

# United States and Australia Joint Research Effort

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*Project 1: Comparative Literature Review*

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# Abbreviations

ADF	Australian Defence Force
AGWVHS	Australian Gulf War Veterans' Health Study
AGWVFUHS	Australian Gulf War Veterans' Follow Up Health Study
ALS	Amyotrophic lateral sclerosis
AMTG	Al Muthanna Task Group
ARP	(Department of Veterans' Affairs) Applied Research Program
BSI	Brief Symptom Inventory
CAPS	Clinician Administered PTSD Scale
CARC	Chemical Agent Resistant Coating
CDC	Centers for Disease Control and Prevention, Atlanta, Georgia
CFS	Chronic fatigue syndrome
CFTS	Continuous full-time service
CHAMPVA	Civilian Health and Medical Program of Department of Veterans' Affairs
CHIP	Children's Health Insurance Program
CI	Confidence interval
CIDI	World Health Organization Composite International Diagnostic Interview
CIMHS	Critical Incident Mental Health Support
CLU	Client Liaison Unit
CTBIE	Comprehensive Traumatic Brain Injury Evaluation
CT-U	Combined Team – Uruzgan
DoD	(US) Department of Defense
DMDC	Defense Manpower Data Center
DSM	Diagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association (APA)
DSM-III	Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition, APA
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, APA
DVA	Department of Veterans' Affairs
FEs	Force Elements
GCS	Glasgow Coma Scale
GW	Gulf War
GWV	Gulf War veterans
HMAS	Her Majesty's Australian Ship
HQ	Headquarters
HR	Hazard ratio
ICD-9	International Statistical Classification of Diseases and Related Health Problems, 9th Revision
ICD-9-CM	ICD-9, Clinical Modification
ICD-10	ICD, 10th Revision

IES	Impact of Event Scale
ISAF	International Security Assistance Force
JHC	Joint Health Command
KIA	Killed in action
LOC	Loss of consciousness
MeSH	Medical Subject Headings
MEAO	Middle East Area of Operations
M-PTSD	Mississippi Scale for Combat-Related PTSD
MRCA	Military Rehabilitation and Compensation Act
MSI	Multisymptom illness
MonCOEH	Monash Centre for Occupational and Environmental Health
mTBI	mild Traumatic Brain Injury
MUSC	Medical University of South Carolina
N	Number
NAPS	Nerve Agent Pre-treatment Set
OEF	Operation Enduring Freedom (Afghanistan)
OIF	Operation Iraqi Freedom
OR	Odds ratio
OBG-W	Overwatch Battle Group (West)
PB	Pyridostigmine bromide tablets
PCL	PTSD Checklist
PCL-C	PTSD Checklist-Civilian
PCL-M	PTSD Checklist-Military
PCL-S	PTSD Checklist-Specific
PC-PTSD	Primary Care PTSD Screen
PHQ-2	Patient Health Questionnaire-2 item
PHQ-9	Patient Health Questionnaire-9 item
POW	Prisoner of War
PRT	ADF Provincial Reconstruction Team
PTSD	Posttraumatic stress disorder
RAAF	Royal Australian Air Force
RAN	Royal Australian Navy
RR	Relative risk
SAS	Australian Special Air Service Regiment
SASR	Special Air Service Regiment
SD	Standard deviation
SECDET	Iraqi Ministry of Defence, the Security Detachment
SOP	Statement of Principles
SOTG	Special Operations Task Group (Australian)
SR	Self report

SRCA	Safety, Rehabilitation and Compensation Act
STDs	Sexually transmissible diseases
SUD	Substance use disorders
SMOIL	Smoke, oil and dust clouds from burning oil wells
SMR	Standardised Mortality Ratio
T1	Time 1
T2	Time 2
TBI	Traumatic Brain Injury
UN	United Nations
UNITAF	Unified Task Force
UNOSOM	United Nations Operation in Somalia
US	United States (of America)
USA	United States of America
VA	Veterans Affairs (US)
VEA	<i>Veterans' Entitlements Act 1986</i> (Cth)
VHA	Veterans Health Administration
VVCS	Vietnam Veterans' Counselling Service, renamed Veterans' and Veterans' Families Counselling Service
WIA	Wounded in action
WRAIR-PTSD	Walter Reed Army Institute of Research - PTSD

# Executive summary

This is the report of the United States (of America) and Australia Joint Research Effort Project 1 Comparative literature review. This project was funded by the Australian Department of Veterans' Affairs (DVA) and has been a collaborative project undertaken by the Monash Centre for Occupational and Environmental Health (MonCOEH), Monash University, Melbourne, Australia and the Medical University of South Carolina (MUSC), South Carolina, USA.

The aim of this project was to gain a clear understanding of the differences and similarities between the military deployment contexts, post-deployment health outcomes and veterans' health care systems in Australia and the United States (US).

There were two sequential stages to the project:

- a deployment analysis and scoping review of health and social outcomes, which informed the methodology and outcomes for the
- literature review of selected health and social outcomes and analysis of health care systems.

The deployment analysis reviewed post-1990 deployments to identify those in which Australia and the US both sent a significant number of personnel (defined as >1,000). Relevant databases of scientific literature were searched as well as websites including those of the Australian Department of Defence, DVA, and Parliament of Australia, and corresponding US departmental websites, and published reports. Four deployments were identified: the 1990-1991 Gulf War (henceforth Gulf War), Somalia, Afghanistan and Iraq War, as follows:

- The US deployed 694,550 personnel, and Australia 1,871 personnel to the Gulf War. The US deployed a much larger force. Australian personnel were largely Naval compared with the US forces which were predominantly Army, and the Australian personnel experienced stressful military service experiences but were less likely to experience direct combat.
- Australia deployed approximately 1,366 personnel to Somalia from 1992-94, whereas the US deployed 25,000 personnel from 1992-95. The US not only deployed a much larger force but also maintained a presence in Somalia for approximately two years longer than Australia did.
- Deployments to Afghanistan and the Iraq War differed between Australia and the US. The US deployed approximately 2.5 million personnel to Afghanistan and Iraq between 2001-current and 2003-2011 respectively, whereas approximately 2,000 Australian personnel were deployed

to Iraq 2003-09, and an annual average of 1,550 personnel to Afghanistan 2001-current. The Australian deployments generally involved fewer combat roles and the dates that personnel were deployed also resulted in differences in combat exposures. In general, US personnel tended to have longer deployments and multiple deployments may have been more common.

Following the deployment analysis, a scoping review was undertaken to identify important health and social outcomes relevant to the above deployment eras, emerging issues, as well as DVA/Veterans Affairs (VA) research priorities. A total of six psychological, eight social, and 18 medical outcomes were included in the scoping review, in total the combined literature included approximately 13,000 articles, including 730 review articles. The scope and magnitude of the research literature was documented for each of the outcomes. From this search, five indicator health outcomes were selected across the outcome categories (psychological, social and medical) that captured important health outcomes, emerging issues, or outcomes that were likely to have sufficient literature for comparison, and where important differences between Australia and the US could be expected. These were posttraumatic stress disorder (PTSD) and suicide, social isolation/connectedness, and multisymptom illness and traumatic brain injury (TBI).

A literature review of the five selected health and social outcomes was conducted in relation to the four common deployments which presented prevalence estimates from studies of US and Australian veterans, where available, for each of the deployments and compared the estimates for the US and Australian veterans across the deployments.

- In relation to PTSD, the review identified 34 studies (27 US and 7 Australian); 18 related to the Gulf War, 4 to Somalia, and 12 to Afghanistan/Iraq War. In general, the US and Australian PTSD prevalence estimates were of a similar magnitude, with more variability noted in the US studies. For both countries, PTSD prevalences tended to be higher for deployments to the Gulf War and Iraq War. Prevalence estimates for the Iraq War also tended to be higher in US veterans than Australian veterans. Few studies were available for Somalia, but these studies had some of the highest prevalences of all the deployments studied, and Australia had considerably higher estimates than the US.
- Eleven studies were identified for suicide (5 US and 6 Australian); 4 related to the Gulf War, 6 to Afghanistan/Iraq War and 1 study of Australian veterans of the Somalia conflict. Gulf War veterans from both countries did not differ in risk for suicide compared with non-deployed comparison groups but both countries did demonstrate a reduced risk for suicide compared with the respective general populations. US veterans of Afghanistan/Iraq War had high prevalence estimates of suicide ideation that increased with time post-deployment, the pattern of estimates in active duty and National Guard/Reserve populations was not clear. Australian veterans deployed to Iraq War had higher prevalence estimates of suicide

ideation than those deployed to Afghanistan but suicide rates did not differ by deployment status. No US studies were identified for Somalia, but one Australian study indicated that the Australian veterans had the highest estimates of suicide ideation and planning across all deployments and a greater proportion of attempted suicide than those deployed to Iraq.

- We were unable to identify studies for the health outcome, social isolation/connectedness, as it related to this project for any of the deployments for either country. Studies often used variables such as homelessness and unemployment as proxies for social isolation; however, temporality and causality need to be considered when attempting to define and measure social isolation.
- For multisymptom illness, 6 studies were identified (5 US and 1 Australian), all in relation to Gulf War veterans. The prevalence estimate of multisymptom illness in Australian veterans was the lowest of all studies. There were no published studies of multisymptom illness in other deployment populations.
- For TBI, a total of 20 studies were identified (17 US and 3 Australian); 1 Australian study of Gulf War veterans and 17 US and 2 Australian studies of Afghanistan/Iraq War veterans. The prevalence in Australian Gulf War veterans was low relative to the prevalence observed in Afghanistan/Iraq veterans. There were higher rates of TBI reported in the US Afghanistan/ Iraq War veteran studies, these were largely mild TBIs. TBI prevalence estimates in Australian Afghanistan/Iraq War veterans were at the low end of those reported in US studies; however, there was a lot of variability between screening and diagnoses of TBI in US studies.

The next stage of this comparative review summarised and compared the health care systems in the US and Australia, including the general health system/s, medical care provided to personnel while they are in the services, health care entitlements and provision through the veterans' affairs systems specific to the health needs of veterans, and implications for the five selected health and social outcomes. The discussion of the health care systems and services also documented any major changes over the deployments from 1990 to current. Notable differences in the organisation and structure of the respective health systems were observed, but points of similarity and comparison were highlighted and discussed. Substantial reforms and developments had been made in both countries over the period of consideration. However, there were aspects in both countries' health care systems that could potentially render some veterans vulnerable in access to health care.

The veterans' health care systems in both countries are aimed at providing adequate and appropriate care for all veterans. Whilst the US provides care via the Veterans Administration clinics, Australia largely provides care via the public health care system which is compensated by

DVA and some specific services. US veterans must be enrolled in the VA to receive care and those in the lowest priority groups may not be able to access care if funding is limited. In Australia, veterans must have liability for their condition accepted by DVA, with the exception of some non-liability conditions such as PTSD. Thus, whilst both countries provide a wide range of programs and services for veterans, and aim to provide comprehensive care, there may be some veterans who cannot access care via these systems and must rely on public or private health insurance schemes or a mix of these. Furthermore, health insurance in the US is largely provided through one's employer, whilst in Australia it is largely personally funded and a public universal health care system/ private health care system balance co-exists.

Both the US and Australian Defence Forces and Veterans' Affairs have made a concerted effort over the past 20 years to raise awareness of mental health, develop mental health policies and increase the availability and extent of mental health and psychosocial services. These include awareness campaigns, including campaigns to destigmatise mental health, as well as extensive psychosocial services and support for the veterans and their families.

Cohort studies of Gulf War veterans have established that PTSD is a longitudinal concern, and monitoring PTSD estimates will be important into the future. As the composition of defence forces changes with deployments, such as increasing numbers of reservists or of females deployed in combat roles, some groups may be at greater risk. An increase in the percentage of veterans who identify a mental health condition as the primary reason for accessing care has been observed both in the US and Australia. The VA and DVA have experienced an increased demand for health services, and in particular, mental health services. This may be due, in part, to the extensive mental health programs and awareness campaigns introduced in both countries over the period of interest. Programs targeting the complexity of veterans' health needs and the delayed-onset nature of some conditions have required comprehensive services. Both countries have also increasingly utilised technology to manage the demand for services.

In relation to the medical indicator outcomes considered, the US has introduced more directed TBI and multisymptom illness programs, including TBI screening programs across VA. These have been less of a focus in Australia; and while Statements of Principles for these outcomes have been introduced, as well as extensive evaluation and rehabilitation services, there were no specific targeted detection or treatment programs identified in our review.

There were some limitations in this project. Although we undertook a comprehensive search of the literature through several data bases for scientific published literature and for government reports and other sources of information, less information was available for health services and specific health programs that may have been available in the early 1990s during the Gulf War and Somalia deployment. Limited scientific literature was available for the social isolation/connectedness

indicator outcome and this limited our ability to compare this indicator between the US and Australian veteran populations and across deployments.

There have been several strengths in this project. There has been value in comparing the US and Australian common deployments, health outcomes and health care systems and services and learning from each other. This has been undertaken in a comprehensive and staged approach, utilising published scientific literature and reports from US and Australian Departments of Defence and Veterans' Affairs to obtain as comprehensive a picture as possible. This project idea was innovative and has involved comparisons at the level of health outcome indicators, two countries, four deployments, health services and programs, and across deployments and time periods. To our knowledge comparisons at these multiple levels have not been made previously.

### ***Future directions***

This comparative literature review could serve as a model for future research in this field to benefit health policy development, service provision and health outcomes for veterans in the future.

Senior International Forum countries' forces were also deployed to these conflicts and further value could be obtained by involving comparisons with Canadian, United Kingdom (UK) and New Zealand veterans and their countries' health services in an extension of this project and/or in future projects.

Social isolation/connectedness is becoming an important concept and aspect of veteran health and wellbeing, and one that future research needs to cover. Clear and concise definitions and standard assessment tools for social isolation are needed for future research.

Access to health care has many facets. In the context of veteran access in both the US and Australia, this includes a transition phase from the care provided within the respective defence forces to a more complex system for the veteran to negotiate. Integration and access between the public/private system and veterans' affairs based systems are an important consideration, and are evolving. A very recent US development is the US Veterans Choice Act that is designed to improve access for some to services if it would take longer than 30 days for a VA appointment, and is an example of an item for potential future follow-up.

The cohort studies of Gulf War veterans have established that PTSD is a longitudinal concern, and monitoring PTSD estimates in veteran cohorts is important into the future. As the composition of defence forces changes with deployments some groups, such as reservists or female personnel if they take on greater roles in active combat, may be at greater risk of psychological disorders.



As is described in the Introduction, this project was undertaken as the first of three proposed joint collaborative research efforts between the US and Australia. The other two projects proposed were:

- Project 2 Comparative study on treatment pathways and access to health care; and
- Project 3 Parallel post-deployment health studies

The findings of this current project have provided insights into the similarities and differences in the health outcomes post deployments and the US and Australian systems and started to delineate the various complexities in veteran health care systems that could inform a comparative study proposed as Project 2. This could also build in a component to build greater understanding of and compare veterans' perspective of access to health care, to identify points at which veterans are particularly vulnerable, and access data that assesses penetration of health services.

Our findings in this current project could also inform the development of Project 3 Parallel post-deployment health studies. Considerations could include: consistency of terminology and measures where appropriate, including development of social isolation/connectedness terminology and exposure assessment measures; parallel studies which include comparisons of associations between exposure and risk by country, controlling for known confounding factors; and prospective assessment of the transition phase from defence force to veteran/civilian health care provision, including access to and comparison of health outcomes.

# 1 Background

Discussions between the United States (US) and Australian Veterans' Affairs Agencies in 2009 led to the development of a joint research effort. This initiative began in late December 2009 when the then Australian Minister for Veterans' Affairs requested the Department of Veterans' Affairs (DVA) to explore the possibility of joint research collaboration with the US Department of Veterans Affairs (VA). Three stages of the joint research effort were agreed, which would involve short, medium and long term activities, with research activities undertaken in parallel for each stage by DVA and the US VA and funded separately by each agency. The three research projects proposed were:

1. Comparative literature review of selected health and social outcomes and review of health services;
2. Comparative study on treatment pathways and access to health care; and
3. Parallel post-deployment health studies.

It should be noted that Projects 2 and 3 will be the subject to ongoing discussion between the Australian and US departments and consideration of future research needs – and so the exact nature of future research collaborations in Projects 2 and 3 is likely to evolve based on the findings from Project 1.

This report covers Project 1, the comparative literature review of health outcomes and health services, which was funded by the Australian Department of Veterans' Affairs and was undertaken by the Monash Centre for Occupational and Environmental Health (MonCOEH) at Monash University, Australia and the Medical University of South Carolina (MUSC), United States of America.

## 2 Study aims and objectives

This first project focused on a comparison between the US and Australia, and included a comparative literature review of health outcomes and health systems, including those designed to meet the health needs of veterans in Australia and the US. The aim of this project was to gain a clear understanding of the differences and similarities between the military deployment contexts, health impacts and veterans' health care systems between Australia and the US.

There were two sequential stages to the project:

- a deployment analysis and scoping review of health and social outcomes, which informed the methodology and outcomes for the
- literature review of selected health and social outcomes and analysis of health care systems.

The deployment analysis involved an investigation of deployments in which both Australia and the US contributed a significant number of personnel; the identified deployments formed the basis of the subsequent sections of this report. By describing the context of each deployment, important differences between the deployments were identified.

The scoping review captured the size and availability of the literature relevant to important health and social outcomes relevant to the identified deployments. The range of outcomes considered reflected those that were associated with deployment, emerging health issues, and those of specific interest or priority in veterans' health. This scoping review was then used to inform which of these outcomes were to be included and prioritised in the literature review.

Considering the social and health outcomes identified in the scoping review, the literature review aimed to identify any differences between US and Australian military personnel in the selected health and social outcomes for the deployments identified in the deployment analysis.

Finally, an analysis of the similarities and differences between the US and Australian health care systems aimed to investigate the services and care available to veterans, and if any differences had implications for the selected health and social outcomes.

# 3 Deployment analysis

## Objectives

The deployment analysis aimed to provide a comprehensive summary of conflicts to which both Australia and the US deployed troops. The focus of this analysis was on deployments post-1990 with more than 1,000 personnel from each country. Important differences between the countries' deployments and exposures were highlighted.

## Methodology

### ***Common Australian and US deployments of >1,000 personnel***

The data for deployment analysis were obtained by searching relevant websites, including the Australian Department of Defence, DVA, and Parliament of Australia, and corresponding US departmental websites. This information was supplemented with published reports, such as the Australian Gulf War Veterans' Health Study 2003.

The terminology used by Australia and the US in relation to deployments was identified such that valid comparisons could be made. Words such as 'veteran' are given a meaning in the context of each country. For example, the term "veteran" is only utilised in one of the several Acts administered by DVA (the *Veterans' Entitlements Act 1986* (Cth)) and encompasses those with specific types of service, so this term does not include all members of the Australian Defence Force (ADF) (see Appendix A for Australian and US terminology).

The deployment analysis identifies and briefly describes and discusses a list of deployments of relevance to both Australia and the US since 1990 (see Table 1 for joint US and Australian deployments of >1,000 personnel each, and Table 9 in Appendix B for joint deployments of <1,000 personnel for either US or Australia). The context of each deployment is also described. This includes start and end dates, number of personnel deployed, type of operation (warlike/non-warlike), number of personnel killed and wounded in action, service personnel involved (Army, Navy, Air Force etc.), operation specific exposures (e.g. Gulf War related exposure to smoke, oil and dust clouds), and main type of service. In addition, differences between the Australian and US deployments are highlighted.

The deployment analysis was used to help inform the range of comparable health and social outcomes that would be the focus of the later literature review.

Table 1 presents common Australian and US deployments where greater than 1,000 US and Australian personnel were deployed, as this limitation ensures meaningful comparisons can be made between deployed service members from each country. Notably, this excludes operations in East Timor, where over 5,500 Australian personnel were deployed, but fewer than 60 US personnel were deployed.

**Table 1 Common Australian and US Deployments of >1,000 personnel each**

Area	Country	Operation <sup>1</sup>	Start date	End date	Number of personnel
Gulf Region	AU	1990-1991 Gulf War, Damask I, II, and III	22 Aug '90	10 May '91	1,871 ADF
	US	Desert Shield & Desert Storm	2 Aug '90	28 Feb '91	694,550 US
Afghanistan	AU	Slipper	11 Oct '01	2014	Annual average 1,550
	US	Enduring Freedom (OEF)	7 Oct '01	current	Ongoing: ~90,000 US (current; isaf.nato.int)
Iraq	AU	Falconer	18 Mar '03	22 Jul '03	~2,000 ADF (Falconer & Catalyst)
		Catalyst	16 Jul '03	31 Jul '09	1,370 ADF
	US	Iraqi Freedom (OIF)	2003	2011	2,453,036 US OEF & OIF combined
		New Dawn	2010	2011	~50,000 US
Somalia	AU	Solace & Iguana	21 Dec '92	30 Nov '94	1,366 ADF
	US	Provide Relief, Restore Hope, Continue Hope, & United Shield	15 Aug '92	3 Mar '95	~25,000 US

ADF, Australian Defence Force

Regarding Table 1, it is important to note that some figures are not available for specific ADF operations due to the overlap of operations or the transitioning of one operation into another. For example, Operation Falconer transitioned into Operation Catalyst and separating the operations in terms of deployment numbers was not possible. Furthermore, Operation Slipper also formed part of Operation Falconer. Similarly, because deployments overlapped, separate estimates are unavailable for Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) deployments.

<sup>1</sup> Note: All deployments in Table 1 were designated 'warlike'.

The common deployments in Table 1 include the three major wars the US and Australia have been involved in since 1990; the 1990-1991 Gulf War (henceforth the Gulf War), the War in Afghanistan, and the Iraq War, as well as one peacekeeping/peace enforcement operation in Somalia. The context and details of each deployment are highlighted in the following section.

## Results

### ***Australian and US Gulf War deployments***

Following Iraq's invasion of Kuwait on 2 August 1990, the United Nations (UN) Security Council passed resolution 660, calling for the immediate withdrawal of Iraqi forces from Kuwait. When Iraq failed to comply, the UN authorised the use of 'all necessary means' to enforce resolution 660. Australia joined a multinational military coalition, with the US providing the largest contingent, to enforce the UN Security Council resolutions. The context and details of the Australian and US deployments are given below.

#### ***Australian Operation Gulf War I, Operations Damask I, II & III***

<b>Date of first deployment:</b>	22 August 1990
<b>End of deployment:</b>	10 May 1991
<b>Total deployed:</b>	1,871
<b>Warlike/non-warlike:</b>	Warlike
<b>Killed in action:</b>	0
<b>Wounded in action:</b>	0
<b>Services involved:</b>	Primarily Royal Australian Navy (RAN)

#### **Operation specific deployment exposures: (1)**

- Intense smoke (smoke, oil and dust clouds from burning oil wells, SMOIL)
- Oil in water: oil from burning oil wells contaminated sea water in the Gulf
- Dust including dust storms
- Multiple vaccinations; including typhoid and cholera as well as deployment specific vaccinations and including plague for some personnel
- Pyridostigmine bromide (PB) (Nerve Agent Pre-treatment Set; NAPS) tablets
- Chemical and environmental exposures (solvents, pesticides, fuel)
- Reported exposure to chemical warfare agents
- Respiratory protective equipment

- Use of nuclear, chemical and biological protective suits
- Entering/inspecting enemy equipment (possibility of exposure to depleted uranium)
- Chemical & Biological Weapons (Khamisiyah, Iraq): Ammunitions storage depot containing warfare agents demolished by US soldiers

**Main types of service:**

- Primarily RAN deployment, Her Majesty's Australian Ship (HMAS) *Darwin*, HMAS *Adelaide*, HMAS *Success* (Damask I) and HMAS *Brisbane*, HMAS *Sydney*, HMAS *Westralia* (Damask II) to conduct major patrols, visit and search operations, and enforce UN sanctions
- HMAS Darwin redeployed 13 June 1991, under Operation Damask III, to conduct sea and air surveillance and escort US aircraft carriers and ships through mine cleared areas. SMOIL exposure was reported in the ships log on several occasions
- Royal Australian Air Force (RAAF) supplied transport and logistic support, but did not fly combat missions
- Deployment of 75 ADF personnel in Northern Iraq on 16 May 1991 (withdrawn 30 June 1991). This deployment was comprised mainly of Army medical teams, who provided humanitarian support to the international relief effort for Kurdish refugees.

***US Operations Desert Shield and Desert Storm***

**Date of first deployment:** 2 August, 1990

**End of deployment:** 28 February, 1991

**Total deployed:** 584,342 (active duty), 110,208 (guard/reservists),  
694,550 (total)

**Warlike/non-warlike:** Warlike

**Killed in action:** 148 battle deaths (145 non-battle deaths)

**Wounded in action:** 470

**Services involved:** Army, Air Force, Marine Corps, Navy, Coast Guard

**Operation specific deployment exposures:**

- Vaccinations: Including anthrax and botulinum toxoid.
- PB: Tablet used as pre-treatment drug to protect against nerve agent soman.
- Oil well fires, smoke and petroleum: Oil or gas wells that caught on fire and burned.
- Pesticides: used to repel or destroy pests and pathogens.

- Chemical and biological weapons (Khamisiyah, Iraq): Ammunitions storage depot containing warfare agents demolished by US soldiers.
- Sand, dust and particulates: Tiny airborne matter that can cause respiratory and other health problems.
- Depleted Uranium: Uranium used in military tank armour and some bullets.
- Toxic embedded fragments: Shrapnel and other metals that remain in the body after injury.
- Noise: Harmful sounds from guns, equipment, and machinery that is often experienced during military service.
- CARC Paint: Chemical Agent Resistant Coating (CARC) used on military vehicles to resist corrosion and chemical agents.
- Heat injuries: Possible health problems from extremely hot temperatures.
- Occupational hazards: Exposures from working with chemicals, paints, and machinery during service.

### **Main types of service:**

Most service was in the form of air strikes and invasion by ground forces. US Army, Navy, Air Force, and Marines were involved.

- Two Naval battlegroups centred around aircraft carriers (USS Dwight D. Eisenhower and USS Independence) and battleships (USS Missouri and USS Wisconsin) stationed in Gulf on 08 August 1990. Bombing sorties were launched from these ships.
- Two F-15 squadrons, including 48 F-15's from Langley Air Force Base (stationed in Saudi Arabia) and 36 F-15's from the 36<sup>th</sup> Tactical Fighting Wing at Bitburg Germany (stationed Al Kharz Air Base in Saudi Arabia). These planes defended the Saudi border and ran sorties.
- The XVIII Airborne Corps included an airborne division, air-assault division, two heavy divisions, an armored cavalry regiment, and combat support.
- 82<sup>nd</sup> Airborne Division and an airborne warning and control unit.
- Ground operations reinforcements from Germany (US Army VII Corps headquarters, 1<sup>st</sup> Armored Division, 3<sup>rd</sup> Brigade, 2<sup>nd</sup> Armored Division, 3<sup>rd</sup> Armored Division, 2<sup>nd</sup> Armored Cavalry Regiment, 11<sup>th</sup> Aviation Brigade, 2<sup>nd</sup> Corps Support Command)
- 1<sup>st</sup> and 2<sup>nd</sup> Marine Divisions, 1<sup>st</sup> Light Armored Infantry Battalion, and 2<sup>nd</sup> Brigade, 1<sup>st</sup> Battalion, 5<sup>th</sup> Cavalry of 1<sup>st</sup> Cavalry Division were responsible for ground invasion.

### **Differences between Australian and US deployments to the Gulf War**

In contrast to US service members, Australian personnel were primarily involved in sea and air surveillance (>90% of deployed personnel were in the RAN), and no Australian Army or Air Force Combat units were deployed. Thus, it is likely that Australian personnel were exposed to less



direct combat than US personnel. This likelihood is reflected in the fact that no Australian personnel were wounded or killed in action. In contrast, 148 US personnel were killed in action and 470 were wounded in action. Notably, the US deployment was far larger than the Australian deployment.

### ***Afghanistan deployments***

The war in Afghanistan was prompted by the September 11 attacks by al-Qaeda in the US. The then government of Afghanistan (the Taliban) was accused by the US of giving safe haven to al-Qaeda. Subsequently, the US gave the Taliban an ultimatum, which included delivery of al-Qaeda leaders to the US. This proposal was rejected by the Taliban, and on 7 October 2001, US and coalition combat operations began, with the aims of dismantling al-Qaeda and ending its use of Afghanistan as a base, removing the Taliban from power, and creating a viable democratic state. The Australian operation in Afghanistan was deployed as part of the International Security Assistance Force (ISAF).(2) This operation is detailed below.(3)

Note: Details of the US Operation in Afghanistan (OEF) are given jointly with the US Operations in Iraq, as they formed part of the larger, 'Global War on Terror'. However details of the Australian Operations in Afghanistan (Operation Slipper) and Iraq (Falconer and Catalyst) are given separately, and as such, details of Operations Falconer and Catalyst are presented directly after details of Operation Slipper. Details of the joint US Operations in Afghanistan and Iraq follow.

### ***Australian Operation Slipper***

<b>Date of first deployment:</b>	11 October 2001
<b>End of deployment:</b>	2014 (4)
<b>Total deployed:</b>	1,550 ADF personnel deployed per year (on average)
<b>Warlike/non-warlike:</b>	Warlike
<b>Killed in action:</b>	38
<b>Wounded in action:</b>	241

### **Proportion of deployers in vulnerable groups:**

Information on the proportion of deployers who were reservists was unable to be located through the reports and references used in the Stage 1 report.

### **Operation specific deployment exposures:(5)**

- Deployment during a period of high operational tempo.(6)
- Combat roles and exposures.

- Exposure to improvised explosive devices (IEDs).
- Smoke from fires, smoke from burn pits.
- Dust including dust storms.
- Extremes of heat and cold and dryness
- Chemical and environmental exposures (aviation, marine or automotive fuel; aircraft fumes, diesel exhaust etc; aerosolised metals and chemicals from exploded IEDs; outdoor aeroallergens such as date pollen, and indoor aeroallergens such as mould aspergillums, particulate matter less than 2.5nm in diameter).
- Deployment specific vaccinations were not described.(5)

#### **Main types of service:**

- Training and mentoring the Afghan National Army and Afghan National Police
- Reconstruction, focussing on development and governance (for example, enabling the construction of roads, schools and other basic infrastructure in the province; engaging with local and provincial government officials to improve governance capacity; and, facilitating the delivery of basic services such as health and education to the Afghan people)
- Military operations, to disrupt insurgent operations and supply routes utilising the Special Operations Task Group (SOTG).

#### **Breakdown of numbers:**

- ~800 personnel provided support from locations within the broader Middle East Area of Operations; ~300 personnel in SOTG; ~100 personnel in Headquarters Combined Team – Uruzgan, commanding, administering and coordinating the multinational operations of the Combined Team – Uruzgan (CT-U, which comprises personnel from the US, Australia, Singapore and the Slovak Republic); ~65 personnel comprising the ADF Provincial Reconstruction Team (PRT<sup>2</sup>) Support Element – providing protection to the civil element of the PRT.

#### **Examples of service:**

- **CT-U:** Security responsibility for Uruzgan province
- **SOTG:** The Australian SOTG was deployed to Southern Afghanistan to conduct population-centric, security and counter-network operations. With approximately 300 personnel, the SOTG was one of the largest Special Forces units in Afghanistan. The SOTG trained, mentored and partnered with Afghan National Police officers from the Uruzgan Provincial

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<sup>2</sup> PRT's provided support and security for reconstruction and development projects in Afghanistan as part of the ISAF mission, (<http://www.isaf.nato.int/mission.html>), accessed Sept 2012

Response Company and other branches of the Afghan National Security Forces, to build their capacity and capability to establish and maintain security and stability in the region.<sup>3</sup>

### ***Iraq War deployments***

Following the loss of the Gulf War by Iraq, the UN Security Council passed resolution 687 in 1991, which called for, among other things, Iraq to destroy chemical and biological weapons and ballistic missiles with a range greater than 150km. On 8 Nov, 2002, the UN passed resolution 1441, which stated that Iraq was in breach of the ceasefire terms and conditions relating to weapons of mass destruction in resolution 687, and gave Iraq a final opportunity to comply with disarmament obligations.<sup>(7)</sup> However, this resolution did not automatically trigger the use of force. Despite this, a 'coalition of the willing' was formed to enforce resolution 1441 unilaterally, and combat operations began on 19 March 2003. Australia was involved in the initial combat operations to disarm Iraq, with service members deployed under Operation Falconer (corresponding US OIF). These combat operations lasted until July 2003, after which a majority of Australian service members were withdrawn. Australia did not redeploy in significant numbers until 2005, under Operation Catalyst, with the main aim of stabilisation and recovery.

### ***Australian Operation Falconer and Operation Catalyst***

Overall, for both operations there were no Australian personnel killed in action in Iraq and 30 wounded in action<sup>4</sup>.

### **Operation Falconer**

**Date of first deployment:** 18 March 2003

**End of deployment:** 22 July 2003

**Total deployed:** ~2,000 ADF personnel deployed across Falconer & Catalyst  
~30 exchange personnel serving in US and UK units (Operation Falconer)

**Warlike/non-warlike:** Warlike

**Type of Operation:** Combat operation to disarm Iraq

**Killed in action:** 0

**Wounded in action:** Operation-specific wounded in action unavailable

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<sup>3</sup> Source: Australian Government Department of Defence  
<http://www.defence.gov.au/op/afghanistan/info/factsheet.htm> , accessed 27 Sep 2012

<sup>4</sup> Australian Government Department of Defence. Annual Report 2004-05.  
[http://www.defence.gov.au/AnnualReports/04-05/downloads/0405\\_DAR\\_10\\_full.pdf](http://www.defence.gov.au/AnnualReports/04-05/downloads/0405_DAR_10_full.pdf) , accessed Aug 2012

**Services Involved:** Air Force, Navy, Army, Special Operations

**Deployed by Service Type:** ~620 Air Force personnel; ~950 Navy personnel; ~500 Special Forces

**Proportion of deployers in vulnerable groups:**

There was no general call for reservists to be on standby for forward deployment. Some regular units may contain individual reservists serving on full time service<sup>5</sup>.

**Operation specific deployment exposures:**

- Inoculation against anthrax. The vaccine was given on the basis of voluntary informed consent. Those who refuse were not punished or discriminated against. Personnel who did not consent to being vaccinated were returned to Australia as soon as possible for their own safety<sup>6</sup>.

**Main types of service:**

- Joint Afghanistan/Iraq deployments: RAN frigates HMAS Anzac and HMAS Darwin, and the RAAF's AP-3C maritime patrol aircraft continued with duties similar to those they had been undertaking as part of the Multinational Interception Force and Operation Slipper until hostilities began<sup>7</sup>.
- RAN: Seize and clear approaches to Umm Qasr, Iraq's only deep water port, capture Iraq's offshore oil platforms, enforce sanctions, clear sea lanes by searching and clearing vessels.
- Special Forces: Operations in Western Iraq to prevent Iraq's use of ballistic missiles, and ground patrols and insertions. The Australian SAS patrols were the closest Coalition ground elements to Baghdad for several days<sup>8</sup>. At the end of March, the Special Forces area of operations was expanded on Coalition request.
- Air Force: Major contribution to Coalition operations in Southern Iraq came via 14 F/A-18 Hornets, who protected high-value coalition aircraft and engaged in combat operations, including supporting ground forces.
- Baghdad Security detachment: Australian Representative Office established in Baghdad on 8 May – initially protected by Special Forces, a security detachment of 75 personnel took over protection duties.

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<sup>5</sup> Australian Peacekeeper and Peacemaker Veterans Association (APPVA). Operation Bastille [http://www.peacekeepers.asn.au/operations/current\\_ops/Op%20Bastille.pdf](http://www.peacekeepers.asn.au/operations/current_ops/Op%20Bastille.pdf) , accessed Aug 2012

<sup>6</sup> Ibid.

<sup>7</sup> Source: Australian Government Department of Defence. The War in Iraq. ADF Operations in the Middle East in 2003. <http://www.defence.gov.au/publications/lessons.pdf> , accessed 2012.

<sup>8</sup> Ibid.

Major combat operations formally ended on 1 May 2003, and the majority of the deployment was returning to Australia.

### **Operation Catalyst<sup>9</sup>**

<b>Date of first deployment:</b>	16 July 2003
<b>End of deployment:</b>	31 July 2009
<b>Total deployed:</b>	~1370 (Catalyst)
<b>Redeployment:</b>	2005, 450 personnel redeployed as part of the Al Muthanna Task Group (AMTG). Three rotations of personnel to AMTG
<b>Joint Deployment:</b>	Sources report personnel jointly deployed to Operation Slipper (Afghanistan)
<b>Warlike/non-warlike:</b>	Warlike
<b>Type of Operation:</b>	Stabilisation and recovery – assisting national recovery and facilitating transition to self-government
<b>Killed in action:</b>	2
<b>Wounded in action:</b>	Operation-specific wounded in action unavailable
<b>Services Involved:</b>	Air Force, Navy, Army, Special Operations

### **Main types of service:**

- Deployment of battlegroups to the Al Muthanna and Dhi Qar provinces, the Australian Army Training Team – Iraq, embedded personnel on key coalition headquarters, a naval frigate and naval training team, RAAF C130 transport and P3 Orion surveillance aircraft, Defence civilian advisors in the Iraqi Ministry of Defence, the Security Detachment (SECDET) protecting the Australian diplomatic mission and a national headquarters<sup>10</sup>.
- AMTG; ~450 personnel: comprised Task Group Headquarters; a cavalry squadron; an infantry company; a training team (on 6-month deployments and supporting elements. Role:
  - Provide a secure environment for the Japanese Iraq Reconstruction and Support Group.

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<sup>9</sup> Sources: Australian Government Department of Defence. The War in Iraq. ADF Operations in the Middle East in 2003; APPVA Operation Catalyst , accessed 2012. [http://www.peacekeepers.asn.au/operations/current\\_ops/Op%20Catalyst.pdf](http://www.peacekeepers.asn.au/operations/current_ops/Op%20Catalyst.pdf) ; Department of Defence. Operation Catalyst: Australia's defence contribution to Iraq's rehabilitation <http://www.defence.gov.au/minister/13tpl.cfm?CurrentId=2678> Media Release 1 May 2003, Accessed 2012.

<sup>10</sup> Sources: Australian Government Department of Defence. The War in Iraq. ADF Operations in the Middle East in 2003 <http://www.defence.gov.au/publications/lessons.pdf> , accessed 2012; Australian Government Department of Defence <http://www.defence.gov.au/opEx/global/opcatalyst/index.htm> accessed 2012 (<http://www.defence.gov.au/Operations/> accessed 2015)

- Assist in the training of local Iraqi Army units so that they are able to take over the internal and external defence of their country.
- Managing a Civil Military Cooperation Program; which employed local people to complete community construction and infrastructure projects (such as the establishment of an ambulance station and mobile health clinic).
- There were three rotations of personnel to the AMTG.
- Overwatch Battle Group (West; OBG-W): Once the Japanese force withdrew, the AMTG was renamed the OWBG-W, to reflect the new role of providing support to Iraqi Security Forces and to the Multi-National Force – Iraq. The main tasks the Battle Group performed were patrols of Main Supply Routes, and training and mentoring of Iraqi Army and Police.

**Operation specific deployment exposures:**

- Inoculation against anthrax. The vaccine was given on the basis of voluntary informed consent. Those who refuse were not punished or discriminated against. Personnel who did not consent to being vaccinated were returned to Australia as soon as possible for their own safety<sup>11</sup>.
- Exposure to IEDs.(5)
- Deployment during a period of high operational tempo.(6)
- Combat roles and exposures.
- Extremes of heat and cold and dryness.
- Chemical and environmental exposures - information on operation specific chemical and environmental exposures was unable to be located through the reports and references used in the Stage 1 report, but where roles, duties or conditions were similar to deployment to Afghanistan it is likely that exposures may also have been similar as described above (MEAO Prospective Study).(5)

***US Operations Enduring Freedom, Iraqi Freedom, and New Dawn (Afghanistan & Iraq)*** <sup>12</sup>

**Date of first deployment:** October 7, 2001

**End of deployment:** Ongoing

**Total deployed:** 2,453,036 (as of July 31, 2012)

**Warlike/non-warlike:** Warlike

**Killed in action:** 2,121 (OEF), 4,486 (OIF) 6,607 (Total)

<sup>11</sup> Source: Australian Government Department of Defence  
<http://www.defence.gov.au/opEx/global/opcatalyst/index.htm> accessed 2012  
[\(http://www.defence.gov.au/Operations/](http://www.defence.gov.au/Operations/) accessed 2015)

<sup>12</sup> Source: United States Department of Defense, Defense Manpower Data Center (DMDC)

**Wounded in action:** 15,322 (OEF), 32,223 (OIF)

**Supplementary operation information:**

- Proportion of redeployments/total deployers:  $1,044,797/2,453,036 = 42.6\%$
- Proportion of active duty personnel across OIF and OEF in 2008 =  $80\%$ <sup>13</sup>
- Tour Length: Active duty members in OIF and OEF were on a 12/12 plan, deployed for 12 months, then exempt from deployment for the next 12 months. US Marines were on a 7/7 plan<sup>14</sup>. However, in April of 2007, OIF and OEF Active Duty Army units had deployments extended to 15 months, with 12 months at home<sup>15</sup>.

**Proportion of deployers in vulnerable groups:**<sup>16</sup>

- Proportion of National Guard personnel across OIF and OEF in 2008 = 11%
- Proportion of Reserve personnel across OIF and OEF in 2008 = 9%

**Operation specific deployment exposures:(8)**

- Exposure to IEDs.
- Lines of battle poorly defined in current conflicts, men and women may be exposed to similar combat related stressors.
- Potential exposure to combat risk and combat intensity.(9)
- Extremes of heat and cold and dryness.
- Cutaneous leishmaniasis, which is endemic in the Middle East.
- Burn pits.
- Sulfur fire.
- Infectious disease.
- Depleted uranium,
- Toxic-embedded fragments.
- Harmful noise.
- Rabies.

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<sup>13</sup> Source: Congressional Research Service, Troop Levels in the Afghan and Iraq Wars, FY2001-FY2012: Cost and Other Potential Issues <http://www.fas.org/sgp/crs/natsec/R40682.pdf>, accessed 2012

<sup>14</sup> Source: McGrath, J. Boots on the Ground: troop density in contingency operations. Combat Studies Institute Press, Fort Leavenworth, Kansas [http://www.cgsc.edu/carl/download/csipubs/mcgrath\\_boots.pdf](http://www.cgsc.edu/carl/download/csipubs/mcgrath_boots.pdf), accessed 2012

<sup>15</sup> Sources: Garamone, J. Defense.gov News Article: Gates Extends Army Tours in Iraq to 15 months. US Department of Defense, Washington, 2007 <http://www.defense.gov/news/newsarticle.aspx?id=32764> [updated April 11 2007; cited 2012]; and Gilmore, G.J. Extended deployments should lessen Army stress, Commander says. US Department of Defense. DoD News. <http://archive.defense.gov/news/newsarticle.aspx?id=32931> , accessed 2012

<sup>16</sup> Source: Congressional Research Service, Troop Levels in the Afghan and Iraq Wars, FY2001-FY2012: Cost and Other Potential Issues <http://www.fas.org/sgp/crs/natsec/R40682.pdf>, accessed 2012

- Heat injuries.
- Traumatic brain injuries.
- Hexavalent chromium.
- Occupational hazards.
- Airborne sand, dust and particulates.

### **Main types of service:**

- Army: mechanised infantry divisions, airborne corps and divisions, six infantry brigades, armoured brigades, armoured cavalry regiments, brigade combat teams, and field artillery brigades.
  - For the operations in Afghanistan and Iraq, the Army comprised the majority of the active-duty personnel deployed. (i.e., as of June 1, 2008, the Army comprised the majority of active duty US forces in Iraq, at 66% of ~150,000 personnel. This proportion was 49% (of ~38,000 total personnel) in Afghanistan during the same period. See Appendix C)<sup>17</sup>
- Navy: carrier strike groups, expeditionary strike groups (13% of personnel in Iraq, 6% in Afghanistan, in 2008)
- Marine Corps: expeditionary forces and units (13% of personnel in Iraq, 10% of personnel in Afghanistan, 2008)
- Air Force: elements of fighter, fighter/bomber, specialised, and support wings (7% of personnel in Iraq, 36% of personnel in Afghanistan, 2008)
- Coast Guard: Coast Guard cutters and elements of Port Security Units (across both Afghanistan and Iraq operations in 2008, the Coast Guard comprised 0.1% of deployed personnel)

### ***Differences between Australian and US deployments to Afghanistan and Iraq War***

#### ***Afghanistan***

One of the major differences between Australian and US deployments in Afghanistan was the dates that personnel were deployed and the size of the deployments. The initial Australian deployment, from 2001 to 2002, consisted of a Special Forces Task Group of 150 personnel<sup>18</sup>. The third of Australia's Special Forces Task Group rotations was undertaken in 2002, and a further deployment of Special Forces element took place in 2005 (~190 personnel). In 2006, a larger

<sup>17</sup> Source: Congressional Research Service, US Forces in Iraq, updated July 24, 2008, <http://www.fas.org/sgp/crs/mideast/RS22449.pdf> , accessed 2012

<sup>18</sup> Source: Brangwin N, Harris M, and Watt D. Parliament of Australia -Department of Parliamentary Services. Australia at war in Afghanistan: revised facts and figures. Updated 12 Sept 2012 [http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/1244230/upload\\_binary/1244230.pdf;fileType=application%2Fpdf#search=%22Defence%22](http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/1244230/upload_binary/1244230.pdf;fileType=application%2Fpdf#search=%22Defence%22) , accessed 2012



reconstruction task force (~240 personnel) was deployed to Southern Afghanistan in support of a Dutch led PRT in Uruzgan Province. Further support for the PRT was provided by a deployment of Army CH-47 Chinook Helicopter detachment including personnel in 2006, additional personnel in 2006, and a 300-strong SOTG in 2007. The number of Australian personnel in Afghanistan increased from ~1078 in February 2008 to 1,550 in mid-2009<sup>19</sup>. In comparison, in June 2008 the US had 48,250 military personnel deployed in Afghanistan. This total does not include 23,000 military support personnel in Kuwait or naval personnel aboard ships patrolling in the Persian Gulf<sup>20</sup>.

Australian personnel who were deployed as part of the PRT were much less likely to be involved in combat compared to the Australian Special Forces Task Group, or US active duty or reserve deployed personnel, owing to the different aims of the deployments. Notably, the number of coalition deaths remained relatively low from 2001 to 2004, then steadily increased from 2005 to a zenith in 2010 (see Appendix D),(10) reflecting increased insurgent/pro-Taliban violence.

The proportion of female ADF personnel deployed to Afghanistan (and to Iraq) was low, but this proportion may increase in the future given that from 1 January 2013 all ADF employment categories were open to women currently serving in the ADF<sup>21</sup>.

### *Iraq*

One of the main differences between the US and Australian operations in Iraq from 2003 was the size of the deployments. The number of Australian personnel deployed to Iraq was ~2000. The official US government source<sup>22</sup> for the total number of deployed personnel in operations in Iraq and Afghanistan provides a combined total only. However, at 2.4 million deployed personnel across both theatres, it is clear that a significantly greater number of US troops would have been exposed to combat. This was also evident in the number of Australian personnel killed in action (n=2) compared to the number of US personnel killed in action (n=4,486).(11)

A key difference between US and Australian deployments involves the dates that personnel were deployed. A majority of Australian troops were withdrawn by May 2003 after major combat operations ceased, and did not redeploy until 2005, under Operation Catalyst. The end of major

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<sup>19</sup> Source: Brangwin N, Harris M, and Watt D. Parliament of Australia -Department of Parliamentary Services. Australia at war in Afghanistan: revised facts and figures. Updated 12 Sept 2012 [http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/1244230/upload\\_binary/1244230.pdf;fileType=application%2Fpdf#search=%22Defence%22](http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/1244230/upload_binary/1244230.pdf;fileType=application%2Fpdf#search=%22Defence%22) , accessed 2012

<sup>20</sup> Source: Congressional Research Service. O'Bryant J, Waterhouse M. U.S. Forces in Afghanistan. Updated 15 July 2008. <https://www.fas.org/sgp/crs/natsec/RS22633.pdf> , accessed 2012.

<sup>21</sup> Source: Australian Government Department of Defence. Women in the ADF Report 2013-2014. Women in Defence, Removal of Gender Restrictions from ADF Combat Roles, <http://www.defence.gov.au/women/> accessed 2012

<sup>22</sup> Source: United States Department of Defense, Defense Manpower Data Center (DMDC)

combat operations marked the beginning of an insurgency that has claimed many lives. 2004 was one of the deadliest years of the conflict for US personnel, with the largest number of personnel wounded in action (n~8,000) and the second largest number of personnel killed in action (n~710) of the conflict (2003-2012<sup>23</sup>). Australian troops began withdrawing from Iraq in June 2008, and were completely withdrawn by July 2009, whereas US personnel remained in Iraq until December 2011 (~450 troops remained in Iraq attached to the US Embassy).

In addition, as previously described in the section describing roles under Operation Catalyst, Australian troops were deployed primarily in the Dhi Qar and Muthanna provinces. The Muthanna province had the second least number of coalition deaths (n=8, 0.2%) and the proportion of coalition deaths in the Dhi Qar province was relatively low overall (2% of coalition deaths). By comparison, a considerably greater proportion of coalition deaths occurred in the Baghdad and Anbar provinces<sup>24</sup>. Also of note, Australian personnel under Operation Catalyst were primarily involved in security and training roles, including the training of Iraqi Army and Police, and providing security to the Japanese Iraq Reconstruction and Support Group. It may be inferred from this analysis that a sizable proportion of Australian personnel deployed under Operation Catalyst had differential exposure with regard to combat intensity compared to US personnel.

### ***Afghanistan and Iraq***

A majority of US personnel (all active duty Army units) deployed to Afghanistan and Iraq had their deployments extended from 12 months to 15 months in 2007.(12)

Australian deployment lengths varied, although this was not straightforward. In 2008, the length of deployment for large Force Elements was increased from six months to eight months, but likely reverted back to six months for most Force Elements by around 2012. Australian Special Forces tended to do shorter rotations (3-6 months), some individuals (especially senior officers in Headquarter roles) would do 12 month deployments, and Navy and Air Force deployment lengths were more variable. ADF policies set out minimum periods of respite between deployments, but this also depends on factors including operational need, length of deployment, and specialisations.(13)

According to a US Army Colonel Director of a Medical Research Program in the US in 2008, in Iraq a typical US unit comprised 60% of personnel who were on either their second, third or fourth

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<sup>23</sup> Source: US Department of Defense, Defense Casualty Analysis System [https://www.dmdc.osd.mil/dcas/pages/report\\_oif\\_month.xhtml](https://www.dmdc.osd.mil/dcas/pages/report_oif_month.xhtml) retrieved 25 Sep 2012. Also see Figure 3, Appendix E.

<sup>24</sup> icasualties.org Operation Iraqi Freedom, Iraq. <http://icasualties.org/Iraq/index.aspx> , data retrieved 25 Sep 2012

deployment<sup>25</sup>. Data from the Middle East Area of Operations (MEAO) Health Study: Census Study Report<sup>26</sup> of 26,915 ADF members who deployed to the MEAO in the period 2001 to 2009 (of whom 14032, 53% of eligible respondents participated) indicated that 39% had deployed to both Iraq and Afghanistan, 37% deployed to Iraq only and 24% to Afghanistan only. More than half of the respondents (*weighted percentage*, 50.4%) had deployed to the MEAO more than once; range 1-26 deployments, with an average of two deployments. In total, participants had spent an average of 8.5 months deployed to the MEAO (range 1-63 months). Approximately half of respondents from the Army (55%) had deployed only once to the MEAO. Compared to the other Services, more participants from the RAAF (29%) reported three or more deployments. Cumulative time deployed to the MEAO varied significantly between roles<sup>27</sup>.

Although it is difficult to make firm comparisons between Australian and the US deployments on length of deployment and number of deployments to Iraq and/or Afghanistan on the basis of the above available data, it would seem that US personnel had a longer usual period of deployment, although there may have been variation based on operational, service and other factors; and at least half of personnel deployed from both Australia and US had deployed more than once. Recurrent deployments may have been more common in US personnel, but caution in interpretation is required here as the data are not directly comparable.

## **Somalia**

In 1991, the government of Somalia collapsed, the national army disbanded, and the country descended into a civil war. The delivery of humanitarian aid was frequently obstructed by militia. This led to the UN Security Council passing resolution 794 in December 1992, authorising the creation of the Unified Task Force (UNITAF) to use all necessary means to create a secure environment for the distribution of humanitarian aid. The authorised use of force thus classified the operations as Peace Enforcement (Peacekeeping, in contrast, limits the use of force to self-defence). UNITAF was led by the US.<sup>(14)</sup> Details of the Australian and US deployments to Somalia are given below.

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<sup>25</sup> Source: Elias, M. Multiple deployments raise mental health risks. USA Today. Aug 15, 2008. <http://abcnews.go.com/Health/MindMoodNews/story?id=5589589&page=1#.UGu71k0gcTY> accessed 2012

<sup>26</sup> Dobson A, Treloar S, Zheng W, Anderson R, Bredhauer K, Kanesarajah J, Loos C, Pasmore K, Waller M 2012. *The Middle East Area of Operations (MEAO) Health Study: Census Study Report*. The University of Queensland, Centre for Military and Veterans Health, Brisbane, Australia.

<sup>27</sup> Ibid.

### ***Australian Operation Solace and Operation Iguana*** <sup>28</sup>

<b>Date of first deployment:</b>	21 December 1992
<b>End of deployment:</b>	30 November 1994
<b>Total deployed:</b>	1,366 at peak
<b>Warlike/non-warlike:</b>	Warlike/Peace Enforcement, authorised to use “all necessary means”, according to Chapter VII of UN Charter
<b>Killed in action:</b>	1
<b>Wounded in action:</b>	3
<b>Services involved:</b>	Air Force, Navy, Army
<b>Type of Operation:</b>	Stabilisation and recovery

#### **Operation details and main types of service:**

Approximately 1,300 Australian personnel were deployed to Somalia on the 21 December 1992 under *Operation Solace*, supporting the US-led UNITAF. This deployment consisted of 990 personnel drawn from 1RAR (1<sup>st</sup> Battalion Royal Australian Regiment), armoured personnel carriers, cavalry regiment; a civil and military operations team; engineers; communications specialists; intelligence personnel; elements of the Electronic Warfare Squadron; headquarters Special Forces detachment; and a support unit<sup>29</sup>. The aim of the mission was to secure a humanitarian relief sector based in Baidoa in order to support non-government organisation (NGO) distribution of aid. This involved four main roles; maintaining a secure environment in Baidoa, maintaining a presence in the surrounding countryside, protecting aid convoys, and assisting in the equitable distribution of aid. Logistical support was provided by the RAN. Operation Solace ended on the 21 May 1993 with the withdrawal of the Battalion group. It was succeeded by Operation Iguana (5 May 1993 to 30 November 1994), which included a small deployment of troops for movement control, air traffic control, some HQ Staff, a security team, and members of the Special Air Service Regiment (SASR)<sup>30</sup>.

#### **Operation specific deployment exposures:**

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<sup>28</sup> Sources: Copeland, P. Submission to the Defence Honours and Awards Tribunal, For the Inquiry into the recognition of Australian Defence Force Service in Somalia 1992-1995) 2009.

<http://www.peacekeepers.asn.au/veterans/submissions/APPVA%20Somalia%2031%20Aug%2009.pdf> , accessed 2012; Australian Government Department of Defence. Defence2020

<http://www.defence2020.gov.au/info> , accessed 2012; Australian Peacekeeper & Peacemaker Veterans Association (APPVA); peacekeepers.asn.au, accessed 2012. Ward, W. Psychiatric morbidity in Australian Veterans of the United Nations peacekeeping force in Somalia. ANZ J Psychiatry 1997;31: 184-193.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

Information was sought but was not available for operation specific exposures for Somalia.

***US Operations; Provide Relief, Restore Hope, Continue Hope and United Shield***

<b>Date of first deployment:</b>	15 August, 1992
<b>End of deployment:</b>	3 March, 1995
<b>Total deployed:</b>	25,000
<b>Warlike/non-warlike:</b>	Warlike (peace enforcement)
<b>Killed in action:</b>	44
<b>Wounded in action:</b>	220
<b>Services involved:</b>	Air Force, Navy, Army, Marines
<b>Type of Operation:</b>	Stabilisation and recovery

**Operation details and main types of service:**

Operation *Provide Relief* was the first deployment of US troops (170 Special Forces soldiers, 400 troops in total), who airlifted aid to remote areas of Somalia. This operation transitioned into Operation *Restore Hope* (8 December 1992 to 4 May 4 1993) which was an expanded multinational coalition (known as United Task Force) led by the US, in response to a deteriorating security situation. The US deployed ~25,000 troops, with the joint aims of providing humanitarian relief, and restoring order. This Operation was to “bridge the gap until the situation stabilised enough for it to be turned over to a permanent UN peacekeeping force”<sup>31</sup>. The transition from UNITAF to United Nations Operation in Somalia (UNOSOM) II (US Operation *Continue Hope*) occurred in March 1993. The UNOSOM II mission significantly expanded the mission to include political reconciliation, disarmament, and nation building. The US provided 3,000 troops for logistical support, and a Quick Reaction Force of ~1,150 soldiers. Together these troops were to conduct military operations to consolidate, expand, and maintain a secure environment for the advancement of humanitarian aid, economic assistance, and political reconciliation in Somalia<sup>32</sup>. A key turning point in the conflict occurred in June 1993 when 24 Pakistani soldiers were killed and mutilated, leading to a UN Security Council resolution calling for the immediate apprehension of those responsible. The US deployed 400 US army rangers and delta force commandos to capture the warlord deemed responsible, General Mohamed Farrah Hassan Aideed. This mission encompassed the notorious Battle of Mogadishu, in which 18 US soldiers died. This promoted a

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<sup>31</sup> Allard, K. Somalia Operations: Lessons Learned. 2002; [http://www.dodccrp.org/files/Allard\\_Somalia.pdf](http://www.dodccrp.org/files/Allard_Somalia.pdf) accessed 2012

<sup>32</sup> Ibid.

change in US policy, with the intention of withdrawal by end of March 1994. A few hundred Marines remained to safely evacuate all UN forces in March 1995<sup>33</sup>.

**Operation specific deployment exposures:**

Information was sought but was not available for specific operations deployed to Somalia.

***Differences between Australian and US deployments to Somalia***

The Australian deployment to Somalia was responsible for securing the area of Baidoa, a city in south-central Somalia, 256km northwest of the capital, Mogadishu. This deployment was withdrawn from Somalia in May 1993, whereas the US maintained personnel in Somalia until fully withdrawing in March 1995.

***Specific aspects of deployments to the Gulf War, Afghanistan and Iraq War, and Somalia***

Veterans of the Gulf War and Iraq War faced the threat of biological or chemical warfare agents or attack, and were inoculated against specific chemical agents (e.g. anthrax or plague) or took nerve agent prophylaxis (e.g. PB). Many veterans of the Gulf War also reported or were potentially exposed to specific environmental exposures such as SMOIL or depleted uranium. Information was sought but was not available for specific operational exposures during deployment to Somalia.

Australian and US service personnel faced the threat of, and therefore were likely to have been exposed to, IEDs during the Afghanistan and Iraq Wars. Insurgency and the use of IEDs was a feature of Afghanistan and Iraq Wars that contrasted with the Gulf War.

The events that led to Australian and US deployments to Somalia were different to those of the Gulf War, Afghanistan or Iraq War. However roles in provision of humanitarian aid to a country in famine in a complicated situation and direct encounters with warlords and marauding gangs suggest the potential for military service experiences of a comparable stressful nature to the Gulf region deployments.

***Discussion***

During the Gulf War, despite the differences in the size and type of deployments (Australia being smaller and largely Naval) both countries experienced similar concerns over exposures to SMOIL, nerve agent prophylactic tablets and vaccinations as well as concerns over chemical and biological warfare. For both countries, during Afghanistan/Iraq War deployment some personnel had their

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<sup>33</sup> Ibid.

deployment periods extended, this was more pervasive and extensive in US than Australian personnel. This may have led to uncertainty over deployments and contributed to stress for all affected personnel.

Although this report considered deployments in which US and Australia both contributed a significant number of troops, the absolute numbers of US personnel deployed were significantly greater for all the deployments considered. There were also a number of differences in the types of deployments for US and Australian personnel. During the Gulf War, US personnel tended to be involved in more direct combat roles, with the largely Naval Australian personnel not suffering any wounded or killed in action. Similarly, in Afghanistan, Australian personnel were less likely to be in combat roles; with the notable exception of the Australian Special Forces Task Group. For Iraq, there were substantial changes in the deployment conditions during different periods that impact US and Australian troops differently. The majority of Australian personnel were withdrawn in 2003. Yet, for the US, due to the rise of an insurgency, 2004 saw the peak of wounded in action and the second highest killed in action. US personnel were more likely to be deployed in combat roles and had been deployed during periods of peak combat relative to deployments of Australian personnel.

During Afghanistan/Iraq War, the US personnel tended to be deployed for longer periods than Australian personnel, this would have increased their potential occupational and environmental exposures, as well as potentially increased the burden of stress/allostatic load.

The US contributed substantially more personnel to each of the included deployment than Australia. The larger US military and veteran population has implications for the health system delivery, access and utilisation. Thus, the size and types of the US and Australian deployments, and consequently some exposures, were substantially different between the countries.

## 4 Scoping review

### Objectives

A scoping review was undertaken to determine the size and availability of literature for a list of candidate health and social outcomes related to the identified common US and Australian deployments. This scoping review was used to inform which of these outcomes were to be included and prioritised in the literature review.

### Criteria for inclusion

The criteria used to decide which outcomes to include in the scoping review were:

- conditions which have demonstrated causality due to deployment (such as PTSD), or
- conditions which have demonstrated sufficient evidence of association with deployment (depression, generalised anxiety disorder, multisymptom illness, chronic fatigue syndrome (CFS), mild TBI (mTBI), alcohol abuse), or
- outcome was considered to be an 'emerging issue', such as TBI, or
- conditions which are of significant interest to US VA and Australian DVA, and deemed research priorities (e.g. substance use disorders, and conditions relating to ageing, such as dementia), or
- social outcomes linked to deployment (e.g. homelessness, incarceration, quality of life), or
- specific outcomes relating to vulnerable groups (such as women and reservists).



# Health and social outcomes included in the scoping review

## Psychological outcomes

PTSD  
Depression  
Alcohol use disorders  
Substance use disorders (e.g. opioids, sedatives, anxiolytics, cocaine, cannabis)  
Suicide  
Generalised anxiety disorder

## Social outcomes

Quality of life/wellbeing  
Unemployment  
Domestic violence  
Sexual violence  
Homelessness  
Homicide  
Incarceration  
Social isolation

## Medical outcomes

Communicable diseases  
Multiple sclerosis  
CFS  
Amyotrophic lateral sclerosis (ALS)  
Migraine disorders  
Fibromyalgia  
Lupus erythematosus, systemic  
Reproductive health  
Obesity  
Digestive system diseases  
Sexually transmissible diseases (STDs)  
Musculoskeletal diseases  
Brain injuries  
Multisymptom illness  
Vaccination  
Women's health  
Dementia/Alzheimer's disease  
Rheumatic diseases

## Methodology

PubMed was the database chosen for the scoping review, as it incorporates the Medline database, as well as other life sciences journals and books. The search proceeded by mapping each deployment and outcome to Medical Subject Headings (MeSH), which is the National Library of Medicine controlled vocabulary thesaurus used for indexing PubMed citations. Where an outcome or deployment e.g. Somalia did not map to a MeSH term, this was entered into the search as a free text term. Women's health encompassed outcomes of Gynaecology/obstetrics and Reproductive health. In addition, the MeSH terms for "Veterans" and "Military Personnel", were included, as were limitations to publications from 1990 onwards, and in English language. An example search string for PTSD is given below.

*"Stress Disorders, Traumatic"[Mesh] AND ("Iraq War, 2003 -"[Mesh] OR "Afghan Campaign 2001- "[Mesh] OR "Gulf War"[Mesh] OR "Somalia" [Mesh] OR Somali\* [Text word] OR Afghan\* [Text*

*word] OR OEF [Text word] OR OIF [Text word] OR "Military Personnel" [Mesh] OR "Veterans" [Mesh]) AND ("1990/01/01"[PDAT] : "2012/12/31"[PDAT]) AND English[lang]*

## **Results**

Results of the PubMed search for several of the Psychological and Medical health and Social outcomes are presented in Figure 1 to give an indication of the relative size and availability of literature. Figure 1 gives the total hits<sup>34</sup>, number of review articles, systematic reviews, meta-analyses, and hits limited to articles relating to Australia,<sup>35</sup> for each of these outcomes.

Appendices F, G, and H present these results separately for all Psychological, Social, and Medical outcomes in the scoping review, respectively.

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<sup>34</sup> Note: the number of hits is used to indicate the relative size and availability of literature. This is only one of the principles we used to prioritise outcomes for the Stage 2 literature review.

<sup>35</sup> The number of hits relating to the US is not presented as the majority of hits related to US deployments

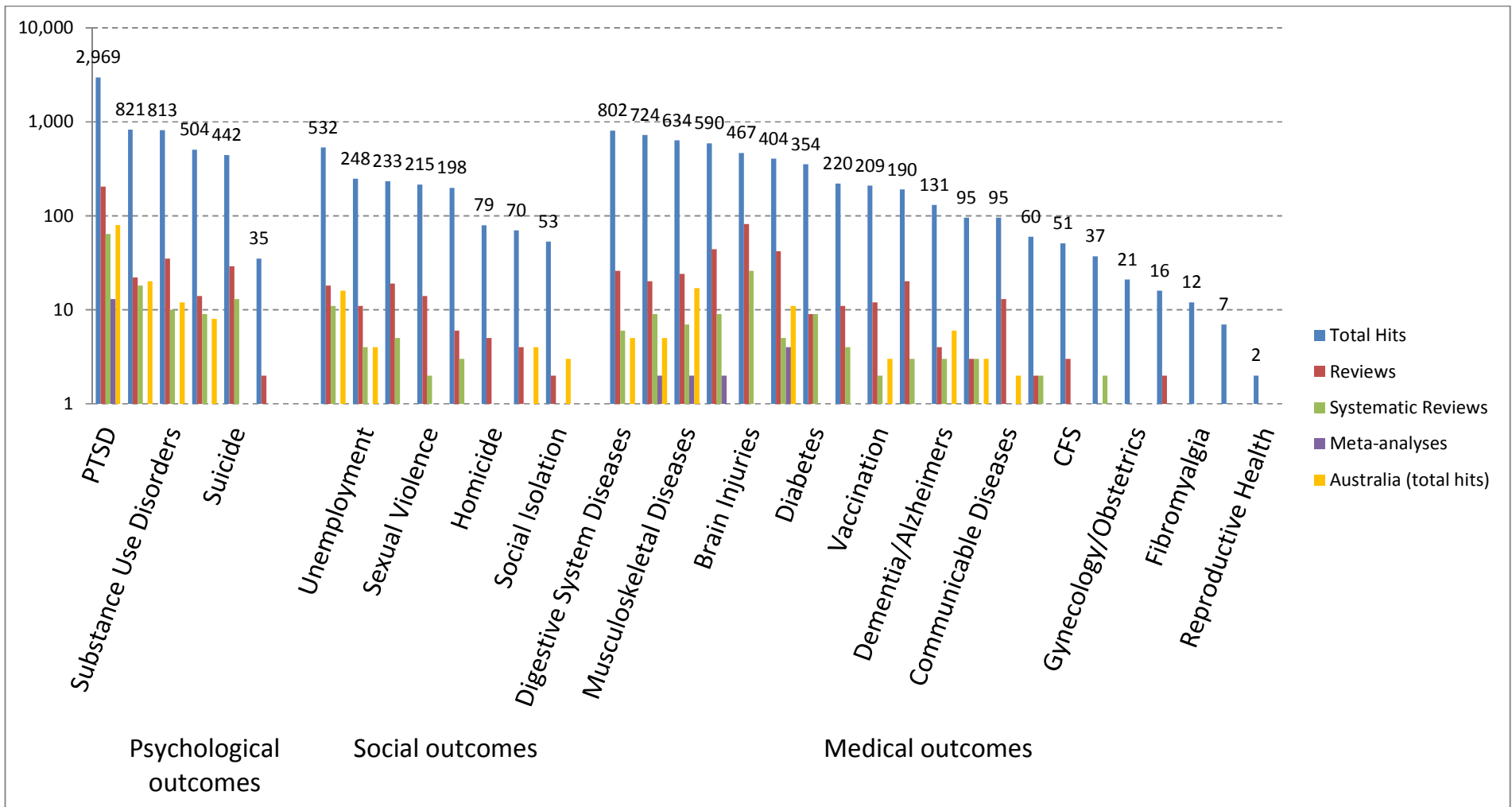


Figure 1 PubMed Search summary, including total number of hits, number of reviews, systematic reviews, meta-analyses, and Australian hits for several of the Psychological, Social and Medical outcomes in the scoping review (log scale)

## ***Psychological outcomes***

As can be seen in Figure 1, research on PTSD dominated the literature as it related to veterans of the four deployments, with almost 3,000 total hits (total hits does not necessarily reflect relevance; we used it here as indicative of the relative size and availability of literature). The relative size of literature for depression and substance use disorders was almost one-quarter (~800 hits). The suicide and alcohol use disorders literature size was almost half again, but remained substantial in size (~440-500 hits) whilst there were very few articles for generalised anxiety disorder (35 hits).

## ***Social outcomes***

The largest literature on social outcomes as they related to veterans of the four deployments under study was for Quality of life/wellbeing (>500 hits), which was greater than twice the size of the next largest of the outcomes; unemployment, domestic violence, homelessness, and sexual violence (ranging from ~200 to ~250 hits). Literature on homicide, incarceration and social isolation literature was smaller in size, at fewer than 100 hits (53 for social isolation).

## ***Medical outcomes***

*Literature >500 hits:* Of the medical outcomes, digestive diseases, STDs, musculoskeletal disorders, and pain had the largest number of hits (ranging from ~600 to ~800).

*Literature >350 and <500 hits:* This scope of literature was present for brain injuries, multisymptom illness, and diabetes (~350 to ~450 hits).

*Literature >50 hits and <350 hits:* Several outcomes were classified in this scope of literature. These include, in descending order of magnitude, obesity (220), vaccination (209), women's health (190), dementia (131), rheumatic diseases (95), communicable diseases (95), multiple sclerosis (60), and CFS (51).

*Literature <50 hits:* In comparison to the other outcomes, the following outcomes received fewer hits: ALS (37), migraine disorders (16), fibromyalgia (12), lupus (7), and reproductive health (2).

The size of the literature on health care and service utilisation was also investigated in the scoping review and was classified in the largest category, with 674 hits.

## Prioritising health and social outcomes for the comparative literature review

Results of the scoping review indicated a large combined literature for the proposed outcomes (~13,000<sup>36</sup> total articles, of which 730 were review articles). The timeframe for conduct of this phase of the study did not allow for a review of all outcomes, given the considerable size of the literature. We therefore considered indicator outcomes selected from across the three groups. The principles for deciding these indicator outcomes were developed between the Monash and MUSC research partners after discussion of the scoping review results and discussion with DVA. These principles were:

- Where we could reasonably expect there to be important differences in outcomes between veterans in the two countries and consideration of these differences had the potential to impact on health outcomes in the future
- Where the outcome was considered to be an emerging issue and where authoritative reviews had not been published
- Where the outcome was of higher significance to both the US VA and Australian DVA
- Where signature outcomes were linked to specific deployments (i.e., multisymptom illness in relation to the Gulf War and TBI for the deployments to Iraq and Afghanistan)
- Where outcomes related to vulnerable groups (e.g. women, reservists, younger veterans).

Application of these principles yielded the following five indicator outcomes:

Psychological indicator outcomes:

1. Suicide;
2. PTSD

Social indicator outcomes:

1. Social Isolation/connectedness

Medical indicator outcomes:

1. TBI
2. Multisymptom illness

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<sup>36</sup> Some studies evaluated more than one outcome (for example, PTSD and depression). Accordingly, the number of unique papers would be less than the ~13,000 found.

# 5 Comparison of health and social outcomes in Australian and US veterans by deployment

## Objectives

The comparative literature review project overall had two objectives. The first objective was to identify any differences between Australian and US personnel on the health and social indicator outcomes, highlighting any areas where there were major differences between veterans of the two countries, including those for more vulnerable veterans. To further investigate the health outcomes of veterans of the selected deployments, the second objective was to identify differences in the US and Australian health systems as they relate to veterans' health indicators over the period of the four deployments to the Gulf War, Somalia, Afghanistan and the Iraq War to the present. This chapter relates to the first objective.

## Methodology

### *Search strategy*

A review of published and unpublished literature from January 1990 to November 2014 was performed. Multiple electronic databases were searched: Medline, Medline In Process, PsycINFO, Embase, Central and the Cochrane Library from 1990 to November 2014 for studies relating to the selected outcomes in military personnel deployed in the Gulf War, Afghanistan and Iraq War, and Somalia conflict. The grey literature was also searched including government reports from US and Australian Departments of Defense/Defence and Veterans' Affairs; reference lists of relevant reports were searched for additional studies.

### *Inclusion criteria*

Studies were included if the following criteria were met:

- (1) The population consisted of military personnel deployed to the Gulf War (1990-1991), Afghanistan (2001-), Iraq War (2003-2011) or Somalia; encompassing Army, Navy, Air Force, Marines, Coast Guard, medics, and Reservists/National Guard.
- (2) The study was available in English.

- (3) The study included odds ratios, prevalence or incidence rates for the outcome.
- (4) The study included an appropriate comparison group (NB: This requirement was dismissed for TBI as an appropriate comparison group has not been defined for this outcome).

### ***Exclusion criteria***

Studies were excluded based on the following criteria:

- (1) The conflict deployed sample was of non-military personnel.
- (2) The study was published in a language other than English.
- (3) No data was reported on the outcome of interest.
- (4) The study used a clinical or treatment-seeking sample. (NB: Treatment-seeking samples were included for TBI as large screening programs were implemented at VA clinics).

A list of free text and MeSH terms corresponding to three concepts in the research question was developed. These concepts were:

A1: Gulf War, Iraq War, and Afghanistan War, Somalia;

A2: Military personnel, military veterans, military medicine, and veterans' health;

B: Selected outcomes; for example, TBI.

The final search strategy was: (A1 or A2) AND (B). Key words varied by database and outcome. However, a modified portion of the search string for TBI in Medline serves as an example:

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exp Afghan Campaign 2001-/ or exp Gulf War/ or exp Iraq war, 2003-/ OR ((iraq* or
afghan* or gulf) adj10 (war* or conflict* or campaign* or combat* or deploy* or military*
or veteran* or army or operation* or battle*)),ti,ab. OR (desert shield or desert storm or
enduring freedom* or iraqi freedom* or OIF or OEF or new dawn or OND or (iraq* adj2
afghan*)),ti,ab. OR "Somalia" [Mesh] OR Somali AND Brain injuries/ or craniocerebral
trauma/ or Brain concussion/ or Post-Concussion syndrome/ or Chronic Brain injury OR
traumatic brain injur* or TBI or craniocerebral trauma or mild TBI or mild traumatic brain
injur* or concussion
```

### ***Study selection and data extraction***

Titles and abstracts from each database were entered into the reference manager software, EndNote version X7. Following the removal of duplicates, titles and abstracts were screened, using the inclusion/exclusion criteria, to identify studies for full-text review. Included studies were reviewed by a second team member, and any discrepancies were reconciled through discussion.

Quantitative and other critical data for each individual study were extracted and tabulated including first author, year of publication, study design and period, method of data collection, sample description, case definition and measure used in the study, response rates where available, and prevalence of outcome, and incidence or odds ratio. When data from the same population was reported by two studies, priority was given to the first published paper.



## Results

### *Posttraumatic stress disorder*

There was a total of 34 Australian and US studies of PTSD prevalence in representative non-treatment seeking military populations that qualified (7 from Australia, 27 from the US). Of these, 18 related to Gulf War veterans (3 from Australia, 15 from the US), 12 to the Afghanistan/Iraq conflicts (3 from Australia, 9 from the US), and 4 to the Somalia mission (1 from Australia, 3 from the US). (See Table 2). Taking into account methodological differences between the studies in terms of PTSD measurement, sampling, response rates, time since deployment, and adjustment factors, we provide a brief summary of the findings below.

### *United States*

The prevalence of PTSD among US Gulf War veterans ranged from 2-15%.<sup>(15-29)</sup> In terms of military service, no substantial differences in PTSD prevalence were observed.<sup>(16, 21, 26)</sup> Deployed members serving in the Reserves or National Guard had a 3 to 6 times greater risk for PTSD while those on Active duty had a 2 to 5 times greater risk for PTSD than their non-deployed counterparts.<sup>(16, 21, 26)</sup> Furthermore, Active duty personnel who were members of the US Navy Construction Battalion (the Seabees) had the highest PTSD prevalence of about 15.2%.<sup>(18)</sup> A 10-year follow-up study, as part of the National Survey of Gulf War Era Veterans and their Families, demonstrated an increase in PTSD prevalence from 12.1% in 1995 to 15.2% in 2005 among deployed Gulf War veterans.<sup>(22, 23)</sup> Those deployed elsewhere, other than the 1990-1991 Gulf War, had similar prevalence rates of PTSD as those who were non-deployed.<sup>(19)</sup> Overall, deployed Gulf War veterans were 1.8-5.8 times more at risk for PTSD than non-deployed veterans.<sup>(15-20, 23, 25, 27)</sup> Moreover, deployed Gulf War veterans who had returned from the Gulf War 18 to 24 months previously were 13 times more likely to develop PTSD as compared to those who had just returned.<sup>(29)</sup>

For US personnel who served in Afghanistan or Iraq, the overall prevalence of PTSD was about 7%.<sup>(30)</sup> The PTSD prevalence ranged between 2.1-12.1% among OIF veterans and 2.2-5% among OEF veterans.<sup>(31, 32)</sup> Differences in PTSD prevalence between military branches were also noted. About 13-18% of Army personnel who served in Iraq reported having PTSD in the past month.<sup>(33)</sup> The highest PTSD prevalence of about 20% was observed amongst the Marines who were deployed during the Iraqi conflict.<sup>(33)</sup> Moreover, OIF veterans in the Army had a 2 to 3-fold increased risk of developing PTSD during post-deployment than pre-deployment.<sup>(33)</sup> As for OEF veterans who served in the Army, the PTSD prevalence was 11.5%.<sup>(33)</sup> Differences in PTSD prevalence between military services were observed as well. PTSD prevalence amongst OIF

veterans in the National Guard or Reserves ranged from 12.7-30.5% and 6.2-23.7% amongst those who were on Active duty.(34, 35) Furthermore, OIF veterans who had served in the National Guard or Reserves showed an increased risk for PTSD at 12 months post-deployment compared to 3 months post-deployment.(35) Overall, deployed OEF and OIF veterans were about 4 times at risk of PTSD than non-deployed veterans.(30)

The overall prevalence of PTSD among US forces deployed to Somalia was 8%.(36) PTSD prevalence gradually increased over time since post-deployment.(36, 37)

### ***Australia***

The overall PTSD prevalence first present post-Gulf War to 2001-2002 was 5.4% among ADF members who were deployed to the Gulf War.(38, 39) Similarly, 5.1% of deployed and 1.7% of non-deployed personnel reported PTSD in the past year.(38, 39) However, PTSD prevalence in the past month, as measured by a self-report instrument, was greater at about 8% in deployed and 4.6% in non-deployed personnel.(39, 40) Moreover, deployed personnel had a 4-fold increased risk of developing PTSD in the past year and a 2-fold risk of developing PTSD in the past month in comparison to their non-deployed counterparts.(38-40)

PTSD prevalence among those deployed to the Afghanistan and Iraq conflicts ranged from 3-8%.(5, 6, 41) ADF members were 13.5 times more likely to report PTSD within the past month during post-deployment than pre-deployment.(6) In addition, a greater proportion of ADF members who served in Iraq reported PTSD in the past month than those who were deployed to Afghanistan.(41) Moreover, those who served in Iraq or in Afghanistan had a 2.5 and 1.4 times greater risk of developing PTSD in the past month than those who served outside of Iraq or Afghanistan, respectively.(41)

Australian peacekeepers deployed to Somalia had the highest PTSD prevalence of about 19-28% in comparison to all other conflicts investigated in this review.(42) In addition, a greater proportion of peacekeepers reported PTSD within the past month compared with 12 month prevalence (28% vs. 19%).(42)

### ***Summary of key comparisons in relation to PTSD and deployments***

While there was greater variability in PTSD prevalence and odds or risk ratios in the US 1990-1991 Gulf War studies (probably due to the larger number of studies), in general the Australian and US results were not dissimilar, with Australian prevalence estimate and odds ratios (for deployment) falling at about the midpoint of the US estimates.

For the Afghanistan and Iraq conflicts, findings for Australia and the US were again similar. For both countries, the prevalence of PTSD tended to be higher for veterans deployed to Iraq; however, odds ratios (for deployment) tended to be higher among the US forces.

Comparisons for the Somalia peacekeeping operation are limited due to the paucity of publications for both US and Australia. Nevertheless, there did appear to be elevated PTSD prevalence estimates for both countries, with notably higher estimates for Australia.

Within the limitations of this descriptive review, there were patterns to note. For both countries, the Gulf War prevalences were approximately similar to those observed for the Iraq War, whilst prevalences for Afghanistan seemed to be lower than these deployments. For the US, prevalences in Somalia were at the high end of the range observed in the Gulf War and Iraq, while for Australia, the prevalences noted for Somalia were considerably higher than any other deployment era. US studies that considered National Guard/Reservists demonstrated higher prevalences in this population.

**Table 2 Posttraumatic stress disorder (PTSD) in included studies**

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
<b>1990-1991 Gulf War - US</b>							
Stretch et al. (1996) (26)	Cross sectional Postal survey (anonymous) 1993	PGW veterans vs. non-deployed PGW era veterans from various units in Hawaii and Pennsylvania	WRAIR PTSD algorithm using 9 items from IES (SR) and 8 items from BSI (SR) based on DSM-III criteria	Current PTSD	Active duty: 8.0% Reserve: 9.2%	Active duty: 1.3% Reserve: 2.1%	Response rate: 31% (4,334/14,167)  Prevalence rates per 100 study subjects
Iowa Persian Gulf Study Group (1997) (21)	Cross sectional Telephone interview September 1995-May 1996	PGW veterans vs. non-deployed PGW era veterans from Iowa  Stratified random sample	≥50 on PCL-M (SR)	Current PTSD	Active duty:1.9% National Guard/Reserve: 2%	Active duty: 0.7% National Guard/Reserve: 1.1%	Response rate: 76% (3,695/4,886)
				Current PTSD	Deployed vs. Non-deployed (Active duty): <b>OR=6.4<sup>a</sup></b> Deployed vs. Non-deployed (National Guard/Reserve): <b>OR=4.7<sup>a</sup></b>		
Holmes et al. (1998) (20)	Cross sectional Postal survey February 1992-Date not provided	PGW veterans vs. non-deployed PGW era veterans from an Air National Guard Unit	≥89 on M-PTSD (SR)	PTSD past 12 months	All 4.8%  6.8%	1.7%	Response rate: 46% (506/1,090)
				PTSD past 12 months	Deployed vs. Non-deployed: <b>OR=4.3<sup>a</sup></b>		
Proctor et al. (1998) (24)	Cross sectional Spring 1994-Fall 1996	PGW veterans from Fort Devens, New England and New Orleans, Louisiana vs. PGW era veterans from Germany  Stratified random sample	CAPS (Clinical Interview)  ≥89 on M-PTSD (SR) for Desert Storm War Zone Personnel	Current PTSD	CAPS: Fort Devens: 5% New Orleans: 8% M-PTSD: Fort Devens: 8.1% New Orleans: 7.6%	CAPS: Germany: 0% M-PTSD: Germany: Not reported	Response rate: Fort Devens 62% (220/353) New Orleans 38% (73/194) Germany 51% (50/not reported)
				Unable to tabulate odds ratios			
Wolfe et al. (1999) (29)	Retrospective Part of Proctor et al. (1998) Spring 1994-Fall	PGW veterans from Fort Devens, New England and New Orleans, Louisiana	CAPS (Clinical Interview) ≥89 on M-PTSD (SR) for Desert	Current PTSD	Fort Devens: 5.4% New Orleans: 7.2%	Germany: 0%	Response rate: Fort Devens 62% (220/353) New Orleans

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
	1996	vs. PGW era veterans from Germany Stratified random sample	Storm War Zone Personnel	Lifetime PTSD	Fort Devens: 6.5% New Orleans: 8.2%	Germany: 0%	38% (73/194) Germany 51% (48/not reported)
Unable to tabulate odds ratios							
Wolfe et al. (1999) (28)	Prospective Part of Fort Devens Operation Desert Storm Reunion Survey 1991-1994	PGW veterans 18-24 months after post-deployment (T2) vs. 5 days after post-deployment (T1)	≥94 on M-PTSD (SR)	PTSD <u>PTSD</u> T2 vs. T1: <b>OR=13</b> Adjusted for PTSD at T1, gender, age, race, military status, education level, marital status, military rank, combat exposure, and prior combat experience	8%	3%	Response rate: T1 99.8% (2,942/2,949) T2 78% (2,313/2,949)
Gray et al. (1999) (18)	Cross sectional  September 1994-June 1995	PGW veterans vs. non-deployed PGW era veterans	PTSD screen based on DSM-IV criteria (SR)	PTSD <u>PTSD</u> Deployed vs. Non-deployed: <b>OR=1.8</b> (1.3, 2.5)	15.2%	9%	Response rate: 53% (1,497/not reported)  Limited to active duty Seabees who remained in service after the war and were serving in one of two large Seabee centers
Steele et al. (2000) (25)	Cross sectional Telephone interview February-August 1998	PGW veterans vs. non-deployed PGW era veterans from Kansas Stratified random sample	SR physician diagnosed illness with onset after August 1991	Onset PTSD <u>Onset PTSD</u> Deployed vs. Non-deployed: <b>OR=4.7</b> Adjusted for sex, age, income, and education level	6.3%	1.4%	Response rate: 92% (2,030/2,211)  Excluded veterans with PTSD prior to 1990

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
Gray et al. (2002) (19)	Cross sectional Postal survey Extension of Gray et al. (1999) May 1997-May 1999	PGW veterans vs. non-deployed or deployed elsewhere PGW era veterans	SR physician diagnosed illness with onset after August 1991	Onset PTSD	Deployed 3.1%	Non-deployed: 0.7% Elsewhere: 0.6%	Response rate: 68% (11,868/17,559)
				<hr/> <u>Onset PTSD</u> Deployed vs. Non-deployed: <b>OR=4.2</b> (2.6, 6.9) Deployed vs. Elsewhere: <b>OR=4.3</b> (2.8, 6.5) All adjusted for age, gender, service status, race/ethnicity, current smoking, current alcohol drinking			
Barrett et al. (2002) (15)	Retrospective Part of Iowa Persian Gulf Study (1997) September 1995-May 1996	PGW veterans vs. non-deployed PGW era veterans	≥50 on PCL-M (SR) based on DSM-III criteria	Current PTSD	All 1.09% Deployed 1.9%	0.8%	Response rate: 76% (3,695/4,886)
				<hr/> <u>Current PTSD</u> Deployed vs. Non-deployed: <b>OR=2</b> (0.97, 3.2) Adjusted for deployment status, age, sex, race, rank, branch, military status, and smoking			
Kang et al. (2003) (23)	Cross sectional Postal survey  Part of National Health Survey of Gulf War Era Veterans and Their Families (1995)  November 1995-1997	PGW veterans vs. non-deployed PGW era veterans  Stratified random sample	≥50 on PCL (SR) based on DSM-III criteria	Current PTSD	12.1%	4.3%	Response rate: 70% (20,917/30,000)
				<hr/> <u>Current PTSD</u> Deployed vs. Non-deployed: <b>OR=3.1</b> (2.7, 3.4) Adjusted for gender, age, marital status, rank, and unit component  Oversampling of females, Reservists, and National Guard members			
Black et al. (2004) (16)	Cross sectional Telephone interview  Part of Iowa Persian Gulf Study (1997)	PGW veterans vs. non-deployed PGW era veterans	≥50 on PCL (SR) based on DSM-IV criteria	PTSD past month	Active duty: 1.9% National Guard/Reserve: 2%	Active duty: 0.7% National Guard/Reserve: 1.1%	Response rate: 76% (3,695/4,886)  Prevalence rates per 100 study subjects

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
	September 1995- May 1996			PTSD past month Deployed vs. Non-deployed: <b>OR =2.5</b> (1.2, 5.0) Deployed vs. Non-deployed (Active duty): <b>OR=2.6</b> (1.1, 6.2) Deployed vs. Non-deployed (National Guard/Reserve): <b>OR=1.9</b> (1.0, 3.5) All adjusted for age, gender, race, rank, branch, military status, and prior mental health conditions including PTSD, depression, or anxiety			
Fiedler et al. (2006) (17)	Cross sectional  Telephone interview  February 2000- October 2001	PGW veterans vs. non-deployed PGW era veterans	CIDI (Clinical Interview) based on DSM-IV criteria	PTSD past 12 months  <u>PTSD past 12 months</u> Deployed vs. Non-deployed: <b>OR=3.9</b> <sup>a</sup>	3.4%	0.9%	Response rate: 55% (1,767/3,204)  Interviews were conducted by non-trained clinicians
Toomey et al. (2007) (27)	Cross sectional Psychological assessment Part of National Health Survey of Gulf War Era Veterans and Their Families (1995) 1998-2001	PGW veterans vs. non-deployed PGW era veterans Subset of Kang et al. (2000)	≥50 on PCL (SR)  CAPS (Clinical Interview) based on DSM-IV criteria	Pre-deployment PTSD Onset PTSD PTSD past month  Lifetime PTSD  <u>Onset PTSD</u> Deployed vs. Non-deployed: <b>OR=5.8</b> (2.6, 12.7) Adjusted for age, gender, ethnicity, duty type, service branch, and rank	3.9%  6.2% 1.8%  10.8%	4.2%  1.1% 0.6%  6.7%	Response rate: Deployed 53% (1,061/1,996) Non-deployed 39% (1,128/2,883)
Kang et al. (2009) (22)	Cross sectional Postal survey	PGW veterans vs. non-deployed PGW	≥50 on PCL-C (SR)	PTSD past month	15.2%	4.6%	Response rate: 34% (9,970/

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
	Follow-up to National Health Survey of Gulf War Era Veterans and their Families (1995) 2005	era veterans		PTSD past month			29,607)
				Deployed vs. Non-deployed: <b>RR=3</b> (2.5, 3.5) Adjusted for age, gender, race, body mass index, current cigarette smoking, rank, branch of service, and unit component			
<b>Afghanistan/Iraq War deployments - US</b>							
Hoge et al. (2004) (33)	Cross sectional Survey (anonymous) 2003	OEF/OIF veterans 3-4 months after post-deployment vs. OIF veterans one week before deployment	Broad definition based on DSM-IV criteria alone Strict definition based on DSM-IV criteria and $\geq 50$ on PCL (SR)	Broad Definition PTSD past month  Strict Definition PTSD past month	OEF: Army: 11.5% OIF: Army: 18% Marine: 19.9%  OEF: Army: 6.2% OIF: Army: 12.9% Marine: 12.2%	OEF: Army: Not studied OIF: Army: 9.4% Marine: Not studied OEF: Army: Not studied OIF: Army: 5% Marine: Not studied	Response rate: 98% (not reported)
				<u>Broad Definition PTSD past month</u> Post-deployment vs. Pre-deployment (OIF Army): <b>OR=2.1</b> (1.7, 2.7) <u>Strict Definition PTSD past month</u> Post-deployment vs. Pre-deployment (OIF Army): <b>OR=2.8</b> (2.2, 3.7) All adjusted for age, rank, education level, marital status, and race/ethnic group			
Hoge et al. (2006) (31)	Cross sectional PDHA  May 1, 2003-April	OEF/OIF veterans vs. OEF/OIF era veterans deployed elsewhere	$\geq 2$ or $\geq 3$ on PC-PTSD (SR)	PTSD $\geq 2$ PC-PTSD	OEF: 4.7% OIF: 9.8%	Elsewhere: 2.1%	Response rate: 82% (not reported)



First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
	30, 2004			PTSD $\geq 3$ PC-PTSD	OEF: 2.2% OIF: 4.8%	Elsewhere: 1.2%	
				<hr/> <u>PTSD <math>\geq 2</math> PC-PTSD</u> Deployed OEF vs. Elsewhere: <b>OR=2.5</b> (2.3, 2.8) Deployed OIF vs. Elsewhere: <b>OR=5.5</b> (5.2, 5.8) PTSD $\geq 2$ PC-PTSD adjusted for sex, marital status, service, component, and grade <u>PTSD <math>\geq 3</math> PC-PTS</u> Deployed OEF vs. Elsewhere: <b>OR=1.9</b> <sup>a</sup> Deployed OIF vs. Elsewhere: <b>OR=4.2</b> <sup>a</sup>			
Miliken et al. (2007) (34)	Cross sectional  PDHA and PDHRA  June 1, 2005-December 31, 2006	OIF veterans who completed PDHRA vs. PDHA with a median of 6 months between post-deployment assessments	$\geq 2$ or $\geq 3$ on PC-PTSD (SR)	PTSD $\geq 2$ PC-PTSD          PTSD $\geq 3$ PC-PTSD	PDHRA: OIF: 19.5% Active duty: 16.7% National Guard/Reserve: 24.5%  PDHRA: OIF: 11% Active duty: 9.1% National Guard/Reserve: 14.3%	PDHA: OIF: 12.1% Active duty: 11.8% National Guard/Reserve: 12.7%  PDHA: OIF: 6.3% Active duty: 6.2% National Guard/Reserve: 6.6%	Response rate: not reported          Excluded Marine personnel
				<hr/> <u>PTSD <math>\geq 2</math> PC-PTSD</u> PDHRA vs. PDHA: <b>OR=1.8</b> <sup>a</sup> PDHRA vs. PDHA (Active duty): <b>OR=1.5</b> <sup>a</sup> PDHRA vs. PDHA (National Guard/Reserve): <b>OR=2.2</b> <sup>a</sup> <u>PTSD <math>\geq 3</math> PC-PTSD</u> PDHRA vs. PDHA: <b>OR=1.8</b> <sup>a</sup> PDHRA vs. PDHA (Active duty): <b>OR=1.5</b> <sup>a</sup> PDHRA vs. PDHA (National Guard/Reserve): <b>OR=2.4</b> <sup>a</sup>			
Shen et al. (2009) (32)	Retrospective  PDHA  October 2002-December 2006	OEF/OIF veterans vs. OEF/OIF era veterans deployed elsewhere	$\geq 2$ on PC-PTSD (SR)	PTSD $\geq 2$ PC-PTSD	OEF 5%  OIF 10%	Elsewhere 3%	Response rate: not reported    Limited to Navy personnel

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
				PTSD $\geq 2$ on PC-PTSD Deployed OEF vs. Elsewhere: <b>OR=1.7</b> <sup>a</sup>  Deployed OIF vs. Elsewhere: <b>OR=3.6</b> <sup>a</sup>			Only those deployed to field mission were eligible to participate
Peterson et al. (2010) (43)	Retrospective  PDHA  June 1, 2005- December 31, 2007	OIF veterans vs. OIF era veterans deployed to Qatar	$\geq 2$ or $\geq 3$ on PC-PTSD (SR)	PTSD $\geq 2$ PC-PTSD  PTSD $\geq 3$ PC-PTSD  <u>PTSD <math>\geq 2</math> on PC-PTSD</u> Deployed vs. Elsewhere: <b>OR=5.9</b> (2.7, 13.6)  <u>PTSD <math>\geq 3</math> on PC-PTSD</u> Deployed vs. Elsewhere: <b>OR=5</b> (1.8, 16.1)	4.1%  2.1%	0.7%  0.4%	Response rate: not reported  Limited to Active duty Air Force members
Kline et al. (2010) (44)	Cross sectional  Survey (anonymous)  November 2007- May 2008	OIF veterans with one or more deployments vs. OIF veteran at pre-deployment with no previous deployments	Broad definition based on DSM-IV criteria alone  Strict definition based on DSM-IV criteria and $\geq 50$ on PCL (SR)	Broad Definition PTSD past month  Strict Definition PTSD past month  <u>Broad Definition PTSD past month</u> Deployed vs. Non-deployed: <b>OR=2.7</b> (2.1, 3.6) Adjusted for age, sex, race/ethnicity, education, marital status, and military deployment other than OEF/OIF <u>Strict Definition PTSD past month</u> Deployed vs. Non-deployed: <b>OR=3.7</b> (2.6, 5.2) Adjusted for age, sex, race/ethnicity, education, marital status, and military deployment other than OEF/OIF	21.1%  14%	9%  4.2%	Response rate: 85% (2,543/2,995)

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
Thomas et al. (2010) (35)	Cross sectional	OIF veterans 12 months after post-deployment (T2) vs. 3 months (T1)	Broad definition based on DSM-IV criteria alone	Broad Definition PTSD past month	Active duty 23.7% National Guard 30.5%	Active duty 20.7% National Guard 21.5%	Response rate: 62% (18,305/29,460)
	Survey (anonymous)			Strict definition based on DSM-IV criteria and ≥50 on PCL (SR)	Strict Definition PTSD past month	Active duty 16.6% National Guard 24.6%	
	Extension of Hoge et al. (2004)						
	2004-2007						
				<hr/> <u>Broad Definition PTSD past month</u> T2 vs. T1 (Active duty): <b>OR=1.3</b> T2 vs. T1 (National Guard): <b>OR=1.6</b> Broad definition PTSD past month adjusted for rank, marital status, and combat exposure <u>Strict Definition PTSD past month</u> T2 vs. T1 (Active duty): <b>OR=1.2</b> T2 vs. T1 (National Guard): <b>OR=1.9</b> Strict definition PTSD past month adjusted for rank, marital status, and combat exposure			
Polusny et al. (2011) (45)	Prospective	OIF veterans 2-3 months after post-deployment (T2) vs. one month before deployment (T1)	Broad definition based on DSM-IV criteria alone	Broad Definition PTSD past month	Not reported	16.7%	Response rate: T1 99% (516/522) T2 81.2% (424/522)
	Part of RINGS			Strict definition based on DSM-IV criteria and ≥50 on PCL (SR)	Strict Definition PTSD past month	13.8%	
	February 2006-September 2007						Follow-up limited to those without PTSD symptoms at pre-deployment
				<hr/> <u>Strict Definition PTSD past month</u> T2 vs. T1: <b>OR=4.2<sup>a</sup></b>			
Vanderploeg et al.	Cross sectional	OEF/OIF veterans vs. non-deployed	≥50 on PCL -C (SR) based on	Probable PTSD	6.9%	1.9%	Response rate: 41%

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
(2012) (30)	Web-based survey (anonymous)  2009-2010	OEF/OIF era veterans	DSM-IV criteria	Probable PTSD Deployed vs. Non-deployed: <b>OR=3.8<sup>a</sup></b>			(4,005/9,700)  Not all elements of survey validated  Limited to Active duty Florida National Guard members
<b>Somalia Mission - US</b>							
Litz et al. (1997) (36)	Cross sectional  Paper-pencil survey	Active duty military personnel 5 months after post-deployment to Somalia	≥68 on PCL (SR)  ≥92 on M-PTSD (SR)	PTSD  No comparison group	8%	Not studied	Issues with directionality
Bolton et al. (2003) (46)	Retrospective  Part of Litz et al. (2003)	Military personnel deployed to Somalia followed-up after 18 months of post-deployment	≥68 on PCL (SR)  ≥92 on M-PTSD (SR)	PTSD  No comparison group	9.4%	Not studied	Response rate: 53% (1,040/1,973)
Gray et al. (2004) (37)	Longitudinal  Telephone interview and postal survey  Part of Litz et al. (2003)	Military personnel deployed to Somalia at 15 weeks and 18 months after post-deployment	≥68 on PCL (SR)  ≥92 on M-PTSD (SR)	Overall PTSD  Acute Onset PTSD  Delayed Onset PTSD  No comparison group	13.3%  4.5%  6.5%	Not studied  Not studied  Not studied	Response rate: 53 (1,040/1,973)
<b>1990-1991 Gulf War - Australia</b>							
AGWVHS (2003) (39)	Cross sectional  Postal survey and medical assessment	PGW veterans vs. non-deployed PGW era veterans	≥50 on PCL-S (SR) based on DSM-IV criteria  CIDI (Clinical	Pre-deployment PTSD  Post-deployment PTSD  PTSD past month	1.3%  5.4%  7.9%	1.2%  1.4%  4.6%	Response rate 81% (1,456/1,808) in PGW veterans and 57%

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
	July 2000-April 2002		Interview) based on DSM-IV criteria	PTSD past 12 months	5.1%	1.7%	(1,588/2,796) in non-deployed PGW era veterans
				<u>Pre-deployment PTSD</u>			
				Deployed vs. Non-deployed: <b>OR=1.1<sup>a</sup></b>			
				<u>Post-deployment PTSD</u>			Analyses limited to males
				Deployed vs. Non-deployed: <b>OR=3.9</b> (2.3, 6.5)			
				<u>PTSD past month</u>			More than 85% of deployed and 70% of non-deployed veterans were Navy personnel
				Deployed vs. Non-deployed: <b>OR=2</b> (1.5, 2.9)			
				Post-deployment PTSD and PTSD in past month adjusted for service type, rank, age, education, and marital status			
				<u>PTSD past 12 months</u>			
				Deployed vs. Non-deployed: <b>OR=4.1</b> (2.4, 7.2) Adjusted for service type, rank, age, education, marital status, and pre-Gulf War PTSD			
Ikin et al. (2004) (38)	Cross sectional	PGW veterans vs. non-deployed PGW era veterans	CIDI (Clinical Interview) based on DSM-IV criteria	Pre-deployment PTSD	1.3%	1.2%	Response rate 81%
	Postal survey and health assessment			Post-deployment PTSD	5.4%	1.4%	(1,456/1,808) in PGW veterans and 57%
	Part of AGWVHS (2003)			PTSD past 12 months	5.1%	1.7%	(1,588/2,796) in non-deployed PGW era veterans
				<u>Pre-deployment PTSD</u>			
				Deployed vs. Non-deployed: <b>OR=1.1<sup>a</sup></b>			
				<u>Post-deployment PTSD</u>			
				Deployed vs. Non-deployed: <b>OR=3.9</b> (2.3, 6.5) Adjusted for service type, rank, age, education, and marital status			
				<u>PTSD past 12 months</u>			

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
							Deployed vs. Non-deployed: <b>OR=4.1</b> (2.4, 7.2) Adjusted for service type, rank, age, education, marital status, and pre-Gulf War PTSD
McKenzie et al. (2004) (40)	Cross sectional Postal survey  Extension of Ikin et al. (2004) and part of AGWVHS (2003)	PGW veterans vs. non-deployed PGW era veterans	≥50 on PCL-S (SR) based on DSM-IV	PTSD past month <u>PTSD past month</u>	7.9%	4.6%	Response rate 81% (1,456/1,808) in PGW veterans and 57% (1,588/2,796) in non-deployed PGW era veterans
<b>Afghanistan/Iraq War deployments - Australia</b>							
ADF MHPWS (2010) (6)	Cross sectional  Two phase design  April 23, 2010- January 31, 2011	Regular currently serving ADF members deployed to MEAO vs. non-deployed ADF members before 2010	≥50 on PCL-C (SR) based on ICD-10 diagnostic criteria  CIDI (CI) based on ICD-10 diagnostic criteria	PTSD past month  PTSD past 12 months <u>PTSD past month</u> <u>PTSD past 12 months</u>	All 3% 3% All 8.3% 8%	2.8%  8.8%	Response rate 49% (24,481/50,049)  Excluded trainees and reservists  Participants obtained from the MEAO Health Studies and the Health and Wellbeing Survey
MEAO Prospective Health Study	Prospective Self-administered	ADF members at pre-deployment vs. post-deployment	≥50 on PCL-C (SR)	PTSD past month	0.2%	2.2%	Response rate 61% (1,872/3,074) at

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
(2012) (5)	survey and health assessment  2010-2012			PTSD past month			pre-deployment and 71% (1,324/1,872) at post-deployment  Participants (n=93) excluded due to incompleteness  Limited to ADF members deployed to the MEAO after June 2010 and returned June 2012
MEAO Census Health Study (2012) (41)	Cross sectional  Postal or online survey  2010-2011	ADF members deployed to Afghanistan or Iraq vs. ADF members deployed elsewhere outside of Afghanistan or Iraq between 2001-2009	≥50 on PCL-C (SR)	PTSD past month	All 4.6%	Inside Afghanistan 4.4%  Inside Iraq 6%	Response rate 53% (14,032/26,239)  Outside Afghanistan 3.2%  Outside Iraq 2.5%
				PTSD past month			Inside vs. Outside Afghanistan: <b>OR=1.4<sup>a</sup></b>  Inside vs. Outside Iraq: <b>OR=2.5<sup>a</sup></b>
<b>Somalia mission - Australia</b>							
Hawthorne et al. (2013) (42)	Cross sectional  Telephone	Australian peacekeepers deployed to Somalia	≥50 on PCL-C (SR) based on DSM-IV criteria	Pre-deployment PTSD	1.4%	Not studied	Response rate 69% (1,025/1,484)

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comparison group prev. (%)	Comments
	interview or online survey	(n=215)	CIDI (Clinical Interview) based on ICD-10 diagnostic criteria	PTSD past month	27.8%	Not Studied	Excluded participants involved in other health studies
				PTSD past 12 months	18.6%	Not Studied	Issues with directionality
No comparison group							

<sup>a</sup> Tabulated measure of association (not reported by study)



## ***Suicide***

There was a total of 11 studies for the two countries (6 for Australia, 5 for the US) which met the criteria for inclusion. Of these, there were 4 studies of Gulf War veterans (2 for each country), 6 of veterans of the Afghanistan and Iraq conflicts (3 for each country), and 1 (Australian) of those deployed to the Somalia mission. (See Table 3). These studies are summarised below for each country stratified by conflict.

### ***United States***

Suicide rates among Gulf War veterans who served in the US Armed Forces were as low as 0.1-0.4%.<sup>(47, 48)</sup> No differences in suicide risk between deployed and non-deployed veterans were observed.<sup>(47, 48)</sup> However, Gulf War veterans were 30% less likely to commit suicide than the general US population.<sup>(47)</sup>

For OEF/OIF veterans, the suicide rate was 0.02%.<sup>(49)</sup> The risk of suicide was 1.2 times greater among deployed veterans compared to the general US population. This risk was significant for active duty personnel (1.3) but not significant for National Guard/Reserves (1.0).<sup>(49)</sup> Additionally, 12.5% of OEF/OIF veterans reported having suicidal thoughts.<sup>(50)</sup> Among OIF veterans, suicide ideation increased with time after post-deployment.<sup>(34)</sup> Lastly, OIF veterans who served in the Reserves or National Guard were 1.7 times at risk for thinking about suicide than those who were non-deployed at the time.<sup>(34)</sup>

### ***Australia***

Australian veterans deployed to the Gulf War and those non-deployed reported similar rates of intentional self-harm.<sup>(39)</sup> Furthermore, deployed Gulf War veterans had a 40% lower risk of death due to intentional self-harm than the general Australian population.<sup>(51)</sup>

ADF members deployed to Afghanistan or Iraq reported similar rates of planned or attempted suicides in the past year.<sup>(41)</sup> However, a greater proportion of veterans deployed to Iraq (6.7%) reported having suicidal thoughts than those deployed to Afghanistan (4.7%).<sup>(41)</sup> Veterans

deployed to Iraq were 40% more likely to have suicidal thoughts and their risk of planning suicide nearly doubled in comparison to those deployed outside of Iraq, while veterans deployed to Afghanistan were 17% less likely to think about suicide than those deployed outside of Afghanistan.(41) However, veterans deployed to Afghanistan/Iraq were 2.2 times more at risk of reporting suicidal thoughts at post-deployment than at pre-deployment.(5) Lastly, the prevalence of suicide attempts was low (0.4-0.6%) and did not significantly differ by deployment status.(6, 41) Furthermore, ADF members deployed to Afghanistan/Iraq were more at risk for thinking about or planning suicide but were less likely to attempt suicide than their non-deployed counterparts.

Australian peacekeepers deployed to Somalia had the highest rates of suicide ideation (12.6%) and planning (7%).(42) Moreover, the proportion of suicide attempts among the peacekeepers was greater than that of Australian forces sent to Afghanistan/Iraq.(6, 41, 42)

### ***Summary of key comparisons in relation to suicide and deployments***

No changes in suicide risk between deployed and non-deployed veterans of each country were noted. US Gulf War veterans had a 30% lower risk of suicide(47) and ADF members deployed to the Gulf War had a 40% lower risk of intentional self-harm when compared to their respective general population.(51)

There were no actual suicide rates provided for the Australian forces who had participated in the Afghanistan/Iraq conflicts, thus a comparison of suicide rates was not possible. Nevertheless it appears that US forces had higher rates of suicide ideation than Australian forces (12.5% vs. 1.6%).(5, 6, 41, 50)

There were no data for the US mission in Somalia, but the rate of suicidal ideation for the Australian peacekeepers was considerably higher than it was for the other conflicts.(42)

**Table 3 Suicide and suicidality in included studies**

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comp group prev. (%)	Comments
<b>1990-1991 Gulf War - US</b>							
Kang et al. (1996) (47)	Retrospective May 1, 1991-September 30, 1993 or date of death	GW veterans vs. non-deployed GW era veterans relative to general US population  Stratified random sample	ICD-9 codes: E950-E959	Suicide <u>Suicide</u> Deployed vs. Non-deployed: <b>RR=0.94</b> (0.8, 1.1) Adjusted for age, race, sex, branch of service, and type of unit Deployed vs. US population: <b>SMR=0.7</b> (0.6, 0.8) Non-deployed vs. US population: <b>SMR=0.7</b> (0.7, 0.8) Deployed and Non-deployed vs. US population adjusted for age, sex, race and calendar year of death	Deployed 0.04%	Non-deployed 0.04%	Cause of death know for ~93% of both study groups  Accidental deaths accounted for most of increase in mortality among PGW veterans
Kang et al. (2001) (48)	Extension of Kang et al. (1996) May 1, 1991-December 31, 1997 or date of death	GW veterans vs. non-deployed GW-era veterans relative to general US population	ICD-9 codes: E950-E959	Suicide          <u>Overall suicide RR not reported</u> Suicide specific SMRs in comparison with the general US population not reported	Deployed 0.1%	Non-deployed 0.1%	Cause of death know for ~ 93% of both study groups  Motor vehicle accidents decreased steadily over time
<b>Afghanistan/Iraq War deployments - US</b>							
Milliken et al. (2007) (34)	Cross sectional PDHA and PDHRA June 1, 2005-December 31, 2006	OIF veterans who completed PDHRA vs. PDHA with a median of 6 months between post-deployment	PHQ-2 (SR)	Suicide Ideation       <u>Suicide Ideation</u> PDHRA vs. PDHA: <b>OR=0.87</b> <sup>a</sup> PDHRA vs. PDHA (Active duty): <b>OR=0.54</b> <sup>a</sup> PDHRA vs. PDHA (National Guard/Reserve): <b>OR=1.7</b> <sup>a</sup>	PDHRA: OIF: 1.1% Active duty: 0.6% National Guard/Reserve: 1.5%	PDHA: OIF: 0.9% Active duty: 1.2% National Guard/Reserve: 0.9%	Response rate: not reported Excluded Marine personnel

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comp group prev. (%)	Comments
Kang et al. (2008) (49)	Retrospective October 2001- December 2005	OEF/OIF veterans vs. general US population	National Death Index based on ICD-9 codes: E950-E959	Suicide	OEF/OIF 0.02% Active duty: 0.03% National Guard: 0.02% Reserve: 0.02% Army: 0.02% Navy: 0.03% Marines: 0.02% Air Force: 0.02%	Not reported	Most common methods of suicide were by firearm (73%) and hanging (21%)
				<p><u>Suicide</u>  Deployed vs. US population: <b>SMR=1.2</b> (1,1.7)  Deployed vs. US population (Active duty): <b>SMR=1.3</b> (1, 1.7)  Deployed vs. US population (National Guard): <b>SMR=1</b> (0.7, 1.4)  Deployed vs. US population (Reserve): <b>SMR=1.1</b> (0.8, 1.5)  Deployed vs. US population (Army): <b>SMR=1.2</b> (1, 1.5)  Deployed vs. US population (Navy): <b>SMR=1.1</b> (0.6, 1.7)  Deployed vs. US population (Marines): <b>SMR=1.3</b> (0.9, 2)  Deployed vs. US population (Air Force): <b>SMR=1</b> (0.7, 1.4)  All standardized for age, sex, race, and calendar year of death</p>			
Pietrzak et al. (2010) (50)	Cross sectional Postal survey (anonymous) Connecticut OEF/OIF Veterans Needs Assessment Survey January 2003- March 2007	OEF/OIF veterans since 2003 from Connecticut	PHQ-9 (SR)	Suicide Ideation  No comparison group	12.5%	Not studied	Response rate: 26% (272/1,050)

**1990-91 Gulf War – Australia**

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comp group prev. (%)	Comments
AGWVHS (2003) (39)	Mortality Cohort  Matched pair  January 1, 1991 - December 31, 2000	PGW veterans vs. non-deployed PGW era veterans	ICD-9 codes: E950-E959  ICD-10 codes: V01-Y89	All External Causes	External 50%	External 65%	Limited to males  Small sample size (n<25) in both groups
				Unable to calculate intentional self-harm SMR due to small sample size			
AGWVHSFU (51)	Follow-up to AGWVHS (2003)  October 19, 2011- August 2012	PGW veterans vs. non-deployed PGW era veteran relative to the general Australian male population	Unknown	Intentional Self-harm	Unknown	Unknown	Limited to males
				<u>Intentional Self-Harm</u> Deployed vs. Non-deployed: <b>Adjusted HR=1.1</b> (0.4, 3.2) Deployed vs. Australian population: <b>SMR=0.6</b> (0.3, 1.3) Non-deployed vs. Australian population: <b>SMR=0.6</b> (0.3, 1.1)			
<b>Afghanistan/Iraq War deployments - Australia</b>							
MEAO Prospective Health Study (2012) (5)	Prospective  Self-administered survey and health assessment  2010-2012	ADF members at post-deployment vs. pre-deployment	Adapted from PATH Through Life Project (SR)	Suicide ideation	1.6%	0.7%	Response rate: Pre-deployment 61% (1,872/3,074) Post-deployment 71% (1,324/1,872)  Limited to ADF members deployed to the MEAO after June 2010 and returned June 2012
				<u>Suicide ideation</u> Post-deployment vs. Pre-deployment: <b>RR=2.2</b> <sup>α</sup>			
MEAO Census Health Study	Cross sectional	ADF members deployed to	SR	Suicidal ideation past 12 months	All 5.5% Inside	Outside Afghan-	Response rate: 53% (14,032/26,239)

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comp group prev. (%)	Comments
(2012) (41)	Postal or online survey  2010-2011	Afghanistan or Iraq vs. ADF members deployed elsewhere outside of Afghanistan or Iraq between 2001-2009			Afghan-istan 4.7%	istan 5.6%	Includes regulars, reserves, and ex-serving ADF members
					Inside Iraq 6.7%	Outside Iraq 4.8%	
				Suicide plans past 12 months	All 1.4%		
					Inside Afghan-istan 1.5%	Outside Afghan-istan 1.4%	
					Inside Iraq 1.7%	Outside Iraq 0.9%	
				Suicide attempts past 12 months	All 0.4%		
					Inside Afghan-istan 0.5%	Outside Afghan-istan 0.6%	
					Inside Iraq 0.5%	Outside Iraq 0.5%	
					0.4%		
				<u>Suicidal ideation past 12 months</u> Inside vs. Outside Afghanistan: <b>OR=0.83</b> <sup>α</sup> Inside vs. Outside Iraq: <b>OR=1.4</b> <sup>α</sup> <u>Suicide plans past 12 months</u> Inside vs. Outside Afghanistan: <b>OR=1.1</b> <sup>α</sup> Inside vs. Outside Iraq: <b>OR=1.9</b> <sup>α</sup> <u>Suicide attempts past 12 months</u> Inside vs. Outside Afghanistan: <b>OR=0.86</b> <sup>α</sup> Inside vs. Outside Iraq: <b>OR=0.82</b> <sup>α</sup>			
ADF MHPWS (2010) (6)	Cross sectional Two phase design Part of MEAO Health Studies and	Regular currently serving ADF members deployed to	SR	Suicidal ideation past 12 months	All 3.9% Deployed 3.8%	Non-deployed 4.1%	Response rate: 49% (24,481/50,049)
				Suicide plans	All 1.1%		Excluded trainees

First author (Year)	Study design and period	Sample description	Case definition and measure	Outcome	Prev. (%)	Comp group prev. (%)	Comments
	Health and Wellbeing Survey April 23, 2010-January 31, 2011	MEAO vs. non-deployed ADF members before 2010		past 12 months	Deployed 1.1%	Non-deployed 1.1%	and reservists
				Suicide attempts past 12 months	All 0.4%		
					Deployed 0.4%	Non-deployed 0.5%	
<hr/>							
				<u>Suicidal ideation past 12 months</u>			
				Deployed vs. Non-deployed: <b>OR=0.93<sup>a</sup></b>			
				<u>Suicide plans past 12 months</u>			
				Deployed vs. Non-deployed: <b>OR=0.97<sup>a</sup></b>			
				<u>Suicide attempts past 12 months</u> Deployed vs. Non-deployed: <b>OR=0.75<sup>a</sup></b>			
<hr/>							
<b>Somalia deployment - Australia</b>							
Hawthorne et al. (2013) (42)	Cross sectional	Australian peacekeepers deployed to Somalia (n=215) between 1992-1996	CIDI (Clinical Interview) based on ICD-10 diagnostic criteria	Suicidal ideation	12.6%	Not studied	Response rate: 69% (1,025/1,484)
	Telephone interview or online survey			Suicide plans	7%	Not studied	
	(1989-2002)			Suicide attempts	0.9%	Not studied	Excluded participants involved in other health studies
				<hr/>			
				No comparison group			
							Suicidality was not assessed through a self-report measure but as part of CIDI interview

<sup>a</sup> Tabulated measure of association (not reported by study)

## ***Social isolation/connectedness***

A database search using PubMed was conducted for all peer-review articles published between 1990 and 2015. Free-text and MeSH including “social isolation” and “Gulf War”, “Somalia”, “Afghan Campaign 2011 -” or “Iraq War, 2003 2011 -” were used to narrow and identify potential abstracts for review. A total of 60 hits were obtained, of which, 2 remained after restricting the inquiry to only reviews, systematic reviews, and meta-analyses. All 60 hits were scanned for relevance and only two remained. However, upon examining the abstracts, we determined that both studies were ineligible based on our inclusion/exclusion criteria. Studies were included if they were population-based and were conducted among veterans deployed to the Gulf War (1990-1991), Somalia, Afghanistan (2001- ), or the Iraq War (2003-2011). In addition, each study had to have a military comparison group from the same era but who were either non-deployed or deployed elsewhere. We also considered studies that compared veterans before and after deployment or at different time periods after returning from deployment.

We found no studies that compared social isolation prevalence or risk among deployed and non-deployed veteran groups for the specific war eras in question. This may be attributed to the ambiguity in the meaning and the use of the term “social isolation”. For example, when conducting the literature review we noted the use of other terms to describe social isolation such as: social withdrawal, estrangement, social exclusion, and social disconnectedness. Most often studies used variables such as homelessness and unemployment as proxies for social isolation; however, temporality and causality should be considered when attempting to define and measure social isolation. For example, homelessness may remove social bonds that previously existed, thus causing the person to feel isolated or removed; however, social isolation may also contribute to a person becoming homeless. Moreover, there is no uniformity in defining, assessing, and quantifying social isolation in the context of military personnel in the current literature. Clear and concise definitions and standard assessment tools for social isolation are needed for future research. Lastly, most of the studies were administered in a clinical setting, in which only certain groups of treatment seeking veterans with specific outcomes were targeted, irrespective of deployment location. In summary, we were unable to assess the health outcome, social isolation, as it relates to this project for any of the deployments for either country.



## ***Multisymptom illness***

We searched the available literature for Australian and US studies of multisymptom illness published between January 1990 and June 2014. The databases searched were MEDLINE, MEDLINE-in-process, PILOTS, PsychINFO, Cochrane Reviews and Embase. Additional sources searched were the System for Information on Grey Literature in Europe (SIGLE); the US, UK and Australian Department of Veterans' Affairs (DVA) and Defence Forces' websites. The search terms used were based on the free-text and MeSH of the condition of interest and the area of operation.

Studies were included if they were original research conducted among veterans deployed to the 1990-1991 Gulf War, Afghanistan (2001- ) or Iraq War (2003-2011) or Somalia. Each included study needed to have a military comparison group, either deployed on a different operation to the one under investigation or not deployed. In addition, studies also needed to have reported multisymptom illness based on the Centers for Disease Control and Prevention (CDC) case definition developed by Fukuda et al. (1998)(52) referred to as the CDC definition, or its variants, with sufficient information to calculate a relative measure of multisymptom illness prevalence (e.g. odds ratios) compared to the military comparison group. We used the CDC definition of multisymptom illness(52) because it represented an internationally accepted definition of multisystem symptom reporting and was commonly available during the period of the review. Variants of the definition were accepted only if they represented multi-systems of the body and were similar in structure to the CDC definition.

## **Results**

We identified six studies of veterans from the Gulf War (five from the US and one from Australia). No studies of Iraq or Afghanistan veterans were identified and none of veterans of the conflict in Somalia. Hence the rest of this section is based on Gulf War veterans alone.

Table 4 shows that all studies were cross-sectional and the methods of data collection used were similar across studies except that some studies used postal questionnaires while others complemented this through telephone interviews.

### ***United States***

The prevalence of multisymptom illness in US Gulf War veterans ranged from 28.9% to 65.3% and the prevalence in the comparison groups ranged from 11.7% to 32.6%, and the risk of multisymptom illness in US Gulf War veterans ranged from an increased odds of twice to just over four times (OR 4.69, 95% CI 4.00- 5.51 for combined mild to moderate/severe)(52) as likely in Gulf War veterans compared with military comparison groups.

The study groups were fairly similar with the exception of the study by Fukuda et al. which was conducted among Air Force personnel only, while the study population in the other US studies included a range of service branches. The definition of multisymptom illness used in most of the studies included was close to the CDC definition. Kang *et. al.* (2009)(22) used modifications of the CDC-definition, and the definition was not described precisely (although the researchers tried to contact the study authors for more detail, but did not obtain a response).

### ***Australia***

The prevalence of multisymptom illness in Australian Gulf War veterans was 25.6% and the odds of multisymptom illness were almost twice that in the comparison group.(38) In the Australian study naval personnel predominated (around 85% but the study population did include Army and Air Force personnel). The multisymptom illness definition was based on the CDC definition but their symptom groupings were derived from factor analysis empirically derived in Australian Gulf War veterans.

### ***Summary of key comparisons in relation to multisymptom illness and deployment***

The prevalence of multisymptom illness in Australian Gulf War veterans was the lowest and the odds ratio was the lowest in the studies overall.

Further comparisons are limited due to only one study being available for Australian 1990-1991 Gulf War veterans and no studies being available through this project for Afghanistan or Iraq War veterans. This demonstrates that multisymptom illness was of primary interest in relation to the 1990-1991 Gulf War deployment.

**Table 4 Multisymptom illness in included studies**

Study (year)	Study design and period	Sample description	Case definition and measure	Prevalence (%)	Comp group prev. (%)	OR (CI 95%)	Comments
Fukuda (1998)(52)	Second phase of a longitudinal study, 1995	Currently serving (at the time of the study) US Air Force personnel stationed at the Lebanon (US) or Pennsylvania (US) Air NG, and US Air Force reserve and active duty personnel stationed in Florida. Combined, 1163 GWV and 2560 non-GWV.	CDC definition	(overall) 45	15	No combined estimate reported Mild-Mod: 4.08 (3.39-4.93) Severe: 16.18 (8.99-29.14)	Participation rate: overall 61%. Non-response bias: demographic characteristics similar between participants and non-responders.
						Adjustment variables not listed	
Proctor (2001)(53)	Third phase of a longitudinal study, 1994-1996	Stratified random sample of GWV whose return-interview was conducted at Ft Devens (Massachusetts, US) (N=180). Comparison group consisted of personal deployed to Germany during the Gulf War (N=46).	CDC-derived definition	65.3	32.6	2.4 (1.1-5.3)	Participation: GWV 62% & non-GWV 51%. Non-response bias assessed only among GWV; participants differed from non-participants on sex, race/ethnicity, education, age, symptomatology as reported Phase-1 study. Other factors similar (drug use/alcohol, service status, employment, marital).(24)
						OR was adjusted for participation bias, age and psychiatric caseness	
Steele (2000)(25)	Cross-sectional telephone interview, 1998	Stratified random sample of US GWV residing in Kansas (N=1548) and non-deployed comparison group (N=482).	CDC-derived definition	47.2	19.8	3.26 (2.48-4.28)	Participation rates: GWV 93% & non-GWV 88%. Participation was significantly higher among females than males.
						OR was adjusted for age, gender, rank, service branch, component, income and education level	
Kelsall (2009)(54)	Cross-sectional postal survey, 2000-2002 (Males only)	Australian male GWV (N=1381) and random sample of non-deployed male veterans (N=1377).	CDC-modified definition	25.6	16.0	1.80 (1.48-2.19)	Participation rates: GWV 81% and non-GWV 57%. Non-response bias: participants were more likely to be older and of higher rank than non-participants. Participation of Air Force personnel was
						OR was adjusted for age, service branch, rank, marital status and highest level of education	

Study (year)	Study design and period	Sample description	Case definition and measure	Prevalence (%)	Comp group prev. (%)	OR (CI 95%)	Comments
Blanchard (2006) (55)	Cross-sectional face-to-face interviews and medical examination, 2001	Random sample of US GWV (N=1035) and non-deployed personnel (N=1116) who participated in a Department of Defence study in 1995-1996.	CDC-derived definition	28.9	15.8	2.16 (1.61-2.90)	higher among non-GWV than GWV. Participation rates: GWV 53% & non-GWV 39%. Non-response bias: participants were more likely to be female, older, white, reservists and in a previous study were more likely to have reported more symptoms and illnesses than non-participants.
Kang (2009)(22)	Longitudinal postal and telephone interview, 2003-2005	Stratified random sample from previous study of US GWV (Navy, Army, Air Force, Marines; N=6111) and non-deployed Gulf Era personnel frequency matched on gender, service branch and status (N=3859).	Presence of several different symptoms together that persisted for 6 months or more and could not be adequately explained through medical or psychiatric diagnoses	36.5	11.7	3.05 (2.77-3.36)	Participation rates: GWV 40% and non-GWV 27%. Non-response bias: non-responders were more likely to be younger, single, non-white or enlisted rank in 1991 than participants. Definition of multisymptom illness adopted in the study was not clearly stated.

## ***Traumatic brain injury***

There were 20 studies that reported TBI prevalence in the included military populations (3 Australia, 17 US). Of these, 1 related to Gulf War veterans (Australia), 19 to the Afghanistan/Iraq conflicts (2 from Australia, 17 from the US); no studies were identified for the Somalia missions (See Table 5). Taking into account methodological differences between the studies in terms of TBI definitions and measurement, sampling, and response rates, we provide a brief summary of the findings below.

### ***United States***

Overall prevalence of TBI for personnel deployed to Iraq or Afghanistan for any TBI ranged between 2.8%(56) and 29%(57, 58) in US deployed personnel. Prevalence of TBI in US study populations that were not from a sub-population (eg, those with TBI and irritability), ranged from 12.7(59) to 21.6%(60) Incidence rates for TBI in Iraq and Afghanistan deployed personnel ranged from 7.6%(61) to 13.9%(62) in US personnel, with overall TBI hospitalisation rates 0.31% and 0.14% for Iraq and Afghanistan respectively.(63)

One US study considered reservist status, and found that 21.5% Reservists screened positive for TBI, which was at the upper end of prevalence estimates for studies that used a screening measure to assess TBI.

Prevalence in US VA-only populations do not appear to be significantly higher than populations that were not specifically drawn from VA clinics. Two of the VA population studies used ICD-9-CM codes, reflecting rates in those who have been diagnosed by a health professional with a TBI and not only those who screened positive, and generally these were lower than screening numbers.

### ***Australia***

There was only one Australian study in Gulf War personnel. The Australian data indicates that 20 years after the Gulf War, veterans had higher odds of concussion symptoms in the past 3 years than a military comparison group, indicating that this group may still be at elevated risk twenty years after deployment, although a limitation was that further questions were not asked about whether the symptoms related to deployment in either study group.

Overall prevalence for any TBI in Australian personnel deployed to Iraq or Afghanistan was approximately 10%.(5) while incidence rates ranged from 1.8%(41) to 9.3%.(5)

### ***Summary of key comparisons in relation to traumatic brain injury and deployment***

The summary of identified literature indicated that in Australian and US populations, there was a wide range in TBI prevalence, but overall a relatively high prevalence of TBI in deployed military populations. Mild TBIs generally accounted for the majority of these high rates, with hospitalisations (indicative of more severe TBIs) being much lower. Deployed personnel were at risk for developing a new deployment-related TBI, as indicated by their incidence rates. Deployed personnel were at greater risk of incident TBI than non-deployed personnel. However, non-deployed personnel had a higher overall prevalence compared with deployed personnel.(5, 61) This highlights the importance of pre-deployment TBIs, which may have been a factor in the reasons for not deploying.

The prevalence of TBI in Australian personnel deployed to Afghanistan/Iraq War seemed to be slightly lower and at the lower end of the range of prevalence of TBI in studies of US personnel. This could be for a number of reasons. For example, the broad screening studies that were conducted through the VA in the US may have screened positive a relatively high number of TBI cases based on criteria used, with lower TBI rates confirmed when evaluated more comprehensively,(60) indicating that the screening identified false positives. In their duties Australian personnel may have encountered fewer combat exposures of relevance to TBI. Whilst the prevalence estimated through the Australian MEAO Prospective Study (5) was broadly similar to those in US data, the prevalence in the Census study was much lower (41). The prevalence may have been lower because participation in the Census Study was lower amongst younger male personnel who may be at higher risk, included ex-serving and Reserve personnel.

The definitions of TBI contributed to the wide range of prevalence and incidence reported. Several studies used screening questions to detect probable TBI, which tend to overestimate prevalence. There appeared to be more variability in the studies using screening tools, while those diagnosed with ICD-9-CM codes were generally at the low end of the range overall. As noted by Hendricks, only approximately 50% of those who screened positive had a TBI confirmed by an evaluator.(60) Screening instruments tended to detect greater numbers of cases, than those cases that were confirmed with a TBI, or have a TBI related hospitalisation. TBI screening prevalence varied by a several risk factors, including demographics, combat exposures and the screening tool.

Females generally reported less than half the prevalence of TBI than their male counterparts.(60, 64) This could be due to the reduced female participation in combat roles. Two studies drawn from the same population, when not restricted to those who had combat exposures, found total TBI was reported as 2.8%,(56) while the other study restricted to those who had combat exposures, found TBI reported as 9.3%;(65) this increase indicated that combat exposures increase the risk of TBI.

**Table 5 Traumatic brain injury (TBI) in included studies**

Author (year)	Study design and period	Sample Description	Case definition and measure	Outcome	Prevalence (%)	Comments	
<b>Afghanistan/Iraq War deployments - US</b>							
Vasterling (2006) (66)	Prospective cohort study. Participants assessed at T1 (2003) and upon return from deployment to Iraq at T2 (2005). 2003-2005	Active duty Army members serving between April 2003 and June 2005. N=1368 (94% participation rate at T1, 75% (N=1028) retention rate at T2).	T1: head injury data collected by questionnaire and interview. Any new incidents at T2 were collected via review of available service and medical records.	Reported prior head injury with LOC >15min	Deployed 5.4%	Non-deployed 7.3%	
				Head injury with related LOC between T1 and T2	7.6%	3.9%	
Hoge (2008) (67)	Cross-sectional study 3-4 months after a year-long deployment in Iraq. 2006.	Two US Army combat infantry brigades (one active and one reserve). N=2714 (59% response rate).	TBI: following a question about injuries involving the head, 3 questions regarding losing consciousness, being dazed, confused or seeing stars and not remembering the injury. A positive response was considered a mild TBI.	Injury with LOC Injury with altered mental status 40 (1.5%) reported having had a head injury without LOC or altered mental state.	Overall Overall	124 (4.9%) 260 (10.3%)	Prevalence rates not reported for active and reserves separately.
RAND Report: Invisible Wounds of War (2008) (68)	Cross-sectional study. August 2007-January 2008	Representative sample of veterans who had previously deployed as part of OEF/OIF. N=1965.	The Brief TBI Screen (BTBIS) screen for probable TBI. Current symptoms not required. Depression (PHQ-8) and PTSD (PCL-M) included as comorbidities	Probable TBI Probable TBI only (no comorbidities) Results weighted to reflect representation of the US Defense Force. Higher risk in Army and Marine Corps, males and enlisted members. Age and length of deployment were also important factors. Time since last deployment ranged from 0-5 years.	Weighted: 19.5% Weighted: 12.2%		
Wojcik (2010) (63)	Retrospective database and registry study. 2001-2007	Personnel deployed to Iraq (N=422,474) or Afghanistan (N=145,505). September 11, 2001 - September 20, 2007.	TBI-related hospitalisations: TBI episodes were identified by ICD-9-CM diagnosis codes, the first 8 diagnoses from each	Iraq	Overall	0.31%	Data on TBI severity was not available for the whole population.
				Most severe TBI-related hospitalisation		1238 (46.5%)	
				Moderately severe TBI-related hospitalisation		1407 (52.9%)	
				Least severe TBI-		125 (4.7%)	

Author (year)	Study design and period	Sample Description	Case definition and measure	Outcome	Prevalence (%)	Comments
			admission were checked for a TBI diagnosis. These were categorised into three grades of severity.	related hospitalization		
				Afghanistan	Overall	0.14%
				Most severe TBI-related hospitalisation		86 (36.2%)
				Moderately severe TBI-related hospitalisation		151 (63.7%)
				Least severe TBI-related hospitalisation		8 (3.4%)
				Males accounted for 97% of TBI-related hospitalisations. Enlisted personnel had increased risk for TBI hospitalisation compared with Officers. NG and Reservists had lower risk than active duty.		
Adams (2012) (62)	Department of Defense Health Related Behaviors Among Active Duty Military Personnel Survey. Population-based survey. 2008	All survey respondents who reported returning from a combat deployment in past 12months with complete data. N=7155.	Self-reported combat-acquired TBI during the last deployment. Three categories were established; Altered consciousness (TBI-AC), LOC less than 1 minute (TBI-LOC <1) and LOC greater than 1 minute (TBI-LOC 1+).	Overall TBI		13.9%
				TBI-AC	Overall	423 (7.5%)
				TBI-LOC<1	Overall	186 (3.5%)
				TBI-LOC 1+	Overall	149 (2.8%)
				Almost 15% of male personnel, and 4.9% of female personnel, reported a TBI.		
Elbogen (2012) (69)	The National Post-Deployment Adjustment Survey (NPDAS). 2001-2009	Random selection of veterans who served in US military on or after September 11, 2001 and had separated from active duty or served in NG/Reserves. Women were oversampled. N=1388 (56% response rate)	TBI: reported a past head injury and endorsed one of; LOC, post-trauma amnesia, being dazed or seeing stars immediately after injury or upon regaining consciousness, skull fracture or brain surgery.	Probable TBI without increased irritability	Weighted N=163	Weighted prevalence =14.8%
				Probable TBI with increased irritability	Weighted N=91	Weighted prevalence =8.2%
				Data were weighted to reflect the gender distribution in the military, a weight-adjusted sample of N=1102.		
Macera	The Post-	All male Navy/Marine	TBI: yes/no questions	TBI only		473 (3.9%)



Author (year)	Study design and period	Sample Description	Case definition and measure	Outcome	Prevalence (%)	Comments
(2012) (65)	Deployment Health Assessment (PDHA) and Reassessment (PDHRA). 2008-2009.	Corps PDHA and PDHRA forms completed during 2008-2009 and endorsed at least one of three combat experiences (encountering dead or wounded people, engaging in direct combat and discharging weapon or feeling in great danger of being killed). N=12,046	regarding experiencing a blast/explosion, vehicular accidents, fragment or bullet wound above the shoulders or other injuries to the head. If endorsed, further questions regarding LOC, feeling dazed/confused or not remembering the event. Positive screen if they sustained a head injury and endorsed at least one of the three alteration/LOC items. This was a modification of the Brief TBI Screen. Primary care PTSD screen.	TBI and PTSD	644 (9.3%)	
Maguen (2012)(57) and Maguen (2012) (58)	Retrospective cohort study. 2007-2010.	OEF/OIF veterans who received a TBI screen April 1, 2007 – January 8, 2010. N=1082.	Modified Brief TBI Screen.	One TBI mechanism Two or more TBI mechanisms Those who reported at least one TBI mechanism were more likely to be younger, male, in the Army, enlisted rank and deployed multiple times.	14% 29%	
Quigley (2012) (70)	Prospective cohort study	Army NG and Reserve personnel from two units. Pre-deployment and post-deployment assessments. N=508 (66.8% of original cohort)	Modified Brief TBI Screen.	Post-deployment TBI	103 (21.5%)	Rate includes both NG and Reserves.
Hendricks (2013) (60)	Observational cohort study Veterans Health Administration (VHA).	All individuals screened for TBI in the VHA between October 1, 2007 - March 31, 2009. N=208,589.	VA clinical evaluators' judgment that a patient's history and clinical course were consistent with a diagnosis of TBI.	Probable TBI overall Probable TBI Males Probable TBI Females Of 24,461 patients who received a comprehensive TBI evaluation Confirmed TBI	44,781 (21.6%) 23.1% 10.7% 11,961 (48.9%)	5.8% of total screened population in study period had a positive screen and a potential TBI

Author (year)	Study design and period	Sample Description	Case definition and measure	Outcome	Prevalence (%)	Comments
	2007-2009.			Uncertain TBI Those with a probable TBI were more likely to be male, enlisted, younger, less education, less than 8 years military service and in Army or Marines.	(11.5%)	confirmed through the CTBIE (does not include those who had a TBI confirmed at a later date).
Iverson (2013) (64)	National cross-sectional survey 2009-2010.	Drawn from VA's Environmental Epidemiology Service's roster of veterans. Both VA and non-VA users who had deployed to OEF/OIF and were separated. Females oversampled. September 2009 – October 2010. N=2348 (48.6% response rate)	Modified TBI screen; three screening questions. Screened positive if one deployment-related head injury was accompanied by alteration or LOC.	Probable TBI Male  Probable TBI Female	198 (19.7%)  119 (10.7%)	
Kontos (2013) (59)	Cross-sectional population based survey. 2009-2011.	USA Special Operations Command (USASOC) personnel without a pathological history. November 2009 – December 2011. N=22,203 (81.7% response rate).	Mild TBI: Glasgow Coma Scale (GCS) score of 13-15 and no associated pathology.	Mild TBI Comparison of 0, 1, 2 and 3+ diagnosed blast mTBI supported a dose-response gradient for reported mTBI symptoms.	Overall 2813 (12.7%)	
Macera (2013) (56)	The Post-Deployment Health Assessment (PDHA) and Reassessment (PDHRA).	Male Navy and Marine Corps personnel post OEF/OIF deployment and who completed a PDHA and PDHRA 3-6months after deployment. N=29,640.	Modified Brief TBI Screen	TBI	825 (2.8%)	

Author (year)	Study design and period	Sample Description	Case definition and measure	Outcome	Prevalence (%)	Comments
	2008-2009. Drawn from the same study as Macera 2012.(65)					
<b>Afghanistan/Iraq War deployments – US VA populations</b>						
Taylor (2012) (71)	Observational study. US VHA Quality Enhancement Research Initiative. 2009 fiscal year.	All OEF/OIF patients who used VHA inpatient or outpatient care in fiscal year 2009. (October 1, 2008 – September 30, 2009). N=327,388.	ICD-9-CM coded TBI	TBI Patients with a TBI diagnosis were male, slightly younger and slightly less likely to be a new user of VA services that year.	6.7%	
Cifu (2013) (72)	Cross-sectional population based retrospective study. Fiscal years 2009/2010/2011	All veterans who received any VHA inpatient or outpatient care.	Any TBI related ICD-P-CM code received at any time in their treatment, ranging from mild to severe.	TBI 2009 2010 2011 Pooled 2009-11 Only 0.8% of all 613,391 veterans received a diagnosis of isolated TBI (unaccompanied by either pain or PTSD).	6.7% 6.8% 6.5% 9.6%	
Evans (2013) (73)	National retrospective cohort study. 2007 – 2008.	OEF/OIF veterans who used VA services and had been active between September 11, 2001 and September 30, 2008. N=170,681.	Modified Brief TBI Screen.	TBI	32,080 (20.5%)	Overall 91.6% or 156,415 of veterans eligible to receive the TBI screen were screened.
<b>Afghanistan/Iraq War deployments - Australia</b>						
MEAO Census Study (2012) (41)	Retrospective self-reported survey. 2010-2011.	Active duty Australian personnel deployed to Iraq or Afghanistan between 2001-2009. N=14,032 (53% response rate).	Self-reported Head injury/ concussion on deployment.	Head injury/ Concussion Lifetime mTBI was reported by more than 10% of participants.	200 (1.8%)	
MEAO Prospective Study	Prospective cohort study. 2010-2012.	Members of ADF from 13 units and a ship who deployed to the MEAO	Pre- and post-deployment self-report questionnaire data. mTBI referred to an	Pre-deployment lifetime mTBI Post-deployment new	Overall Overall	23.3% 9.3% Respondents on a combat role in Afghanistan or who

Author (year)	Study design and period	Sample Description	Case definition and measure	Outcome	Prevalence (%)	Comments
(2012) (5)		after June 2010 and returned by June 2012. N=1295.	event in which the head was physically injured, and was characterised by the immediate symptoms of LOC, altered mental status, and/or post-traumatic amnesia	mTBI Pre-deployment mTBI and post-deployment new mTBI	3.6%	worked outside the main support base were significantly more likely to report a new mTBI at post-deployment, compared to those in non-combat roles outside Afghanistan
<b>1990-91 Gulf War – Australia</b>						
Australian Gulf War Veterans' Follow-up Health Study (2011-2012) (51)	Longitudinal follow-up study. 2011-2012.	Australian Gulf War veterans (N=715) and a non-deployed comparison group (N=675).	Respondents were asked to report whether any injuries received in the past three years involved being dazed, confused or seeing stars; not remembering the injury; or losing consciousness (knocked out).	Dazed/Confused Knocked Out Not remembering injury	Gulf War 8.6% 3.1% 2.3%	Comparison Group 6.3% 1.9% 1.4%
				Gulf War veterans were statistically significantly more likely than the comparison group to report at least one of the three concussion-related consequences of injury (11% vs 7%; p=0.013).		

# 6 US and Australian health care systems in relation to veterans' health

## Objectives

To further investigate the health outcomes of veterans of the selected deployments, the objective of this section was to identify differences in the US and Australian health systems as they relate to veterans' health indicators over the period of the four deployments to the Gulf War, Somalia, Afghanistan and the Iraq War to the present. Specifically, we aimed to describe the extent of services and health care available for serving Defence Force members and veterans in each country, including any major changes from the earliest to the most recent deployment identified in the deployment analysis. We also aimed to identify important gaps in the research. It is important to recognise that multiple factors impact on health outcomes, not only health care systems and services, including social, economic and personal factors.

## Methodology

Important and relevant aspects and developments of the US and Australian health care systems were investigated for factors pertinent to the health and social indicator outcomes but also for significant comparative differences between the US and Australian health systems and health care available to their respective veterans.

The major milestones and developments in the respective health care systems were searched for via Government documents and websites, DVA annual reports, factsheets, websites, Medicare documents and websites. The VA website was the main source of information concerning the US VA health care system. Other sources included the official Medicare, Medicaid, and Tricare federal websites. A PubMed database search using free-text and MeSH including "veterans" and "health care reform" was used to obtain additional peer-reviewed studies that were published since 1990.

The health services considered for inclusion in this review comprised hospital, medical, psychological, paramedical (such as physiotherapy), rehabilitation, counselling, social, family and community based services (if available and relevant); available to those remaining in military services and for those who have left military service following deployment. This also included non-veteran-specific health care services available to Australian and US current and former members, where relevant (e.g. that Australian veterans can access Medicare for non-service related

conditions). We quantified differences between the two health systems using metrics such as rates of service utilisation, reported barriers to care, and health seeking behavior.

Further to this, decisions were reached about which variables should be extracted from available documents and the utility of these. Vulnerable groups of veterans were identified for whom targeted services may have been implemented in each country, and a particular focus was to identify specific services or barriers for these groups.

Based on our knowledge of the health care systems in each country, relevant information was extracted for descriptive and comparative purposes. Clearly capturing data across the study period within each country and drawing appropriate comparisons between Australia and the US was a major focus of this part of the review.

## **Results**

### ***Overview of US health services and health care system***

US health care delivery is difficult to characterise, as it is not a single system but a patchwork of multiple systems and sectors, consisting of both public and private insurers as well as a safety net component. Each has different layers and eligibility rules. Below are the major components broken down by public versus private insurers and safety net providers.

#### ***Private insurance***

Most non-elderly in the US have private health insurance sponsored by their employer. Private health insurance typically covers outpatient visits as well as hospitalisations. Coverage of medication varies, as do copayments. There is a small percentage of the population which purchases insurance on their own (not through their employers).

#### ***Public insurance***

Medicaid: Insurance provided for low income individuals of all ages. It is jointly subsidised with federal and state funds and administered by states. It covers both inpatient and outpatient care and medications.

Medicare: Federally funded insurance provided primarily for people 65 and older, those with certain disabilities, and those with end stage renal disease. It covers both inpatient and outpatient care.

Children's Health Insurance Program (CHIP): Inpatient and Outpatient care provided for children in families that earn too much to qualify for Medicaid. Some states cover parents and pregnant women.

Military health care: Care provided directly by the military health system. A program (TRICARE) is available for dependents and military retirees. It covers both inpatient and outpatient care and medications.

Veterans Health Administration: Care provided for military veterans who meet eligibility criteria. It covers both inpatient and outpatient care and medications.

Indian Health Service: Care provided for federally recognised Indian Tribes and Alaska Natives. It covers both inpatient and outpatient care.

Affordable Care Organisations: In 2010, the Affordable Care Act, passed into law, and extended medical insurance benefits to previously uninsured individuals. This Act requires most employers to provide insurance, requires most individuals to have insurance, and prohibits companies from denying insurance due to pre-existing conditions.

### ***Safety nets***

Federally Qualified Health Centers: Care provided for under-served individuals, including migrant workers and homeless. These centers cover only outpatient care, with a focus on primary care services.

Hospital emergency rooms: By law, care cannot be denied to anyone presenting with acute care needs. Though intended for acute care, many use emergency rooms for primary care needs.

### ***The US Department of Veterans Affairs: veteran health care***

The Veterans Health Administration (VHA), one of three administrations of the current Department of Veterans Affairs (VA), was established after the department, formerly known as the Veterans Administration, reached Cabinet status in 1989.(74) The VHA is responsible for providing health benefits and services to qualifying veterans through the VA health care system.(74) The VA health care system is the largest integrated health care delivery system in the US, servicing over 8.3 million veterans each year.(75) It is unique, in that it serves a diverse population of veterans with exclusive medical needs separate from the general US population.(76) Many of the conditions experienced by veterans are indicative of their deployment eras. Therefore, there is pressure on the system to provide a wide range of health services to benefit all war-era veterans. In response, several actions over the course of the decade have been taken, including a shift from inpatient to

outpatient care, universal enrollment of veterans under care into primary care clinics, integration of mental health services within primary care settings, expansion of services to rural areas, utilisation of technology (including telemedicine), establishment of cost sharing agreements with non-VA providers, application of evidence-based practices in treatment options, development of quality measures and indicators, and extension of hours of operation.(77-79) Moreover, the challenge continues as more and more veterans, especially those who have served in the Iraq and Afghanistan conflicts, become eligible for enrollment. Below are the major characteristics of the current VA health care system.

### ***Organisational structure***

During the mid-1990s, as part of the health reform initiative, the VHA restructured the systems' delivery points of care into geographically defined regions called Veterans Integrated Services Networks (VISNs).(77) Currently, the VA health care system is organized into 21 VISNs with over 800 community-based outpatient clinics (CBOCs), 150 medical centers, 135 community living centers (nursing facilities), 300 vet centers, 50 Mobile Vet Centers, and 48 domiciliaries (residential programs) across the U.S.(75-77, 80)

### ***Eligibility rules***

Discharged veterans of the US Armed Forces separated under any condition other than dishonorable who are enrolled in the VA health care system meet the basic eligibility requirements to receive VA health benefits and coverage.(81) Current and former service members who served in the National Guard/Reserves may also be eligible for enrollment, but only if they were called to active duty by a federal order and have completed their period of active service.(81) However, those on active status during training purposes do not qualify.(81) Moreover, certain veterans may be granted an enhancement eligibility status when applying for care.(81) This includes veterans who meet one of the following criteria: a former prisoner of war (POW); recipient of the Purple Heart decoration (for injury in the line of duty) or the Congressional Medal of Honor; service-connected disability of 10% or more; catastrophically disabled; VA pension recipient; discharged from the military due to non-preexisting disability or hardship; served in Vietnam, the Gulf War, or another theater of operations for 5 years; stationed in Camp Lejeune; or income below VA's National Income or Geographical-Adjusted Thresholds.(81) VA has also recently been granted authority, by the Veterans Choice Act of 2014, to treat active duty service members who report a history of military sexual trauma.

Veterans who served in a theater of combat after November 11, 1998 qualify for an extended period of enrollment eligibility into the VA health care system; five years post discharge from active



duty.(82) Combat veterans who were discharged or released from active duty on or after January 28, 2003 are also included.(82)

### ***Annual enrollment system***

Provision of care in the VA health care system is based on an annual enrollment system that assigns veterans to one of eight priority groups; with the highest priority going to veterans with service-connected disabilities of 50% or more.(83) The number of veterans enrolled into the VA health care system is dependent upon federal funding.(83) It may be possible for veterans in the lowest priority group to lose medical coverage if funds become limited, and in fact, most Category 8 veterans are not able to enroll in VA care.(83)

### ***Dual eligibility***

#### ***Medicare and VA health benefits***

Veterans who receive VA health benefits and are over the age of 65, are disabled, or have end-stage renal disease are eligible for dual enrollment with Medicare, a federally funded health insurance program.(84, 85) More than half of all veterans who use the VA health care system are also eligible for Medicare, clearly these would be older cohorts of veterans.(86)

It is important to note that dual enrollees cannot be jointly covered for medical services by both programs.(85) Services rendered at VA facilities cannot be covered by Medicare, and VA health benefits cannot pay for services covered by Medicare.(84, 85) However, there are exceptions. For example, if the VA authorised treatment in a non-VA facility but did not cover all costs, then Medicare may compensate for Medicare-covered portions of services not paid by the VA.(85) Generally, the VA cannot bill Medicare.(84)

Qualifying veterans are often encouraged to enroll in both programs, especially if at some point they prefer to receive certain care from outside the VA system. Medicare gives veterans a wider choice of health care providers. However, it also means that they would have to pay a monthly premium.(84) Nonetheless, veterans with dual enrollment reduce their risk of losing VA health coverage if in subsequent years federal funding becomes insufficient to support those in the lower priority groups.(84)

#### ***Medicaid and VA health benefits***

Veterans who receive VA health benefits may also qualify for Medicaid.(84) Medicaid is a state administered health insurance program that provides medical coverage to certain low income individuals (e.g. children, pregnant women, parents, seniors, disabled persons) and families who fit

into an eligibility group that is recognised by federal and state law.(84, 87) Most often, veterans who qualify for Medicaid will not pay copays for VA health care.(84) Generally, the VA cannot bill Medicaid as well.(84)

### ***CHAMPVA vs. TRICARE***

Family members, including spouses and children, of veterans with permanent and total service-connected disabilities and of those who have died on active duty or due to their VA-rated service-connected disability are also eligible to receive health benefits through the Civilian Health and Medical Program of the Department of Veterans Affairs (CHAMPVA).(84) CHAMPVA is an open federal health benefit program in which the VA shares costs for certain health services and supplies.(84, 88)

Uniformed service members, retirees, and their families are able to acquire private health insurance through TRICARE.(84, 89) TRICARE is a federal health care entitlement program managed by the DoD.(89) Therefore, delivery of care is provided through a military health care system which is maintained by a civilian network of providers and facilities.(89) Moreover, VA facilities which elect to be TRICARE providers can bill TRICARE for non-service connected medical treatments received.(84)

Both programs offer inpatient and outpatient treatment settings as well as medication coverage.(85, 89) However, those enrolled in CHAMPVA are also eligible to enroll in Medicare and those eligible for TRICARE no longer qualify for CHAMPVA.(88)

### ***Overview of Australian health services and health care system***

The Australian Government's health funding contributions include a universal public health insurance scheme, introduced as Medibank in 1975 and renamed Medicare in 1984. Medicare provides free or subsidised treatment by health professionals such as doctors, specialists and optometrists.(90)

The major elements of Medicare include:

- Hospitals: free treatment for public patients in public hospitals.
- Medical services: the payment of benefits or rebates for professional health services listed on the Medicare Benefits Schedule.
- Pharmaceutical: subsidisation of the costs of a wide range of prescription medicines (but not all) under the Pharmaceutical Benefits Scheme.(90)

The government-funded schemes and arrangements aim to give all Australians access to adequate, affordable health care, irrespective of their personal circumstances. Patients usually require a referral from a GP to see a specialist.

Public hospitals were mainly established to provide acute care, but over time, have developed more of a continuum of care, including sub-acute care, such as rehabilitation, geriatric evaluation and management, palliative care for patients with terminal conditions, and services for nursing home patients.(91) The current organisation of hospitals means that while patients are usually admitted under the care of an individual clinician, they are cared for by a team of multidisciplinary health professionals (eg. registered nurses, physiotherapist, speech pathologist, dietician).(91)

The National Government funds about 39% and the State and Territory Governments funded about 54% of the costs of public hospitals, with the remaining 7% provided by private health insurance and out-of-pocket payments by individuals.(91)

Australian citizens are entitled to receive free health care and emergency hospital services, on the basis of clinical need. This entitlement has been maintained through Australian Health Care Agreements between the National, and State and Territory Governments.(91)

Medicare does not cover:(92)

- medical and hospital services which are not clinically necessary, or surgery solely for cosmetic reasons;
- ambulance services;
- most dental examinations and treatment;
- most physiotherapy, occupational therapy, speech therapy, eye therapy, chiropractic services, podiatry and psychology services;
- acupuncture (unless part of a doctor's consultation);
- glasses and contact lenses;
- hearing aids and other appliances; or
- home nursing.(93)

To assist funding Medicare, most Australian residents pay a 2.0% levy on their taxable income. This levy is reduced for low incomes. In addition to the Medicare Levy, a Medicare Levy Surcharge is applied to individuals and families on incomes above a certain threshold who do not have an appropriate level of private patient hospital cover; this surcharge is in addition to the Levy and acts as an incentive to have appropriate private health insurance.

Thus, a person can have Medicare cover only, or a combination of Medicare and private health insurance coverage. Private health insurance is not compulsory, and people who opt to buy private health insurance can mix and match the levels and type of cover to suit their individual circumstances. Private insurance also offers cover for some or all of the costs of a range of other items or services not covered by Medicare. Census data indicates that in 2011-12, 57.1% of the adult Australian population had some form of private health insurance.(94)

### ***Australian Department of Veterans' Affairs: veteran health care***

The Veterans' Entitlements Act of 1986 (VEA), Safety, Rehabilitation and Compensation Act 1988 (SRCA) or the Military Rehabilitation and Compensation Act 2004 (MRCA) provide coverage/entitlement to members of the veteran community for health services and treatment.(95)

VEA is primarily a military compensation scheme, SRCA is a workers' compensation scheme oriented to rehabilitation and MRCA is a combination. For injury, disease or death related to service before 1 July 2004, personnel are likely to be covered under SRCA or VEA. For injury, disease or death related to service on or after 1 July 2004, personnel will be covered under MRCA.(95)

Hospital care for eligible veterans and war widows and widowers is provided through the Repatriation Private Patient Scheme.

### ***DVA claims process***

To access the cover of these schemes, claims must be lodged with DVA. Compensation entitlements are not automatic. For conditions related to defence service, a claim can be submitted to have liability accepted by DVA. If accepted, the person can be entitled to additional support and services. Under the MRCA, both a causal connection and a temporal connection with service must be established if the claim is to succeed. Under the *Safety, Rehabilitation and Compensation Act 1988* (SRCA), in contrast, causes of medical conditions are determined on a case-by-case basis using evidence provided by a specialist medical practitioner. Diseases that have a temporal connection with service but not a causal connection, e.g. a heart attack may be more likely to succeed under SRCA because of differences in the interpretation of injury and disease, and the liability provisions of that Act.(96) If the claim is accepted, the level of compensation is then assessed by determining the degree of impact of the condition.

### ***Statement of principles (SOPs) and the Repatriation Medical Authority***

The Repatriation Medical Authority (RMA) (the Authority) is an independent statutory authority established under Part XIA of the *Veterans' Entitlements Act 1986* (VEA).(97) It was established when, in 1994, the Australian Government requested the Repatriation Commission, in consultation with veterans' organisations, to prepare legislation that would reform the decision making process about disease causation. The aim was to create a more equitable and consistent system to deal with disability pension claims by Australian veterans and their dependants. The RMA is responsible to the Minister for Veterans' Affairs but is a statutory authority independent of DVA. The Authority consists of a panel of five practitioners eminent in fields of medical science, including at least one experienced in epidemiology, supported by medical research staff who undertake literature reviews and prepare briefings, who undertake their statutory role of determining Statements of Principles (SOPs) for any disease, injury or death that could be related to military service, based on sound medical-scientific evidence. The SOPs state the factors which "must" or "must as a minimum" exist to cause a particular kind of disease, injury or death.(97) In 2015 there are around 300 medical and psychological conditions covered by SOPs, categorised under 15 categories. The Authority is responsible for the development, revision and revocation of SOPs.

SoPs are legislative instruments. As an example, the SOP concerning PTSD No. 83 of 2014(98) includes:

- definition of the criteria for PTSD, i.e that "posttraumatic stress disorder" means a psychiatric disorder which meets the following criteria (derived from DSM-5) :.....” and includes the DSM-V diagnostic criteria for PTSD.
- the Basis for determining the factors, i.e. that “On sound medical-scientific evidence available, the RMA is of the view that it is more probable than not that PTSD and death from PTSD can be related to relevant service rendered by veterans or members of the Forces under the VEA, or members under the MRCA.
- factors, at least one of which must exist, before which it can be said that on the balance of probabilities, PTSD or death from PTSD is connected with the circumstances of a person’s relevant service. For example these include experiencing a category 1A stressor (such as experiencing a life-threatening event) before the clinical onset of PTSD, experiencing the traumatic death of a significant other within the one year before the clinical onset of PTSD; or being exposed to repeated or extreme aversive details of severe traumatic events before the clinical onset of PTSD.
- other definitions, including e.g. of a category 1A stressor.(98)

The legislation requires that claims for pension (and the SOPs used to determine claims) should be assessed at two different standards of proof depending on the type of service and this is reflected in the SOPs for conditions.(97, 99) It provides that the same body of evidence be interpreted differently and claims be assessed at two different standards of proof, and therefore, for any given condition there are two SOPs. The more generous (beneficial) standard of proof, the reasonable hypothesis standard, applies to veterans and serving members who have operational (or equivalent) service; which includes peacekeeping, hazardous and British nuclear test defence service under the VEA and warlike and non-warlike service under the MRCA. The sound medical-scientific evidence must *indicate or point to* a causal association between a risk factor and the disease in question. The balance of probabilities standard of proof is for veterans and serving members with non-operational service. The sound medical-scientific evidence must show that it *is more probable than not* that there is a causal association between a risk factor and the disease. In most cases there are at least slight differences between the SOPs. In many cases the reasonable hypothesis SOP version will contain more causal factors.(99)

SOPs are not used under SRCA; instead, medical causation issues are determined by reference to evidence provided by a specialist medical practitioner on a case-by-case basis.(97)

### ***Non-liability health cover***

Non-liability health cover allows former and current ADF personnel, depending on their eligibility, to receive treatment for pulmonary tuberculosis, malignancies, PTSD, and other psychiatric conditions of anxiety and depressive disorders, alcohol use disorder and substance use disorder. There is not a need to establish that these conditions were caused by the person's service, however, the specific conditions for which they may be eligible to receive treatment depends on the period in which they served or, in some cases, the nature of their service. Eligibility for treatment for all these conditions includes those who had eligible war service or operational service under the VEA, warlike and non-warlike service under the VEA or MRCA, peacekeeping or hazardous service. In respect of peacetime service from 7 April 1994, personnel were eligible for non-liability health care for these conditions if they enlisted or were appointed on or after April 1991 and completed 3 years full time service (continuous full-time service, CFTS) or were discharged on the grounds of invalidity or physical or mental incapacity to perform duties before completing 3 years CFTS on or after 7 April 1994, but were engaged to serve not less than 3 years.(100)

***Gold, White and Orange Cards***

The Gold *Repatriation Health Card – For All Conditions* (Gold Card) entitles the holder to all health services according to clinical need. The White *Repatriation Health Card – For Specific Conditions* (White Card) entitles the holder to health services for treatment of a specific condition as approved by DVA. An Orange Card provides eligible veterans with access to pharmaceuticals listed on the Repatriation PBS according to clinical need for all medical conditions.

**Table 6 Summary of treatment options covered under DVA Acts**

	<b>VEA</b>	<b>SRCA</b>	<b>MRCA</b>
Personnel covered	Prior to 1 July 2004, personnel were covered by a combination of VEA and SRCA depending on enlistment and type of service		Enlisted on or after 1 July 2004
Treatment for accepted injury or disease	Fully covered for White Card holders	Reimbursement for medical expenses for treatment reasonably required as a result of accepted injury. From 10/12/2013 White cards will be issued.	Fully covered for White Card holders or reimbursement for expenses
Treatment for all conditions	Fully covered for Gold Card holders	Not covered	Fully covered for Gold Card holders
Pharmaceutical Benefits	Pharmaceutical Allowance for holders of Repatriation Health Cards	Cost of all reasonable pharmaceuticals is reimbursed for accepted conditions	Pharmaceutical Allowance for holders of Repatriation Health Cards. For others, cost of all reasonable pharmaceuticals is reimbursed for accepted conditions
Cost of attendance for medical treatment	Reimbursement of travel and accommodation	Reimbursement of travel and accommodation	Reimbursement of travel and accommodation
Rehabilitation	Veterans' Vocational Rehabilitation Scheme for eligible veterans	All rehabilitation required or deemed appropriate covered	All rehabilitation required or deemed appropriate including social, vocational and educational status

DVA established a Client Liaison Unit (CLU) in 2007 to provide a more holistic service to entitled clients with complex needs under all three Acts. It provides a single point of entry and ongoing contact mainly by telephone.

### ***Transition from ADF to DVA***

DVA works with Defence to identify the needs of current and former ADF personnel in order to provide them with the most appropriate support and services. DVA has On Base Advisors located on over 35 ADF bases.(101)

The Single Access Mechanism facilitates the transfer of information and relevant service and medical records between the Department of Defence and DVA for current and former members of the ADF. DVA uses these records, which includes records of service, overseas postings, leave confirmations, workplace health and safety incident reports, medical and psychological reports, and financial statements, to assist in the determination of claims under VEA, SRCA and MRCA.(102)

Rehabilitation for serving members is provided by the ADF Rehabilitation Program (ADFRP). However, where DVA has accepted liability for an injury or illness, rehabilitation services such as the vehicle modifications, provision of household services, aids and modifications and attendant care, can be provided by DVA.(103)

### ***Reservists***

All members and former members of the ADF Navy, Army, and Air Force Reserves who render service on or after 1 July 2004 are covered under the MRCA, whether they are on part-time or CFTS, for injury, disease or death related to that service. All ADF members can receive the same range of medical, compensation and rehabilitation benefits. The only difference is in the calculation of incapacity payments for Reservists, to ensure that Reservists receive incapacity payments that reflect fairly the earnings they have lost. (104)

The ADF provides limited treatment for part-time reservists who need medical attention whilst performing their reserve service, provided until they return home from reserve duty and can access their regular medical practitioner or, until it is possible for the DVA to take over management of their compensation claim.(104)



## Timeline of milestones in the US and Australian veterans' health care systems

Table 7 Timeline of milestones in the US and Australian veterans' health care systems

Year	US	Australia
1982		Vietnam Veterans' Counselling Service (now VVCS)
1986		Veterans' Entitlement Act (VEA)
1988		Safety, Rehabilitation and Compensation Act (SRCA)
1989	Department of Veterans Affairs established	
1990		
1991	Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act Vet Centers eligible to veterans of the Persian Gulf and Somalia	
1992	Veterans Health Care Act of 1992; VA starts a Persian Gulf registry	
1993	Medical care authorised for GWV for conditions possibly related to exposure to toxic substances or environmental hazards	
1994		National after-hours crisis counselling service (Vetline) established Depressive disorder, PTSD, Anxiety disorder SOPs
1995	VA Health Care Reform	Non-liability health cover for PTSD
1996	Eligibility Reform; annual enrolment, 7 priority groups Expansion of cost sharing agreements	Defence Community Organisation formed  Suicide and attempted suicide SOP
1996-97	Community-based outpatient clinics	
1997	VA began accepting enrolment applications from veterans	Vetline changed to Veterans' Line
1998	Combat veterans eligible to enrol in the VA for 2 years after discharge	
1999		ADF operational mental health screening on return and at 3-6months
2000		Memorandum between VVCS and ADF on provision of counselling services to ADF members Introduction of the Alcohol Management Program
2000-01		VVCS finalised accreditation process
2002	Veterans Integrated Services Networks reduced to 21	ADF Mental Health Strategy and Suicide Prevention Program Return to Australia Psychological Screening (rTAPS) Post-operational Psychological Screening (POPS) Critical Incident Mental Health Support (CIMHS) initial and follow-up
2003	VA cuts-off new enrolment in priority group 8	Annual Health Assessment (AHA) Comprehensive Periodic Health Assessment (CPHA)
	Medicare Prescription Drug, Improvement and Modernization Act	Broadened eligibility for non-liability anxiety and depression
2004		Military Rehabilitation and Compensation Act (MRCA)

	Year	US	Australia
Afghanistan	2005-09	VHA Comprehensive Mental Health Strategic Plan (MHSP)	Can Do – mental health and substance use initiative
	2006		Operation Life Suicide Prevention At Ease; suite of mental health literacy products
	2007	Additional 3 years of VA eligibility for OIF/OEF veterans (total 5 years) TBI screening program introduced at VA centers Joshua Omvig Veterans Suicide Act	VVCS Stepping Out program ADF Rehabilitation program
	2008	Health and Other Care Improvements Act Uniform Mental Health Services in VA Medical Centers and Clinics Handbook published	DVA Case coordinators for complex cases
	2009	DoD/VA Integrated Mental Health Strategy (IMHS) VA eases enrolment restrictions of priority group 8	How are you travelling? Initiative
	2010	Caregivers and Veterans Omnibus Health Services Act  Affordable Care Act (ACA); veterans do not need to sign up to VA	Broadened eligibility for non-liability health care (alcohol & substance misuse) SMART (Self-management and resilience training initiatives) Wellbeing Toolbox (online self-help) DVA On Base Advisory Service (OBAS)
	2011	PTSD Coach App Make the Connection campaign Improve Veterans Mental Health Initiative (IVMH)	PTSD Coach App ADF Mental Health and Wellbeing Strategy On Track – The Right Mix App Periodic Health Examination (Replaced AHA and CPHA)
	2012	VA Mental Health Hiring Initiative Improve Access to Mental Health Services for Veterans, Service Members and Military Families Executive Order VA-IHS National Reimbursement Agreement	ADF Alcohol Management Strategy Soldier Recovery Centres  Concussion SOP Moderate-Severe TBI SOP
	2013	Veterans Access Choice and Accountability Act	Government formally removed gender restrictions on combat roles Veterans Mental Health Strategy Released DVA announces expanded benefits for TBI
	2014	Choice Program; veterans can access eligible non-VA health providers	Chronic Multisymptom Illness SOP Social Health Strategy for the veteran and ex-service community GP health assessment available for all former serving personnel

## ***Comparison of the US and Australian health care systems and service provision for veterans***

### ***Health care systems***

US health care delivery is complex; it is not a single system but multiple systems and sectors, consisting of both public and private insurers. Most health insurance is sponsored by employers, with public schemes available to elderly and low-income populations. Australia has a publicly funded universal health care that includes medical and pharmaceutical benefits (uncapped) schemes. However, the Australian Medicare Levy Surcharge acts as an incentive for the general public to also have private health insurance. An important point of difference to note here is that the private insurance schemes in the US are often paid for by employers, while private insurance in Australia is not associated with employment. Australians may opt for private health insurance to have more choice in their doctors, allied health providers and also for the benefits of elective surgery. If US veterans need to access non-veteran health care but they do not have a civilian employer, this may act as a barrier to care.

### ***Defence Forces and Veterans' Affairs health services***

The US Department of Defense and Australian Department of Defence provide inpatient and outpatient medical care and pharmaceuticals to current military personnel.

Many of the conditions experienced by veterans are indicative of their deployment eras. Therefore, there is pressure on both Veterans' Affairs systems to provide a wide range of health services to benefit all war-era veterans.

In the US, the VHA is responsible for providing health benefits and services to qualifying veterans, including honorably discharged personnel of the US Armed Forces enrolled in the VA health care system and some current/former serving National Guard/Reserve personnel. This integrated health care system serves the veteran population separate from the general US population. Dual enrolment in Medicare is encouraged, and for those who are eligible gives veterans a wider choice of benefits. The number of veterans enrolled into the VA health care system is dependent on federal funding. Veterans in certain priority groups may have to co-pay for medications and care provided.

In the US the number of veterans enrolled into the VA health care system is dependent on federal funding. In Australia, there is no specified cap, but veterans must have claims accepted by DVA for their health care expenses to be covered. Thus, veterans' access to health care faces some possible barriers in each respective country, leaving veterans to access health care via the public or private health schemes. Australia's public health care system may provide a more complete

safety net for veterans when they cannot access care via DVA. In the US, there are some gaps between the health insurance schemes based on age, income and employment. If US veterans do not have access to health care via the VA, they may have accessed health care via private health insurance, Medicare, or Medicaid. In the last two years they could have purchased insurance through the Affordable Care Act. In 2014, the Expiring Authorities Act expanded care by allowing veterans to access eligible health care providers outside the VA, this may increase accessibility for US veterans.

US VA priority enrolment could potentially leave those in low priority groups in a vulnerable position and potentially without access to health care. These veterans may need to access care via alternative cover or safety nets, although it is possible that they may not meet the age or income requirements of the other health schemes in the US. Australian citizens are entitled to receive free health care and emergency hospital services on the basis of clinical need via Medicare and DVA may also cover additional requirements. To access the cover of the three veterans' entitlements Acts, claims must be lodged with DVA, assessed, accepted for liability of the injury or disease, and the level of compensation is determined. If Australian veterans are not eligible for health care through the DVA system they may access health care via the public health care system or their own private insurance.

Another important aspect of accessing health care to note is that in Australia, veterans may not want Defence or DVA to know about certain conditions, for example, mental health issues, due to perceived stigma around some conditions. Conversely, US veterans may provide information to VA but may not want civilian employers who provide their health insurance cover to know about conditions in case it may affect their cover.

The structure and organisation of both health systems for veterans have developed over the past 20 years. Following the VA Health Care Reform in 1995, the VA moved towards decentralisation, universal availability of healthcare, inpatient to structured outpatient care programs and an emphasis on measuring health care performance. Whilst, in Australia with the closure or transfer of all Repatriation Hospitals throughout the early 1990s, health care provision was transferred to the public or private system with compensation through DVA. Australia's DVA provides most of its health care services via the public health system, there are many programs and services available for veterans as a first port of call or evaluation service but most of the health care is serviced through the public scheme.

In Australia, there are a number of conditions, such as PTSD and tuberculosis, that do not require a liability claim to be approved by Australian DVA for health care to be received. However, these are limited in number and thus most health conditions would still require a liability claim to be

accepted by DVA. Conversely, all US veterans are entitled to VA enrolment, but this is dependent on priority groups and on funding. Veteran access to care through the respective Veterans' Affairs systems, at a systems level, may have limitations imposed in different ways and at different levels in the systems.

### ***Vulnerable groups***

US reservist veterans may qualify for VA health care if called to duty by federal order, while the ADF provides treatment until CFTS is ceased at which point treatment may be taken over by DVA if judged eligible, similar to regular veterans.

In transitioning from the ADF there are different responsibilities in the separation process for voluntary and medical separations. This may mean that there are different barriers for some veterans. Furthermore, veterans need to be aware of their entitlements and the claims process via the three acts.

In the US, specific Acts were introduced to meet the needs of specific groups, such as in 2010, to extend care available to female and rural veterans.

The VA has some targeted specific screening and treatment programs, the lesser focus on such programs in Australia may result in Australian veterans being less aware of available treatment options until they engage with DVA and therefore potentially more likely to access health care via the public system.

### ***Important milestones and developments in veterans' health care***

For US Gulf War veterans, assessment through the Persian Gulf Registry Program and congressionally authorised medical care for Gulf War veterans for conditions possibly related to exposure to toxic substances or environmental hazards became available to Gulf War veterans over the period 1992 to 1993. For more contemporary veterans who served in combat, eligibility for free VA care for two years after leaving active duty was introduced in 1998, and in 2007 this was extended to 5 years for OEF/OIF veterans. If veterans enrolled after these eligibility periods, their eligibility periods were based on other factors, such as compensable service-connected disability and financial circumstances.

After VA Health Care Reform in 1995 and Eligibility Reform in 1996, enrolment of eligible combat deployed veterans into the VA was based on an annual enrolment system with priority groupings, with highest priority going to those groups with greater service-related disability. The VA cut off new enrolment for priority group 8 in 2003, which was eased and priority group 8 enrolments

partially reinstated in 2009. In 2010, veterans were no longer required to enrol; enrolment became automatic and veterans were automatically assigned to a priority group.

Both the US and Australia Defence Forces and Veterans' Affairs have introduced mental health policy development and reforms over the past 20 years and made a concerted effort to increase the availability and extent of mental health and psychosocial services. Policy developments included the VHA Comprehensive Mental Health Strategic Plan (MHSP) 2006-2009, which involved recovery and rehabilitation oriented care, maximising access, decreasing stigma, expanding partnerships and increasing the use of technology. The Health and Other Care Improvements Act of 2008 also expanded mental health services. In 2009, the US Department of Defense and VA jointly launched an Integrated Mental Health Strategy. Introduction of mental health treatment coordinators reflected a generally increased focus on mental health outcomes in US veterans.

Similarly, in Australia, both the 2002 ADF Mental Health Strategy and 2011 ADF Mental Health and Wellbeing Strategy aimed to improve health and access to mental health services. Increased focus on mental health policies in Australia was also reflected in the increased availability of health programs and initiatives (e.g. the ADF's introduction of standardised operational mental health screening instruments in 1999, on return and 3-6months post deployment, and the introduction of RTAPS and POPS in 2002), which helped increase detection rates and awareness of mental health problems, including delayed-onset conditions. These efforts have been reflected in the increased usage of VVCS services and the increased percentage of veterans identifying mental health issues as their primary concern. These programs were designed to detect issues when personnel return from deployment and provide services for delayed issues (i.e. Soldier Recovery centres 2012). The introduction of case coordinators in 2008 was designed to assist veterans with complex needs and help in navigating the DVA process.

In Australia, acknowledgement of the complexity of veterans' health conditions was demonstrated by a number of programs and coordinators designed to manage complex cases. There were also expansions to allied health services available to veterans in the mid-1990s. During the mid-2000s, a steering committee on rehabilitation services aimed to integrate and streamline these processes to improve accessibility and outcomes for veterans using a whole-of-person approach.

Both countries are increasingly utilising technology in managing the demand for services, especially for contemporary veterans. For example, in the US in 2013 more than 91,000 veterans received some of their mental health treatment through telehealth. In Australia, Vetline is being complemented with programs such as eHealth.

### *Utilisation of health care*

Both the US and Australia have seen an increase in both the provision and utilisation of mental health services and have made movements towards eHealth provision. Regarding mental health care, both countries have also seen an increase in the percentage of veterans identify a mental health condition as the primary reason for accessing care.

Veterans' utilisation of available health services is an important indicator of the availability and suitability of health care resources. In the US between 2002 and 2013, more than half of those who became eligible for VA care accessed health care. Between 2005 and 2013, the number of veterans who received mental health care from VA increased over three times faster than the growth in numbers of VA users overall. Veterans from recent conflicts accounted for a significant proportion of the increase in mental health service users.

In Australia, the number of clients receiving services through VVCS between 2005 and 2014 increased substantially for counselling programs and Vetline, with a slight dip in 2009-2010; while the number of group programmes decreased. Overall in 2013-14, 93.4% of the veteran population used medical services and 10.6million medical services were accessed.

Thus, both countries have experienced an increased demand for health services, and in particular, mental health services. This may partly be due to the extensive mental health programs and awareness campaigns introduced in both countries over the period of interest.

## 7 Discussion

The primary objective of this project was to provide a comparative review of common deployments, health and social outcomes, and health care systems and services for Australia and the US.

There were four common deployments post-1990 in which the US and Australia had committed a significant number of personnel: these were the 1990-1991 Gulf War, Somalia, Afghanistan and the Iraq War. Whilst there were many similarities between US and Australian deployments, there were also notable differences between the countries, both in terms of the dates that personnel were deployed and also the predominant forces that were deployed and the types of roles that personnel were involved in. Also, the US deployed a substantially greater number of personnel than Australia.

The scoping review identified five health and social outcomes for further review and comparison between the countries: these were PTSD, suicide, social isolation/connectedness, multisymptom illness and TBI. For most of these health outcomes, there was a greater number of health studies conducted in US veterans than in Australian veterans of the deployments.

Within the limitations of the descriptive rather than analytical nature of this review, the following discussion focuses on comparisons in the prevalence estimates for the health outcomes between the two countries for deployments which crossed a 25 year period, what can be observed from the comparison of health services between the two countries over that time period, and any specific comparisons relevant to the health outcome indicators. We have taken a broader population based perspective, rather than focus on individual studies or health services, in order to comment on patterns.

### ***PTSD***

Whilst there was greater variability in PTSD prevalence and odds or risk ratios in the US Gulf War studies, in general the Australian and US estimates were not dissimilar, with Australian prevalence estimate and odds ratios (for deployment) falling at about the midpoint of the US estimates. It is important to note that the Australian data were collected 10 years after the Gulf War, whereas the US data were collected from a variety of sources at different time points after the Gulf War. This indicates that PTSD in the cohorts of Gulf War veterans is a longitudinal concern,

For the Afghanistan and Iraq conflicts, findings for Australia and the US were again similar. The PTSD prevalence estimates for Australian veterans of Somalia were the highest and those of US veterans were also relatively high, at the high end of the range observed in the Gulf War and Iraq.



The high rate in Australian veterans may be due to stressors associated with the peacekeeping operation.

For both countries, the prevalence of PTSD tended to be higher for veterans deployed to the Iraq War than to Afghanistan (where these were documented separately); however, odds ratios (for deployment) tended to be higher among the US than Australian forces. US studies that considered National Guard/Reservists demonstrated higher prevalences in this population than for regular military personnel.

The findings of this review suggest that PTSD estimates vary by country and by deployment, and there is some indication that they have varied over time, but do not seem to be increasing. Nonetheless PTSD has been and is a serious and ongoing health concern for both the US and the Australian Defence Forces and Veterans' Affairs departments. There has been a concerted effort by both countries to develop mental health policy in defence forces and Veterans Affairs, working with national mental health initiatives, to increase mental health services' provision to veterans, and importantly to try and destigmatise mental health in defence forces and with veterans and encourage people to seek help and access services. Another common feature has been an increased emphasis on the need to increase awareness of mental health issues with defence personnel and veterans' families and to work with them to support them and the serving member or veteran. These mental health initiatives gained momentum from the late 1990s and 2000s onwards.

There are several other commonalities that we observed:

- increasing recognition of comorbidity of mental health and physical health conditions and the need for a multifactorial and multidisciplinary approach to treatment and services,
- an increased recognition of coordination in the transition from the defence forces to veterans services and civilian life and the assessment of health needs,
- outreach of services and a move away from veteran hospital based/provided care, and
- adaption of services to meet increased need and technological advances.

Specifically in relation to PTSD, in the US, veterans must be referred for specialty services by a primary care provider. Veterans are exempt from co-payments if psychosis or any other mental health illness developed within two years after discharge or release from active duty. In 2006, VA allocated \$19M for PTSD services and OEF/OIF care.

Australia's PTSD SOP was released in 1994 which coincided approximately with the end of the Somalia deployment. DVA has a non-liability policy for PTSD treatment. PTSD awareness has

been a notable aim for DVA. Between 2005 and 2010, of the 50,279 clients seen by VVCS, 8280 (16.5%) nominated PTSD as their primary presenting problem.

Nonetheless, penetration of services and veterans' access to health care are very important aspects of policies and programs which we were not able to assess to a great extent in this review, and from veterans' perspective barriers to care and access to care are very important.

### ***Suicide***

No changes in suicide between deployed and non-deployed veterans of each country were noted. US Gulf War veterans had a lower risk of suicide and Australian Gulf War veterans had a lower risk of intentional self-harm when compared to their respective general population. It appeared that US Afghanistan/Iraq veterans had higher rates of suicide ideation than Australian veterans, but there were no suicide rates provided for Australian forces who had deployed to Afghanistan/Iraq, thus a comparison of suicide rates with the US was not possible. There were no data on suicide for the US mission in Somalia, but the rate of suicidal ideation for the Australian peacekeepers was considerably higher than it was for the other conflicts.

Data on reported suicide ideation and suicide attempts was available to a greater or lesser extent from surveys of US and Australian veterans; less studied was suicide rates.

The reasons for suicide are multifactorial but poor mental health is a risk factor. Both countries have suicide prevention programs in partnership with national initiatives. The US has Suicide Prevention Coordinators and the Joshua Omvig Veterans Suicide Prevention Act (2007) included comprehensive services for veterans at risk. Australia implemented a Social Health Strategy for the Veteran and Ex-service Community in 2014, and case coordination teams to assist clients at risk of self-harm or harm to others, to navigate DVA services were introduced in 2008.

### ***Social isolation/connectedness***

Social isolation/connectedness is becoming an important concept and aspect of veteran health and wellbeing, and one that future research needs to cover.

We were unable to assess the health outcome, social isolation, as it related to this project for any of the deployments for either country. Studies often used variables such as homelessness and unemployment as proxies for social isolation; however, temporality and causality need to be considered when attempting to define and measure social isolation. For example, homelessness may remove social bonds that previously existed, thus causing the person to feel isolated or removed; however, social isolation may also contribute to a person becoming homeless.

Homelessness and unemployment have been the subject of various programs, particularly

targeted programs in the US, and in the Australian context a program aimed at improving social networks; but in the context of military and veteran personnel in the current literature searched, there was no uniformity in defining, assessing, and quantifying social isolation.

Clear and concise definitions and standard assessment tools for social isolation are needed for future research.

### ***Multisymptom illness***

Australian Gulf War veterans had the lowest prevalence estimate of multisymptom illness and the lowest odds ratio in the studies overall compared with studies of US Gulf War veterans. This could be a reflection of the definitions and level of medical assessment used in the studies. The Australian study involved a full medical exam and the full CDC definition and a factor analysis of symptoms, while some of the US studies relied on self-reported symptoms and did not apply the full definition.

In this review studies of multisymptom illness were not identified in veterans of Somalia or in veterans of Afghanistan/Iraq War. For the Gulf War and Afghanistan/Iraq War a relationship was identified between deployment-era exposures and health care concerns; eg Gulf War related exposure and multisymptom illness, and MSI and Afghanistan/Iraq War combat related exposure and TBI. The medical, chemical and environmental exposures experienced by Gulf War veterans and concerns over exposure to chemical and biological warfare agents were considered to be risks factor for multisymptom illness, and common to both countries forces, and although some of the environmental exposures or vaccinations may also have been experienced by personnel deployed to Afghanistan or Iraq, other exposures such as increased levels of direct combat, insurgency and IEDs were more characteristic or defining exposures associated with these deployments.

The systematic evaluation of multiple symptoms reported by Gulf War veterans was initiated in the US. Fukuda et al. evaluated Gulf War veterans and developed the CDC definition(52), that has been used for the epidemiological definition of cases of multisymptom illness, as has the definition developed by Steele et al.(25) Other programs such as the Comprehensive Clinical Evaluation Program which was a self-referred assessment program for veterans with health complaints including multisymptom illnesses were initiated which were not a feature of Australian assessment of Gulf War veterans who were more likely to be assessed through the DVA or general medical systems. A chronic multisymptom illness SOP was determined by the Repatriation Medical Authority in 2014 under the VEA.

### ***Traumatic brain injury***

TBI and mTBI only became a major health focus during the Afghanistan/Iraq War campaigns, particularly due to the use of IEDs, and have often been described as the 'signature' injury of these deployments. Studies on TBI in veterans were available only for veterans of Afghanistan/Iraq War.

The reported prevalence estimate of TBI in Australian veterans of Afghanistan/Iraq War seemed to be slightly lower and at the lower end of those in US veterans. This could be for several reasons, including level of combat exposure on deployment, US personnel deployed to Afghanistan/Iraq War were more likely to be in combat roles and deployed during peak periods of combat. Furthermore, the US studies used a variety of measures from screening tools to diagnostic tools and hospitalisations, while the Australian studies relied on self-report. A very low rate was reported in one of the Australian studies, which may have been due to the study population being slightly older and therefore less at risk.

In particular, mTBI has received considerable attention in recent years. The US implemented a broad screening program and a treatment program for TBI, in which all veterans who presented at a VA clinic were screened for TBI, and this could explain the higher screening TBI prevalence estimates reported in the US. Alternatively, differences in Australian duties on these deployments may have resulted in a reduced overall risk of experiencing a TBI compared with US personnel.

In the US, referrals are required for TBI treatment but there are a number of programs ranging from screening and treatment (inpatient, outpatient and pharmacy services) to assisted living programs. In 2012, 64% of veterans diagnosed with TBI received care at PSCT facilities and 54% sought treatment at CBOCs.

Conditions that are targeted (or screened for) will result in enhanced case-finding (with higher prevalence – at least treated prevalence). If there are financial incentives, e.g. payments for disability it may also encourage more veterans to come forward, so there would be more identified cases. This is probably more applicable to the less visible and more stigmatised problems, such as TBI and mental health problems.

There has been a less targeted focus on TBI in Australia. TBI SOPs were introduced in Australia in 2012. In the absence of targeted screening programs it is difficult to say what the screening rates for TBI may be, especially for mild TBI. DVA announced expanded benefits for TBI in 2013. Although the emphasis in Australia has not been on targeted TBI detection or treatment programs, the health care and services system including the rehabilitation system is different to that in the US.

### ***Limitations***

Although we undertook a comprehensive search of the literature through several data bases for scientific published literature and for government reports and other sources of information, less information was for health services and specific health programs that may have been available in the early 1990s during the Gulf War and Somalia deployment and post deployment period than was available over the past ten to 15 years.

Limited scientific literature was available for the social isolation/connectedness indicator outcome and this limited our ability to compare this indicator between the US and Australian veteran populations and across deployments.

### ***Strengths***

There has been value in comparing the US and Australian common deployments, health outcomes and health care systems and services and learning from each other. This has been undertaken in a comprehensive and staged approach, utilising published scientific literature and reports from US and Australian Departments of Defence and Veterans' Affairs to obtain as comprehensive a picture as possible, the latter were sourced particularly for deployment and health care service and program information.

This project idea was innovative and has involved comparisons at the level of health outcome indicators, two countries, four deployments, health services and programs, and across deployments and time periods. To our knowledge comparisons at these multiple levels have not been made previously.

### ***Future directions***

This comparative literature review could serve as a model for future research in this field to benefit health policy development, service provision and health outcomes for veterans in the future.

Senior International Forum countries' forces were also deployed to these conflicts and further value could be obtained by involving comparisons with Canadian, UK and New Zealand veterans and their countries' health services in an extension of this project and/or in future projects.

Social isolation/connectedness is becoming an important concept and aspect of veteran health and wellbeing, and one that future research needs to cover. Clear and concise definitions and standard assessment tools for social isolation are needed for future research.

Access to health care has many facets. In the context of veteran access in both the US and Australia, this includes a transition phase from the care provided within the respective defence forces to a more complex system for the veteran to negotiate. Integration and access between the public/private system and veterans' affairs based systems are an important consideration, and are evolving. A very recent US development is the US Veterans Choice Act that is designed to improve access for some to services if it would take longer than 30 days for a VA appointment. There have been no evaluations/publications of this particular program to date, and it will probably some time for this to be evaluated, so this is an example of an item for potential future follow-up.

The cohort studies of Gulf War veterans have established that PTSD is a longitudinal concern, and monitoring PTSD estimates in veteran cohorts is important into the future. As the composition of defence forces changes with deployments some groups, such as reservists or female personnel if they take on greater roles in active combat, may be at greater risk of psychological disorders.

As described in the Introduction, this project was undertaken as the first of three proposed joint collaborative research efforts between the US and Australia. The other two projects proposed were:

- Project 2 Comparative study on treatment pathways and access to health care; and
- Project 3 Parallel post-deployment health studies

The findings of this current project have provided insights into the similarities and differences in the health outcomes post deployments and the US and Australian systems and started to delineate the various complexities in veteran health care systems that could inform a comparative study proposed as Project 2. This could also build in a component to build greater understanding of and compare veterans' perspective of access to health care, to identify points at which veterans are particularly vulnerable, and access data that assesses penetration of health services.

Our findings in this current project could also inform the development of Project 3 Parallel post-deployment health studies. Considerations could include: consistency of terminology and measures where appropriate, including development of social isolation/connectedness terminology and exposure assessment measures; parallel studies which include comparisons of associations between exposure and risk by country, controlling for known confounding factors; and prospective assessment of the transition phase from defence force to veteran/civilian health care provision, including access to and comparison of health outcomes.

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Table 12 Summary of Australian veteran health services 2000-2014

## Appendix A

**Table 8 Australian and US terms and respective definitions**

Term	Australian Definition	US Definition
Active Duty <sup>1</sup>		<p>(A) full-time duty in the Armed Forces, other than active duty for training;</p> <p>(B) full-time duty (other than for training purposes) as a commissioned officer of the Regular or Reserve Corps of the Public Health Service (i) on or after July 29, 1945, or (ii) before that date under circumstances affording entitlement to “full military benefits” or (iii) at any time, for the purposes of chapter 13 of this title;</p> <p>(C) full-time duty as a commissioned officer of the National Oceanic and Atmospheric Administration or its predecessor organisation the Coast and Geodetic Survey (i) on or after July 29, 1945, or (ii) before that date (I) while on transfer to one of the Armed Forces, or (II) while, in time of war or national emergency declared by the President, assigned to duty on a project for one of the Armed Forces in an area determined by the Secretary of Defense to be of immediate military hazard, or (III) in the Philippine Islands on December 7, 1941, and continuously in such islands thereafter, or (iii) at any time, for the purposes of chapter 13 of this title;</p> <p>(D) service as a cadet at the US Military, Air Force, or Coast Guard Academy, or as a midshipman at the US Naval Academy; and</p> <p>(E) authorised travel to or from such duty or service.</p>
Air National Guard <sup>1</sup>		<p>(4) The term “Air National Guard” means that part of the organised militia of the several States and Territories, Puerto Rico, and the District of Columbia, active and inactive, that- (A) is an air force; (B) is trained, and has its officers appointed, under the sixteenth clause of section 8, article I, of the Constitution;</p>



Term	Australian Definition	US Definition
Allied Mariner <sup>2</sup>	<p>means a person who: (a) was during the period of World War 2 from its commencement to and including 29 October 1945: (i) a master, officer or seaman employed under agreement, or an apprentice employed under indenture, in sea-going service on a ship that was engaged in trading; or (ii) a master, officer, seaman or apprentice employed in a lighthouse tender or pilot ship; or (iii) employed as a pilot; or (iv) a master, officer, seaman or apprentice employed in sea-going service on a ship (being a hospital ship, troop transport, supply ship, tug, cable ship, salvage ship, dredge, fishing vessel or fisheries investigation vessel) that was operated by, or on behalf of, a foreign country; and</p> <p>(b) was at any time during the course of that employment during the period referred to in paragraph (a) on a ship that was:</p> <p>(i) operating from a port in Australia or from a port in a Commonwealth country or an allied country; or</p> <p>(ii) engaged in trading with Australia or with a Commonwealth country or an allied country; or</p> <p>(iii) engaged in providing assistance or support to the Defence Force, or to the forces, or any part of the forces, of a Commonwealth country or an allied country; or (iv) engaged in providing assistance or support to Australia or to a Commonwealth country or an allied country; but does not include: (c) an Australian mariner; or (d) a person who has, at any time, been employed by</p>	<p>(C) is organised, armed, and equipped wholly or partly at Federal expense; and (D) is federally recognised.</p>

Term	Australian Definition	US Definition
	<p>a foreign country that was, at that time, at war with Australia; or (e) a person who has, at any time, been employed: (i) on a ship that operated to, or was operating from, a port in a country that was, at that time, at war with Australia; or (ii) on a ship that was engaged in trading with a country that was, at that time, at war with Australia; or (iii) on a ship that was engaged in providing assistance or support to the enemy or to a country that was, at that time, at war with Australia.</p>	
Allied Veteran <sup>2</sup>	<p>means a person (a) who has been appointed or enlisted as a member of the defence force established by an allied country; and (b) who has rendered continuous full-time service as such a member during a period of hostilities; but does not include a person who has served at any time: (c) in the forces of a country that was, at that time, at war with Australia, or in forces engaged in supporting or assisting the forces of such a country; or (d) in forces that were, at that time, engaged in war-like operations against the Naval, Military or Air Forces of Australia.</p>	
Armed Forces <sup>1</sup>		means the Army, Navy, Air Force, Marine Corps, and Coast Guard.
Army National Guard <sup>1</sup>		<p>The term “Army National Guard” means that part of the organised militia of the several States and Territories, Puerto Rico, and the District of Columbia, active and inactive, that—(A) is a land force; (B) is trained, and has its officers appointed, under the sixteenth clause of section 8, article I, of the Constitution; (C) is organised, armed, and equipped wholly or partly at Federal expense; and (D) is federally recognised.</p>

<b>Term</b>	<b>Australian Definition</b>	<b>US Definition</b>
Defence Force <sup>3</sup>	means: (a) the Permanent Forces; and (b) the Reserves.	
Deployment <sup>4</sup>	See warlike and non-warlike service.	Military personnel (active duty, Reservists or National Guard) serving in the primary area of conflict
Mobilisation		the act of assembling Reserve forces for active duty in times of war or national emergency (Source: military.com)
Full-time National Guard duty <sup>1</sup>		means training or other duty, other than inactive duty, performed by a member of the Army National Guard of the US or the Air National Guard of the US in the member's status as a member of the National Guard of a State or territory, the Commonwealth of Puerto Rico, or the District of Columbia under section 316, 502, 503, 504, or 505 of title 32 for which the member is entitled to pay from the US or for which the member has waived pay from the US.
National Guard <sup>1</sup>		means the Army National Guard and the Air National Guard.
Non-warlike service <sup>3</sup>	non-warlike service means service with the Defence Force that is of a kind determined in writing by the Defence Minister to be non-warlike service for the purposes of this Act;	
Warlike service <sup>3</sup>	warlike service means service with the Defence Force that is of a kind determined in writing by the Defence Minister to be warlike service for the purposes of this Act	
Peacetime service <sup>3</sup>	means any other service with the Defence Force	
Reserves <sup>3</sup>	means (a) the Naval Reserve established by the Naval Defence Act 1910; and (b) the Army Reserve established by the Defence Act 1903; and (c) the Air Force Reserve established by the Air Force Act 1923.	With respect to the Armed Forces, the Army Reserve, the Naval Reserve, the Marine Corps Reserve, the Air Force Reserve, the Coast Guard Reserve, the Army National Guard of the US, and the Air National Guard of the US (Source: Department of Veterans Affairs; Government Printing Office- 38 U.S.C. 101 -

Term	Australian Definition	US Definition
Reservist (continuous full-time) <sup>3</sup>	means a member of the Reserves on continuous full-time service.	DEFINITIONS) A member of a reserve component of the Armed Forces ordered to active duty during a period of military conflict (Source: uslegal.com)
Reservist (part-time) <sup>3</sup>	means a member of the Reserves who is not on continuous full-time service.	
Veteran <sup>2</sup>	(a) a person (including a deceased person): (i) who is, because of section 7, taken to have rendered eligible war service; or (ii) in respect of whom a pension is, or pensions are, payable under subsection 13(6); and (b) in Parts III and VIIC also includes a person who is: (i) a Commonwealth veteran; or (ii) an allied veteran; or (iv) an allied mariner.	A person who served in the active military naval, or air service, and who was discharged or released under honorable conditions.  (The government will not recognise you as a Veteran if you have a dishonorable discharge. Veterans who served at least 90 days on active duty in the US Armed Forces during a time of war, however, are eligible for a range of benefits not available to those without wartime service (those of course including VA benefits. Or those given a medical discharge) (Source: Department of Veterans Affairs; Government Printing Office- 38 USC. 101 – DEFINITIONS)
<b>Sources:</b> <sup>1</sup> US CODE Title 10 Armed Forces, Chapter 1, § 101 – Definitions, (Legal Information Institute, Cornell University <a href="http://www.law.cornell.edu/uscode/text/10/101">http://www.law.cornell.edu/uscode/text/10/101</a> ); <sup>2</sup> Australian Government Veterans' Entitlement Act 1986 ( <a href="http://www.comlaw.gov.au/Details/C2012C00505/Html/Volume_1#_Toc328044567">http://www.comlaw.gov.au/Details/C2012C00505/Html/Volume_1#_Toc328044567</a> ); <sup>3</sup> Australian Government Military Rehabilitation and Compensation Act 2004 ( <a href="http://www.comlaw.gov.au/Details/C2012C00436/Html/Text#_Toc324497232">http://www.comlaw.gov.au/Details/C2012C00436/Html/Text#_Toc324497232</a> ); <sup>4</sup> Magruder & Yeager (2009);		

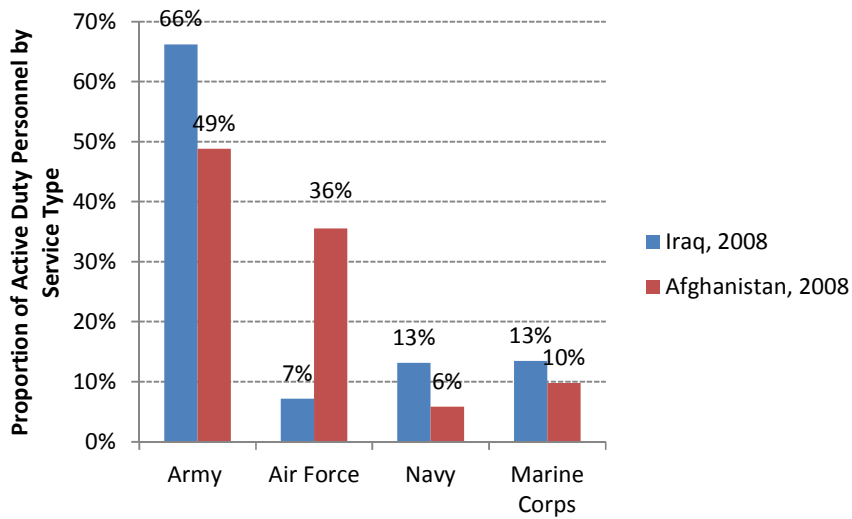
## Appendix B

**Table 9 Common Australian and US Deployments of <1,000 Personnel for either AU or US**

#	Country	Operation	Area	Start date	End Date	Deployment	# of Personnel
1	AU	Palate	Afghanistan	18 Apr '03	5 Jul '04	Warlike	ADF contribution to UNAMA
	AU	Palate II	Afghanistan	27 Jun '05	Current	Warlike	Two ADF Army officers serving as military advisers to UNAMA
	AU	Jural/Bolton	Iraq	30 Jun '91/31 Aug '92	12 Jan '03	Warlike	ADF members assigned to UK operation to patrol the Iraq No-Fly-Zones
	AU	Southern Watch	Iraq	31 Aug '92	12 Jan '03	Warlike	ADF members assigned to the US operation to patrol the Iraq No-Fly-Zones
	AU	Kruger	Iraq	1 Jan '09	July '11	Warlike	ADF contribution to provision of security for Australian Embassy and staff in Iraq
	AU	Riverbank	Iraq	21 Jul '08	Current	Warlike	Two ADF officers to support UNAMI
2	AU	Warden, Stabilise, Faber, Tanager, Citadel	East Timor	16 Sep '99	17 Aug '03	Warlike	5,700 at peak, to 1,600 in '01-'02
	AU	Astute, Tower	East Timor	25 May '06	Current	Non-warlike	390 (Astute) 4 (Tower)
	US	Unknown	East Timor	1999	2002		Support for INTERFET, UNTAET (30 US Personnel), USGET (US support group East Timor, 20 US personnel; CRS, 2011)

Sources: Dept of Defence [Operations](#) page and [Honours & Awards](#) page; and APPVA [Operations](#) page; CRS (2011) [Instances of US Forces Abroad](#); Comlaw.gov.au

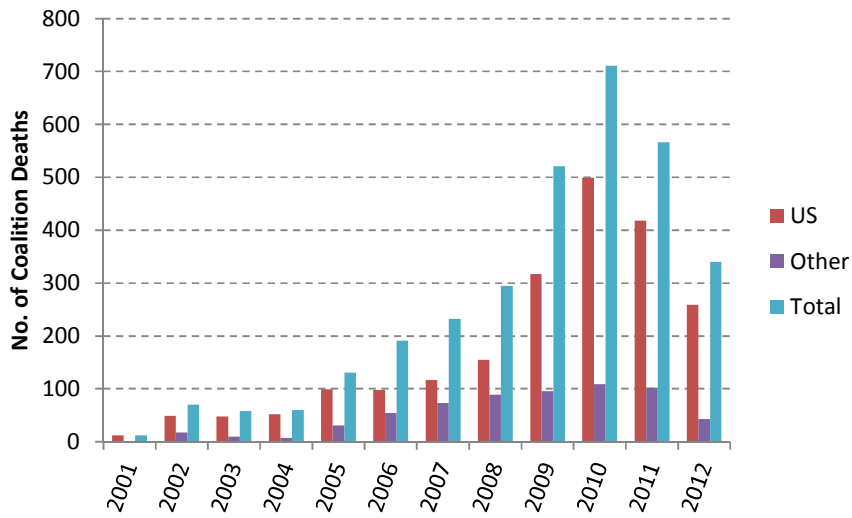
## Appendix C



**Figure 2 Composition of US active duty personnel by service type in 2008 in Iraq and Afghanistan<sup>37</sup> (105) (106)**

<sup>37</sup> Source: Congressional Research Service, US Forces in Iraq, <http://www.fas.org/sqp/crs/mideast/RS22449.pdf> and US Forces in Afghanistan <http://www.fas.org/sqp/crs/natsec/RS22633.pdf>

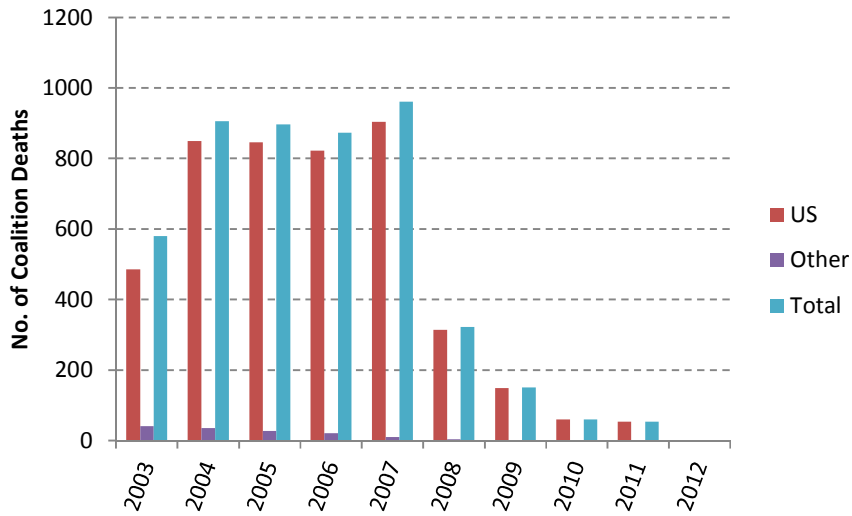
## Appendix D



**Figure 3 Coalition deaths in Afghanistan, by year, and for US, Other, and Total Coalition personnel**

Source: icasualties.org Operation Enduring Freedom. <http://icasualties.org/oef/icasualties.org> , data retrieved 25 Sep 2012.(10)

## Appendix E



**Figure 4 Coalition deaths in Iraq, by year, and for US, Other, and Total Coalition personnel**

Source: icasualties.org Operation Iraqi Freedom, Iraq. <http://icasualties.org/Iraq/index.aspx> , data retrieved 25 Sep 2012.



## Appendix F

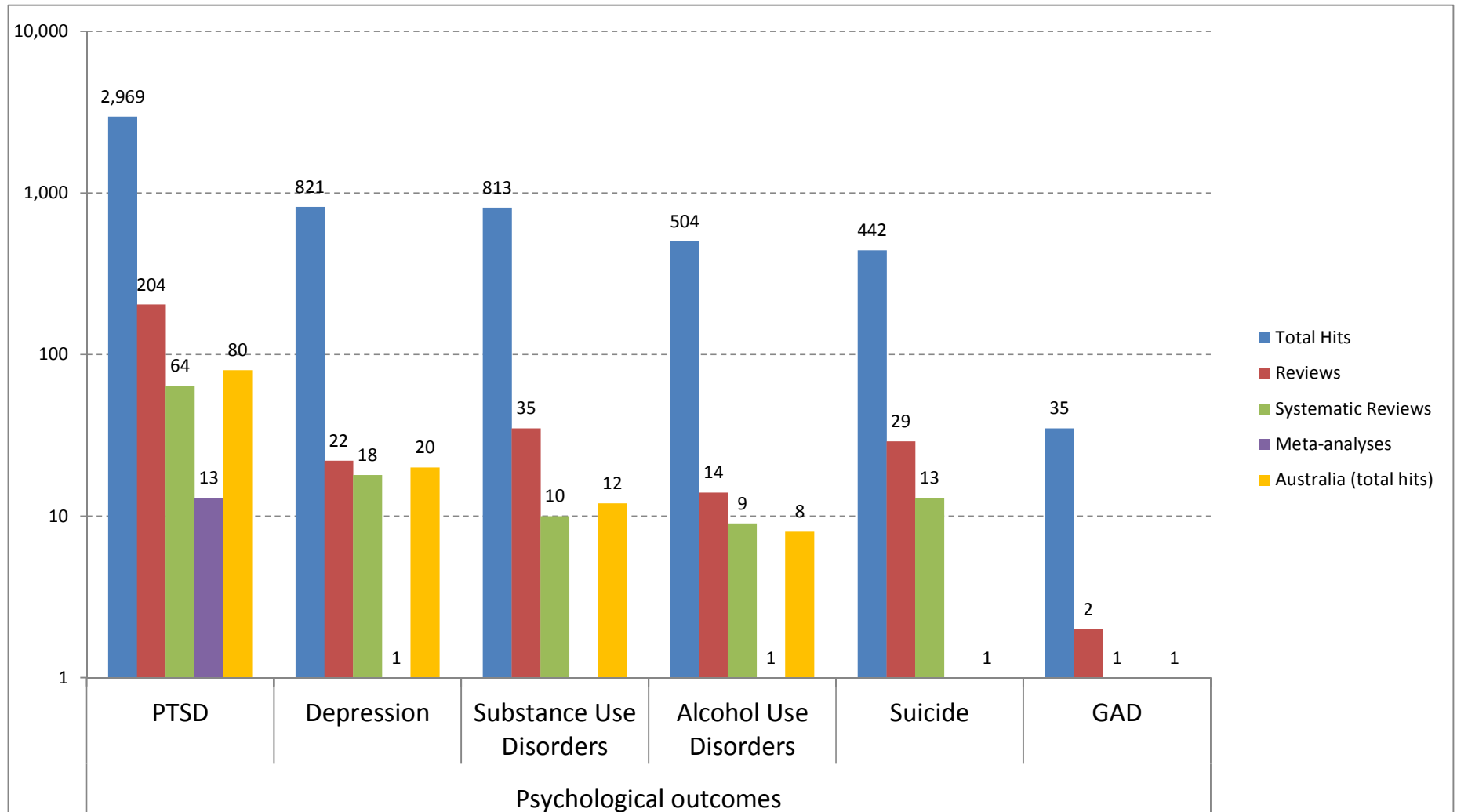


Figure 5 PubMed search summary for Psychological outcomes, including total hits, no. of reviews, systematic reviews, meta-analyses, and Australian hits for each outcome (log scale)

## Appendix G

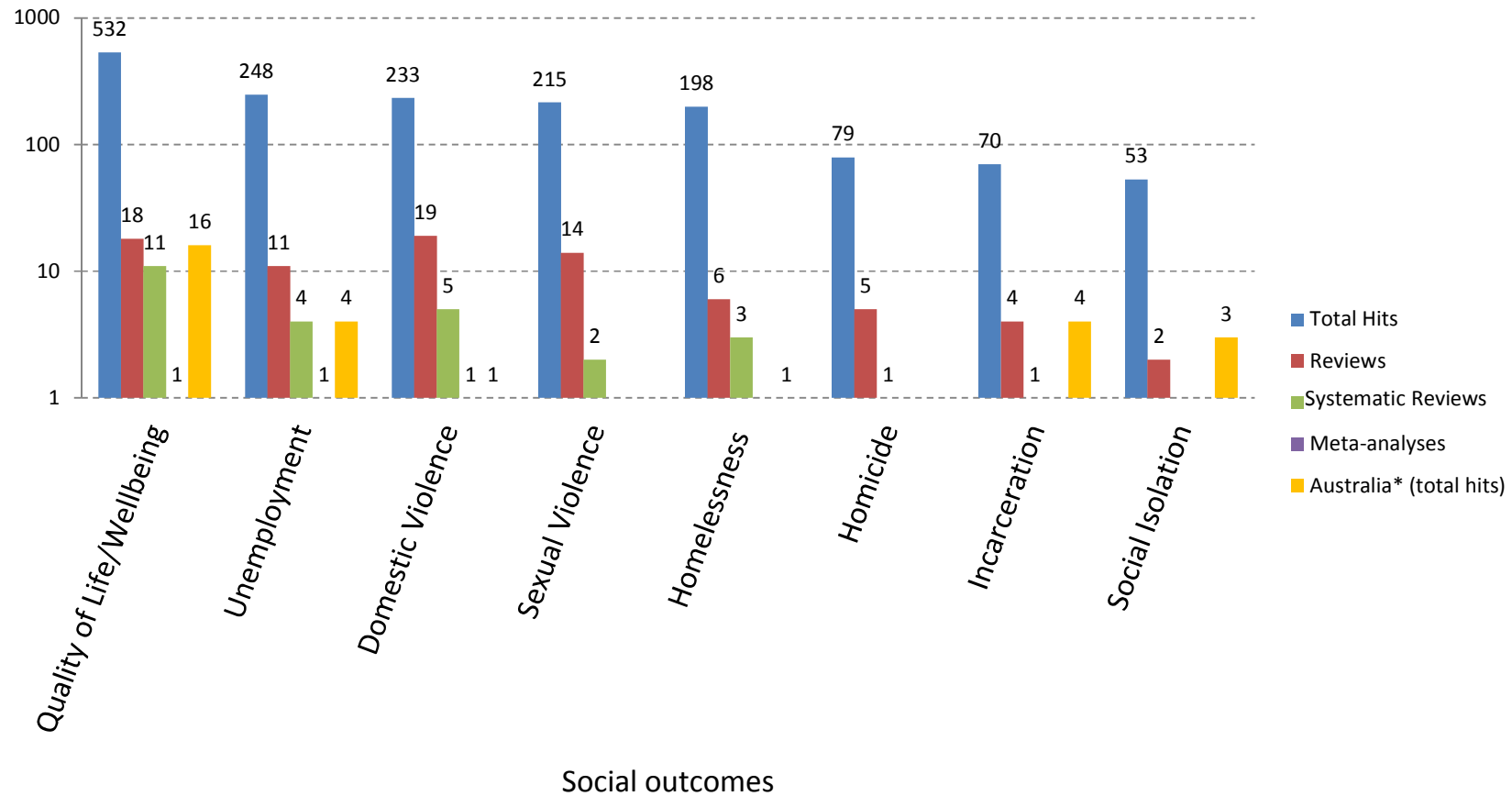


Figure 6 PubMed search summary for Social outcomes, including total hits, no. of reviews, systematic reviews, meta-analyses, and Australian hits for each outcome (log scale)

## Appendix H

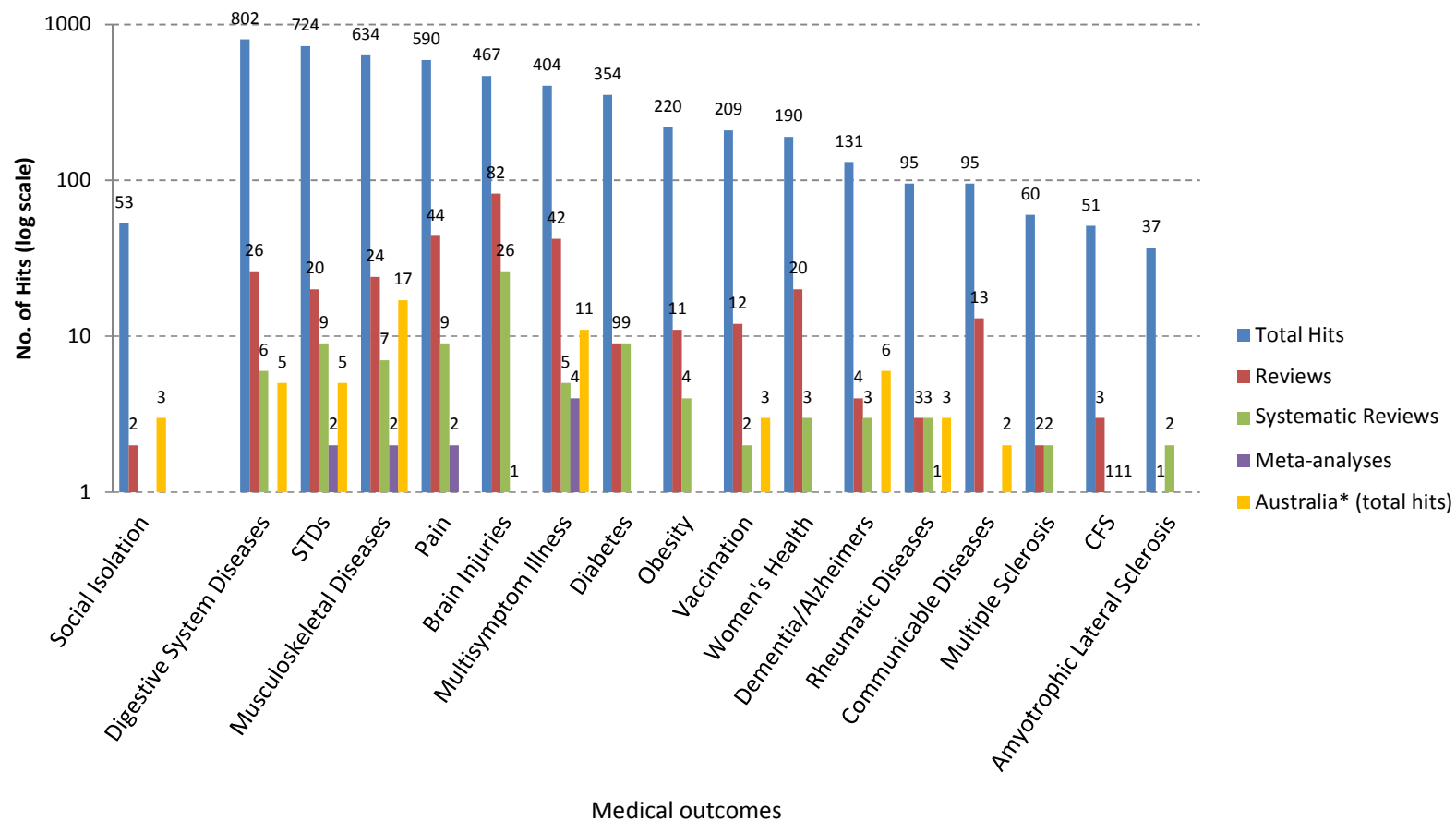


Figure 7 PubMed search summary for medical outcomes, including total hits, no. of reviews, systematic reviews, meta-analyses, and Australian hits for each outcome (log scale)

# Appendix I

**Table 10 Summary of US veteran health services 2000-2014**

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<b>US health services</b>					
<p><b>Types of settings</b></p> <p>Primary care</p> <ul style="list-style-type: none"> <li>▪ Patient Aligned Care Teams (PACTs)</li> </ul> <p>Inpatient (short-term)</p> <p>Outpatient</p> <ul style="list-style-type: none"> <li>▪ General services</li> <li>▪ Specialty services</li> </ul> <p>Residential</p> <ul style="list-style-type: none"> <li>▪ Stand-alone programs</li> <li>▪ Large domiciliary programs</li> </ul> <p>Supported work</p> <p><b>Programs</b></p> <p>Psychosocial Rehabilitation and Recovery Center (PRRC)</p> <p>Residential Rehabilitation Treatment Program (RRTP)</p> <p>National Tele-Mental Health Program</p>	<p><u>VA Facilities (2013)</u></p> <p>VA Medical Centers (VAMCs): 150</p> <p>Community-Based Outpatient Clinics (CBOCs): 820</p> <p>Vet Centers: 300</p> <p><u>Types of CBOCs</u></p> <ul style="list-style-type: none"> <li>▪ Very large (≥10,000 Veterans per year)</li> <li>▪ Large (≥5,000 Veteran per year)</li> <li>▪ Mid-sized (1,500-5,000 Veterans per year)</li> <li>▪ Small (&lt;1,500 Veteran per year)</li> </ul> <p>VAMCs and very large CBOCs provide:</p> <ul style="list-style-type: none"> <li>▪ Mental Health Intensive Case Management (MHICM) teams</li> <li>▪ PRRCs</li> <li>▪ Intensive outpatient programs for SUD</li> <li>▪ Grant and Per Diem programs for homeless Veterans</li> </ul>	<p>All Veterans enrolled in the VA health care system</p> <p><b>Enrolment eligibility</b></p> <ul style="list-style-type: none"> <li>▪ Served in active duty</li> <li>▪ Discharged or released under conditions other than dishonorable</li> <li>▪ Reservists and National Guard members may qualify if they were called to active duty by a Federal order and have completed the full period for which they were ordered to serve</li> </ul> <p><b>1990-1991 Gulf War Veterans</b></p> <p>Exempt from copayments if psychosis or any other mental health illness was developed within 2 years after discharge or release from active duty</p>	<p><b>General</b></p> <p>Among Veterans who used VA health care services in 2013, 26% used mental health services</p> <p>Between 2005 and 2013, the number of Veterans who received mental health care from VA increased 63%, over three times faster than the growth in numbers of VA users overall</p> <p>Veterans from recent conflicts accounted for a significant portion of this increase in mental health service users</p> <p>Between 2002 and 2013, more than 1.6 million Veterans left active duty and became eligible for VA care, and just over half of these Veterans have access to VA care; of these new users, 54% have sought care for mental health</p>	<p><b>Enrolment</b></p> <p>Enrolment eligibility organised by priority groups, of which, certain groups are able to enroll before others</p> <p>If Federal funding drops, some veterans in the lower priority groups could lose VA coverage entirely</p> <p>Some Veterans may have to pay copay to be placed in certain priority groups</p> <p><b>Human resources</b></p> <p>High demands for VA mental health services pose challenges in adequate staffing and providing timely services</p> <p><b>System boundaries and size</b></p> <p>The capacity to deliver mental health care services is affected by geographic location (e.g. travel time to the</p>	<p>In 2013, 11.2% of VA health care spending (\$6.2B) was directed towards mental health care</p> <p>There was a 6% increase in per capita spending on health care services between 2008 (\$3,480) and 2013 (\$3,702)</p> <p><u>Percent spending for different mental health program settings</u></p> <p>2013: 61% outpatient, 25% inpatient, 14% residential</p> <p>2009: 56% outpatient, 30% inpatient, 15% residential</p> <p>2007: 47% outpatient, 36% inpatient, 16% residential</p> <p>2000: 42% outpatient, 43% inpatient, 14% residential</p> <p>In 2006, VA allocated an additional \$158M to MHSP initiatives,</p>

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
VA Readjustment Counseling Service Veterans Center (Vet Center)	<p>Large, mid-size, and small CBOCs provide:</p> <ul style="list-style-type: none"> <li>▪ General mental health services on-site or via telehealth</li> <li>▪ Referrals to RRTPs, VAMCs, or community services via sharing agreement contracts or a non-VA fee basis with local providers or organisations to extend eligibility</li> </ul> <p><b>Hours of care</b> VAMCs and very large CBOCs must provide additional evening, early morning, or weekend hours</p> <p><b>Emergency services</b> VAMCs and very large CBOCs must offer on-site 24/7 emergency care</p> <p><b>Remote areas</b> Veterans living in remote areas may be serviced by MHICM-RANGE or Enhanced RANGE (E-RANGE) programs</p>	<p>and before the 2-year period beginning on the last day of the war (end date not yet determined)</p> <p>Veterans who are not eligible for VA health care but meet the description as stated above can receive treatment for psychosis, mental illness, or any other condition directly related to psychosis or mental illness at no cost</p> <p><b>Primary care</b> Veterans must be enrolled in a VA primary clinic to receive primary care</p>	<p>disorders, more than double the rate seen among all VA users</p> <p>23% of all service-connected Veterans and 50% of Veterans who are service connected for mental health conditions are receiving mental health services from VA</p> <p><b>National Tele-Mental Health Program</b> In 2013, more than 91,000 Veterans received some of their mental health treatment through telehealth</p>	<p>nearest VA facility) and the characteristics of the Veteran population in the region being served (e.g. service connected Veterans are more likely to use VA health care services)</p> <p><b>Cost</b> Variations in costs due to different treatment programs (general outpatient care is least costly, followed by specialty outpatient care, and then by residential treatment and inpatient programs)</p> <p><b>Physical infrastructure</b> Limited space and equipment (i.e. mental health care accounted for 5% of all space managed by VHA in 2013)</p>	<p>including: \$4M MHICM teams, \$6M PRRCs, \$10M telehealth and web-based support tools</p> <p>In 2005, VA allocated an additional \$88M to MHSP initiatives</p>
<b>Posttraumatic stress disorder (PTSD)</b>					

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<p>Medication management</p> <p>Psychotherapies (group or individual)</p> <ul style="list-style-type: none"> <li>▪ Cognitive behavioral therapy</li> <li>▪ Cognitive processing therapy</li> <li>▪ Prolonged exposure therapy</li> </ul> <p>PTSD Coach App (2011)</p> <p>Domiciliary PTSD or PTSD Residential Rehabilitation Treatment Programs</p> <p>Mental Health Treatment Coordinators (MHTC)</p>	<p>VAMCs and very large CBOCs provide:</p> <ul style="list-style-type: none"> <li>▪ Specialised outpatient programs</li> <li>▪ Evidence-based talk therapies</li> <li>▪ Medications on-site</li> </ul> <p>VAMCs and very large CBOCs must have staff with training and expertise to serve the OEF/OIF population through an OEF/OIF team or PTSD program staff</p> <p>Large and mid-sized CBOCs provide:</p> <ul style="list-style-type: none"> <li>▪ Evidence-based talk therapies</li> <li>▪ Medication on-site</li> <li>▪ Telehealth</li> </ul> <p>Small CBOCs provide:</p> <ul style="list-style-type: none"> <li>▪ General and specialty services via on-site or telehealth</li> <li>▪ Referrals to RRTPs, VAMCs, or community services sharing agreement contracts or a non-VA fee basis with local providers or organisations to</li> </ul>	<p>All Veterans enrolled in the VA health care system</p> <p>Veterans must be referred for specialty services by an primary care provider</p>	<p>PTSD Coach App (2011)</p> <p>AboutFace (2012)</p>	<p><b>Avoidance and denial</b> Veterans believe they will get better on their own or think that services are for other people and not them</p> <p><b>Problems accessing care</b> Finding a therapist, transportation, or cost</p> <p><b>Misinformation</b> Not knowing that PTSD treatments work</p> <p><b>Stigma</b> Negative labels or stereotypes (e.g. showing signs of weakness), fear of discrimination at work, school, or finding housing because of symptoms, and damage to career</p> <p><b>Privacy</b> Fear of confidentiality breach in medical records</p> <p><b>Timeliness</b> Most Veterans do not get help until after returning from deployment or after</p>	<p>In 2006, VA allocated \$19M for PTSD services and OEF/OIF care</p> <p>In 2005, VA allocated \$18M for PTSD services and OEF/OIF care</p>

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
	<p>extend eligibility</p> <p><b>MHTCs</b> Veterans who receive specialty mental health care have a MHTC, who serves as a point of contact to ensure continuity throughout the treatment and transition</p>			his/her family tells them there is a problem	
<b>Suicide</b>					
<p>Veterans Crisis Line</p> <p>Suicide Prevention Coordinators</p> <p>Personal safety plans managing suicidal thoughts and feelings</p>	<p>VAMCs and very large CBOCs must appoint and maintain an SPC with a full-time commitment to suicide prevention activities</p>	<p><b>Veterans Crisis Line</b> Offered to all Service Branches, the National Guard and Reserves, Veterans, their families, and providers.</p> <p>In cooperation with the National Suicide Prevention Lifeline, Suicide Prevention Resource Center, and the American Association of Suicidology</p>			
<b>Traumatic brain injury (TBI)</b>					
<p><b>Types of settings</b></p> <p>Acute Inpatient Rehabilitation</p> <p>Transitional Rehabilitation</p> <p>Outpatient Rehabilitation</p> <ul style="list-style-type: none"> <li>▪ Telerehabilitation</li> </ul>	<p>Polytrauma System of Care, local VAMC, or community healthcare providers</p> <p><u>Polytrauma/TBI System of Care Components</u></p> <ul style="list-style-type: none"> <li>▪ Polytrauma Rehabilitation Centers: 5</li> </ul>	<p>All Veterans enrolled in the VA health care system and Service Members covered by TRICARE authorisation</p>	<p>In 2012, 64% of Veteran diagnosed with TBI received care at PSCT facilities and 54% sought treatment at CBOCs</p>	<p>Geographic location</p> <p>Referral needed</p>	<p>In 2012, the average cost of care at VHA facilities for OEF/OIF Veterans with TBI was \$11,481 per capita (this includes inpatient, outpatient, and pharmacy services)</p>

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<p><b>Treatments</b></p> <p>Medication management</p> <p>Learning strategies to deal with health, cognitive, and behavioral problems</p> <p>Rehabilitation therapies</p> <ul style="list-style-type: none"> <li>▪ Physical therapy</li> <li>▪ Occupational therapy</li> <li>▪ Speech-language therapy</li> </ul> <p>Assistive devices and technologies</p> <p><b>Programs</b></p> <p>Polytrauma Transitional Rehabilitation Program</p> <p>Assisted Living Plot Program for Veterans with TBI</p> <p>Emerging Consciousness Program</p> <p>Assistive Technology Labs</p>	<ul style="list-style-type: none"> <li>▪ Polytrauma Network Sites: 23</li> <li>▪ Polytrauma Support Clinic Teams: 87</li> <li>▪ Polytrauma Point of Contact: 39</li> </ul>				
<b>Multisymptom illness</b>					
<p><b>Clinical programs</b></p> <p>Comprehensive Clinical Evaluation Program</p> <ul style="list-style-type: none"> <li>▪ Clinical evaluations for post-deployment</li> </ul>	<p>War Related Illness and Injury Center (WRIISC)</p>	<p><b>Comprehensive Clinical Evaluations</b></p> <ul style="list-style-type: none"> <li>▪ Any deployed Veteran with a complex health</li> </ul>		<p>Referrals needed through an Inter Facility Consult; may only be made by the Veteran's primary care provider</p>	



Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<p>health concerns</p> <ul style="list-style-type: none"> <li>▪ Environmental exposure assessments</li> <li>▪ Neuropsychiatric and neuropsychological evaluations</li> <li>▪ Advanced diagnostic testing when clinically indicated</li> <li>▪ Post-deployment health education</li> </ul> <p>Exposure Assessment Program</p> <ul style="list-style-type: none"> <li>▪ On-site or via telehealth</li> <li>▪ Environmental exposure assessments</li> <li>▪ Education</li> </ul> <p>Integrative Health and Wellness Program</p> <ul style="list-style-type: none"> <li>▪ Preventative health</li> <li>▪ Nutrition</li> <li>▪ Exercise therapy</li> <li>▪ Yoga</li> <li>▪ Acupuncture</li> <li>▪ Meditation</li> <li>▪ Relaxation techniques</li> </ul>		<p>condition and no known cause (medically unexplained symptoms)</p> <ul style="list-style-type: none"> <li>▪ Any deployed Veteran that has had many tests and/or treatment with little to no symptom improvement</li> <li>▪ Any deployed Veteran with possible deployment-related environmental exposure problems or concerns</li> </ul> <p><b>Exposure Assessment Program</b></p> <ul style="list-style-type: none"> <li>▪ All combat Veterans</li> <li>▪ Veterans who participated in military Atmospheric Nuclear Weapons Tests</li> <li>▪ Veterans who participated in Project 112 or Shipboard Hazard and Defense</li> </ul>			

## Appendix J

Table 11 Summary of Australian veteran health services 1990-1999

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<b>Australian health services 1990-1999</b>					
<p>Veterans and Veterans Families Counselling Service (VVCS)</p> <ul style="list-style-type: none"> <li>▪ centre counselling</li> <li>▪ outreach counselling</li> <li>▪ group counselling</li> <li>▪ veterans line</li> <li>▪ formal case management (1996)</li> </ul> <p>Quality of Life package (1993)</p> <p>Vocational and social rehab for veterans (unknown)</p> <p>Improving Social Networks Program (1996-97)</p> <p>Transition Support Services (unknown)</p> <p>Repatriation Comprehensive Care Scheme (1996) – local medical officers take greater responsibility for management of chronically ill or complex conditions</p> <p>Country Outreach Program (1995-96) - Government Health Policy for the Veteran Community in Rural and Remote Areas (1996)</p>	<p>A number of initiatives for younger veterans were announced in the 1994-95 budget; implementation of these initiatives continued through 1995-96.</p> <p>Allied health services extended to include chiropractic and osteopathic services (1995)</p> <p>Acute hospital treatment provided exclusively under the Repatriation Private Patient Scheme (1995)</p> <p>The last Repatriation Hospital was transferred in 1997.</p>	<p><u>DVA:</u> All eligible Australian veterans, peacekeepers and their family members, and other ADF personnel referred under an agreement on a fee for services basis.</p> <p><u>Medicare:</u> Veterans may choose to seek services through the Medicare or private health systems.</p>	<p>In 1994 the median age of veterans receiving a disability pension was 72 years with 79% aged 65 years or over. An increase in the use of services was attributed to the ageing/increased frailty of the veteran population.</p> <p>Of the people entitled to health care through DVA in 1996, 108,415 (31.8%) lived in rural and remote areas. Rural programs initially started with approximately 20 centres, this increased over the years to almost 70 centres nationwide.</p> <p>Demand for VVCS services reached a new high over 1997-98, centres were contacted by 2800 new or re-presenting clients.</p> <p>1997-98: VVCS staff provided more than 30,000 sessions in metro areas. In rural and remote areas, over 27,000 sessions were provided. Group program activity was significantly increased during the year under the Younger Veterans' Program; with over 500 courses conducted for 4800 participants. Veterans' Line responded to 5600 calls seeking after-hours crisis counselling or information.</p>		
<b>Posttraumatic stress disorder (PTSD)</b>					

<b>Services/programs</b>	<b>Availability</b>	<b>Eligibility</b>	<b>Utilisation</b>	<b>Barriers/challenges</b>	<b>Resources/funding</b>
The National Centre for War-Related PTSD (1995) in collaboration with the University of Melbourne.		Veterans, peacekeepers and current serving personnel with PTSD and related problems.			DVA contracts with Australian Centre for Posttraumatic mental health (ACPMH) to accredit the PTSD group treatment programs.
<b>Suicide</b>					
<b>Traumatic brain injury (TBI)</b>					
<b>Multisymptom illness</b>					
Repatriation Comprehensive Care Scheme (1996) – local medical officers take greater responsibility for management of chronically ill or complex conditions					

## Appendix K

Table 12 Summary of Australian veteran health services 2000-2014

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<b>Australian health services 2000-2014</b>					
<p>Veterans and Veterans Families Counselling Service (VVCS)</p> <ul style="list-style-type: none"> <li>▪ centre counselling</li> <li>▪ outreach counselling</li> <li>▪ group counselling</li> <li>▪ veterans line</li> <li>▪ stepping out program (2007)</li> <li>▪ Operation Life workshops (2007)</li> </ul> <p>DVA On Base Advisory Service (2010)</p> <p>Mental Health All Hours Support Line</p> <p>Psychosocial Rehabilitation (unknown)</p> <p>Transition Support Services (unknown)</p> <p>Integrated People Support Strategy (2007)</p> <p>Lifecycle (2007)</p> <p>Allied health services</p> <p>E-health:</p> <ul style="list-style-type: none"> <li>▪ Wellbeing toolbox (2010)</li> <li>▪ DVA YouTube mental health videos (2012)</li> <li>▪ DVA At Ease mental health web portal (2006)</li> <li>▪ Entitlements self-assessment</li> </ul>	<p>For serving members, including full-time ADF members and reservists on CFTS, Defence is responsible for all their medical needs.</p> <p>Once an ADF member is discharged, DVA is responsible for all components of their care and rehabilitation.</p>	<p><u>DVA:</u> All eligible Australian veterans, peacekeepers and their family members, and other ADF personnel referred under an agreement on a fee for services basis.</p> <p><b>DVA Liability claims:</b> For conditions related to Defence service, a claim can be submitted to have liability accepted by DVA. Veterans need to claim under the correct Act for which they are eligible. DVA online eligibility self-assessment</p> <p><u>Medicare:</u> Veterans may choose to seek services through the Medicare or private health systems.</p>	<p><u>VVCA 2013-14</u> 14,136 clients received one or more episodes of counselling</p> <p><u>Veterans' Line</u> received 7,050 calls in 2014–15.</p> <p><u>VEA, SRCA, MRCA</u> At March 2013, 148,700 were supported with one or more service-related disabilities. Of these, 46,400 had an accepted mental health disability.</p> <p><u>At Ease</u> 89,537 website hits (2013-14)</p> <p><u>Operation Life</u> 4,768 website hits (2013-14)</p> <p><b>DVA 2013-14:</b> 93.4% of the veteran population used medical services. 10.6m medical services</p>	<p><u>DVA annual report 13/14</u></p> <ul style="list-style-type: none"> <li>▪ Difficulty diagnosing mental health disorder</li> <li>▪ DVA does not have specialist mental health advisers</li> <li>▪ Stigma</li> <li>▪ Deployability concerns</li> </ul> <p><u>Dunt Report (107)</u></p> <ul style="list-style-type: none"> <li>▪ Stigma around weakness</li> <li>▪ Undiagnosed PTSD</li> <li>▪ Limited or no mental health services in remote areas</li> <li>▪ Lack of professionals who understand veteran experiences</li> <li>▪ Pride</li> <li>▪ Veterans acknowledging they have a problem</li> <li>▪ Feelings of solitude and isolation</li> <li>▪ Those who only have peacetime service</li> </ul> <p>Veterans may not know which act their entitlements are covered by. Depending on when the condition presents, veterans may not know how to access</p>	<p><b>DVA 2013-14:</b> The average cost per medical service was \$77.72</p> <p><b>VEA Expenditure</b> Compensation and support: 6.23bn Health: 5.10bn</p> <p><b>SRCA Expenditure</b> Compensation and support: 128.8m Health 37m</p> <p><b>MRCA Expenditure</b> Compensation and support: 152.3m Health: 24.7m</p> <p><u>Mental Health Strategy Report</u> DVA spends approximately \$166 million annually (2011-12): <b>VVCS:</b> 26.1m <b>Australian Centre for Posttraumatic mental health (ACPMH):</b> 1.3m <b>Consultant Psychiatrist:</b> 17.8m <b>Mental Health Initiatives:</b></p>

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<p><b>DVA:</b></p> <ul style="list-style-type: none"> <li>• Veterans' Access Network and General Enquiries Line</li> <li>• DVA rehabilitation services</li> <li>• DVA health care services</li> </ul> <p><b>DEFENCE:</b></p> <ul style="list-style-type: none"> <li>• JHC all hours helpline</li> <li>• ADF All Hours Support Line</li> <li>• Defence Family Helpline (2012)</li> <li>• SeMPRO 24/7 support service</li> <li>• Member Support Coordinators (2012)</li> <li>• Soldier Recovery Centres (2012)</li> <li>• ADF Rehabilitation Program (2007)</li> <li>• Garrison Health Operations (2012)</li> <li>• Contracted health professionals who deliver services through Medibank Health Solutions contract</li> </ul>			<p>were accessed.</p> <p>SRCA Clients: 50,053 SRCA open rehab cases: 1,160</p> <p>MRCA Clients: 15,971 Open rehab cases: 631</p>	<p>their entitlements.</p> <p><b>Medical discharge complications:</b></p> <ul style="list-style-type: none"> <li>• Multiple injuries</li> <li>• Accepted military compensation claims</li> <li>• Previous rehabilitation programs</li> <li>• May have to find civilian medical service providers</li> <li>• Geographic relocation</li> <li>• Possible loss of support networks</li> <li>• Removal of Defence structure</li> <li>• Medical discharge process can affect attitudes towards rehabilitation and DVA</li> </ul> <p>Expectations of what DVA can provide</p>	<p>3.8m <b>GP:</b> 22.5m <b>Public Hospitals:</b> 29m <b>Private Hospitals:</b> 32.8m <b>Pharmacy:</b> 30.3m <b>Allied Mental Health workers:</b> 2.4m</p>
<b>PTSD</b>					
<p>PTSD Coach app Australia (2011)</p> <p>ACPMH accredited PTSD Treatment Programs</p> <p>PTSD Group Therapy Program</p>		<p>Veterans, peacekeepers and current serving personnel with PTSD and related problems.</p>	<p><u>2005-2010</u> of the 50,279 clients seen by VVCS, 8280 (16.5%) people nominated PTSD as their primary presenting problem.</p> <p><u>PTSD Coach:</u> 10,237 website hits (2013-14)</p>	<p><u>CMVH Review of PTSD Programs</u></p> <ul style="list-style-type: none"> <li>▪ Uncertainty about what help was available</li> <li>▪ Difficulty accepting the presence of a problem</li> <li>▪ Economic or time constraints</li> <li>▪ Insufficient numbers of mental health professionals</li> <li>▪ Stigma and concerns</li> </ul>	<p>DVA contracts with ACMPH to accredit the PTSD group treatment programs.</p> <p><b>Australian Centre for Posttraumatic mental health (ACPMH):</b> 1.3m</p>

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
				<ul style="list-style-type: none"> <li>▪ about privacy</li> <li>▪ Career concerns</li> <li>▪ Previous unsuccessful treatment</li> <li>▪ Lack of confidence in mental health professionals</li> </ul>	
<b>Suicide</b>					
<p>Case Coordination team to assist clients at risk of self-harm or harm to others, to navigate DVA services (2008)</p> <p>Operation Life (2007)</p> <ul style="list-style-type: none"> <li>- safe talk</li> <li>- suicide talk</li> <li>- program assist</li> <li>- assist tune up</li> </ul>		Closely linked to the National Suicide Prevention Strategy and the Living Is For Everyone (LIFE) Framework.			
<b>TBI</b>					
ADF/DVA rehabilitation and health care services					
<b>Multisymptom illness</b>					
ADF/DVA rehabilitation and health care services					
<b>Transitions</b>					

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
<p><b>ADF:</b></p> <ul style="list-style-type: none"> <li>Defence Transition Support Services (Regional transition centres, transition seminars, website, links to other government and community services)</li> <li>The Career Transition Assistance Scheme (CTAS)</li> <li>Defence Family Helpline</li> <li>ADF Transition Booklet</li> </ul> <p><b>DVA:</b></p> <ul style="list-style-type: none"> <li>DVA On Base Advisory Service</li> <li>VVCS Stepping Out Program</li> <li>Veterans' Access Network and General Enquiries Line</li> <li>Benefits Guide</li> <li>Entitlement Self Assessment</li> <li>Online Claim for Liability</li> <li>Eligibility and Claim Factsheets</li> <li>A-Z Guide to DVA Services</li> </ul>	<p>There are different responsibilities in the separation process for voluntary and medical separations.</p> <p>Post-transition DVA takes responsibility for all veterans' health care needs.</p>	<p>DVA undertakes activities to ensure that serving and former ADF members and dependants have access to support services provided through joint arrangements between DVA and Defence.</p> <p>DVA works in close liaison with Defence to identify the needs of current and former ADF personnel in order to provide them with the most appropriate support and services.</p>	<p>2013-14 ADF separations: 3,069 voluntary separations. 1,287 involuntary separations.</p>		
<b>Reservists</b>					
<p>Reservists have access to the same services as ADF personnel.</p>	<p>ADF provides treatment for reservists until CFTS is ceased.</p> <p>ADF provides limited treatment for part-time reservists for service-related conditions until they can access their regular</p>	<p>Before DVA can assist, it is necessary to lodge a claim for acceptance of liability for the injury or disease under the MRCA and for it to be determined that there is liability to pay compensation for that injury or disease.</p>		<ul style="list-style-type: none"> <li>Reservist status may impact the way they seek information about entitlements and access and engage with rehabilitation support</li> <li>Part-time reservists do not have access to the full range of services</li> </ul> <p>May experience disruptions to their civilian career which has the potential to compound the impact of their service-related injury or illness</p>	

Services/programs	Availability	Eligibility	Utilisation	Barriers/challenges	Resources/funding
	medical practitioner or until DVA assumes management of their compensation claim.				