatic stress disorder were all elevated.⁵ The first UK systematic epidemiological study was undertaken by King's College London. This random sample of over 4,000 UK Gulf veterans was compared to similar numbers of active duty personnel who had deployed to Bosnia in 1992, and a further military non-deployed group.⁶ We found that the Gulf group were twice as likely to report each and every one of the 50 physical symptoms enquired about. Furthermore, the Gulf cohort reported decreased

health perception, but physical functioning was only very slightly different and still above expected non-military norms. Hence, Gulf veterans experienced more symptoms, endorsed more conditions, felt worse, but were still physically functioning almost as well as those deployed to another busy and stressful operational theatre.⁶

Other US, UK, Australian and Canadian epidemiological samples show essentially the same findings. Gulf War veterans report two to three times the rates of common symptoms as their non-deployed colleagues and also have more negative health perception and poorer quality of life.⁷ Nearly every study also confirms that the general increase in symptoms is not a new cluster of unusual symptoms specifically linked to Gulf service, suggesting that although subjective health has been clearly impaired, there is no specific nor unique 'Gulf War Syndrome'. A distinct syndrome was reported by US epidemiologist Robert Haley, but in a small study of a single unit with a low response rate and no controls.⁸ Furthermore, Haley's group has reported both central and peripheral nerve damage in the same veterans, which they attribute to exposure to a combination of chemical weapons and/or pesticides. However, expert review panels have not been convinced by either the medical evidence or the suggestion of significant exposure to chemical weapons. Our epidemiological study, and an even larger US study, failed to find evidence of significant damage to the peripheral nervous system, making exposure to organophosphate pesticides an unlikely cause of ill health.⁹

Yet, although there is no denying this change in symptoms and quality of life, it is equally clear that there has been no increase in well defined physical outcomes. For example, there has been no increase in cancer. All that has been found is a US study reporting an increase in motor neuron disease or amyotrophic lateral sclerosis (ALS) as it is known in the US.¹⁰ Irrespective of this, whilst ALS is a devastating disease, it remains very rare in veteran populations, and cannot account for more than a tiny fraction of the observed increase in morbidity in Gulf veterans. What Gulf veterans are therefore experiencing is an increase in symptoms, but not disease.

The search for possible aetiological agents has examined a variety of sub groups of deployed personnel. However the Gulf War health effect appears to have affected deployed military groups relatively equally. For instance, there is no consistent evidence of differences in the reporting of symptoms between the Services, suggesting that any possible causative agent of GWS would have to have equally affected those who operate over



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sea, land or in the air. However many of the predictors of ill health in Gulf veterans are more general rather than related to Gulf service. For example, lower rank, which is highly correlated with education, is firmly associated with ill health.¹¹

An interesting, but confusing, finding is the association between receiving large numbers of vaccines, given together, and subsequent self reported ill health.⁵ However, detailed investigations have not confirmed that this link is immunologically mediated. It may be a result of an unknown confounder, perhaps mediated by the stress of an impending deployment. Better designed studies around either new recruits or personnel deployed to the Iraq conflict may assist.¹²

So what can we conclude?

Firstly, at the time of writing there is no evidence that history has repeated itself; thankfully there is no current evidence of a repeat of a 'Gulf War Syndrome' saga arising in personnel returning from Iraq.¹³ Given also that in both conflicts the UK Armed Forces used depleted uranium munitions, gave anthrax vaccine and pyridostigmine bromide tablets, and used pesticides, yet there was only a GWS in the earlier and not the later conflict, it follows that the above factors are highly unlikely to be the cause of Gulf related ill health. Also, since the current war in Iraq is proving to be a more long lasting and difficult engagement, simplistic explanations of Gulf related illness as a manifestation of stress are also implausible. On the other hand, we cannot rule out that anxieties about so called weapons of mass destruction, which were realistic threats in 1991 but less so in 2003, may have differentially affected psychological health.

Secondly, it is unlikely that further studies will reveal much more useful information about the origins of Gulf ill health. We will have to accept that there are, and will always be, gaps in our knowledge. But we should not abandon our concerns over the health of our veterans, not least because regrettably spontaneous improvement does not seem to be the norm.¹⁴ Instead it is time to focus our efforts on treatment, rehabilitation and improving quality of life.

References

1. Joseph S. *A Comprehensive Clinical Evaluation of 20,000 Persian Gulf War veterans*. Military Medicine 1997;162:149-56.
2. Coker W, Bhatt B, Blatchley N, et al. *Clinical findings for the first 1000 Gulf war veterans in the Ministry of Defence's medical assessment programme*. British Medical Journal 1999;318:290-4.
3. Kang H & Bullman T. *Mortality among U.S. Veterans of the Persian Gulf War*. New England Journal of Medicine 1996;335:1498-504.
4. MacFarlane G, Thomas E. & Cherry N. *Mortality amongst United Kingdom Gulf War Veterans*. Lancet 2000;356:17-21.
5. The Iowa Persian Gulf Study Group. *Self-reported illness and health status among Persian Gulf War veterans: a population-based study*. Journal of the American Medical Association 1997;277:238-45.
6. Unwin C, Blatchley N, Coker W, et al. *The health of United Kingdom Servicemen who served in the Persian Gulf War*. Lancet 1999;353:169-78.
7. Barrett DH, Gray GC, Doebbeling BN, Clauw DJ, Reeves WC. *Prevalence of Symptoms and Symptom-based Conditions among Gulf War Veterans: Current Status of Research Findings*. Epidemiologic Reviews 2003;24:218-27.
8. Haley R, Kurt T & Hom J. *Is there a Gulf War syndrome? Searching for syndromes by factor analysis of symptoms*. Journal of the American Medical Association 1997;277:215-22.
9. Davis L et al. *Clinical and laboratory assessment of distal peripheral nerves in Gulf War veterans and spouses*. Neurology 2004;63:1070-7.
10. Horner R, Kamins K, Feussner J et al. *Occurrence of amyotrophic lateral sclerosis among Gulf War veterans*. Neurology 2003;61:742-9.
11. Ismail K, Blatchley N, et al. *Occupational risk factors for ill health in UK Gulf war veterans*. Journal of Epidemiology and Community Health 2000;54:838.
12. Peakman M, Skowera A & Hotopf M. *Immunological dysfunction, vaccination and Gulf War illness*. Philosophical Transactions of The Royal Society B 2006;361:681-7.
13. Horn O, Hull L, Jones M, Murphy D, Browne T, Fear NT, Hotopf M, Rona RJ, Wessely S. *Is there an Iraq war syndrome? Comparison of the health of UK service personnel after the Gulf and Iraq wars*. Lancet, 367,1742-6.
14. Hotopf M, David AS, Hull L, Nikalaou V, Unwin C, Wessely S. *Gulf war illness - better, worse, or just the same? A cohort study*. British Medical Journal 2003;327:1370.



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