

# JMVH

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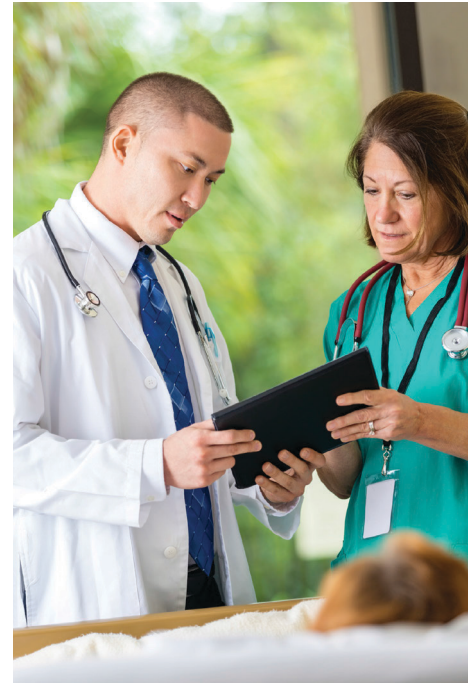


- 2015 Conference Abstracts
- Epidemiology of Medical Discharge in the New Zealand Defence Force
- Australian Doctors at War. A literature review. Part Two: After Gallipoli



The Journal of the Australasian Military Medicine Association





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## STATEMENT OF OBJECTIVES

The Australasian Military Medicine Association is an independent, professional scientific organisation of health professionals with the objectives of:

- Promoting the study of military medicine
- Bringing together those with an interest in military medicine
- Disseminating knowledge of military medicine
- Publishing and distributing a journal in military medicine

Membership of the Association is open to doctors, dentists, nurses, pharmacists, paramedics and anyone with a professional interest in any of the disciplines of military medicine. The Association is totally independent of the Australian Defence Force.

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# Centenary of the August Offensive

Australian Defence Force personnel joined their New Zealand contemporaries at Gallipoli on Saturday, 8 August 2015, to commemorate 100 years since the Battle of Chunuk Bair.

Several Australian Army soldiers stood alongside New Zealand Defence Force personnel to help present wreaths and form an honour guard during an early ceremony at the lower cemetery.

The Governor-General of Australia, His Excellency General the Honourable Sir Peter Cosgrove (Retd) AK MC, and the Governor-General of New Zealand, His Excellency Lieutenant General the Right Honourable Sir Jerry Mateparae GNZM QSO, were met by Maori warriors upon arrival and invited to pay their respects in the lower cemetery before the service began.

Chief of Army, Lieutenant General Angus Campbell, DSC, AM, joined the Governor-Generals of Australian and New Zealand in laying wreaths at the New Zealand Battlefield Memorial at Chunuk Bair.

The Battle for Chunuk Bair, which took place from 6–10 August 1915, was the New Zealand Expeditionary Forces' most significant action in the Gallipoli campaign, and formed an integral part of the August Offensive.

The Wellington Battalion initially seized the hilltop on 8 August, but the unit and all other reinforcing New Zealand units suffered extremely heavy losses. Chunuk Bair was eventually lost on 10 August after sustained Ottoman counterattacks.

New Zealand forces suffered 2000 casualties in August 1915, with approximately 870 killed during the August Offensive.

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# AMMA 2015 Conference Abstracts

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### The ADF Centre for Mental Health Second Opinion Clinic

*Dr Duncan Wallace & LTCOL Jacqueline Costello*

**Presenter: Dr Duncan Wallace**

#### Abstract:

The ADF Centre for Mental Health (ADFCMH) was established as part of the Australian Government's response to the 2009 Dunt Review of Mental Health services in the ADF. The mandate for the ADFCMH includes the provision of expert clinical advice, assessment and treatment services for complex mental health cases and the delivery of tele-psychiatry services to the ADF. To meet these requirements a second opinion clinic was established.

This presentation will describe the establishment and work of a national, military, mental health tertiary referral clinic and the evaluation of its performance through surveys of referring medical practitioners and patients.

A retrospective file review of the first 60 patients seen at the clinic was undertaken. Referrer satisfaction was assessed using an in-house questionnaire, based on the Primary Care Assessment Survey developed by The Health Institute of the New England Medical Centre. Patient satisfaction was gauged using the existing Defence Health Service Outpatient Satisfaction Survey.

Patients seen were complex and appropriate referrals. Almost a quarter of patients were assessed by telepsychiatry. Major Depression, Alcohol Disorders, Bipolar II Disorder and PTSD were the most common disorders seen. The diagnosis was changed in half of the patients seen, resulting in significantly different clinical management and administrative outcomes. High levels of satisfaction with the service were reported by referrers and patients.

#### Biography:

*Dr Duncan Wallace has been a consultant psychiatrist since 1990, practising mainly in public hospitals with special interests in emergency departments, rural psychiatry, telepsychiatry and military psychiatry.*

*Dr Wallace was appointed to his current position as psychiatrist to the Australian Defence Force Centre for Mental Health, at HMAS PENGUIN, Sydney, in 2010.*

*Dr Wallace has extensive operational experience as a Medical Officer in the Navy Reserve. He has deployed on Active Service to East Timor, Iraq, Afghanistan and the Persian Gulf. He also deployed on OP RELEX I to Christmas Island and Ashmore Reef, as well as*

*humanitarian assistance operations in Banda Aceh and Nias in 2005 and 2006.*

*He is a Commodore in the RANR and was posted to the position of Director-General Naval Health Reserves in May 2012.*

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### ADF Medical Specialist Program/ Clinical Placement Deed Update

*CMDR Craig Spinks & CMDR Wendy Davey*

**Presenters: CMDR Craig Spinks & CMDR Wendy Davey**

#### Abstract:

The Medical Specialist Program enables permanent ADF registrars and consultants in specified fields to progress their training and maintain their skills within the civilian health system pursuant to arrangements between the Commonwealth and relevant health service provider. Originally restricted to the SE QLD area it has now expanded across the country with participants in five States. Significant advances in the program have been made since this was last presented at AMMA 2013 and the program continues to grow. This presentation will provide a short history and overview of the program as well as outline its future aspirations.

Clinical placements are being conducted by all Health professionals to consolidate training, provide clinical currency and exposure to broader clinical and medical presentations. The revised Clinical Placement Deed template has streamlined the process of establishing new Deeds, with around 60 now in place nationally. Reporting of clinical placements occurs monthly, and has provided an insight into the ongoing challenges that are faced by the ADF as members seeking to undertake placements are faced with competing demands. This presentation will provide a short update of progress in the usage of the deed mechanism for maintaining clinical currency and the lessons learnt by the administrators of the program that may be applicable to those in the audience.

### Biography:

*Commander Craig Spinks RANR - A career Naval Aviator and civilian solicitor by trade, CMDR Spinks is undertaking a period of reserve service within Joint Health Command in his role as the Medical Specialist Program Manager.*

*Commander Wendy Davey RAN - A highly experienced Officer, CMDR Davey has had a range of administrative and operational postings throughout her career including Commanding Officer HMAS Cairns. In her role as Staff Officer Clinical Placement Governance she is the interface between Defence and a range of civilian health service providers.*

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## ADF Mental Health and Wellbeing Strategy 2016-2020: Where We Have Come From and Where We Are Going

*COL Nicole Sadler & Mr David Morton*

**Presenter: COL Nicole Sadler**

### Abstract:

The current ADF Mental Health Strategy Capability Through Mental Fitness, and the subordinate ADF Mental Health and Wellbeing Action Plan (2012-2015) expire at the end of 2015, and throughout this year Defence has been developing the next iteration of the Strategy. This presentation will provide a review of the current Strategy, including the key achievements and outcomes, and then outline Defence's strategic vision for mental health and wellbeing for the period 2016 to 2020. This will include an outline of the implementation and governance process for the ADF Mental Health and Wellbeing Strategy 2016-2020.

The ADF Mental Health and Wellbeing Strategy 2016-2020 has been developed in close collaboration between Joint Health Command, the single Services and members of the Mental Health Advisory Group. Throughout the development process extensive

internal consultation occurred with commanders and command teams, mental health and health providers and personnel management and cultural reform agencies, and external to Defence with national mental health and health experts, other Government Departments, including the Department of Veterans' Affairs, and ex-service organisations. This process has resulted in the development of a Strategy which aims to: consolidate the achievements under the current Strategy and align with national approaches to mental health; align with ADF personnel initiatives and cultural reforms; continue to acknowledge that mental health and wellbeing is a shared responsibility between individuals, commanders and health providers; be inclusive of spiritual health; increase the focus on wellbeing and resilience, whilst ensuring Defence continues to improve service provision for mental health problems and disorders; improve the communication of the Strategy and associated policies and initiatives.

### Biography:

*Mr David Morton. David Morton is the Director General Mental Health, Psychology and Rehabilitation in Joint Health Command, Department of Defence. He has held this position since 2010 and his primary role and responsibility is to establish the policy and program framework supporting delivery of an integrated approach to mental health and rehabilitation services within Defence. David has a Bachelor of Social Work and has completed post graduate studies in Public Sector Management. He has extensive work experience in a variety of roles within the Department of Defence and Department of Veterans' Affairs (DVA), including as Director Mental Health Policy within DVA and as the National Manager Veterans and Veterans families Counselling Service (VVCS).*

*Colonel Nicole Sadler CSC. COL Nicole Sadler is the Director Strategic and Operational Mental Health within Joint Health Command. She is also the Head of Corps of the Australian Army Psychology Corps. COL Sadler joined the Regular Army in 1994 as a psychology officer and throughout her career has worked in recruitment, assessment, counselling, training, research, and strategy and policy development. She was the Commanding Officer of 1st Psychology Unit between January 2010 and August 2012. COL Sadler has deployed in support of ADF personnel to Operation BEL ISI, Operation SUMATRA ASSIST, Operation CATALYST, Operation ASTUTE and Operation SLIPPER. She completed the Australian Command and Staff Course in 2004 and was awarded a Master of Psychology (Clinical) degree in 2005.*



## Authors' affiliations:

Colonel Nicole Sadler<sup>1</sup>, Mr David Morton<sup>2</sup>

<sup>1</sup>Joint Health Command. <sup>2</sup>Department of Defence

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## ADF Sterilising Capability Improvement Project

*Ms Madeline Makeham*

**Presenter: Ms Madeline Makeham**

### Abstract:

A desktop review into known incidents involving sterilising activities over four years concluded that causal factors were human and systems related. Policy, governance and training/orientation were identified as key areas for review and development. A project to address these findings and minimise the potential risks associated with Defence sterilising was endorsed as a high priority by SGADF in Dec 13.

The project aimed to standardise governance, policy and training to move Defence Health services towards improving current sterilising practices. The project commenced in Apr 14 with a working group being convened in Jun 14.

The working group was made up of appropriate garrison and Service representatives. Four meetings of the SCIP WG were held throughout the duration of the project.

The SCIP Working Group (WG) reviewed the key areas identified at the outset of the project. This was achieved through review of extant Defence Policy and civilian standards and analysis of existing training provided and competency assessment programs within the Defence healthcare environment.

Two audits were conducted in the course of the project. The audits highlighted other improvement opportunities in relation to reprocessing in Defence healthcare facilities. These included facility design suitability for reprocessing and appropriate risk identification and management by frontline staff.

The ADF SCIP WG found that overall garrison facilities and single Service health services are generally compliant with civilian and Defence reprocessing standards. A suite of recommendations were made by the SCIP WG in Jun 15 to SGADF in relation to reprocessing in the ADF healthcare environment. These recommendations have been considered and are in the process of being implemented.

## Biography:

*Ms Madeline Makeham is a Registered Nurse with over 30 years experience in a variety of healthcare organisations. Most recently Madeline has worked as a Clinical Risk Manager for Harrison Health Operations and has been involved in a number of Quality Improvement initiatives that have contributed to the provision of safe healthcare to Defence members.*

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## ADF Trauma Clinical Practice Guidelines - about time?

*LTCOL Michael Reade*

**Presenter: LTCOL Michael Reade**

### Abstract:

One of the most important advances in military trauma care in the last 14 years has been the US and UK military clinical practice guidelines (CPGs). Traditional military surgery textbooks assume little baseline knowledge and provide an overview of a clinical topic, typically in extended prose from which it can be difficult to extract quickly specific guidance. Writing and editing such books is onerous, which results in new editions appearing only every 5-10 years. In contrast, modern military CPGs provide terse practical instructions on controversial clinical decision points, making the assumption that the practitioners reading them will already have a broad theoretical construct in which to frame the advice. They provide a standardised, "military" way of doing things, accepting that other practices may be better in other situations. Generally around 3-10 pages long, they are much easier to update than textbooks, making them much more responsive to feedback from the deployed environment and to new research. By explicitly requiring specific actions in certain situations, often within a specified timeframe, they form the basis of an effective quality improvement audit tool, and a mission-essential list of drugs and equipment. By identifying knowledge gaps, they also

drive priorities in future research. Specific examples from the US Joint Trauma System include:

- The requirement that all patients with soft tissue, exposed bone or open joint wounds must receive Cefazolin 2 g IV q6-8 hrs or Clindamycin 600 mg IV q 8h at the first level of surgical care; and
- The requirement that all trauma surgery patients receive sequential calf compression devices from the time of intraoperative management, and 30mg enoxaparin SC bd within 12hrs of laboratory evidence that coagulopathy has been corrected.

Many US and UK guidelines are directly applicable to the ADF, but some are not, either because of differences in Australian practice (such as drug selection) or resources available (such as lack of CT scanning capability). The ADF has had several documents providing this type of advice, including ADFP 709 Casualty Treatment Regimes (dated 1995) (concerned primarily with prehospital care), a critique (with endorsement or modification as appropriate) of the 2004 edition of the US Emergency War Surgery Textbook, and an extensive series of Clinical Practice Guidelines prepared by the (then) 2nd Health Support Battalion in 2010-2011. However, in an era of rapidly changing clinical practice, much of this advice is now dated. The key differences between the ADF and the US / UK are: 1. lack of a Joint (rather than single-service) structure to take responsibility for such guidelines; 2. lack of agreed scope; and 3. lack of a process for constant review. Such problems are not insurmountable. Joint Health Command already provides guidance in other fields of clinical practice. The optimal scope requires discussion, but a provisional list is readily identified. Writing and updating such guidelines will require extensive input from Reserve specialists, but this is arguably a comparatively wise investment in training days. In short, ADF-specific CPGs are a desirable endstate that is within our reach.

### Biography:

*LTCOL Reade is a specialist anaesthetist and intensive care physician, with training at Royal North Shore in Sydney, the Austin in Melbourne, the John Radcliffe in Oxford and the University of Pittsburgh. He has a doctorate in applied molecular biology from Oxford and a Masters in clinical trials. In November 2011 he was appointed to a full-time Defence position as the inaugural Professor of Military Surgery and Medicine at the University of Queensland, and he is the Director of Clinical Services of the Regular Army's only field hospital. He has deployed seven times, most recently in 2015 as the Director of Clinical Services at the Role2E Hospital, TG Taji, Iraq. His research is at the interface of civilian and military trauma, including the*

*provision of blood products in austere environments, management of traumatic coagulopathy, and trauma systems design.*

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## Application of Clinical Governance in the Role 2E Environment: The 2nd General Health Battalion Experience

*LTCOL Michael Reade, LTCOL Russell Linwood, COL Bradley McCall, LTCOL Nicholas Duff, LTCOL Clarke Flint & MAJ Paul Krohn*

**Presenter: LTCOL Michael Reade**

### Abstract:

Military health governance, both in the garrison and deployed environments, has improved markedly over the past few years through a series of deliberately chosen initiatives. This paper will outline the experiences of the 2nd General Health Battalion (2GHB) during this time as it continues to aspire to the delivery of the best possible safety and quality in healthcare. The paper will be delivered in four sections.

Health restructure issues including the management of health care delivery will be addressed. The optimisation of both corporate and clinical governance included the introduction of a Director of Clinical Services to supplement that of the Commanding Officer. Splitting technical (DCS) and command (CO) authority essentially mirrors the structure of modern civilian hospitals.

How that Clinical Governance Framework was developed and then implemented will be presented, including the necessary investment in supporting processes to achieve certification of a R2E capability. That Framework includes the use of national best practice through the conduct of Continuous Quality Improvement. 2GHB is now benchmarked against the ten National Standards prescribed by the Australian Commission for Safety and Quality in Health Care.

The steps taken to enable the Force Preparation of a body able to respond to any deployment or national or international emergency will be outlined. This experience has culminated in the operational deployment in 2015 to the Middle East Area of Operations on Operation OKRA, Australia's support to the Government of Iraq in combating Da'esh. Examples include high fidelity training (with a policy of minimal notional) with cases based on patterns of injury drawn from recent and current operations (trauma registries), and a focus on credentialing that reviews qualification and currency to maintain professional attestation. It also includes certification exercises (HOSPEX) that involve the delineation of performance indicators evaluated by independent assessors with subject matter expertise, clinical currency and limited bias. Structures and processes acknowledge the unique nature of Defence health care compared to the civil sector, and also notes differences between coalition partners.

Current Clinical Governance initiatives taken during deployment on Operation OKRA in the Middle East will also be presented. These include a specific Clinical Governance Directive tailored to a range of real time applications of improved practice including provision for audit and patient feedback, haemovigilance and infection control reporting. In virtually every area of hospital practice, the R2E meets Australian civilian standards. For the first time in an ADF hospital on operations, the deployed Director of Clinical Services, as the representative of Surgeon-General ADF, has full responsibility for the standard of clinical service, given the constraints of the operation and the conditions imposed by the command chain.

Defence health governance has progressed in a very positive fashion at many levels in past five to ten years. Within 2 GHB these improvements have been achieved by the improved uptake of health governance by all ranks and health disciplines and improved communication within the wider Defence and national health communities.

### Biography:

*Lieutenant Colonel Reade trained in anaesthetics and intensive care medicine at Royal North Shore Hospital in Sydney, the Austin Hospital in Melbourne, the John Radcliffe Hospital in Oxford and the University of Pittsburgh Medical Center. He has a doctorate in applied molecular biology from the University of Oxford and a masters in clinical trials from the University of Pittsburgh. In November 2011 he was appointed to a full-time Defence position as the inaugural Professor of Military Medicine and Surgery at the University*

*of Queensland. He is also the Clinical Director of the Regular Army's only field hospital. He has deployed seven times, most recently in 2015 as the Director of Clinical Services at the ANZAC Role 2E Hospital, Taji, Iraq. His research is at the interface of civilian and military trauma, including the provision of blood products in austere environments, management of traumatic coagulopathy, and trauma systems design.*

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## Army Health Workforce Reform is Implementation of Nurse Practitioners One Strategy?

*CAPT Roneel Chandra*

**Presenter: CAPT Roneel Chandra**

### Abstract:

The Australian Defence Force (ADF) is postured to respond to a spectrum of military operations. Despite the demands place on the ADF, the organisation is constrained by a budget. The White Paper (2014) will increase the defence budget from 1.8% of GDP (29.3 billion) to 2% OF GDP by the 2023-2024 financial year to support ADF operations. For the ADF this means providing realistic and affordable strategies to meet Australia's defence current and future objectives; especially when investment on current ADF posture will impact on money available for investment in the future force (Department of Defence, 2014).

Currently Medibank Health Solutions is primarily responsible for the delivery and management of health services in barracks for the 80,000 permanent and reserve Australian Defence Force personnel. In the FY12/13 a Medibank Health Solution Report revealed a total cost of healthcare services was \$170 million, which continues to grow each year. (Medibank Health Solutions, 2013). Similar to

defence, the public sector is motivated to change to meet current budget and evolve with the dynamic healthcare environment. This includes adopting efficient and effective methods of health care delivery without compromising quality and safety.

Nurse Practitioners (NPs) are highly qualified and experienced nurses with the ability autonomously assess, diagnose prescribe, refer and discharge patients (Government of South Australia, 2010). The implementation of Nurse Practitioners into the health workforce is one method the public sector is implementing to meet demands of health-care whilst balancing resources. In 2002 a Senate inquiry into nursing, recommended Commonwealth and State Governments promote the development and introduction of NPs across Australia as a viable component of healthcare services (Queensland Health, 2003). This was facilitated in 2010 with the Australian Senate passing legislation to provide NPs access to the Medical Benefits Scheme (MBS) and the Pharmaceutical Benefits Scheme (PBS).

#### Example of Health work force restructure with NPs

Treatment teams are deployed in the field either as primary health care or as a resuscitation team. In both structures Medical officers in the current model are trained as a Fellow Royal Australian College of General Practitioners (FRACGP) or Fellow Australian College of Rural and Remote Medicine (FACRRM). Both teams have identical structure in terms of staff mix, however the equipment is task specific.

The above is a suggested model of care with NPs leading the primary health care team. The other significant difference is FACEM trained medical officer strengthening the resuscitation capability. The number of medical personnel remains the same but the ability of both teams is tailored to their roles. Implementing NPs into the health workforce will free Medical Officers to conduct specialty training; therefore having the desired skills to respond to high-end trauma patients seen in recent high intensity conflicts.

The cost benefit is not overtly quantifiable in medical support provided in field environments. However, the Australian Health Workforce Advisory Committee (2006) highlighted a number of benefits of NP programmes. These include decreased waiting times to access assessment and consultation; decrease in duplication of tasks; increased education, mentoring and supervision for junior nurses; reduced disruption in care for clients and transfers between settings; staff satisfaction; and improved patient outcomes.

#### Biography:

*Captain Roneel Chandra enlisted into the Royal Australian Infantry Corp in 2000. Following his deployment to East Timor with the 6th Battalion Royal Australian Regiment on Operation Citadel in 2004, he decided to combine his previous civilian nursing qualifications and military experience by joining the Parachute Surgical Team as a Nursing Officer. Subsequent postings include 2nd Commando Regiment, 1st Health Support Battalion and Singleton Health Centre; providing primary health care, rehabilitation co-ordination and trauma care.*

*The past two years Captain Chandra has conducted a critical care nurse role with the Shock Trauma Platoon at 2nd General Health Battalion. Concurrently he is conducting further education towards a Masters in Nursing, specialising as a Nurse Practitioner, which he will complete this year. His ambition is to establish a Nurse Practitioner role in the Australia Regular Army.*

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### Associations Between Pre-Deployment and Deployment Specific Factors, and Inflammatory Markers Among ADF Members

*Dr Ellie Lawrence-wood, Dr Amelia Searle, Dr Miranda Van Hooff, Dr Blair Grace, Ms Jenelle Baur & Prof Alexander McFarlane*

**Presenter: Dr Ellie Lawrence-Wood**

#### Abstract:

There is now a substantial body of research showing how repeated exposures to trauma over a prolonged period can increase risk of morbidity and even mortality, but neurobiological associations have been poorly characterized to date. This is relevant to military personnel who often experience multiple trauma exposures through combat. A mechanism of particular interest is that of sensitization, whereby individuals who experience repeated exposures may



exhibit greater reactivity over time. Inflammatory markers represent one measure of low level reactivity that may be indicative of sensitization. In order to explore whether deployment and other lifetime exposures are in fact associated with inflammatory reactivity, this paper will present data from the Middle East Area of Operations (MEAO) Prospective Health Study. The associations between static risk factors (lifetime trauma history; previous deployment history; combat exposure), deployment-specific factors (length of deployment; deployment exposures), and inflammation at pre- and post-deployment were examined among 536 high combat exposed ADF members deployed to the MEAO. While number of previous deployments and previous combat experience (marginal) were associated with higher Il-6 at pre-deployment, in multivariate models number of previous deployments remained the most significant predictor of Il-6, and a marginally significant negative association for total number of lifetime traumas emerged. For post-deployment inflammation, number of previous deployments was negatively associated with Il-6 (in contrast to the positive association observed with pre-deployment levels), possibly suggesting resilience among those who have been fit enough to deploy numerous times.

### Biography:

*Dr Lawrence-Wood is a Senior Research Fellow in the Centre for Traumatic Stress Studies at the University of Adelaide. She has been involved in a number of large scale research projects focussed on the health and wellbeing of Australian Defence Force personnel. As the Study Manager for the Impact of Combat Study (Transition and Wellbeing Research Programme), a longitudinal follow-up to the MEAO Prospective Health Study, her current research focus is on the physiological and psychological impacts of deployment to a combat zone. She was also responsible for the Mothers in the MEAO project, aimed at understanding the specific health and psychosocial wellbeing impacts of deployment, for Australian mothers who have deployed to the MEAO. This research forms part of a broader area of research interest regarding the health and wellbeing of women and families in the military and other services.*

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Dr Ellie Lawrence-wood<sup>1</sup>, Dr Amelia Searle<sup>1</sup>, Dr Miranda Van Hooff<sup>1</sup>, Dr Blair Grace<sup>1</sup>, Ms Jenelle Baur<sup>1</sup>, Professor Alexander McFarlane<sup>1</sup>

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## An Audit of Clinical Recall in Garrison Health Operations

*Dr Darrell Duncan*

**Presenter: Dr Darrell Duncan**

### Abstract:

In response to a significant pathology result that was not identified for six months an audit of the reports of outstanding clinical recall in Garrison Health Operations was undertaken. It was identified that there were a number of reasons why the current report was a poor indicator of the performance of the recall and follow up process and more importantly this area continues to be a major source of clinical risk within Garrison Health Operations. Suggestions on how to reduce this risk will be outlined.

### Biography:

*Darrell Duncan has been in the Defence environment for 38 years including service in the Regular Army and continuing service in the Army Reserve. He is a Fellow of the Royal Australasian College of Medical Administrators and holds Masters in Health Administration, Public Health and Clinical Epidemiology. His interests are in applying statistical thinking to everyday problems, use of information on the management and delivery of health care and assessing and improving the quality of health care.*

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## Australian Soldier Load Carriage: From Gallipoli to Afghanistan

*Dr Rob Orr*

**Presenter: Dr Rob Orr**

### Abstract:

From the early Assyrian spearman of antiquity (circa 800 B.C.), soldiers have been required to carry external loads consisting of weaponry, equipment and food. For the Australian soldier during the Great War, the external loads carried were estimated to weigh between 27 to 33.5 kg (59 to 74 lbs) when fighting in Gallipoli and assaulting Mont St Quentin. These loads were similar through the Second World War in the North African desert, being between 22 and 32 kg (48 to 70 lbs), and in the Pacific Theatre, being between 20 and 41 kg (48 lbs to 90 lbs).

Through the Vietnam War, Australian troops generally carried heavier loads of between 30 to 40 kg (66 lbs to 88 lbs) for rifleman and up to 47.5 to 56 kg (105 to 123 lbs) for radio operators. It was these loads that led to the Australian soldiers constantly taking measures to lighten their loads by removing stores like dioxies, blow up mattresses and other non-essentials.

In more recent conflicts in East Timor, Iraq, and Afghanistan these loads are reported to have averaged around 50 kg (110 lbs), representing 56% of the average soldier's body weight. When these recent loads were considered in terms of Marching Order loads alone, the weight rose to an average of 56.7 kg (125 lbs). Interestingly, with an increasing exposure of female Australian soldiers to operational load carriage, recent evidence (1997-2010) suggests that they carry lighter external loads than their male counterparts (female = 26.4 kg; male = 39.0 kg) over a similar operational period. These loads are however more closely aligned with body weight (female = 43%; male = 47%).

The downstream effects of these loads have been shown to impact on the tactics of warfare: From the First World War through to recent conflicts. Likewise they are known to have caused injuries to Australian soldiers ranging in bodily sites from the back to the ankle and knee with muscular stress the leading cause. Given the variations in loads carried by gender, the relative injury risk for female soldiers compared to males when carrying loads over a two year period (01 January 2009 to 31 December 2010) was found to be similar (RR= 1.02: 95% CI 0.74 to 1.41). With this in mind, for female soldiers the relative risk of sustaining a serious personal injury

when compared to male soldiers was notably higher (RR= 2.40: 95% CI 0.98 to 5.88) with the lower back being the most common site of injury and serious personal injury for both genders.

As such, the requirement for soldiers to carry loads has impacted on the Australian soldier through the ages, from the shores of Gallipoli to the sands of Afghanistan. Furthermore, history suggests that these loads are increasing.

### Biography:

*Rob served for over 20 years in the Australian Regular Army as an infantry soldier, physical training instructor, physiotherapist and human performance officer. Still serving in the Army Reserve, Rob took up an appointment at Bond University where the majority of his teaching is on maximising human potential. With a PhD in occupational load carriage for military personnel, Rob has over 20 peer reviewed publications specialising in tactical populations alone and has been invited to present his research both nationally and internationally.*

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## The Benefits of Utilizing Hybrid Military/Private Contractor Medical Services in Conflict Resolution and Post-conflict Rehabilitation Operating Environments. Case Study – Eastern Ukraine and Support to the OSCE in 2014/2015

*Ewen McLay*

**Presenter: Ewen McLay**

### Abstract:

When operating overseas, national and international organization civilian-missions such as the UN, EU and NATO routinely depend on deployed militaries for provision of their medical support. However, gaps often appear in medical coverage at points in

the crisis spectrum, either because militaries are yet to be committed, cannot be committed or have been redeployed. These conditions normally exist at the pre-conflict-resolution or post-conflict-rehabilitation ends of the spectrum.

**Discussion:** To deliver strategic political, diplomatic and development objectives, civilian-missions are required to operate in challenging conditions, providing a persistent presence on the ground while working alongside local populations. This approach results in both physical and policy risks, which combine to constrain the civilian-mission's ability to achieve its objectives. The risks are amplified, since civilian-missions generally do not have organic medical capabilities; there are typically under-developed local medical systems in the operating environment further weakened by conflict; and the presence of high endemic health risks exists, adding to those created by conflict.

Recent examples characterized in part by the situation described above include civilian-missions in Iraq, Afghanistan, Eastern Ukraine and the Ebola-affected countries of West Africa. The latter presenting a different perspective of 'conflict', which could apply equally to any geography affected by national disaster.

Direct experience shows the importance for deployed civilian-missions for utilising a hybrid (combined military, host nation and deployed civilian) medical system. Implementing an effective and sustainable hybrid medical system not only has a direct impact on the deployed civilian-mission, but it can also indirectly impact positively the broader political, diplomatic and development objectives of national and international organizations.

Drawing on recent experience of managing the provision of a hybrid medical system for a civilian-mission in the conflict-affected Eastern Ukraine – through the design, planning, execution and refinement phases – International SOS will address lessons learned, which can be applied to other conflict resolution and conflict rehabilitation environments.

Three educational learning objectives:

1. Participants will hear key lessons learned in hybrid medical system set-up, applicable to other conflict resolution and post-conflict rehabilitation environments.
2. International SOS will share industry best practices for the effective design of a hybrid medical system, including the planning, execution and refinement phases to ensure short- and long-term success and sustainability.

3. The presentation will demonstrate how a hybrid medical system can contribute directly to the deployed civilian mission and indirectly to the wider political, diplomatic and development objectives of both national governments and international organisations.

### Biography:

*Ewen leads International SOS' government services business across Africa and the Middle East. He maintains a particular focus on NATO, UN, EU and OSCE operations, with an emphasis on Afghanistan and Kosovo, and other conflict affected regions such as Ukraine, Mali, Democratic Republic of Congo, Central African Republic and Somalia.*

*Before joining International SOS, Ewen served 25 years in the British Army where he commanded at each level from Platoon to Brigade. In these roles he conducted multiple deployments to Iraq, Afghanistan, Northern Ireland, Bosnia Herzegovina, Kosovo.*

*Ewen has strategic planning experience gained from several tours in the UK's Ministry of Defence, including the Operations Directorate. In this and his previous roles, he was responsible for planning and delivering a comprehensive range of medical (responsibility for the Role 3 in Camp Bastion, Southern Afghanistan), engineering, and logistic support to military operations – in the national, NATO, UN and multi-national domains.*

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## Building GRIT in Performance Focused Populations - Taking it From Theory to the Street

*Mr Mark Mathieson*

**Presenter: Mr Mark Mathieson**

### Abstract:

This presentation will provide an overview of the author's experiences and learning over the past

10 years in the development and application of performance focussed programs aimed at the development of GRIT in individuals and organisations. GRIT is a psychological construct that combines perseverance and passion (motivation) for long term goals and can be differentiated from the more popular construct of resilience in that it has a performance focus. The author will contend that GRIT is a more appropriate framework for the ADF in that it aligns with the performance focus of military personnel. Additional work in using the GRIT framework with veterans with Trauma related difficulties will be covered, along with a new framework for working with PTSD entitled FAST - Functional Adaptation to Stressors Training - an experiential program which allows veterans to re-interpret their behaviours triggered by PTSD.

### Biography:

*Mark is a registered Psychologist and the Founder of The Psyched Up! Group - a niche company that specialises in applying the principles of performance focussed Psychology to the real-world.*

*Over the past 15 years Mark has experienced a broad variety of roles and adventures, with roles taking him from Antarctica to the war-zones of the Middle East. He has served as a Military Psychologist in the Australian Army for over 18 years including a number of years supporting Special Forces and numerous deployments around the world. Mark has designed, managed and successfully achieved mission outcomes on diverse and complex projects including green-field LNG sites in Papua New Guinea, mining companies across Australia and in Laos and Timor Leste, utility companies, NGO's and with individuals and organisations working in the sustainability sector.*

*Throughout these experiences, Mark has developed and refined the application of experiential psychology to real-world environments.*

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## Building Mental Fitness – High Resilience

*COL Nicole Sadler, Assoc Prof Darryl Wade, Stephanie Hodson & Prof Jane Burns*

**Presenter: Stephanie Hodson**

### Abstract:

Resilience is the ability to cope with or bounce back from stress or potentially traumatic events. The ability to do this is enhanced by having the broadest range of coping strategies or 'toolbox' available. Due to the risks of military service, this is particularly true of individuals in the Australian Defence Force (ADF). This can include challenges in training environments, on deployment, providing disaster and humanitarian support or on transition from service. SMART (Self-Management and Resilience Training) is a practical approach to resilience that supports ADF personnel to develop an effective toolbox of coping strategies. It has an active "help yourself, help your mates" method to managing reactions to stressful situations that work at the individual and team level.

The High Resilience (High Res) website and accompanying app recently developed by the Department of Veterans' Affairs jointly with Defence, Phoenix Australia and the Young and Well Cooperative Research Centre, are based on SMART. The website and app include cognitive behavioural therapy based tools, which have been modified to an online and interactive environment, to provide access to serving and ex-serving personnel as well as their families. These e-mental health resources significantly enhance the ability to reinforce the SMART continuum of training conducted in Defence, but also provides access to personnel on deployment or as they transition and face the challenges of post service life.

This presentation will give an overview of the research and model underpinning the tools utilised in both the app and website. It will present a case study to demonstrate how the e-mental health tools can be used by clinicians as a complement to treatment.

### Biography:

*Dr Stephanie Hodson, CSC, works for the Department of Veterans' Affairs as the Mental Health Advisor. She has worked for 22 years in the area of military psychology and is a reserve COL. As an Army Psychology Officer she worked with Defence members in both clinical, research and organisational health roles both in Australia and on operational deployment. In 2002, Dr Hodson completed her doctoral studies investigating the longitudinal psychological effects*



of deployment to Rwanda. In 2006 she assumed command of the 1st Psychology Unit, responsible for all land-based psychology support to ADF operations and had the opportunity to deploy to both the Middle East Area of Operations and Timor Leste. For this work she was awarded the Conspicuous Service Cross. She currently works at the Department of Veterans' Affairs (DVA), as the DVA Mental Health Advisor responsible for technical psychology advice in the areas of clinical practice, primary prevention and research.

### Authors' affiliations:

Colonel Nicole Sadler<sup>2</sup>, Associate Professor Darryl Wade<sup>3</sup>, Stephanie Hodson<sup>1</sup>, Prof Jane Burns<sup>4</sup>

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## Building Mental Health in the New Zealand Defence Force

LTCOL Clare Bennett

**Presenter: LTCOL Clare Bennett**

### Abstract:

Over the last 12 months the NZDF has increased our focus on creating a positive mental health culture, recognising that positive mental health is a key enabler for operational effectiveness.

This presentation provides a summary of identified challenges and opportunities and the strategy and underpinning initiatives that have been developed to maintain and grow mental health across the Defence community.

Our initiatives span four themes:

Lead - focusing on the important role leaders play in creating the right culture, including promoting health and fitness, reducing stigma, managing workloads, supporting and developing their people and building high performing engaged teams.

Understand - better understanding our current state, including the factors that may increase or reduce the severity of mental health related issues, and evaluating the short and long term impacts of life events and intervention support.

Prepare - education and training, including a focus on building resilience, reducing stigma and growing understanding about mental health and the ability to recognise and manage mental health related issues in self and others.

Care - building an integrated multi-disciplinary model of care based on evidence-based practice.

Strong leadership is critical to success as is an intelligence-led approach built on strong internal and external partnerships and clearly articulated process and outcome measures.

### Biography:

Clare has been a member of the NZDF since joining as a Psychologist in 1987. During the latter part of her career she held a range of HR related roles in the HQ environment spanning Psychology, Policy and Strategy. In 2007 she left the Regular Force to work in roles across the broader State Sector, continuing to serve as a Psychologist in the Reserve Force as a Lieutenant Colonel. Last year she joined the Health Directorate where she currently has responsibility for the roll out of the NZDF Mental Health Strategy. Clare was made a Member of the NZ Order of Merit in 2003 and holds a degree in Psychology and Masters in Business Studies and Strategic Studies.

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## The Can't Intubate, Can't Oxygenate Scenario- Update and Who is Responsible

Michael Lumsden-Steel

**Presenter: Michael Lumsden-Steel**

### Abstract:

The Cannot Intubate, cannot oxygen scenario is a medical emergency that requires immediate management in order to preserve life and avoid significant morbidity from hypoxia.

This presentation will provide an update on the cannot intubate cannot oxygenate management guidelines, with particular reference to the role of the team, and what this means for ADF health providers

### Biography:

Full time Anaesthetist in the Royal Australian Air Force, posted to HQHSW and on clinical placement at the Royal Hobart Hospital.

### Author's affiliation:

Journal of Military and Veterans' Health

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### The Changing Needs of Australia's Servicewomen and Female Veterans: A Historical Overview

*Assoc Prof Susan Neuhaus, Dr Ellie Lawrence-Wood, Dr Samantha Cromptvoets*

**Presenter: Assoc Prof Susan Neuhaus**

Abstract:

Australian women have served in overseas military operations since the Boer War. Over the past two decades, an increasing number of women have deployed, often repeatedly, in Australian Defence Force (ADF) operations. Among this group are peacekeepers, reservists and veterans of conflict in Iraq and Afghanistan.

In recent decades, the roles and tasks undertaken by women have become more diverse, including service as helicopter pilots, surgeons, logisticians, explosive ordinance or communications experts and women have participated in combat related activities. As ADF gender restrictions have been lifted, Australian women are now allowed involvement in every aspect of military service, including frontline combat.

As the number of women in the ADF increases, the health issues affecting servicewomen and female veterans can also be expected to increase. As women's roles change, the profile of service-related injury is also expected to change. Expanded roles for women bring new physical demands, such as those that come with wearing heavy body armour on active patrols, and potentially new mental health issues. Significantly, the cohort of servicewomen who have deployed now also includes mothers with dependent children.

Nonetheless, Australian female veterans are an emerging but largely invisible group with unique health needs. This paper will provide an overview of the changing health needs of Australian servicewomen and female veterans within a historical context. This will include a review of the gender specific health needs of the women who served in World War II,

particularly the specific cohort of female prisoners of war, and the health issues confronted by Australian women returning from Vietnam and peacekeeping operations. It will provide a framework to consider the emerging gender-specific health issues related to training and deployment of women in the Australian Defence Force drawing on the lessons of the past and contemporary international evidence.

Biography:

*A/Prof Susan Neuhaus is a graduate of the University of Adelaide and a Fellow of the Royal Australasian College of Surgeons. She has completed 22 years experience with the Australian Army (both Regular Army and Reserve) as a Medical Officer and unit commander and has served in Cambodia, Bougainville and Afghanistan. She obtained the rank of Colonel before transitioning to the inactive reserve. She was awarded the Conspicuous Service Cross in 2009 for service to Army Health. She is actively engaged in issues affecting veterans of war and is widely published on issues of strategic and Defence health.*

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### Chronic Fatigue, Irritable Bowel Syndrome and Chronic Pain in Australian Gulf War Veterans: 20 Years After Deployment

*Dr Helen Kelsall, Dr Jill Ikin, Ms Stella Gwini, Prof Andrew Forbes & Prof Malcolm Sim*

**Presenter: Dr Helen Kelsall**

Abstract:

Background: A baseline study in 2000-2002 found that all fatigue related conditions including chronic fatigue were increased in Gulf War veterans (veterans) compared with a military comparison group. The Follow Up Health Study 2011-2012 re-assessed their physical and psychological health and wellbeing.

**Aims:** The study investigated whether veterans at follow up currently had a higher prevalence of chronic fatigue and other adverse health outcomes including Irritable Bowel Syndrome (IBS) and increased pain, than the military comparison group, and 2) does the persistence, or incidence, of chronic fatigue differ between veterans and comparison group?

**Methods:** A baseline and follow-up questionnaire asked about chronic fatigue (extreme tiredness or fatigue of 6 months or more in the past 12 months). Persistent cases were defined as met health outcome criteria at baseline and follow-up. Incident cases were absent at baseline but present at follow-up. Additional questions using the Chalder Fatigue Scale (CFQ) and the Rome III criteria for Irritable Bowel Syndrome (IBS) were asked at follow-up. The CFQ includes a Physical and Mental fatigue component score. Total scores range 0-33. Fatigue cases were defined as a score  $\geq 4$ .

Pain was measured using the 7-item Chronic Pain Grading Scale (Grade 0 "pain free"; and Grades I-IV of low-high disability and intensity); the Widespread Pain Index which identified areas of the body participants had experienced pain or tenderness in the past seven days (scored 1-19 by summing the number of body areas); and the SF-36 Bodily Pain subscale.

**Results:** Of the final eligible cohort, 715/1,330 veterans (54%) and 675/1,449 comparison group (47%) participated.

More veterans met criteria for chronic fatigue risk ratios RR 1.41 (95% CI 1.02-1.96) than comparison group. Chronic fatigue prevalence more than doubled in both groups at follow up compared with baseline. Amongst veterans there was a greater incidence of new chronic fatigue cases since baseline than in the comparison group, however this was not statistically significant, while remittance and persistence were similar in the two groups. Median total CFQ scores, and median Physical- and Mental fatigue component scores, each indicative of severity, were very similar between the study groups. However, more veterans were defined as CFQ cases RR 1.23 (1.04-1.45). More veterans met criteria for IBS 1.64 (1.18-2.27) than the comparison group.

Veterans were slightly less likely to be pain free, but the difference was not statistically significant. Almost 1 in 5 veterans and 1 in 6 comparison group reported pain that was graded as high in disability and moderately or severely limiting. Around 40% of both groups reported functional limitations because of pain. Veterans were more likely than comparison group to endorse 4-6 RR 1.47 (1.12-1.93) and 11 or more RR 2.89 (1.01-8.28) body areas of pain.

**Conclusions:** Australia's Gulf War veterans had increased chronic fatigue, IBS, and widespread pain than their military comparison group and similar chronic pain at follow up. Our findings highlight the 20 year longer-term physical health of a Gulf War veteran cohort and the importance of effective detection and management of existing chronic conditions.

### Biography:

*Dr Helen Kelsall is a Senior Research Fellow at the Department of Epidemiology and Preventive Medicine Monash University. She was an Investigator on the baseline and follow up Australian Gulf War Veteran's Health study and several other current veteran health epidemiological research studies including the Transition and Wellbeing Research Program. She is also a member of the Editorial Committee of JMVH.*

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## Civil-Military Cooperation and Combat Service Support

*Edmund Ng*

**Presenter: Edmund Ng**

### Abstract:

1. Strategy is the science and art of applying resources and capabilities effectively and efficiently to achieve a mission. All organisations seek a strategic advantage to get ahead in its industry. Alike all organisations, Army seeks the same by incorporating civil-military cooperation (CIMIC) within its strategies to facilitate communication and cooperation between military and civil agencies.
2. 17th Combat Services Support Brigade (17 CSS Bde) currently provides CSS to all of Army including engineering, logistic, transport and health support; but more importantly provides a critical capability to Army. Without the support from 17 CSS Bde, Army is effectively unable to

conduct or maintain operations. Providing various support from across the NATO system, CIMIC is arguably a CSS function, so why is it not an element that is embedded within 17 CSS Bde?

3. A CIMIC force embedded at the Bde level, more specifically 17 CSS Bde, will increase effectiveness of a support force. The integration of a CIMIC force in 17 CSS Bde will afford:
  - a. a more readily deployable force for operations both within Australia and international engagements
  - b. higher interoperability with supported force elements
  - c. opportunities for more efficient and relevant training between and within CIMIC and support elements
4. Regardless if the doctrine is still in development, continual review should always be conducted in order to achieve the best product. Questions should be asked and current concepts challenged to ensure we develop a solution that allows Army to achieve aims and goals in future operations. To enable successful CIMIC, this paper suggests the implementation of raising a CIMIC element within 17 CSS Bde to add value to current strategies. The implementation of a 17 CSS Bde CIMIC unit will produce capabilities for a more specialised and integrated force to enable more reactive and effective command decisions and actions.
5. To enable successful CIMIC, the implementation of raising a CIMIC element -(i.e. advisors and operators) within 17 CSS Bde to add value to current strategies. The implementation of a 17 CSS Bde CIMIC unit will produce capabilities for more specialised and integrated force to enable more reactive and effective command decisions and actions.
6. Continual inclusion of specialised CIMIC advisers throughout planning, and operators supporting the focus of a WOG approach are imperative for Army to achieve success in future operations.

### Biography

*Originally based in Melbourne, Lieutenant Edmund Ng completed a Bachelor of Engineering from the University of Melbourne and with the support of his parents, elder brother and younger sister, moved to Canberra to pursue commissioning into the Australian Army.*

*He graduated from the Royal Military College of Australia into the Royal Australian Army Medical Corps in 2013 before initially being posted to the Army*

*School of Health as a Platoon Commander, where he managed 60 trainee medics from all three services.*

*Edmund currently serves as the Operations Lieutenant of the 2nd General Health Battalion, and is concurrently undertaking further education towards a Masters in Business which he hopes to further develop into a Masters in Public Health or Health Administration in the future. His career interests lie in enhancing his capabilities to foster the overall improvement of the processes within Army Health and government and public sectors.*

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## Clinical Governance in the NZDF; Leading the Way Through Change

*Dr Vanessa Weenink, COL Andrew Gray &  
WGCDR Paul Nealis*

**Presenter: Dr Vanessa Weenink**

Abstract:

The New Zealand Defence Force (NZDF) is going through a series of simultaneous transformational change projects in health. A new model- of -care has re-oriented services to focus on prevention, with the patient at the centre of the model. Another major project is the establishment of the Joint Operational Health Group (JOHG) which will change the organisational structure of health services for NZDF. The Director Defence Health (DDH) has identified clinical governance as a key enabler for these projects to succeed. Clinical governance is interpreted for front-line clinicians and the relevance of it to NZDF Health examined. Local and international examples are used to demonstrate what success may look like. In particular the Canterbury initiative and National Health Service leadership academy in the United Kingdom are described. The Veterans Health Administration (VHA) in America highlights some of the pitfalls when implementing targets to measure performance. Using these examples, the structures and processes of governance in application within NZDF Health are considered and suggestions are



made. The overall intention is that this commentary will highlight the collective responsibility of clinicians at every level to ensure that systems work; in order to best serve our patients.

### Biography:

*I joined the NZDF as a medical student in 1998 as a Territorial medic in the Otago University Medical Corps. In 2000 I became a regular force medical Officer and then graduated from Otago medical school in 2002. After working for 2 years as a House Officer, I started work for the Army full time. I was deployed on Operations 3 times within 2 years. Served as RMO at 2/1 Bn and SMO in Burnham. I trained in General practice part-time between operational service, gaining fellowship RNZCGP in 2012 after leaving the NZDF in 2010. Now I am a GP-owner in a large group practice in Papanui in Christchurch (11000 enrolled patients) working 8/10ths. Also work 2/10ths for NZDF in Burnham Military camp. I'm a mother of one and in my spare-time I like to read, exercise and potter in my garden. I'm passionate about clinical leadership and patient-centred medicine.*

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## A Comparison of Work Health and Safety Incidents and Injuries in Part-time and Full-time Australian Army Personnel

*Dr Robin Orr, Dr Rodney Pope & Dylan MacDonald*

**Presenter: Dr Robin Orr**

### Abstract:

**Introduction:** Part-time personnel are an integral part of the Australian Army. With their operational deployments increasing, identification and management of their work health and safety (WHS) risks is critical. The aim of this research was to compare the patterns of reported WHS incidents and

injuries in part-time and full-time Australian Army personnel.

**Methods:** Employing a retrospective cohort study, data were captured from the Workplace Health, Safety, Compensation and Reporting (WHSCAR) database for the period 01 July 2012 and 30 June 2014, inclusive. The data inclusion criterion was participants identified as serving in either the Australian Army Reserve (ARES) or Australian Regular Army (ARA) in the data collection period. Proportions of reported WHS incidents resulting in injuries among ARES and ARA personnel were captured, along with specific details of the: (a) body locations affected by incidents; (b) natures of resulting injuries; (c) injury mechanisms; and (d) activities being performed at the times incidents occurred.

**Results:** Over two years, 15065 WHS incidents and 11263 injuries were reported in ARES and ARA populations combined. In the ARES population, 85% of reported incidents were classified as involving minor personal injuries, with a further 4% involving a serious personal injury. In the ARA population, 68% of reported incidence involved a minor personal injury and 5% involved a serious personal injury. Muscular stress while lifting, carrying or donning equipment was the leading mechanism of injury for both populations accounting for around a third of all reported incidence. Substantially lower proportions of ARES than ARA WHS incidents involved sports (ARES=2.5%: ARA=8.9%) while substantially higher proportions were associated with combat training (ARES 23.6%: ARA=12.0%), manual handling (ARES=8.5%: ARA=4.7%) and patrolling. (ARES=6.0%: ARA=1.8%). The proportion of injuries attributed to Physical Training was similar, albeit slightly higher for ARA personnel (ARES=20.2%: ARA=24.6%)

**Conclusion:** A lower proportion of reported WHS incidents resulted in injuries in the ARA population than in the ARES population. Rates of injuries associated with combat tasks and manual handling are generally higher in an ARES population and require regular practice to maintain adequate conditioning and so prevent injuries.

### Biography:

*Rob served for over 20 years in the Australian Regular Army as an infantry soldier, physical training instructor, physiotherapist and human performance officer. Still serving in the Army Reserve, Rob took up an appointment at Bond University where the majority of his teaching is on maximising human potential. With a PhD in occupational load carriage*

for military personnel, Rob has over 20 peer reviewed publications specialising in tactical populations alone and has been invited to present his research both nationally and internationally.

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## DeHS and its contribution to Clinical Governance in Defence Health Care

*Dr Felicity Williams, Mr Jason Kerr  
& Dr Andrew Johnston*

**Presenters: Dr Felicity Williams  
& Mr Jason Kerr**

### Abstract:

The Defence eHealth System (DeHS) was introduced into Garrison Health Operations over 2014. It is now used in all Garrison Health facilities and is the first national ehealth system of its type in use in Australia.

Maintaining more than 75,000 health records across the broad range of health disciplines within Defence, the emerging data has exciting potential for application in quality improvement activities, clinical governance and resource management of health in Defence.

The ability to access multiple data sources across the many facets of health care in Defence, and provide comprehensive reports regarding significant aspects of military health care is driving a new era in health management within the organisation.

We will discuss this reporting capability and show, through real-time examples, how Defence is evolving its care and management models in response to data drawn from the System. These changes will aid in improving monitoring of complex and higher risk clinical cases as well as drive the improvement of clinical and management processes to meet the need of this complex and changing organisation.

### Biography:

*Dr Felicity Williams is a GP working in Garrison Health Operations in Joint Health Command. She has previously worked in the RAAF as an MO and AVMO, and on leaving the ADF, has worked in both civilian general practice and military health. In her role as SMA-GHO she provided clinical advice to the DeHS project and was a member of the DeHS implementation team in 2014.*

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## Detection and Mitigation of Hearing Loss in the Australian Defence Forces

*Dr David Sly, Assoc Prof Gary Rance, Assoc Prof Simon Ng, Dr Luke Campbell & Kyle Slater*

**Presenter: Dr David Sly**

### Abstract:

Hearing loss is the most prevalent health problem of returned soldiers, with over 30% of soldiers suffering permanent hearing loss. Within defence environments soldiers are frequently exposed to sustained high noise from military equipment and impulse noise through weapons and blast exposure. When there is a potential hearing loss during training or action, there is currently no way to quickly confirm whether a hearing loss has occurred and this likely leads to under reporting. Also, following blast-related injury, hearing loss is often not examined, as it is invisible. Yet hearing loss is damaging to the individual, can endanger their own life and those of their colleagues and is the single largest expenditure of the DVA. It is important then that hearing loss in soldiers in active duty, particularly after blast or noise exposure, is quickly detected through an objective hearing test.

During 2014-15 with support from the Defence Health Foundation, we began development of a novel medical diagnostics device for point of care hearing testing to meet Defence forces needs. We have developed and trialled an electronics device controlled via a mobile

tablet device that can conduct diagnostic audiometry testing in a completely wireless operation and via telemedicine with the specialist (audiologist) testing remotely over 4G networks. We have validated the use of the device in its teleaudiometry mode in simulated military base noise conditions in 40 Australian soldiers. Our current aims are to maximise the utility of the device for Defence needs by making it capable of performing objective electrophysiological hearing testing in awake and unconscious soldiers after noise exposure or blast trauma and to make the device smaller, rugged and completely head worn.

The device will be the first-of-its-kind in allowing rapid, objective, diagnostic-level hearing tests in the field. Our development of this device would allow collection and centralisation of information for medical staff to aid in decisions about whether soldiers should remain in active duty or be returned home for treatment. Ultimately the use of this device would result in improved operational readiness, safety, potentially fewer casualties, improved immediate medical treatment and improved quality of life outcomes for ADF Personnel as well as their caregivers and families.

### Biography:

*Dr Sly is a Senior Research Fellow and Deputy Director at the Department of Otolaryngology, University of Melbourne. He holds Honorary appointments at the Royal Victorian Eye and Ear Hospital and the Hearing CRC. Dr Sly's research interests are in hearing loss, inner ear protection, cochlear implants. In collaboration with the Australian Defence Forces, he has recently begun investigations into hearing loss in the Australian Defence Forces and development of advanced hearing diagnostics.*

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## Differences in Physical Characteristics and Performance Measures of Part-Time and Full-Time Tactical Personnel: A Critical Narrative Review

*D. MacDonald, Dr Rob Orr & Dr Rodney Pope*

**Presenter: Dr Rob Orr**

### Abstract:

**Introduction:** Tactical personnel such as those in military, law enforcement and fire and rescue services routinely perform physically strenuous occupational tasks, requiring muscular strength, endurance and metabolic fitness. These services are comprised of part-time and full-time personnel, with both groups expected to perform similar occupational tasks, at equivalent levels. Safe fulfilment of this expectation requires adequate physical fitness in both groups, which may be achieved by a combination of initial and ongoing physical fitness assessments and conditioning programs. The aim of this critical review of the literature was to determine and compare between groups what is known on the physical characteristics and performance capacities of part-time and full-time tactical personnel.

**Methods:** Literature databases including PubMed, CINAHL, EBSCO, and Web of Science were searched using search terms including 'full-time', 'part-time', 'reserve', and a range of terms representing military, law enforcement, fire-fighter and first responder populations, to identify relevant published research. To identify the final set of articles to be included in the review specific inclusion and exclusion criteria were applied to the identified articles through initial screening of titles and abstracts, followed by examination of the full text of articles that remained after screening. Reference lists of included articles were manually searched, and colleagues with expertise in the topic area were asked to identify any additional articles of relevance. Included articles were critically appraised using the Downs and Black (1998) checklist for observational studies, and key data were systematically extracted and tabulated prior to critical narrative synthesis of key findings.

**Results:** Six articles were retained for the critical narrative review, with a mean methodological quality score of 58% (range 57% to 61%). Based on the inclusion and exclusion criteria, each study included both part-time and full-time personnel, to enable comparison, and assessed physical characteristics and/or physical performance capacities of these personnel. Together, the included studies covered personnel of both genders and from military, law enforcement and firefighter populations. Findings

indicated that, in comparison to full-time personnel, part-time personnel typically received substantially lesser amounts of organised physical training, while on duty, and were more responsible to arrange their own training. Physical characteristics and physical performance capacities in each group (full-time vs part-time) varied across the included studies, particularly in relation to aerobic capacity. On balance, however, part-time personnel typically exhibited substantially higher BMI and levels of body fat, and lower levels of aerobic capacity and strength, though the findings regarding aerobic capacity and strength were variable, sometimes indicating no difference.

**Conclusion:** The available evidence regarding differences between part-time and full-time tactical personnel in relation to physical fitness and physical characteristics is of moderate methodological quality. All things considered, the research indicates that typically part-time personnel exhibit higher BMI and body-fat levels and lower levels of aerobic capacity and strength than full-time personnel. However, findings regarding aerobic capacity and strength were variable and may reflect variation across populations in differences between part-time and full-time personnel in regular work frequencies and intensities, and individually and institutionally-arranged physical training regimes.

### Biography:

*Rob served for over 20 years in the Australian Regular Army as an infantry soldier, physical training instructor, physiotherapist and human performance officer. Still serving in the Army Reserve, Rob took up an appointment at Bond University where the majority of his teaching is on maximising human potential. With a PhD in occupational load carriage for military personnel, Rob has over 20 peer reviewed publications specialising in tactical populations alone and has been invited to present his research both nationally and internationally.*

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## Diploma of Military Medicine

*Elizabeth Rushbrook*

**Presenter: Elizabeth Rushbrook**

### Abstract:

The Diploma of Military Medicine recognises the specialist skill set and experience of ADF medical practitioners. The Royal Australian College of General Practitioners will take carriage of this qualification and will offer it to medical officers from 2016. The doctor with this qualification will demonstrate advanced and specialised skills in medical practice in the ADF. ADF Medical Officers, Reserve Medical Officers, Contract Health Practitioners, and those interested in pursuing careers as doctors in the ADF will be eligible for this qualification. This presentation will outline the details of this qualification, such as the eligibility criteria, course requirements and the recognition of prior learning.

### Biography:

*Commodore Rushbrook completed her medical training in 1995 in Queensland. She began her naval career in a variety of junior Medical Officer roles ashore and afloat, working primarily in General Practice and Emergency Medicine. She has also had senior clinician health administrative roles. She completed her Masters in Health Administration in 2004 and was awarded her Fellowship with the Royal Australian College of Medical Administrators in 2005. She is also the independent chair of the Calvary Hospital (Canberra) Clinical Review Committee, RACMA ACT Chair of Board of Studies. In 2007 she was appointed the Director Navy Health and promoted to Captain in 2008. In 2010 she was appointed as Director Defence Clinical Service within Garrison Health Operations Headquarters. She was promoted to Commodore next year and assumed her current roles of Director General Health Capability and Director General Navy Health Service.*

### Author's affiliation:

*Elizabeth Rushbrook<sup>1</sup>*

<sup>1</sup>*Australian Defence Force*



## Do Lifestyle Risk Factors Differ For Serving and Ex-Serving Australian Defence Force Personnel? The Australian Gulf War Veterans' Health Study

*Ms Stella Gwini, Prof Andrew Forbes,  
Prof Malcolm Sim & Dr Helen Kelsall*

**Presenter: Ms Stella Gwini**

### Abstract:

**Background:** Recognition of levels of lifestyle and health-related risk factors among military populations is important because not only do they influence the risk of many chronic diseases such as cardiovascular disease, cancer, diabetes, depression, dementia and cerebrovascular disease but they can also exacerbate existing conditions. Training and discipline within the military is structured and can influence lifestyle and behaviour of personnel, but once personnel transition from the military the structures alter and this can impact on people's health. The aim was to compare lifestyle risk factors (smoking status, high body mass index (BMI), alcohol consumption, unhealthy eating, physical inactivity and high cardiovascular risk) in serving and ex-serving Australian Defence Forces (ADF) personnel.

**Methods:** In 2000-02 a cohort of Australian veterans of the 1990-1991 Gulf War and a comparison group was studied. Participants of the baseline study were invited to participate in a follow-up study in 2011-12. At follow-up, a postal questionnaire was administered and questions were asked about smoking status, alcohol consumption using the Alcohol Use Disorders Identification Test (AUDIT), physical activity, fruit and vegetable intake. Height was measured by a clinician at baseline and weight and waist circumference (which was used to determine cardiovascular risk) were self-reported at follow-up. Body mass index (BMI) was calculated. Within the questionnaire, participants were also asked to state whether they were still serving in the ADF or not.

**Results:** A total of 1,356 males participated at follow-up. There were small differences between Gulf War veterans and the comparison group for most risk factors hence the results presented here are combined for the two study groups. Over a tenth (11%) of participants were current smokers, 48%

were overweight and 36% were obese while 60% were classified as physically inactive. Smoking and physical inactivity were significantly lower among participants who were still serving in the ADF (smoking risk ratio (RR) 0.54, 95% CI 0.32-0.91; and physical inactivity RR 0.56, 95% CI 0.42-0.75), while there were no significant differences with regard to BMI. Majority of participants (95%) had inadequate vegetable intake (<5 serves of vegetables/day) and 43% consumed less than the recommended ( $\geq 2$  serves) daily fruit intake, and there were no significant differences between serving and ex-serving participants. One-in-four (25%) participants was classified as having a hazardous or harmful alcohol use (AUDIT scores  $\geq 10$ ), with fewer cases among the serving than ex-serving participants (RR 0.40, 95% CI 0.27-0.60). Almost half (49%) of participants had a waist circumference  $\geq 102$ cm and were therefore classified as being at high risk of cardiovascular disease, and there were no significant differences by serving status.

**Conclusions:** Smoking, physical inactivity and high alcohol consumption were significantly more prevalent among ex-service members than those still serving in the ADF. These findings suggest that awareness and reduction of lifestyle risk factors and maintenance of healthy behaviours are particularly important in ex-service members.

### Biography:

*Ms. Stella Gwini is a Biostatistician and PhD Student with the Monash Centre for Occupational and Environmental Health at the School of Public Health and Preventive Medicine, Monash University. She is investigating the longitudinal changes in prevalence of multiple symptoms among Gulf War veterans and how the changes relate to health service use and other health outcomes.*

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## The Effect of PTSD Symptoms and mild TBI on Neural Responses to Emotional Faces Following Deployment

*Prof Kim Felmingham, Mr Daniel Zuj, Prof Richard Bryant, Dr Matthew Palmer, Dr Carol Davy, Dr Ellie Lawrence-Wood, Mr Andy Lawrence & Prof Alexander McFarlane*

**Presenters: Prof Kim Felmingham & Mr Daniel Zuj**

### Abstract:

This study aimed to examine the independent effects of mild TBI and PTSD on electrophysiological brain activity in response to threatening signals (angry and fearful facial expressions). 16 military veterans who had a mild TBI during deployment in Afghanistan and 16 veterans without TBI were matched for age, sex, amount of war exposure and level of PTSD symptoms, and event-related potential (ERP) responses were recorded to angry, fearful and neutral facial expressions before and following deployment. TBI was associated with generally reduced N170 responses to facial expressions compared to controls. In contrast, 21 non-head injured veterans with PTSD were matched with 21 non-head injured veterans without PTSD on age, sex, and amount of war exposure and ERPs were recorded to angry, fearful and neutral faces. Results revealed an increase in early attentional components (P1 and P2 amplitude) to angry and fearful faces post-deployment in the PTSD group. These findings suggest that TBI is associated with a general reduction in face specific processing, whereas PTSD is associated with an increase in early automatic attentional processes to threat following deployment consistent with an attentional bias towards threat developing during deployment.

### Biography:

*Kim Felmingham is a professor in the School of Psychology, University of Tasmania. She is a clinical psychologist and neuroscientist, who specializes in examining the neural mechanisms underlying Posttraumatic Stress Disorder and the cognitive behavioural therapy of anxiety disorders using a range of methodologies (fMRI, EEG, and hormonal). She has recently begun examining neural and genetic predictors of response to cognitive behavioural therapy in PTSD, and to explore sex differences in processes related to anxiety and trauma (memory consolidation, fear conditioning and extinction, and attentional*

*bias). She has recently obtained an NHMRC Project grant, and an NHMRC Program grant to continue her research in this field.*

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## E-Mental Health – A Tool to Provide Support Where and When it is Needed

*Veronica Hancock & Mr David Morton*

**Presenter: Veronica Hancock**

### Abstract:

The Departments of Veterans' Affairs and Defence are working to respond to a new generation of serving and ex-serving personnel by enhancing their approach to mental health promotion and early intervention. Consistent with the national mental health agenda, the Departments are exploring options to ensure that information and services are readily available for serving and ex-serving personnel in formats they are more likely to utilise and at time when they need them. Using new technology, the Departments are seeking to promote wellbeing as well as giving serving and ex-serving personnel the capability to build resilience and self-manage their mental health within a stepped care model.

This paper will provide an overview of the DVA and Defence approach including achievements to date, as well as future challenges and opportunities. It will summarise the outcomes of engagement with leaders in the emerging field of e-mental health technology, as well as outlining the themes emerging from a range of consultations being conducted with the serving and ex-serving community. It will also explore how help-seeking research is informing the strategic approach to early intervention programs

and how partnership with both clinical and technology experts are resulting in the development of new health tools.

### Biography:

*Ms Veronica Hancock is the Assistant Secretary, Mental & Social Health Branch in the Health & Community Services Division of the Department of Veterans' Affairs. She is responsible for mental and social health policy and programmes, and the development of a range of e-mental health tools and resources.*

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## Enhancing Resilience and Performance in Military through Biofeedback Based Skills Training.

*MAJ Kane Pflugst, Assoc Prof Eugene Nalivaiko, Assoc Prof Mathias Baumert, Dr Ellie Lawrence-Wood & Dr Blair Grace*

### Presenter: MAJ Kane Pflugst

### Abstract:

**Background:** Resilience generally refers to the susceptibility to diminished functioning and the capacity to overcome stressful events. An individual's capacity to adapt and recover from stressful events has been shown to be associated with the dynamic interaction of psychological and physical functioning. Soldiers capacity to adapt and recover from the demands of service challenges is essential for the delivery and sustainment of capability. The Australian Army has accordingly directed the delivery of contemporary services to enhance resilience.

**Method:** Biofeedback involves the use of electronic monitoring of bodily functions in order to train and acquire voluntary control of these functions. A trial of biofeedback based controlled breathing at the

Australian Army School of Infantry was evaluated through a randomised control trial (RCT). Army Psychologists delivered biofeedback training through the MyCalmBeat computer based package in the field and garrison environment during the 14-week Infantry training course. One platoon of Infantry trainees received regular training sessions during the first seven weeks of training and refresher training sessions prior to week 14. The effectiveness of training was evaluated through measurement of Heart Rate Variability (HRV) and self-report Distress Tolerance in the intervention and control groups at rest during weeks 1, 7 and 14 of Infantry training. Performance was assessed through a high-intensity care of battle casualty (CBC) scenario simulation during week 13.

**Results:** Multi-level Mixed Effects Modelling was used to analysis changes in HRV and self-report Distress Tolerance. Infantry trainees who received biofeedback training were shown to have enhanced Heart Rate Variability and Distress Tolerance during week 7 of training. In comparison, the control group were shown to have suppressed parasympathetic nervous system activation in response to the high stress training environment. The benefits of biofeedback training were not observed at week 14. However, when controlled for age the training group displayed superior performance in providing care to a battle casualty during the high-intensity training simulation. Older trainees who received biofeedback training were assessed as showing superior performance. Curiously, low HF-HRV when at rest during week 14 was associated with increased performance during the battle simulation.

**Conclusions:** The results show evidence for HRV as a biomarker for resilience in military populations and temporal manipulation of HRV through biofeedback training in a training environment. Moreover, the results from the biofeedback trial demonstrate benefits to enhanced wellbeing and performance through investing in modern evidence-based training initiatives.

**Future directions:** The 1st Psychology Unit is currently conducting further research into biomarkers of resilience and is expanding the delivery of biofeedback training. Biofeedback training is being incorporated into unit training continuums, including simulation and arduous training. The delivery of evidenced-based biofeedback training will assist delivery of contemporary services to enhance resilience and support capability in the Australian Army.

### Biography:

MAJ Kane Pfingst is the Officer Commanding of the Darwin Detachment, 1st Psychology Unit. He is currently the Officer-In-Charge of the 1st Psychology Unit Biofeedback program under Project DURUS. He commissioned into the Australian Army in 2008 and has completed a variety of posting across mental health, aviation, training and operational psychology. MAJ Pfingst has deployed in support of ADF personnel on Operation QUEENSLAND FLOOD ASSIST, Operation SLIPPER, Operation ACCORDION, Operation MANITOU, Operation OKRA, and Operation HAWICK. He completed a Bachelor of Science (Honours) at the University of Newcastle in 2006 and is currently studying under the Masters of Psychology (Defence) program at the University of Adelaide.

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## Enhancements in Rehabilitation and Mental Health

Veronica Hancock & Mr Neil Bayles

**Presenter: Veronica Hancock**

### Abstract:

The Department of Veterans' Affairs (DVA) has a strong and proud history supporting the men and women who have served our nation, and their families who have made sacrifices to support them. For wounded, injured or ill ex-serving personnel, rehabilitation and mental health are essential parts of their overall care and helping them to transition to civilian life. DVA is currently focusing on improving both the rehabilitation and mental health programs for younger veterans - those who served with the ADF from 1999 onwards.

DVA is currently reviewing its rehabilitation framework to have a whole-of-person focus. This new framework will have a heavy emphasis on early intervention and continuity of care as well as

a multi-disciplinary focus. In the interim, DVA is improving and refining its rehabilitation programs, especially to cater for the needs of younger veterans. Recent initiatives include the Veterans' Employment Assistance Initiative that places greater emphasis on assisting veterans back to work through their rehabilitation. It aims to help injured former ADF members reclaim independence, realise their skills and capabilities, and achieve their vocational rehabilitation goals post-service. The first stage of this initiative was a six-month pilot run in South East Queensland from September 2014 to February 2015.

DVA is also focusing heavily on the mental health and wellbeing of younger veterans. The new Veteran Mental Health Strategy 2013-2023 provides a ten-year framework to support the mental health and wellbeing of the veteran and ex-service community. It was developed to consider the changing needs of DVA's existing clients while also responding to the emerging needs of younger cohorts and their families. This strategy focuses on prevention of mental health conditions, encouraging early treatment and rehabilitation as well as maximising quality of life.

In addition DVA is also implementing new mental health programs that are designed to reach younger veterans. One of these initiatives is the new High Resilience (High Res) mobile application that was released by DVA in March 2015. The app helps current and ex-serving ADF personnel to manage the daily stresses of military life, deployment, transition to civilian life and life post-service. The app features a series of interactive, easy-to-use tools such as Controlled Breathing, Progressive Muscle Relaxation and Thought Stopping.

This paper will provide an overview of the advances in the support services in place to ensure that this generation of veteran, where needed, has the optimal opportunities for recovery and the ability to live a contributing and meaningful life. It will highlight lessons learnt and the importance of integrated rehabilitation, mental health and social support services.

### Biography:

Ms Veronica Hancock is the Assistant Secretary, Mental & Social Health Branch in the Health & Community Services Division of the Department of Veterans' Affairs. She is responsible for mental and social health policy and programmes, and the development of a range of e-mental health tools and resources.



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### Establishment of an Ebola Treatment Centre (ETC) in Sierra Leone on Behalf of the Australian Government: A Description of Activities, Clinical Outcomes and Synthesis of Lessons Learnt

*Dr John Shephard*

**Presenter: Dr Nicole Gilroy**

Abstract:

**Introduction:** The recent West African outbreak of Ebola Virus Disease (EVD) had its origins in the forested province of Guéckédou in Guinea in December 2013. Due to human movement, EVD spread rapidly to the neighbouring countries of Sierra Leone, Liberia and Mali in the first half of 2014. Existing health services, recovering from long periods of conflict and under-resourcing, struggled to adequately contain the outbreak in these countries. In Sierra Leone an exponential increase in cases overwhelmed care services in the Eastern Districts of Kenema and Kailahun in May-June 2014 and by September 2014 had taken root in Western Rural and Urban Districts including the capital city, Freetown.

**Methods:** As part of Australia's contribution to the International EVD response, the Prime Minister announced on 6 November that ASPEN Medical would be engaged to manage the 100 bed ETC located at Hastings Airfield, in the Western Rural District of SL. The Hastings Airfield ETC was commissioned on 14 December 2014. Within the first month of operation, 62 confirmed EVD patients were managed by a team of clinicians and sanitation workers drawn for Australia, New Zealand and SL.

**Results:** We report on a broad range of operational activities associated with the running of an ETC in the setting of SL, West Africa, including the

training, clinical management, health promotion and infection control measures. Clinical features, epidemiology, psycho-social care and outcomes of the EVD confirmed cases will be discussed.

**Conclusion:** The Australian Government's ETCs at Hastings's Airfield has safely and successfully contributed to EVD outbreak control in SL and commenced the long road to recovery for SL and the region. Analysis of activities reveals a number of lessons applicable to future infectious outbreaks.

Biography:

*Dr John Shephard is the Group Medical Director at Aspen Medical where he holds overall responsibility for Clinical Governance activities across Aspen's international activities, including the delivery of all on-base primary health services across Australia's 52 Defence bases. He is a graduate of the University of Newcastle, Australia, a Fellow of the Royal Australian College of GPs and holds post graduate degrees in Tropical Medicine and Public Health. His clinical experience spans more than 25 years predominantly in Primary and Emergency Care settings. He has worked extensively in marginalised settings including with refugees, first Australians, homeless, veterans and the elderly and has conducted population health research in the areas of health promotion, workforce innovation and e-health. He is passionate about continuous improvement, quality and value-based healthcare delivered by multi-disciplinary teams.*

*Dr Nicky Gilroy is a Sydney-based Infectious Diseases (ID) Specialist with professional interests in infection prevention and control, the epidemiology of hospital-acquired infections, the control of vaccine preventable diseases and the management of complex infections in those with impaired immunity.*

*Dr Gilroy has postgraduate qualifications in epidemiology and public health. She has deployed with humanitarian missions to Burundi (1994), the Russian Caucasus (1996) and Sri Lanka in the wake of the Boxing Day Tsunami (2004). In 2014 she joined a team of Australian and New Zealand doctors, nurses and environmental health officers to work at the 100-bed Aspen Medical managed Hastings Airfield Ebola Treatment Centre (HAETC) in the Western Rural District of Sierra Leone. More recently she has returned to Sierra Leone with Aspen Medical to work in the Kerry Town Ebola Treatment Unit (KTTU), a facility established to provide a medical capability for managing high-risk occupational exposures and Ebola Virus Disease (EVD) involving healthcare workers.*

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### Evolution of a Healthcare Complaint and Clinical Incident Management System for Garrison Health

*Ms Madeline Makeham & Ms Margaret Gorman*

**Presenters: Ms Madeline Makeham,  
Ms Margaret Gorman**

Abstract:

Garrison Health Operations (GHO) has evolved a healthcare complaints and clinical incident (HCCI) management system as a vital component of the GHO Clinical Governance framework.

The system has been designed and adapted as GHO has matured as a health service delivery organisation.

The HCCI system provides GHO with the ability to measure, identify and address the issues and trends related to HCCI in garrison health facilities as per Chapter 1, Volume 25 Clinical Governance Framework that was published in 2011. The HCCI process aligns with the overarching CJHLTH strategic clinical governance plan.

HCCI identified and reported at all levels of the organisation and often from other jurisdictions are managed in a systematic, responsive manner to address reported HCCI. The system aims to analyse, manage and manage issues identified with health service delivery of both on base and off base service providers. Trends identified through this process subsequently inform GHO quality improvement initiatives.

The core components of the GHO HCCI management system interface across the organisation to work in synergy with each other. The core components are:

GHO policy and processes that have been developed to provide guidance and promote consistent standards and practice across GHO when managing HCCI.

Contemporary Defence health policy developed in consultation with key stakeholders across Defence health services. Policy was developed in line with Defence and Civilian best practice standards. This activity was led by GHO staff.

A database known as the Performance Outcome Management System (POMS) that was conceived, designed, developed and implemented across GHO to record and track the management actions and progress of reported HCCI.

Establishment of agreed reporting data sets of HCCI information to different forums. The data reported is analysed and tailored to meet the needs of healthcare providers, consumers, executive management and government.

Mechanisms to review adverse outcomes from health service delivery provided by external providers.

Quality Improvement activities initiated and completed secondary to HCCI.

Biography:

*Ms Madeline Makeham is a Registered Nurse who has worked in the Clinical Governance Cell for Garrison Health Operations over the last four years.*

*Madeline has an interest in the working to overcome the challenges of providing positive patient outcomes in a contemporary healthcare system. Madeline led and coordinated the input from key stakeholders to achieve the development of Defence wide Policy on Healthcare Complaints and Clinical Incident management.*

*Ms Margaret Gorman is a Registered Nurse who has worked as a Clinical Risk Manager with Garrison Health Operations for the last five years. Margaret has been instrumental in the development of the database that GHO use to record healthcare Complaints and Clinical Incidents.*

*Margaret has a keen interest in Health Informatics and has been central to the development of effective reporting of Garrison health service delivery outcomes.*

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## The Experience and Impacts of Deployment Among Mothers in the Australian Defence Force: Findings from the Mothers in the MEAO Study

*Dr Ellie Lawrence-Wood, Dr Laura Jones, Dr Stephanie Hodson, Dr Samantha Cromptoets, Prof Alexander McFarlane & Assoc Prof Susan Neuhaus*

**Presenter: Dr Ellie Lawrence-Wood**

### Abstract:

Some international military research indicates that female veterans with dependent children may be at increased risk of negative health impacts of deployment, but that any increased risk may be offset by psychosocial factors including family and broader social supports. There is however a dearth of research, and a lack of consistent evidence, regarding the specific impacts of deployment for women with dependent children. Furthermore, general research with families suggests that separation from children could have adverse consequences for mothers (as well as children and family back home) however this may be a necessary and unavoidable element of military service. Therefore, establishing the factors that increase risk or resilience for mothers in relation to this is of high importance. The aim of the Mothers in the MEAO study was to focus in detail on the experiences of mothers, before, during and after deployment to the MEAO. Telephone interviews were conducted with 76 female Australian Defence Force veterans who had deployed to the Middle East Area of Operations since having their dependent children. Interviews were semi-structured in order to allow participants to freely discuss aspects of their experiences which were important to them. These discussions broadly covered their experiences of preparing for deployment, experiences while on deployment and reconnecting with life after deployment. In addition, the interviews included discussions of the ways in which female veterans managed the commitments of their family and their career in the ADF. These discussions were complex and multi-faceted because participants simultaneously drew upon their experiences as mothers, women and defence personnel. The majority of mothers interviewed viewed deployment as an important and enjoyable element of their service despite the challenges of balancing work and family commitments. In addition to personal resilience factors, key information sources, organisational, social and family supports, and services allowed mothers to navigate the challenges posed by their

service successfully, so ensuring these are adequate is extremely important. As important is the need to consider the wellbeing of female veterans with dependent children within the broader context of their family situation.

### Biography:

*Dr Lawrence-Wood is a Senior Research Fellow in the Centre for Traumatic Stress Studies at the University of Adelaide. She has been involved in a number of large scale research projects focussed on the health and wellbeing of Australian Defence Force personnel. As the Study Manager for the Impact of Combat Study (Transition and Wellbeing Research Programme), a longitudinal follow-up to the MEAO Prospective Health Study, her current research focus is on the physiological and psychological impacts of deployment to a combat zone. She was also responsible for the Mothers in the MEAO project, aimed at understanding the specific health and psychosocial wellbeing impacts of deployment, for Australian mothers who have deployed to the MEAO. This research forms part of a broader area of research interest regarding the health and wellbeing of women and families in the military and other services.*

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## An Exploration and Comparison of Civilian and Military Management of Traumatic Brain Injury (TBI)

*MAJ Brendan Wood*

**Presenter: MAJ Brendan Wood**

### Abstract:

The Aim: To identify opportunities to inform practice in the pre-hospital setting and improve patient outcomes.

**Background:** Traumatic Brain Injury (TBI) is the single biggest contributor to civilian trauma deaths. Deaths from TBI in contemporary combat operation have also been a significant cause of death. A direct comparison between the two may not be achievable due to the profoundly different mechanism of injury but lessons learnt in combat may provide some insight to better patient outcomes in the care of TBI.

**Objective:** To review both civilian and military medical articles relating to TBI and compare and contrast the management, outcome and trends in the management of TBI.

**Methods:** Review both online and journal articles relating to pre-hospital trauma management within the civilian and military environment. The search was limited to English articles and patients aged over 18 years. The search was limited to the ten-year period 2002-2012 in the pre-hospital environment.

**Results:** Twelve civilian and sixteen military articles were reviewed. The key findings included the difference in MOI, mortality and the number of in-hospital surgical interventions as well as the significances of preventing a single hypotensive episode in the TBI patient.

**Conclusion:** Although the guidelines of care are supported in current literature the emphasis on preventing hypotension and hypoxia should be reinforced. The MOI in combat results in higher death from wounds but aggressive in hospital care is resulting in better outcomes for TBI patients.

**Lesson learnt in combat** support a more aggressive approach to non-hypotensive resuscitation in standalone TBI and places the emphasis of care on effective assessment utilising tools like GCS and pupil assessment, a clear area for excellence in paramedic practice.

### Biography:

*I have been a member of the New Zealand Defence Force (NZDF) for more than 35 Years and hold the rank of Major in the Royal New Zealand Army Medical Corps. I am currently employed by Auckland University of Technology (AUT) as a Military Programme Leader and Senior Lecturer.*

*I have completed operational deployments with the NZDF as well as eight years of regular (full time) service in 2013. During that time I was able to change the NZDF medic-training and successfully introducing a degree-based programme for all Defence Force medics. I currently serve on the St John National Governance Committee as an elected member and sit on the St John Clinical Governance Committee.*

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## From Soldier to Civilian: Improving Reintegration Following Discharge by Targeting Psychological Adjustment to Society

*Dr Madeline Romaniuk*

**Presenter: Dr Madeline Romaniuk**

### Abstract:

The development of Posttraumatic Stress Disorder (PTSD) following active deployment remains a significant concern for military personnel and the veteran population. Similarly, psychological conditions including anxiety disorders, mood disorders and substance dependence are more prevalent among the military community than the general Australian community (McFarlane, Hodson, Van Hoof & Davies, 2011). The process of reintegration following discharge from the military however, has not been addressed in Australia with equal attention and scientific rigour as the above psychological issues. Reintegration following military service has varying interpretations in the literature and includes career transition, family functioning and psychological diagnoses. Yet the psychological adjustment process concerning the transition from soldier to civilian has not been examined thoroughly. As part of the Vietnam Veteran PTSD Initiative project run by the Gallipoli Medical Research Foundation (GMRF), a team of psychologists conducted comprehensive clinical assessments and interviews with 300 veterans. In addition to this, these psychologists had previous experience assessing and treating a wide variety of ex-service personnel at a specialised psychiatric facility. Initial qualitative observations suggest that difficulties regarding reintegration were apparent for large proportion of veterans and may be conceptualised as an 'adjustment to society' issue, in which fundamental aspects of military versus civilian culture are unable to be integrated and remain unresolved within an individual, leading



to an array of consequences on employment, social and relationship functioning and mental health. Such adjustment difficulties seemingly cannot be completely explained by the presence of PTSD or another psychological disorder, but represent a standalone issue that needs further systematic observation and analysis. This issue will be discussed further and conceptualisations of psychological adjustment and reintegration for military personnel transitioning to civilian life will be presented, as well as an outline of research in development at GMRF to address this gap in the understanding of military and veteran mental health.

### Biography:

*Dr Madeline Romaniuk is the lead clinical psychologist at the Gallipoli Medical Research Foundation and is responsible for the development and implementation of innovative and clinically meaningful research focussed on mental health concerns for members of the ADF and the Veteran community. She completed an Honours degree in Behavioural Science in 2008 and went on to complete a Doctorate in Clinical Psychology at Queensland University of Technology, which focused on psychometric assessment. In addition to research, Dr Romaniuk has worked for a number of years assessing and treating war veterans and ADF personnel suffering PTSD and comorbidities within a specialist psychiatric facility at Greenslopes Private Hospital as well as private practice in Brisbane.*

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## From Well to Wounded and Back Again: High Risk/Highly Cohesive Soldiers Experience of Self During Rehabilitation in the Australian Army.

*P.A. Dabovich, J.A. Elliott, M. Van Hooff & A.C. McFarlane*

**Presenter: P.A. Dabovich**

### Abstract:

**Background:** Self, as a locus of identity and agency, is relevant to behaviour in all domains of military service. A soldier's sense of self will directly impact how they experience and relate to others, including families, unit personnel and healthcare providers. This presentation is a part of a suite of findings from the research project 'From well to wounded and back again: Identity and agency in high risk and highly cohesive soldiers' undergoing rehabilitation in the Australian Army. **Aim:** The aim of this research project was to examine how soldiers' identity is impacted by serious wounding, injury, or illness; and, how potential shifts in identity may relate to health behaviour.

**Methodology:** A total of 13 high risk and highly cohesive soldiers rehabilitating from physical or psychological wounds, injuries, or illnesses took part in two semi-structured recorded interviews, over a one-year period. Each interview lasted an average of two hours, yielding approximately 50 hours of primary interview data. Analysis employed a thematic discourse dynamic approach, within a qualitative social constructionist paradigm. **Results:** Identified themes parallel ideas surrounding the warrior spirit: that of destruction and new growth. Themes of self-loss of and self-reconstruction are discussed, along with the experience of the doldrums in-between. The rehabilitation journey is not without pain and as such, emotions experienced during each phase are illuminated. Themes highlighting the core values that soldiers' draw upon during rehabilitation suggests an as yet unarticulated rehabilitation ethos amongst high risk and highly cohesive soldiers. Finally, recommendations on how a unit may best support their wounded injured and ill soldiers, based on the soldier's discourse, are proposed. **Conclusion:** Understanding soldiers' experience of themselves during rehabilitation is essential to facilitate culturally sensitive rehabilitation and transition practice. The findings of this research will be useful to medical, nursing, and allied health professionals, as well as commanders who seek to maximise their human resource capability. Information presented will assist in creating dialogue around the perception of self during rehabilitation, thereby contextualising and normalising some of the more difficult experiences. Themes of values and personal growth during rehabilitation may give soldiers a renewed and much-needed sense of hope for their future selves, both within the military and beyond.

### Biography:

Paula has been involved with the Australian Army since 1992 in both a reserve and regular capacity. Originally serving as a soldier with NORFORCE she graduated from Royal Military College in 1995 and served with 1 CSSB and the Joint Logistics Unit – North. From 2001 until 2010 Paula trained and practiced as a Registered Nurse in NSW, in both emergency and community settings, during which time she focussed on working with veterans living with chronic health conditions. In 2010 and 2011, Paula's unique GSO and holistic health skill-set were utilised to assist in the implementation of welfare initiatives at two infantry based units as they came to experience a surge in wounded, injured and ill members. Paula's observations and insights have formed the foundation of her clinical research agenda which is based around identity and its relationship to health behaviours in soldiers undergoing rehabilitation and/or transition from the Australian Army. Paula is now based in South Australia and is working towards her Higher Degree by Research, through The University of Adelaide, School of Public Health.

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## Future Soldier Rehabilitation: A Next-generation Brain-Computer Interface for Robotic Limb Control

Sam John

**Presenter: Sam John**

### Abstract:

Abstract not available.

### Biography:

Sam John is a Research Fellow at the Departments of Electrical and Electronic Engineering and Medicine at the University of Melbourne. His areas of interest include neural prostheses for treatment and rehabilitation of patients afflicted by loss of sensory, motor or cognitive function. He has a passion for the design and development of novel neural implants and its translation to patients. His early work resulted in the development of a suprachoroidal bionic eye that was developed in Melbourne with Bionic Vision Australia. His present work is in developing brain machine interfaces for rehabilitation of veterans of war with spinal cord injury and loss of limb function.

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## Head Injury Prediction Due to Ballistic Impact: Optimising Military Helmet Design Parameters

Peter Lee, Wenming Chen & Melanie Franklyn

**Presenter: Peter Lee**

### Abstract:

Experimental approaches to evaluate the effectiveness of military helmet have predominately been limited by the used of standard headform such as the Hybrid III dummy. The headform is unable to provide intrinsic brain responses, which is one of the key parameters in predicting the risk of traumatic brain injuries. In this project, we have developed a suite of multi-scaled computational biomechanical models to predict the combined helmet / head system response under ballistic impact loading scenarios, which could be further integrated into a detailed model of the head / brain structure to predict the risk of brain injury. The head was model as a simplified spring-damper-mass system. An additional soft tissue mass known as a "wobbling mass" was added to model the effect of brain oscillation when subjected to impact load. Subsystems consisting of nonlinear spring-damper units were constructed in order to model the helmet's shell and padding. The physical properties of contact between the helmet's padding and the head were described by the Hertz type contact law, which were obtained experimentally using impact tests to determine the stiffness and damping parameters of the helmet pad (ZAP PADS, Zorbium Foam, Cleveland, USA). The helmet subsystem was then coupled onto the head model to form an integrated helmet

/ head system. The model's validity was assessed by comparing the contact force profiles predicted by the model to those measured using an instrumented headform (Ballistic Load Sensing Headform (BLSH), Biokinetics, USA) wearing a helmet subjected to a ballistic test using 9 mm projectiles at a controlled velocity of 360 m/s. Typical traces of the helmet-head contact force predicted by the model exhibited double peaks, i.e., forces peaked rapidly at 1~2 ms, which was followed by a second peak with slightly a lower magnitude. The force trace resembled those measured experimentally by the BLSH headform. In addition, the movement pattern of the wobbling mass was also similar to previous studies showing how the brain shifts relative to the skull and "wobbles" in a complex damped manner upon impact. Using this model, different helmet / padding material combinations when subjected to ballistic impact were investigated. A total of 48 different types of design variations were tested by changing the material properties of the helmet shell and padding materials. The results highlighted the relationship between the helmet materials and the response of the brain (i.e. the brain motion or displacement). The analysis revealed that the maximum displacement of the brain varies from 1.23 to 2.52 mm for the different helmet / padding configurations. The maximum brain acceleration could also be decreased from 372.5 to 192.4 m/s<sup>2</sup> when the helmet padding properties were altered from hard to soft conditions. Another interesting finding is that brain motions were largely influenced by changes to the padding materials instead of changes to the helmet's shell material. Although, combat helmet has been predominantly designed to prevent penetration from projectiles, the padding material is also a vital component in preventing brain injuries.

### Biography:

*Peter Lee obtained his BEng in Mechanical Engineering (1st Class Hons. 1991) and PhD (1996) in Bioengineering from the University of Strathclyde, UK, and continued his post-doc in the same university. In 2001, he joined the Defence Medical and Environmental Research Institute, DSO National Laboratories in Singapore, as the Head of the Bioengineering Laboratory. He was appointed as an Adjunct Associate Professor from 2002–2008 at the National University of Singapore, Division of Bioengineering. He later joined University of Melbourne in 2008. His research aims to better understand the mechanism of injury, leading to effective prevention strategies. Research spans all three levels, the human, organs and cells. These investigations use human volunteers and computational models to advance*

*our understanding of clinical symptoms, pathological evidence and injury. Computational studies include models to the human brain, head-neck, spine, knee and foot.*

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## Health Impacts and Veterans' Health Care Systems Between Australia and the USA: A Comparison for Post-1990 Deployments

*Dr Helen Kelsall, Prof Malcolm Sim, Ms Breanna Wright, Ms Danira Karzic & Prof Kathryn Magruder*

### Presenter: Dr Helen Kelsall

### Abstract:

**Introduction:** This presentation will report on a recent collaborative project conducted by the Monash Centre for Occupational and Environmental Health, Monash University, and the Medical University of South Carolina (MUSC), USA, funded by the Australian Department of Veterans' Affairs. The aim was to gain an understanding of the differences and similarities between the military deployment contexts, health impacts, and veterans' health care systems between Australia and the USA for deployments post-1990.

**Methods:** There were 2 sequential stages: 1) a deployment analysis and scoping review of health and social outcomes, which informed 2) literature review comparing selected health and social outcomes and analysis of health care systems.

### Results:

- 1) Four common deployments were identified: 1990-1991 Gulf War, Somalia, Afghanistan, and Iraq War.
- 2) PTSD, suicide, social isolation/connectedness, multisymptom illness, and traumatic brain injury (TBI) were identified as indicator outcomes that captured important/emerging health issues

likely to have sufficient literature for comparison, and where important differences between Australia and the US could be expected.

- 3) PTSD prevalences for both countries tended to be higher for Gulf War and Iraq War deployments than Afghanistan. PTSD odds ratios for Iraq War tended to be higher in US than Australian veterans. Few studies were available, but Somalia veterans had some of the highest prevalences, and Australia had higher estimates than the US.
- 4) Gulf War veterans from both countries did not differ in risk for suicide compared with non-deployed groups, but both countries demonstrated a reduced risk for suicide compared with respective general populations. US Afghanistan/Iraq War veterans had higher prevalence estimates of suicide ideation than Australian veterans; the pattern of estimates in active duty and National Guard/Reserve populations was not clear. Suicide ideation prevalence was higher in Australian Iraq War than Afghanistan veterans but reported attempted suicide prevalence was low and did not differ by deployment status.
- 5) All studies of multisymptom illness were in Gulf War veterans. The prevalence estimate and odds ratio in Australian veterans was the lowest of all studies.
- 6) TBI prevalence was lower in Australian Gulf War than Afghanistan/Iraq veterans. Higher rates of TBI were reported in US Afghanistan/Iraq War veterans; 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 considerable variability between screening and diagnoses of TBI in US studies.
- 7) We were unable to identify studies for social isolation/connectedness, based on the criteria used.
- 8) Notable differences in veteran specific and public/private health systems were observed, but similarities were also identified, e.g. both countries' Defence and Veterans' Affairs efforts over the past 20 years to raise mental health awareness, develop policies, and increase availability and extent of mental health and psychosocial services.

**Conclusions:** 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 future veterans, and to identify important concepts and aspects of

veteran health and wellbeing that future research needs to cover.

### Biography:

*Dr Helen Kelsall is a Senior Research Fellow at the Department of Epidemiology and Preventive Medicine Monash University. She was an Investigator on the baseline and follow up Australian Gulf War Veteran's Health study and several other current veteran health epidemiological research studies including the Transition and Wellbeing Research Program. She is also a member of the Editorial Committee of JMVH.*

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## Health Services and Pharmaceutical Use and DVA Disability Claims in Australian Gulf War Veterans: 20 Years After Deployment

*Dr Helen Kelsall, Ms Stella May Gwini, Dr Jillian Ikin, Ms Breanna Wright & Prof Malcolm Sim*

**Presenter: Dr Helen Kelsall**

### Abstract:

**Background:** In the 2000-02 baseline study, Australian Gulf War veterans were found to have increased symptom reporting, psychological disorders, multisymptom illness and several doctor diagnosed medical conditions, compared to a military comparison group. The Gulf War Veterans' Follow Up Health Study 2011-12 re-assessed their physical, psychological and social wellbeing; including whether health services and pharmaceutical use and DVA disability claims since the baseline study differed between veterans and comparison group.

**Methods:** Health service and pharmaceutical use information was drawn from a self-reported questionnaire and linkages with Medicare Medical



Benefits Scheme (MBS) and Pharmaceutical Benefits Scheme (PBS) databases, DVA-held health data (MBS and Repatriation Pharmaceutical Benefits Scheme (RPBS)) (since 2001), and hospitalisation data (from 1/1/2007). Medicare and DVA MBS data were combined, as were PBS and RPBS datasets. Analyses were limited to male participants due to limited number of female veterans.

**Results:** 697 male Gulf War veterans (veterans) and 659 male comparison group participated in both baseline and follow up studies. 605 (87%) veterans and 554 (84%) comparison group consented to at least one of Medicare and DVA linkages.

In the past 12 months, more than 85% participants self-reported consulting a General Practitioner, 68% consulted a dentist/dental professional, and approximately 50% consulted specialist doctors. Veterans reported consulting psychiatrists, dieticians or alcohol/drug worker a little more often than comparison group, but there were no statistically significant differences. Based on MBS data, almost two-thirds visited a GP in the past 12 months and GP attendances were similar for the study groups; medical specialist consultations of a priori interest (i.e., neurologists, gastroenterologists, psychiatrists, respiratory physicians, dermatologists) were also similar between the groups. About one-third of participants in each study group had been dispensed at least one pharmaceutical script in the past 12 months.

15% participants self-reported hospitalisation for at least one night in the past year. Based on DVA-funded hospitalisation data, veterans were 71% more likely than the comparison group to have been hospitalised at least once January 2007-August 2012 (Risk Ratio (RR) 1.71; 95% CI 1.19-2.45).

DVA Disability claims analysis showed 2,176 disability claims were lodged by male study participants 1 January 2001-15 August 2012. Median number of claims lodged: 5 (IQR 2-9) veterans vs 4 (IQR 2-7) comparison group. Veterans lodged 56% higher total number claims (1,327 vs 849 claims) than the comparison group. Around two-thirds of claims in both groups were accepted. Nearly half of claims submitted by veterans were for illness or disabilities attributed to Gulf War service. In those who had ever held a DVA treatment card, veterans were more likely to hold a Gold Card RR 2.27 (1.49-3.45).

**Discussion:** In this study of Gulf War veterans 20 years post-deployment, combined self-reported and linked recorded datasets provided a more complete description of health service, pharmaceutical use and benefits than would be achievable with any one data source alone. There were only a few statistically

significant differences between the veterans and comparison group in regard to their health service utilisation and some differences in relation to DVA disability claims.

### Biography:

*Dr Helen Kelsall is a public health physician/epidemiologist who is a Senior Research Fellow at the Monash Centre for Occupational and Environmental Health. She was a lead investigator on the 2000-02 and 2011-12 Australian Gulf War Veterans' Health Study and other collaborative studies investigating physical, psychological and social health and wellbeing in military and veteran populations.*

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## Health Support to Amphibious Operations - What Can the Largest Amphibious Operation in History Teaches Us Today? OPERATION NEPTUNE - 6 June 1944

*COL Andy Williams*

**Presenter:** *COL Andy Williams*

### Abstract:

Just after midnight on 6 June 1944 six gliders were released over the Normandy coast, minutes later they landed yards from their target; 156,000 Allied troops would follow over the next 24 hours. On those gliders was a Medical Officer and six Medical Orderlies; the first 'medics' to land on D-Day. They would be followed by over 200,000 more. How was this health force raised? What were the personnel, clinical, health materiel and command and control issues that had to be addressed in raising, training and sustaining this huge force; and what lessons, if any, does it have for ADF health planners today?

Days after the British Army's extraction from Dunkirk, planning began for the return trip. The lead health planner was Lt Gen Alexander Hood, Director

General Army Medical Services. Hood had been an MO at Gallipoli and he was determined there would be no repeat of that campaign's medical disasters.

Hood's team had to consider myriad problems from the apparently mundane clinical issue of motion sickness in the large amphibious and airborne forces involved, through to the design and allocation of specialist medical evacuation vessels. His proposals met considerable opposition from operational planners, especially when competing for limited space in the assaulting fleet. He eventually raised his frustrations directly with Prime Minister Churchill.

A vast complex of hospitals would be established on the "far shore". The British Commonwealth force alone eventually established 32,000 beds on the continent. This required over 1,000 Pioneer Corps personnel to be placed under a medical Commander to construct the initial hospital capability in a timely manner. New types of medical units for air manoeuvre operations had to be raised and trained in competition with other manpower demands. And it was not just the Germans who were a threat to the force. Sexually transmitted disease had risen by over 400% amongst France females between 1940 and 1944. Many of the veteran formations that would lead the assault had drawn deeply on their "well of courage" and the mental health effects of a battle that was to prove more deadly than the Somme were not overlooked.

Large scale strategic aeromedical evacuation of casualties was to be used for the first time. The system developed becoming the model for strategic evacuation that survives until today. One of Hood's major battles was with the air forces as he looked to establish airfields dedicated to aeromedical evacuation. Another notable use of airpower was the creation of a blood supply system that extended from the US through to the field hospitals in France that provided fresh whole blood in quantities unknown previously by allied surgeons and which never ran short.

Despite the apparent differences in scale and passage of over 70 years, many of the issues Hood had to consider, and the internal battles he had to fight with the broader operations and logistics staffs reverberate in our time as we develop our expeditionary amphibious capability.

### Biography:

*Colonel Andy Williams trained in the UK National Health Service as a psychiatric nurse, general nurse and also completed post-graduate courses in behaviour therapy and later neonatal intensive care. He joined the UK Regular Army in 1987, where his*

*appointments included base and field medical units, as well as staff appointments. Andy deployed to South Africa during the transition from apartheid to democracy and, in 2003, to Iraq as the Deputy Commander Medical, CJTF 7. His last position was Colonel Force Development, Army Medical Directorate.*

*In 2006, Andy transferred to the Australian Army as General Service Officer. He was initially appointed as the Senior Health Officer, HQ Special Operations Command. He has since held appointments as Director Health Capability Development, Joint Health Command; Commanding Officer 2nd General Health Battalion and SO1 Health Governance in the Directorate of Army Health.*

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## Health Support in Austere Environments - An Example at the Extremes - OPERATION CASTOR - Dien Bien Phu 1953-1954

*COL Andy Williams*

**Presenter: COL Andy Williams**

Abstract:

A recurring theme in military medicine is the need for health personnel to be prepared to deliver clinical services with limited equipment in austere environments. The experiences of the French Far-East Expeditionary Corps during the First Indo-China War (1946 - 1954) represents one of the most significant extended expeditionary campaigns in an austere environment of the past 60 years. It was to be the first conflict in which extensive use was to be made of rotary wing evacuation and was the apogee of parachute insertion as an operation of war. Modern antibiotics such as chloramphenicol, penicillin G and erythromycin were to see their first use by military physicians.

By 1953 the French people had tired of this distant

war and the first signs of unrest had emerged in France's "home colony" of Algeria. A new government determined to exit sought one final spectacular victory that would allow them negotiate their departure from a position of strength. So emerged the plan to insert a large airborne force into the remote valley of Dien Bien Phu; OP CASTOR. French control of the air and its ability to coordinate and bring to bear massive fires convinced them they could sustain this remote garrison with a very small health footprint on the ground, while inflicting a devastating defeat on the Viet Minh. This assumption was to prove disastrous, and for the medical team on the ground led by a redoubtable surgeon MAJ Paul-Henri Grauwain it was to prove a "trial by ordeal".

The siege of Dien Bien Phu was to last 57 days. The air-bridge that would allow evacuation of casualties was to fail within days, and Grauwain and his medical teams would come to manage over 5,000 casualties in a series of small, underground and mud filled improvised facilities. In an attempt to save the garrison more personnel were to be parachuted in during the siege, including an extensive surgical capability. The last medical personnel were to be parachuted in, under fire, at night having had a few minutes parachute training, and knowing their inevitable fate was to be capture by an unforgiving enemy. Over 60 percent of the medical personnel at Dien Bien Phu were themselves to become casualties before the siege ended. Many were to die in subsequent captivity.

Gauwain and his teams were faced with a range of clinical, ethical and practical problems, most of which they overcame. Through improvisation of equipment, the use of non-traditional providers, the liberal use of antibiotics, permissive hypotensive resuscitation and good basic surgical technique, the French surgeons were to match the best practice of their contemporary US and Commonwealth colleagues operating in much less trying circumstances in Korea and Malaya. Two remarkable women health professionals were to also achieve fame at Dien Bien Phu, Genevieve de Galard and Valerie Andre for their courage in the air and on the ground.

The health support provided at Dien Bien Phu has relevance today as it provides an object lesson in what can be achieved in austere environments and in the most unfavourable circumstances with the minimum of people.

### Biography:

*Colonel Andy Williams trained in the UK National Health Service as a psychiatric nurse, general nurse and also completed post-graduate courses in*

*behaviour therapy and later neonatal intensive care. He joined the UK Regular Army in 1987, where his appointments included base and field medical units, as well as staff appointments. Andy deployed to South Africa during the transition from apartheid to democracy and, in 2003, to Iraq as the Deputy Commander Medical, CJTF 7. His last position was Colonel Force Development, Army Medical Directorate.*

*In 2006, Andy transferred to the Australian Army as General Service Officer. He was initially appointed as the Senior Health Officer, HQ Special Operations Command. He has since held appointments as Director Health Capability Development, Joint Health Command; Commanding Officer 2nd General Health Battalion and SO1 Health Governance in the Directorate of Army Health.*

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## How Clinicians can Improve the Psychological Well-Being of People in High-Risk Occupations

*Dr Ian de Terte*

**Presenter: Dr Ian de Terte**

### Abstract:

Military personnel would be considered to be in a high-risk occupation. Traumatic stress and related psychological difficulties have been considered to be a major occupational hazard for this occupation. Various techniques have been utilized with this population (e.g., debriefing), but from a theoretical perspective most individuals in these high-risk occupations will not display any psychological difficulties. However, there will be a percentage of this population that will present with psychological concerns. There are psychological aspects of this population that could be classed as susceptible and cannot be addressed in "normal" allied health methods. Controversially the question that this

paper will address is how to intervene with this population? This paper will present issues that this population typically presents with, such as trust, paranoia, and stigma. This paper will explain how the presenting symptoms of occupational posttraumatic stress disorder may be a protective mechanism that military personnel may use.

Parenthetically this protective mechanism of occupational posttraumatic stress disorder may give rise to the escalation of these psychological difficulties. Some suggestions are made about how to clinically deal with these psychological concerns. It is suggested that if these psychological complications presented in the “general” population then a clinician would not use the same clinical approach. It should be noted that these suggestions could be utilized with other high-risk occupations such as, police officers and fire-fighters. The main aims of this paper are to (1) explain occupational PTSD; (2) suggest the psychological difficulties that are inherent in this population; and (3) suggest clinical methods in how to address these psychological difficulties.

#### Biography:

Dr de Terte is a clinical psychologist and senior lecturer in clinical psychology (US equivalent: Associate Professor) at Massey University, Wellington, New Zealand. His current research interests are: (1) psychological resilience, (2) psychological trauma, and (3) high-risk occupations. Dr de Terte is on four editorial boards. He is a member of the New Zealand Psychological Society, International Society for Traumatic Stress Studies, and the Australian and New Zealand Association of Psychiatry, Psychology, and Law. Dr de Terte’s clinical interests are directly transferable from his research interests. Dr de Terte has been fortunate to be involved in clinical or research work in some remote locations such as Phuket, Pitcairn Island, and Dubai. In his “previous life” he was a police detective with the New Zealand Police.

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## How Private Health Providers Can Play a Vital Role Helping Governments Respond to Infectious Disease Outbreaks. Ebola Case Study in West Africa 2014/2015: Operational Considerations and Lessons Learned.

*Craig G. Stark*

**Presenter: Craig G. Stark**

#### Abstract:

The Ebola outbreak spread throughout West Africa in early 2014 disrupting healthcare systems and business continuity on a global scale. Within the affected countries, the local healthcare infrastructure rapidly collapsed requiring significant support from external governments, militaries and civilian healthcare organizations. Normal business operations ceased and many local and foreign joint ventures went bankrupt or halted operations. Over the initial weeks to months, there was a voracious demand for real time updates, disease information and educational materials. In addition to supporting the local population, the influx of expatriate workers and healthcare professionals created the need for a parallel medical infrastructure and strategic medevac capabilities to sustain the aid operations.

Working closely with the United Nations (UN), World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC), International SOS helped organisations minimise disruption and complemented affected health infrastructure with Emergency Ebola Response Plan for in-country support and out-of-country medical evacuation services. At the time of the outbreak, International SOS had over 300 personnel operating in affected countries and rapidly mobilized a team of medical experts to respond to the requests from over 1200 Government, military and private sector clients. Over the course of the outbreak, International SOS managed a large number of cases ranging from Ebola Preparedness and Infection Control Training to Mass Evacuations and Staffing of Short Term Isolation Units. This experience has provided significant insight into the logistical, clinical and operational considerations required during a viral hemorrhagic fever outbreak in the following areas:

- Ebola Education and Training
  - Development of Ebola education materials in over 25 languages
  - Creation of a dedicated Ebola website and Ebola Education App for mobile devices



- Ebola-specific public health consulting and Personal Protective Equipment (PPE) training
- Medical Staffing and Response
  - Set up of training centers for Ebola prevention
  - Airport and workplace thermal scanning programs
  - Fever Clinics and Short Term isolation Units in Ebola Affected Countries
  - PPE and Medical supply services
- Medical Evacuation from Ebola affected countries
  - Mass evacuation (relocation) of personnel with no known exposure
  - Medical evacuation of patients with non-Ebola illness
  - Medical evacuation of Ebola-exposed but asymptomatic individuals
  - Medical evacuation of patients with active Ebola illness

**Conclusion:** The current Ebola outbreak is the first viral hemorrhagic fever epidemic to spread across international borders and have a protracted global impact. The rapid response by the global health community stabilized a deteriorating situation and mitigated the spread of the disease. The dissemination of accurate information and effective lines of communication were critical in educating the population and changing behaviour. Healthcare workers required focused infection control training and the implantation of Ebola specific protocols to re-establish confidence and reinstitute healthcare operations. The impact on transportation and logistics made international medical evacuation more complex for Ebola exposed personnel as well as patients with non-Ebola illness. Organizations at all levels of the response had to establish robust Business Continuity Plans, implement and adapt travel policies and reinforce health and safety policies, standards, and procedures.

### Biography:

*Dr. Stark joined International SOS in 2005 and currently holds the position of Regional Medical Director, Government Services. He received his Medical Degree from Tufts University in Boston and completed his Internal Medicine specialization at the Walter Reed Army Medical Center. He is a board certified Diplomate in Internal Medicine and a Fellow of the Faculty of Travel Medicine by the Royal College of Physicians and Surgeons of Glasgow.*

*During his career at International SOS, Dr. Stark has held the position of Medical Director based out of London, Moscow, Singapore and Beijing. Prior to joining International SOS, he served as the NATO Flight*

*Surgeon at the Supreme Headquarters Allied Powers Europe and flight surgeon for the Multinational Force and Observers in Egypt. Dr. Stark entered the U.S. Army in 1995 achieving the rank of Major in 2004. Dr. Stark specializes in Aviation Medicine, Disaster Response, International Health and Travel Medicine.*

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## Implementation of Health Care Coordination Forums and Mental Health Integration Project in Garrison Health Facilities.

*GPCAPT Michele Walker & Ms Fiona Stockwell*

**Presenters:** *GPCAPT Michele Walker & Ms Fiona Stockwell*

Abstract:

The Joint Health Command commitment to a comprehensive, customised and coordinated Health Service delivery model is demonstrated through the Health Service Delivery Improvement Program (HSDIP) which commenced in April 2013. The intent of the program was to provide an effective governance framework for managing a number of complementary high level work streams that relate to improving Garrison health service delivery. Under this program the Case Management Project (CMP) and the Mental Health Integration Project (MHIP) have been successfully implemented in all Garrison health facilities during 2014/15.

The Case Management Project was established to implement a Garrison Health Operations (GHO) national Health Care Coordination Model to provide a standardised and nationally consistent approach to patient management and oversight for cases that are complex and/or where high level coordination and situational awareness is required. The key element of the model is the Health Care Coordination Forum (HCCF).

The Mental Health Integration Project (MHIP) was established and has worked to ensure the key

principles of the Mental Health and Psychology Service Delivery Model (MH&P SDM) are implemented in accordance with best practice and with national consistency in all JHC health facilities. The project has translated this model into a revised and nationally consistent framework for provision of mental health and psychology services within JHC health facilities. In doing so, JHC is embedding mental health care into the primary health care setting when caring for ADF members.

This presentation will provide an overview of both the Health Care Coordination Model and the Mental Health Service Delivery Model and future work planned for sustainment and continuous improvement.

### Biography:

*GPCAPT Walker joined the Air Force in 1989. She has a Bachelor Applied Science Nursing and a Master of Management (Defence). Her more recent postings include CO 1EHS, COS HQHSW, Director Military Medicine and she is currently Director Specialist Clinical Advice in JHC. In this role she is responsible for Mental Health and Rehabilitation service delivery and radiation safety.*

*Fiona Stockwell is a Founding Partner of Stockwell Bretton, a leading management consulting firm, specialising in the provision of high quality, innovative advice across the areas of strategy, organisational performance and major business reform.*

*Fiona has designed, developed and evaluated service delivery frameworks and business improvement processes in a range of sectors including health. She was the Project Manager for both the JHC Case Management and Mental Health Integration projects.*

*She has a Bachelor of Commerce, Masters of Human Resource Management and is currently studying for a Graduate Diploma in Psychology.*

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## Implementing Interprofessional Simulation Training for the Navy's Maritime Role 2 capability at the Royal Australian Navy Medical School, HMAS Penguin

*LT CMDR Nathan Saunders & LT Steven Grosser*

**Presenter: LT CMDR Nathan Saunders**

### Abstract:

This presentation explores the RAN Medical School (RANMS) implementation of inter-professional simulation-based training to the Navy's Maritime Role 2 (MR2) capability at HMAS Penguin. In 2015 the RANMS attempted to formalise evidence-based simulation practice into the range of training and education delivered from Penguin. This included amending simulation delivery across our three military medic courses, clinical workshops, team training and assessments/evaluations for the range of multidisciplinary healthcare professionals and non-medical healthcare providers in the Navy. It was determined we would adopt and include more behavioural elements into our simulation design.

Implementing human factors and crisis management training through simulation-based education (SBE) has a long and successful history—founded by the aviation and military industries—that healthcare has adopted and proven as a highly effective and important training modality. This is especially so in respect to developing an individual's knowledge, skills, attitude and understanding of the impact that non-technical (non-clinical) components of performance have on patient safety.

Over the period 22-25 June 2015, RANMS conducted an immersive, high-fidelity, progressive healthcare simulation exercise (SimEx) to test and review a concept of training for the RAN MR2 capability—the Maritime Operational Health Unit (MOHU)—with a focus on interprofessional teamwork and communication. It was decided that due to the infancy of processes and competencies against which to evaluate MR2 capabilities, there was limited scope to assess the MR2 against its directed operational outcomes. Alternatively, RANMS conducted the SimEx with a view to developing a foundation and prospective model for certification or Unit Readiness Evaluation (URE) of the MR2 capability.

In light of this, RANMS collected basic, qualitative information through a validated, objective teamwork measure and simple post-activity surveys. The

experiences of MOHU participants and RANMS faculty during the SimEx had not been collated by the time this abstract was submitted.

We intend to present and discuss some preliminary findings and present recommendations on the future course of research and development of competencies and URE process for the RAN MR2 capability.

### Biography:

*Lieutenant Commander Saunders has been an Officer with the Royal Australian Navy for over 13 years. He holds a Bachelor of Nursing, Master of Remote Nursing Practice, Master of Public Health and Master Health Management. He has deployed operationally aboard HMA Ships Manoora and Kanimbla to Solomon Islands, Sumatra Assist and Timor as part of Navy's previous Role 2 surgical capabilities as a critical care and AME nurse, and in health operations and plans officer positions. He has participated in numerous multinational exercises as part of headquarters and Australian National Command elements in various health roles including J07. He has been posted to his current position as OIC RAN Medical School at HMAS Penguin for nearly two years.*

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## Improving Hearing Rehabilitation for the Defence Community: Perspectives of Ex-Serving Defence Members, Family Members, and Hearing Care Professionals

*Dr Nerina Scarinci, Carly Meyer, Louise Hickson, Christopher Lind & Kyla Hudson*

**Presenter: Dr Nerina Scarinci**

### Abstract:

Hearing loss occurs frequently in the Australian population, and is highly prevalent among ex-serving Australian Defence Force (ADF) members. Importantly, it is not only the ex-ADF member who

experiences difficulties, with family members also affected by the hearing loss. Although Government-funded hearing services are available for ex-ADF members, the current focus of hearing rehabilitation is very much on the person with hearing loss through the fitting of hearing aids and family members are rarely involved. This indicates that there is a need to develop hearing rehabilitation services in which hearing difficulties are better addressed for the ADF community.

This project aimed to explore the hearing rehabilitation needs of ex-ADF members and their families. Three groups of stakeholders participated in this qualitative descriptive study, including: 10 ex-serving ADF members with hearing loss ranging in age from 52 to 83 years (mean = 68.1; SD = 8.82) and their nominated family members; 11 audiologists working with ex-serving ADF members with hearing loss; and representatives from relevant government departments and government funded organisations that provide services to ex-ADF members with hearing loss.

In-depth interview with ex-ADF members and their families and focus group interviews with audiologists and government representatives indicated that as a result of their hearing loss, ex-ADF members with hearing loss experience numerous impacts on their communication across many daily life activities, which also have an impact on the family and can lead to tension within family relationships. Despite the majority of ex-ADF members in this study being fitted with hearing aids, over half reported not using their hearing aids on a regular basis, and many had sought other technologies to improve communication in specific situations such as listening in RSL meetings and hearing the television. Results also indicated that ex-ADF members with hearing loss have a number of unique characteristics that should be met in hearing rehabilitation programs and that family members play an important role in rehabilitation, often advocating for the ex-ADF member. Inclusion of family members was reported to lead to more successful rehabilitation outcomes, however, participants indicated that family members are not routinely part of the rehabilitation process. A number of specific service needs were identified, including better uptake of communication rehabilitation programs, further provision of information to ex-ADF members and families regarding hearing loss and its treatment, and greater recognition of ex-ADF members service history and other health conditions (e.g., tinnitus and mental health issues). Important implications for the provision of hearing rehabilitation services for ex-ADF members will be discussed, including opportunities to further engage

ex-ADF members and their family in audiological decision making in order to improve outcomes.

### Biography:

*Dr Nerina Scarinci is a Senior Lecturer in Speech Pathology in the School of Health and Rehabilitation Sciences at The University of Queensland. She is a member of the Communication Disability Centre and HEARing Cooperative Research Centre (CRC). Nerina has published in the areas of hearing loss, outcomes of intervention for adults and children with communication disability, and alternate models of service delivery in speech pathology and audiology. Nerina has a special interest in the World Health Organization International Classification of Functioning, Disability and Health (ICF), and its application to communication disability and third-party disability, as well as the development of family-centred interventions to improve outcomes of audiological rehabilitation.*

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## Incidence Rates of Reported Work Health and Safety Incidents and Injuries in Part-Time and Full-Time Australian Army Personnel

*D. MacDonald, Dr Rodney Pope & Dr Rob Orr*

**Presenter: Dr Rodney Pope**

### Abstract:

**Introduction:** Work health and safety (WHS) incidents and associated injuries affect the capabilities of both full-time and part-time Australian Army personnel but rates are rarely determined and published for part-time personnel. The aims of this study were to determine, validate and compare the incidence rates of reported WHS incidents and injuries in part-time and full-time Australian Army personnel.

**Methods:** In this retrospective cohort study, WHS incident and injury data for both the Australian Army Reserve (ARES) and Australian Regular Army (ARA) populations were extracted from the Workplace Health, Safety, Compensation and Reporting (WHSCAR) database for the period 01 July 2012 to 30 June 2014. The Australian Defence Human Research Ethics Committee (Protocol LERP 14-024) and the Bond University Human Research Ethics Committee (Protocol RO1907) approved the study. Reported WHS incident and injury incidence rates were calculated for both ARES and ARA populations and compared. The incidence rates were also compared with previously published incidence rates in the same and similar populations, for validation.

**Results:** 15065 WHS incidents, resulting in 11263 injuries, were reported in ARES and ARA populations combined. The incidence rate for reported WHS incidents in ARES personnel was 5.3 incidents per 100 soldiers per year, compared to 22.9 in ARA personnel. The incidence rate for injuries reported in ARES personnel was 4.77 injuries per 100 soldiers per year, compared to 16.72 in ARA personnel. By comparison, the injury incidence rates reported in the Defence Health Status Report (2000) for Australian Defence Force part-time and full-time elements were slightly lower, at 3.9 and 9.1 injuries, respectively, per 100 personnel per year, based on injuries reported on the occupational health and safety reporting system. In sharp contrast, based on data capture at point of medical care, Pope et al (2000) reported a lower-limb (alone) injury incidence rate equivalent to 87 lower limb injuries per 100 army recruits per year in Australian Army recruit training. In an operational Australian Army unit, Rudzki and Pope (2006) reported injury incidence rates ranging from the equivalent of 35 to 127 injuries per 100 personnel per year, depending on time of year and military activities, consistent with injury incidence rates routinely published online by the US Armed Forces Health Surveillance Centre for its Army population - for example, in the single month of August 2014, 13.3% of US Army soldiers reported an injury.

**Conclusion:** Lower incidence rates of reported WHS incidents and injuries were calculated for ARES than ARA populations. However, suspected under-reporting of occupational injuries on the WHSCAR database means these ARES to ARA comparisons are questionable. Point of care injury surveillance provides much more complete injury data for ARA personnel and is recommended as much more valid to inform injury risk management in the ARA population. This approach could be adapted, based on underlying principles, to provide similar data



quality for ARES personnel, despite differences in medical care arrangements. ARES and ARA incidence rates should then also be adjusted for annual days 'on duty', to provide a more valid comparison of risks.

### Biography:

*Dr Rod Pope is currently the Co-Lead of the Tactical Research Unit and an Associate Professor of Physiotherapy at Bond University. Rod provided clinical physiotherapy, rehabilitation and injury prevention services at the Australian Army Recruit Training Centre 1990-2000 before establishing and leading the Australian Defence Injury Prevention Program 2000-2006, at the request of the Defence Health Service Branch. In this role he worked closely with military health and safety staff and commanders, and with senior military Physical Training Instructors to implement systems to monitor and mitigate risks of injury in military personnel and to optimise physical training practices and physical performance. As part of this work and more recently in his subsequent University roles, Rod has conducted and supervised wide-ranging research and consultancy projects on preventing injuries and enhancing performance in wide-ranging tactical training and operational contexts.*

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## Incidences and Causative Factors of Lower Limb Injuries in the New Zealand Army.

*MAJ Jacques Rousseau, Prof Hugh Morton, LTCOL (Dr) Andrew Dunn, Dr Sally Lark*

**Presenter: MAJ Jacques Rousseau**

### Abstract:

Musculoskeletal injuries are an international problem affecting deployability of service personnel, but the specific events causing the injuries are not defined. Eight years of injury data for the New Zealand Defence Force (n=2401) was examined. Causative

factors were derived from a filtered narrative completed by the soldier to identify the injury and contributing activity. Frequency data and Chi square analysis was carried out on injury anatomical site by activity. Analysis shows 43% of all NZ Army soldiers are injured annually. A significant proportion of injuries are lower limb injuries (47%) and this rate has remained static over the last 8 years. The ankle has the highest injury rate at 37%, with most of these occurring whilst running during military training and sport. The precise injury aetiology has yet to be elucidated to determine any specific changes in muscle function of the ankle joint. The results are expected to help determine future interventions to decrease lower limb and ankle injuries and therefore increase deployability of defence force personnel.

### Biography:

*Completed a Master of Philosophy in Sport Science. Researched and published articles regarding high intensity intermittent training for cardiac rehabilitation; the effects of exercise on adult onset growth hormone deficiency in cardiac patients; self-paced walking on task-specific anxiety in cardiac rehabilitation patients; musculoskeletal injury patterns in hockey players; delayed onset muscle soreness and whole body vibration therapy. Co-authored books on the topic of exercise and health.*

*Enlisted in the NZ Army in 2011 and employed as a clinical exercise physiologist. Currently involved in research and development programmes regarding performance health and injury prevention, these include the effects of entry level fitness standard on recruit performance and injury incidence; development of a "health related" fitness assessment (clustering of risk factors); investigating changes in biomarkers as a result of high intensity intermittent exercise.*

*Currently a PhD candidate researching lower limb injuries in the New Zealand Army – epidemiology, aetiology and interventions.*

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## Induction and Orientation for Health Staff in Garrison Health Facilities.

*Ms Janine Fletcher & Mrs Toni Murry*

**Presenter: Ms Janine Fletcher & Mrs Toni Murry**

### Abstract:

Garrison health care personnel are comprised of ADF, Contracted and APS employees. ADF and Contracted Health Practitioners (CHP) can be employed to perform their duties in any Garrison health facility nationwide.

In 2014, two Regional Health Governance Managers raised at the quarterly Garrison Health Clinical Governance Working Group (GHCGWG) that they had identified the need to develop a standardised induction and orientation package for garrison health staff. The aim of this initiative was to provide a framework to enhance the ability to support a cohesive, collaborative workforce that had a set of consistent and portable core competencies to be able to work in Garrison health facilities across the nation.

This initiative is in line with the Royal Australian College of General Practitioner (RACGP) Standards for Garrison Health Facilities in the Australian Defence Force, published in March 2015. The guidelines state under Criterion 4.1.1, Human Resource systems that "Our practice supports effective human resource management".

In order to comply with the RACGP criterion, the health facility is required to demonstrate a system for assisting new members of the health team to learn their role. The principle underpinning this initiative is that good human resource management will in turn support good clinical care.

The Garrison Health Induction and Orientation package will assist all health facility staff to perform their role more competently and consistently. Components of the program are:

- Induction checklist for ADF, CHP and APS health care staff
- Specific Craft Group checklists for example: Medical Officer, Registered Nurse, Dental Officer and Physiotherapist
- Orientation checklist to orientate staff to Garrison Health Operations
- Facility handbook detailing specific information about the facility

The Induction Package will provide information to new staff regarding their role and responsibilities. This package will also provide incoming employees with information about the roles and responsibilities of the members of the Garrison health multidisciplinary team. The package will align with the JHC Introduction Handbook and training directive.

Next steps in the implementation of the program includes

- piloting the package at selected facilities and adjusting the content
- development of a training package for health centre managers to support implementation and
- integration of assessment of compliance and effectiveness of the program through a broader GHO audit schedule

### Biography:

*Janine Fletcher is the Health Governance Manager (HGM) Joint Health Unit Southern NSW. Janine Fletcher commenced her nursing career as an Enrolled Nurse at Sutherland Hospital Sydney, gained her Bachelor of Nursing Science at Charles Sturt University, Bathurst and her Diploma of Critical Care Nursing at NSW College of Nursing, Sydney. In a previous role Janine was responsible for leading a busy civilian General Practice through the RACGP accreditation process.*

*Toni Murry is the Health Governance Manager Joint Health Unit Northern NSW. Toni commenced her career with The Royal Australian Air Force as a medical assistant in 1990, earned her Bachelor of Nursing at University of Western Sydney. Commissioned as a nursing officer Toni has been deployed on two occasions and was part of Pacific Partnership.*

*As HGM's Janine and Toni implement Joint Health Command's quality framework in the Australian Defence Force health facilities across Southern and Northern NSW.*

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## It's Always Good When You Know Who's on the Other End of the Phone: Defence Liaison in Natural Disasters. A Lesson from the Christchurch Earthquakes.

*MAJ Brendan Wood & LTCOL Gerard Wood*

**Presenter: MAJ Brendan Wood**

### Abstract:

The intent of this presentation is to highlight the lessons learned by New Zealand Defence Force Health Service Personnel during the initial Rescue Phase of a National Civil Defence Emergency.

**Situation.** At 12:51hrs on 22 February 2011 a 6.3 magnitude shallow earthquake (aftershock) struck Christchurch, a major city in the South Island of New Zealand, a city still recovering from an earlier quake in September 2010. This quake caused major destruction and disruption to civil infrastructure and services, and 185 deaths.

**Rationale for Mission.** There was an urgent need for supplemental support to the civil power in logistics and specialist health service capability. This was both in the practical application of services and need for Health Planners at all levels.

**Method.** Major Brendan Wood was the on-ground commander of Defence Health Service elements in Christchurch immediately after the quake and Lt Col Gerard Wood was deployed to the National Crisis Management Centre and National Health Coordination Centre in Wellington to provide advice on health evacuation missions.

**Outcomes of Mission.** The application of military planning skills at all levels greatly assisted in the effective execution of tasking required by the civil health authorities. This was achieved through effective communication based on interpersonal relationships developed pre disaster by personnel in the course of normal duties, and by embedding Military Health Liaison Officers at Emergency Operations Centres.

**Implications for Military Medicine.** The integration of personnel within decision making centres is essential so that civilian authorities can be given a realistic understanding of military health service capability. Relationships between senior military health managers and their civilian peers are greatly beneficial.

### Biography:

*I have been a member of the New Zealand Defence Force (NZDF) for more than 35 Years and hold the rank of Major in the Royal New Zealand Army Medical Corps. I am currently employed by Auckland University of Technology (AUT) as a Military Programme Leader and Senior Lecturer.*

*I have completed operational deployments with the NZDF as well as eight years of regular (full time) service in 2013. During that time I was able to change the NZDF medic-training and successfully introducing a degree-based programme for all Defence Force medics. I was intimately involved with the NZDF response to the Feb 2011 Christchurch Earthquakes.*

*I currently serve on the St John National Governance Committee as an elected member and sit on the St John Clinical Governance Committee.*

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## Introduction of OverWatch an NZDF Experience

*MAJ Brendan Wood*

**Presenter: MAJ Brendan Wood**

### Abstract:

OverWatch is an organisation of Regular, Reserve and Civilian members of the New Zealand Defence Force (NZDF) who are gay, lesbian, bisexual or Transgender (GLBT). The New Zealand Defence Force is an equal opportunity employer that values the diversity of its workforce. The NZDF believes that a diverse, modern and well supported workforce is vital for the future of our organisation. Groups such as OverWatch directly support NZDF's goals and strategic policies around personnel as outlined in The Defence White Paper 2010, and Future 35 - the NZDF's strategy to 2035. The NZDF understands the importance of providing support mechanisms to its personnel, those both in and out of uniform, in order to achieve its future

objectives and goals. OverWatch is considered a key support mechanism for current and ex-serving GLBT personnel, their commanders and managers, and their friends, allies and colleagues. OverWatch works in concert with other support areas, such as Military Psychologists and Chaplains, as part of a people-centered Total Defence Workforce. Groups such as OverWatch are a tangible example of NZDF's commitments to its people, its future strategies, and its core values of courage, comradeship, commitment and integrity.

Mission To promote the well-being of gay, lesbian, bisexual, transgender and intersex men and women within the Defence Force, and to foster an environment of inclusiveness which allows them to be the very best they can be in the Service of New Zealand. The group provides peer support and networking to the NZDF's GLBT people as well guidance to Command and Commanders.

### Biography:

*I have been a member of the New Zealand Defence Force (NZDF) for more than 35 years and hold the rank of Major in the Royal New Zealand Army Medical Corps (reserve). I am currently employed by Auckland University of Technology (AUT) as a Military Programme Leader and Senior Lecturer.*

*I have completed operational deployments with the NZDF as well as eight years of regular (full time) service in 2013. During that time I was able to change the NZDF medic-training and successfully introducing a degree-based programme for all Defence Force medics. I currently serve on the St John National Governance Committee as an elected member and sit on the St John Clinical Governance Committee.*

*I was an inaugural member of the NZDF OverWatch committee establishing GBLT support within the NZDF.*

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## Is There an Association Between Inflammation and Psychological Disorder in Veterans and Military Personnel? Outcomes of a Systematic Review

*Ms Nianne Bennett, Dr Carol Davy, Dr Ellie Lawrence-Wood, Prof Alexander McFarlane*

**Presenter: Ms Nianne Bennett**

### Abstract:

Although much has been done to better understand the trajectory of psychological conditions, particularly in relation to early intervention and treatment outcomes, the specific risk factors that contribute to the development of some disorders is not always clear. Emerging literature suggests biomarkers and inflammatory indicators may provide a promising method to identify risk for developing certain health conditions. However, the association between immune and inflammatory responses on mental health and psychological disorder is still relatively unknown. Whilst research on the effects of systemic inflammation on disease and health issues is developing, it is worth considering if inflammation also contributes to psychological symptom development or changes, particularly as psychological stress has been known to place excessive demands on the physiological system. To better understand this process, a systematic review was conducted to address the question of whether inflammation is associated with changes in mental health. This review will enhance the understanding of existing evidence which suggests inflammation is associated with health disorders and may offer directions for future primary research in military and veteran populations.

### Biography:

*LTCOL Nianne Bennett is a psychologist serving with the Australian Army. She completed her Masters in Psychology in 2002 at the University of Canberra, followed by a Graduate Diploma in Rehabilitation at the University of Sydney in 2009. Her research career has involved studies examining the clinical presentation, management and treatment of veterans with PTSD, with a particular interest in the provision of psychological support to high risk groups within the ADF.*

*Currently LTCOL Bennett is completing her PHD through the University of Adelaide Centre for Traumatic Stress Studies. Her research is focused on*



*the identification of risk and resilience factors in high risk groups, including the prediction of psychological outcomes and adaptation to sustained combat operations.*

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Ms Neanne Bennett<sup>1</sup>, Dr Carol Davy<sup>2</sup>, Dr Ellie Lawrence-Wood<sup>1</sup>, Professor Alexander McFarlane<sup>1</sup>

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### Linkages Between Findings of Recent Large Cohort Studies

*Kyleigh Heggie*

**Presenter: Kyleigh Heggie**

Abstract:

The increased level of operational tempo and the nature of Australian Defence Force (ADF) deployments since late 1999, (including East Timor and later in areas including the Persian Gulf and Afghanistan), have impacted the research direction and investment by the Australian Department of Veterans' Affairs (DVA).

As a result, DVA has commissioned a number of veteran cohort studies including: the Australian Peacekeepers: Long Term Mental Health Status, Health Service Use, and Quality of Life Study 2014, the Rwanda Deployment Health Study 2014, Australian Gulf War Veterans Follow Up Study 2015, as well as the Vietnam Veterans Family Study 2014. Across the findings from these studies, it has been identified that there is a significant overlap concerning veterans' and their families' health and wellbeing including: social connectedness and social isolation; the impact of service on family health and wellbeing; post-traumatic stress disorder (PTSD); depression; anxiety; and risk behaviours including suicide and problematic alcohol misuse.

Understanding the linkages between research findings related to veterans' health and wellbeing, and that of their families, assists DVA to remain informed of issues related to veterans and their health and identify gaps to help focus future research

efforts. Further, understanding the linkages between research findings can assist DVA to understand the factors that either assist or hinder a veteran or their family to seek assistance, what interventions are appropriate, and provide rehabilitation and other health and wellbeing services.

Biography:

*Kyleigh Heggie has been the Director of Research Development and Co-ordination within the Department of Veteran Affairs (DVA) since 2011. Kyleigh has had a long career as a clinical psychologist and research criminologist in Australia, Europe and Africa working largely with divergent criminal justice systems. Since joining DVA, Kyleigh has been discovering the world of military and veteran health and is responsible for the strategic policy development, management and administration of all research undertaken or commissioned by DVA. Kyleigh and her team are working to generate best practice research into the health and wellbeing needs of Australia's veteran community.*

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### The Longitudinal ADF Study Evaluating Resilience (LASER-Resilience): An Analysis of Data Obtained from ADF Members at Enlistment and at the End of Initial Training (Time 1 and Time 2).

*Carolina Casetta & David Forbes*

**Presenters: Carolina Casetta & David Forbes**

Abstract:

The Directorate of Strategic and Operational Mental Health (DSOMH) has been conducting the Longitudinal ADF Study Evaluating Resilience (LASER-Resilience) since 2009, in collaboration with Phoenix Australia (formerly known as the Australian Centre for Posttraumatic Mental Health). LASER-Resilience is a longitudinal study of the psychological

and environmental factors that contribute to the resilience of ADF members. Data has been collected from new members at enlistment (Time 1), at the end of initial training (or 12 months following Time 1) and is now being collected every 12 months for the first three years of their career (Time 3 to Time 5).

Thus far, LASER-Resilience reporting has predominantly focused on the data obtained in the first two time points and this presentation will aim to provide a summary of the results from three reports based on this data (The Initial Training Report, The Contributors to Change Report and the Prior Trauma Exposure Report). As described below, these reports aimed to determine whether changes in mental health and wellbeing occurred throughout training, what factors contributed to changes in mental health and wellbeing throughout training and to examine the relationship between trauma prior to enlistment and mental health outcomes at the end of initial training in ADF members.

In early 2013, Defence released the second report based on LASER-Resilience data (the Initial Training Report), which aimed to describe the changes in psychological and behavioural attributes of new members that occur over the course of initial training. This report demonstrated that overall, General Enlistees and Officers had very good mental health and wellbeing at enlistment, but that some small to moderate changes were observed at the end of initial training. These changes in psychological distress, post-traumatic stress symptoms, days of reduced functioning, alcohol consumption and anger were interpreted as a reflection of the impact of the intense physical and mental demands and significant life changes occurring during initial training.

Also in 2013, in order to identify which factors contributed to the changes in mental health and wellbeing observed over the initial training period as reported in the Initial Training Report, Phoenix Australia produced the Contributors to Change Report. This report examined coping styles, social support, personality and sleep problems in relation to changes in mental health and wellbeing over initial training.

The latest LASER-Resilience report which has been released is a detailed report regarding exposure to pre-military enlistment trauma. This report examined whether General Enlistees and Officers entered recruit training with different levels of prior trauma, the relationship between prior trauma and mental health outcomes at the end of initial training and how coping styles mediate the relationship between prior trauma and mental health outcomes.

### Biography:

*David Forbes is the Director, Phoenix Australia, Department of Psychiatry, University of Melbourne. He is a clinical psychologist with many years' experience in the assessment and treatment of mental health problems following trauma. Professor Forbes was the Co-Chair of the Steering Group for the NHMRC approved Australian Guidelines for the Treatment of Acute Stress Disorder and Posttraumatic Stress Disorder, and he sits on the editorial boards of key international journals and publishes widely in the international literature. Professor Forbes has a specialised interest in the assessment and treatment of traumatic stress and in veteran and military mental health.*

*Ms Carolina Casetta is a research officer in the Mental Health Research and Evaluation Team within Joint Health Command. Ms Casetta has worked on the Longitudinal ADF Study Evaluating Resilience since her commencement at Defence in 2012, and is currently the project manager of this study. Ms Casetta completed her Masters of Clinical Psychology at the University of Canberra.*

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## Measuring the Effectiveness of P.A.R.T.Y. (Prevent Alcohol and Risk-related Trauma in Youth) Programs in Reducing Alcohol Related Harms in Young Naval Trainees: Preliminary Findings of Early Use of Screening Tools.

*LEUT Jason Watterson, Prof Belinda Gabbe, CDRE Elizabeth Rushbrook & Prof Jeffrey V Rosenfeld*

**Presenter: LEUT Jason Watterson**

### Abstract:

Background: Risk-taking behaviours are associated with alcohol and substance abuse issues amongst trainees in the Australian Defence Forces (ADF). Reducing alcohol consumption issues in defence force trainees is a key aim of the ADF. Most interventions to address alcohol and substance abuse issues have not been developed or tried in the defence context, and there are substantial differences between the

civilian and defence force populations. The Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) Program, developed in North America, is a widely used program for addressing risk-taking behaviour and alcohol consumption in young people. Following a brief pilot program in 2012, a large randomised controlled trial of the efficacy of the P.A.R.T.Y. program is being conducted in the ADF. The aim of this presentation is to describe the prevalence of alcohol use disorders in naval trainees based on the baseline screening of the participants in the trial.

**Methods:** All participants in the P.A.R.T.Y. trial were screened at baseline using the Alcohol Use Disorders Identification Test (AUDIT), and the Modified Drinking Motives Questionnaire - Revised (MDMQ-R). These are validated tools for screening for excessive drinking and drinking motives respectively. Responses to the AUDIT are used to calculate a total score ranging from 0 to 40 where scores of  $\geq 8$  are recommended as indicators of hazardous and harmful alcohol use. Three further domains are also assessed within the tool; questions 1-3 explore hazardous alcohol use, questions 4-6 explore dependence symptoms, and questions 7-10 explore harmful alcohol use.

**Results:** Of the 704 participants screened to date, 43% reported total scores  $\geq 8$  indicating hazardous and harmful levels of alcohol use. Almost half (47.5%) of the participants reported consumption of 5 or more drinks containing alcohol in a drinking session, exceeding the National Health and Medical Research Council guidelines for alcohol consumption.

**Conclusion:** The results presented to date indicate that many Royal Australian Navy trainees could benefit from interventions aimed at reducing risk-taking behaviour and hazardous drinking, such as the P.A.R.T.Y. program, which is currently being evaluated in the ADF.

### Biography:

*Jason is currently employed as a Research Fellow with the National Trauma Research Institute (NTRI) at the Alfred hospital. Jason accepted a commission with the Royal Australian Navy in 2008 and currently holds the rank of Lieutenant.*

*Jason's clinical background is in Intensive Care Nursing, he has working in this area both in Australia and in the UK for the past 17 years. His primary clinical interests include trauma and hyperbaric.*

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## Mental Health Issues Following Combat Trauma

*Dr Duncan Wallace*

**Presenter: Dr Duncan Wallace**

### Abstract:

Patterns of wounding and deaths in the recent conflicts in Iraq and Afghanistan, including Australian casualty figures are briefly described. Traumatic limb amputation and mild traumatic brain injury are then focussed upon, discussing the types of resultant mental health conditions, their prevalence, screening, diagnosis, treatment and prognosis.

### Biography:

*Dr Duncan Wallace has been a consultant psychiatrist since 1990, practising mainly in public hospitals with special interests in emergency departments, rural psychiatry, telepsychiatry and military psychiatry.*

*Dr Wallace was appointed to his current position as psychiatrist to the Australian Defence Force Centre for Mental Health, at HMAS PENGUIN, Sydney, in 2010.*

*Dr Wallace has extensive operational experience as a Medical Officer in the Navy Reserve. He has deployed on Active Service to East Timor, Iraq, Afghanistan and the Persian Gulf. He also deployed on OP RELEX I to Christmas Island and Ashmore Reef, as well as humanitarian assistance operations in Banda Aceh and Nias in 2005 and 2006.*

*He is a Commodore in the RANR and was Director-General Naval Health Reserves from May 2012 to July 2015.*

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### **Military and Veteran's Mental Health: The US Experience**

*Dr Jonathan Lane*

**Presenter: Dr Jonathan Lane**

Abstract:

The aim of this presentation is to detail the current practices of delivery of mental health programs and services for both US Navy and Army personnel, and retired veterans, within the US. Major Lane was awarded a 2014 Churchill Fellowship for the purposes of this study, and hence will discuss the range of programs and services currently being delivered throughout different regions within the US. This includes a detailed overview of services for Veterans provided at the Kevin J. Zablocki Veterans Affairs Memorial Hospital in Milwaukee, with a focus on programs for treatment for Post-Traumatic Stress Disorder and substance abuse, along with psychosocial and supportive interventions. In terms of the current US Navy and Army practises, the primary focus of the presentation will be on both material being delivered by the National Centre for Combat & Operational Stress Control (NCCOSC) San Diego, as well as the OASIS Program - Overcoming Adversity and Stress Injury Support, which is a 10-week residential treatment program designed to get troops back into fighting form. The latter program is an intensive 10-week inpatient program utilising cognitive processing therapy, which is a treatment protocol shown to effectively treat post-traumatic stress disorder by helping patients make sense of their traumatic experiences, understand how those experiences affect their lives and learn skills to overcome, recover and, ultimately, return to their military job and transition to a more normal life. Finally, the presentation will conclude with a comparison to currently available Australian services, along with suggestions about how the US practices could inform services that could be developed here.

Biography:

*MAJ Lane enlisted as a soldier in the Army in 1989. He completed his Medical Degree at University of Tasmania as a sponsored Undergraduate student in 2004, and then served with 1 HSB in Holsworthy until*

*returning to Hobart in 2010 to complete his Psychiatry training. In 2013 he spent 6 months working with the US Mental Health Team at the NATO Role 3 MMU in KAF, Afghanistan, as the first ADF psychiatrist to be directly embedded with US MH providers. He is an active member of 3 HSB, and works as a Forensic Psychiatrist, along with a small private practice at The Hobart Clinic in order to be able to see both serving and retired military personnel.*

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### **Moral Injuries and Military Personnel: Impact on Service Members and Potential Therapies.**

*Dr Steven L. West & Dr Kirsty Dixon*

**Presenter: Dr Steven L. West**

Abstract:

Active duty service personnel deployed in combat theatres, both as aggressors and peace keepers commonly experience moral injuries, situations and actions, which run counter to their moral, ethical, and religious beliefs. These experiences have been found in service members from multiple unrelated conflicts, among troops from multiple nationalities, and in refugees from war torn locations (Drescher, et al., 2011; Ferrajão & Oliveira, 2014; Nazarov, et al., 2015; Ritov & Barnett, 2013). Experiencing moral injury often leaves service members in such situations with feelings of self-condemnation, moral ambiguity, self-loathing, and the questioning of one's own self-worth and self-goodness (Currier, Holland, & Malott, 2014; Dombro, Gray, & Early, 2013; Drescher, Foy, Kelly, Leshner, Schutz, & Litz, 2011; Gibbons, Shafer, Hickling, & Ramsey, 2013). Such feelings present themselves both in reaction to one's own behaviors and in response to the actions of others. The experience of simply witnessing the horrors of war and the suffering of humanity in dire conditions can also facilitate such feelings (Harris, Park, Currier, Usset, & Voecks, 2014; Nazarov, Jetly, McNeely, Kiang, Lanius, & McKinnion, 2015). The



self-condemnation associated with moral injuries have been shown to lead to (?) a lack of self-care and a variety of self-injurious behaviors, both immediately after such experiences and chronically for decades thereafter (Drescher, et al., 2011; Litz, et al., 2009; Nazarov, et al., 2015). Nascent research has linked moral injuries and associated self-condemnation with substance misuse, anxiety, depression, and suicidal ideation and attempts, in both military/veteran and civilian populations (Currier, et al., 2014; Dombo, et al., 2013; Litz, et al., 2009; Nazarov, et al., 2015). Moral injuries are thought to be distinct from, yet obviously related to, post-traumatic stress disorder (PTSD) (Litz, et al., 2009).

Although aspects of moral injuries have been studied for decades, as a unique and independent phenomenon, study of moral injuries has largely been limited to the last decade (Litz, et al., 2009). Although research in this area is burgeoning, to date only a handful of papers have provided discussion of potential treatments for military personnel who experience such injuries. The majority of these treat moral injuries as a component of other psychological conditions such as PTSD, or utilize therapies derived from the treatment of such conditions. These include exposure therapy, individual and group cognitive behavioral therapy, and aversion therapy (Gray, et al., 2012; Keenan, Lumley, & Schneider, 2014; Maguen & Burkman, 2013; Paul, et al., 2014). In this paper, we review the literature on the rates, correlates, and comorbidities of moral injuries, the assessment tools available for the identification of such injuries, and the extant literature on available therapies. Finally, we provide a discussion of a proposed therapeutic technique "Forgiveness Therapy", which has proved effective in the treatment of moral injuries in civilian populations, as an alternate therapy for military and veteran populations.

### Biography:

*Steven L. West, Ph.D., CRC is an Associate Professor in the Department of Physical Medicine and Rehabilitation, and Associate Director of the Center for Rehabilitation Science and Engineering at Virginia Commonwealth University in Richmond, VA, USA. His primary research interests center on traumatically acquired disabilities including traumatic brain injury and spinal cord injury. Specifically, he studies psychosocial adjustment, health care access, and issues of co-morbidity in such populations. He is currently the Mid-Atlantic Area Director for the Chronic Effects of Neurotrauma Consortium funded jointly by the U.S. Department of Defense and Department of Veterans Affairs.*

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## Nanocomposite Materials for Anti-infective Medical Device Coatings.

*Andrea O'Connor, Phong Tran, Assoc Prof Neil O'Brien-Simpson, Dr Keren Abberton, Anand Deva & Wayne Morrison*

**Presenter: Andrea O'Connor**

### Abstract:

Medical devices, such as fracture fixation plates and wound dressings, can provide major improvements in outcomes for patients suffering from traumatic injuries and can even be life-saving. A significant challenge with such devices, particularly when used on battlefield injuries, is potential contamination with bacteria that can cause infections and may form biofilms on the devices. Bacterial biofilms form coatings that protect bacteria from conventional antibiotics and are difficult to treat. As drug-resistant bacteria are becoming increasingly problematic, strategies to combat the formation of bacterial biofilms using non-drug based materials may be a valuable way to minimise or prevent biofilm formation in vivo. In this study, inorganic nanoparticles of a range of materials including silver and selenium were investigated for their potential to inhibit formation of bacterial biofilms. Their toxicity towards both bacteria and mammalian fibroblasts was initially tested in vitro. Selenium nanoparticles showed a good balance of potency against important bacteria, including drug-resistant bacteria like methicillin-resistant *Staphylococcus aureus*, and low toxicity to mammalian cells. A method to create bioactive coatings of these nanoparticles on metal plates and screws used for fracture fixation was developed and optimised. These coated plates were tested in a rat femur model in which drug-resistant bacteria were inoculated into the wound site at the time of implantation. Without the nanoparticle coatings, biofilms of bacteria formed, but when plates with the new coating were used, the numbers

of bacteria found in the wound sites after four weeks were reduced and the biofilm formation was dramatically inhibited. Thus we have demonstrated a versatile non-drug based, non-toxic antibacterial coating that could be applied to resist bacterial infection and biofilm formation on a wide range of implanted materials and devices.

The authors acknowledge the support of the Defence Health Foundation for this work via an Establishment Grant.

### Biography:

*Associate Professor O'Connor obtained her Bachelor of Engineering (Chemical, Hons) and PhD degrees from The University of Melbourne before being awarded a Fulbright Postdoctoral Fellowship to undertake research at Massachusetts Institute of Technology, USA. She returned to Australia where she is now the Deputy Head of the Department of Chemical and Biomolecular Engineering at The University of Melbourne. Her expertise is in chemical and biomedical engineering with particular focus areas including biomaterials, tissue engineering, porous materials and downstream processing for biotechnology. She leads the Tissue Engineering and Nanoporous Materials Research Group in the Department of Chemical and Biomolecular Engineering. Her research and teaching are focussed in cross disciplinary applications of engineering involving biological systems, including a strong interest in 3D soft tissue engineering. She has active collaborations with several medical research institutes and medical device companies in Australia and has worked in the chemical industry in Australia and overseas.*

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## New Beginnings: Challenges for the Families of Members who Transition from Military Service

*Dr Jacqueline Harvey & Ms Kyleigh Heggie*

**Presenter: Dr Jacqueline Harvey & Ms Kyleigh Heggie**

### Abstract:

Australia's most comprehensive research programme into the impact of contemporary military service is currently underway. One of the goals of the programme is to enhance the evidence base that informs policy and support services for ADF families in both the Department of Defence and the Department of Veterans' Affairs. Consequently the programme includes the first Australian study to examine the social and mental health of the families of recently transitioned ADF members. The Family Wellbeing Study will survey approximately 25,000 family members of ex-serving ADF members who transitioned from full-time service between 2010 and 2014. In this paper, we summarise the survey methodology of the Family Wellbeing Study and briefly describe the key issues and findings from the pilot testing and cognitive interviewing component conducted prior to the commencement of the fieldwork. The rationale and background to the survey design will also be presented.

### Biography:

*Jacqueline Harvey is currently the Design/Project Manager of the Family Wellbeing Study. Previous to this she was the Design Manager of the Longitudinal Study of Australian Children (LSAC). During her five years in this role she designed a developmental and lifespan conceptual framework of the longitudinal data from Waves 1 to 8. Before joining the Australian Institute of Family Studies, she worked as a psychologist in numerous educational settings at the primary, secondary and tertiary level. This work including counselling, psycho-educational assessment, school consultations, psycho-educational research and lecturing at the University of Melbourne.*

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### **New Beginnings – Challenges of Transition from Military Service**

*Dr Miranda Van Hooff & Dr Stephanie Hodson*

**Presenters: Dr Miranda Van Hooff & Dr Stephanie Hodson**

#### **Abstract:**

Australia's most comprehensive research programme into the impact of contemporary military service on the health and wellbeing of serving and ex-serving Australian Defence Force (ADF) personnel is currently underway. It includes the first Australian study to examine the physical, social and mental health of an entire cohort of recently transitioned ADF members. The programme will survey around 25,000 ex-serving ADF members who transitioned from full-time service between 2010 and 2014 and invite them to nominate a family member. The goal of the programme is enhance the evidence base that informs policy and support services in both the Department of Defence and the Department of Veterans' Affairs. To achieve this goal a consultation process was undertaken including veteran representatives, policy makers and leading researchers to determine the key research concepts to be included within the study. This paper will summarise the methodology of the program, including the rationale and background to the high priority health and wellbeing areas under investigation.

#### **Biography:**

*Dr Van Hooff is the Director of Research at The University of Adelaide, Centre for Traumatic Stress Studies. She has been an author, lead researcher and program manager of a number of large-scale longitudinal epidemiological studies of child and adult trauma survivors. Dr Van Hooff was the lead researcher on the 2010 ADF Mental Health Prevalence and Wellbeing Study, the first study to examine the prevalence of Mental Disorder in the entire Australian Defence Force. She is currently Chief Investigator for The Transition and Wellbeing Research Programme, Australia's most comprehensive research programme to examine the impact of contemporary military service on the physical, social and mental health and wellbeing of serving and ex-serving ADF personnel. Embedded in this programme is the first longitudinal follow-up of over 24,000 people who completed the MilHOP programme of research in 2010, which has a particular focus on ADF members who deployed to the MEAO.*

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### **New Zealand Last ANZAC. Pte Alfred Douglas (Doug) Dibley, New Zealand Medical Corps (NZMC).**

*MAJ Brendan Wood*

**Presenter: MAJ Brendan Wood**

#### **Abstract:**

In 1915, New Zealand sent almost 14,000 troops to Gallipoli. One of those soldiers was Alfred Douglas Dibley. Unlike the over 2700 Kiwi's who did not return from WW1. Private Dibley returned. His death 82 years later in 1997 at the age of 101 years saw him as our last surviving ANZAC.

Born in Wellington, New Zealand, Alfred Douglas Dibley, known as Doug, joined the New Zealand Medical Corps.

He answered an advertisement calling for medical helpers at Trentham Military Camp in Upper Hutt, where soldiers from the Wellington region were trained before sailing overseas. He soon found himself on his way to Turkey as a member of the New Zealand Medical Corps.

He arrived in Gallipoli in August 1915, not long before the ANZAC evacuation. Like the other survivors of the Gallipoli campaign, in December of that year stretcher-bearer Doug was transferred to Egypt. He was returned to New Zealand with ill Health.

#### **Biography:**

*My career as a soldier commenced in 1980. I currently serve in the NZ Army Reserve as a Major in the RNZAMC. I am a career paramedic gaining my Advanced Care certificate in 1996 and became an Intensive Care Paramedic. I am currently employed by Auckland University of Technology (AUT) as a Military Programme Leader and Senior Lecturer.*

*I currently serve on the St John National Governance Committee as an elected member and sit on the St John Clinical Governance Committee.*

*I am a Commander of the Order of St John (CSt.J) and was awarded the New Zealand Distinguished Service Decoration (DSD).*

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### 100 Years of Garrison Health Services.

*Ms Paula Sear & Ms Tonia Handcock*

**Presenter: Ms Paula Sear & Ms Tonia Handcock**

Abstract:

The focus in military medicine is often on the critically important area of Defence's deployable health capability. This presentation will focus on Garrison Health Service delivery which prepares members for deployment, support members post deployment as well as maintaining their everyday health.

This presentation will explore the provision of Garrison Health Services (GHS) in 1915 and the arrangements under which they are provided 100 years later in 2015. It will look at the workforce that provides on-base services and the connection between on-base and off-base service providers, including medical specialists, allied health care providers, hospitals and diagnostic services.

The current arrangements under which GHS are delivered combine with a sophisticated electronic health system to provide us with a plethora of data. This presentation will also highlight how health data contributes to shaping and refining the delivery of GHS.

Biography:

*Ms Paula Sear - spent 7 years as an ARA Medic in early adulthood. Is an Exercise Physiologist by trade and has worked for JHC since mid-2010.*

*Ms Tonia Handcock - Certified Practising Accountant and has worked for Joint Health Command since 2008*

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### Operation Nightingale: Revisiting Bullecourt 2016

*CAPT Melanie Van Twest*

**Presenter: CAPT Melanie Van Twest**

Abstract:

Operation Nightingale is a British Army initiative which aims to promote recovery through participation in archaeological excavation and research for returned personnel injured during their service in Iraq and Afghanistan.

It uses both the social and technical aspects of field archaeology, and takes advantage of the close correlation between the team-oriented and outdoor-based skills of the soldier and the archaeologist.

Operation Nightingale has excavated at a number of sites around the UK and was featured on an episode of the well-known television program 'Time Team'. It has had a number of successes in helping returned personnel adjust to civilian life and recover from the physical and mental trauma arising from wartime service.

An excavation is planned for September 2016 in the area of Bullecourt, France, where British and Australian soldiers fought alongside one another in two battles in April and May 1917 to liberate the village.

It is proposed that for the first time Operation Nightingale will field an international team of veterans from the UK and Australia to acknowledge this important history and to trial this initiative with Australian service personnel.

This presentation will discuss details of the planned excavation, summarise the British experience of using archaeology as a means of recovery from combat-related injuries, and consider whether this method may be adaptable to the Australian context.



### Biography:

*CAPT Van Twest joined the Australian Army Reserve in 1987, achieving the rank of Warrant Officer Class Two before becoming a Medical Officer in 2010. She is currently posted as the Regimental Medical Officer at the 8th/7th Battalion, Royal Victoria Regiment, at its headquarters in Ballarat, Victoria.*

*Before studying medicine, CAPT Van Twest was a working field archaeologist specialising in the excavation and study of human skeletal remains. She has an ongoing affiliation with a long-term archaeological research project based around an Anglo-Saxon cemetery site in Norfolk, England.*

*In her civilian life, CAPT Van Twest is undertaking a qualification as a General Practice Anaesthetist and plans to work in rural and remote Australia. She has worked for the Australian Antarctic Division, residing on Macquarie Island for most of 2012.*

*CAPT Van Twest maintains a strong interest in the wellbeing of service personnel, particularly psychological health and the welfare of veterans.*

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## Persisting Increase in Multiple Symptom Reporting in Australian Veterans of the 1990-91 Gulf War

*Ms Stella Gwini, Prof Andrew Forbes, Dr Jillian Ikin, Prof Malcolm Sim, & Dr Helen Kelsall*

**Presenter: Ms Stella Gwini**

### Abstract:

**Background:** Ten years post-war, prevalence of multiple health symptoms were significantly higher among Australian veterans of the 1990-91 Gulf War (veterans) than in a military comparison group. The reported symptoms spanned multiple body systems and presented varied symptom profiles among veterans. The term multisymptom illness (MSI), also known as chronic MSI and Gulf War illness, has been used to describe symptomatology among Gulf War veterans, the definition of which was developed

on the basis of the patterns/correlations of reported symptoms. A baseline study conducted in 2000-02 showed that around one-quarter of Australian veterans were defined as having MSI, but little is known about changes over time. In 2011-12, a follow-up study was conducted with an aim of investigating changes in symptom reporting and MSI over time.

**Methods:** The baseline and follow-up studies included a 63-item past-month symptom checklist. A modified version of the Centers for Disease Control and Prevention's definition of MSI was adopted for both these studies. A total of 697 male veterans (54% follow-up participation) and 659 male comparison group members (47% follow-up participation) participated in both studies. Prevalence of symptoms and MSI at baseline and follow-up were compared within and between study groups. Persistence was defined as symptoms present at both time points while incidence was referred to symptoms present only at follow-up.

**Results:** The average number of symptoms reported by veterans at follow-up was higher than that reported by the comparison group (ratio of means 1.36, 95% CI 1.24-1.48). The prevalence of 34/63 and 25/63 symptoms reported by veterans and the comparison group respectively, were higher at follow-up than baseline. For most symptoms, the rate-of-increase in symptom prevalence from baseline to follow-up was similar for veterans and comparison group. A quarter of symptoms were significantly more persistent in veterans than the comparison group (risk ratios from 1.02 to 1.96) and symptom incidence was significantly higher in veterans than the comparison group for over half the symptoms (risk ratios from 1.25 to 2.72). The prevalence of MSI at follow-up was 60% higher in veterans than the comparison (risk ratio 1.60, 95% CI 1.31-1.95). MSI prevalence in Gulf War veterans significantly increased from baseline (risk ratio 1.27, 95% CI 1.11-1.44) but prevalence change over time was not significantly different between the two study groups (risk ratio 1.06, 95% CI 0.83-1.35).

**Conclusions:** Overall, symptom prevalence and MSI increased from baseline to follow-up and remained higher in Gulf War veterans. For most symptoms, symptom persistence was similar for the two study groups while symptom incidence in Gulf War veterans was higher than in the comparison group. The gap between Gulf War veterans' and comparison groups' symptomatology remained unchanged. These findings indicate enduring increased health symptoms and enduring health consequences of Gulf War service.

### Biography:

*Ms. Stella Gwini is a Biostatistician and PhD Student with the Monash Centre for Occupational and Environmental Health at the School of Public Health and Preventive Medicine, Monash University. She is currently investigating the longitudinal changes in prevalence of multiple symptoms among Gulf War veterans and how the changes relate to health service use and other health outcomes.*

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## Post-traumatic Stress Disorder, Antipsychotic Use and Risk of Dementia in Veterans

*Prof Elizabeth Roughead, Dr Nicole Pratt, Dr Lisa Kalisch Ellett, Ms Emmae Ramsay, Mr John Barratt, Prof Philip Morris & Dr Graeme Killer*

**Presenter: Prof Elizabeth Roughead**

### Abstract:

**Background:** Observational studies have found an association between post-traumatic stress disorder and dementia; however, none have examined the contribution of medicines, particularly antipsychotics. Antipsychotics have been associated with changes in brain structure and may be a contributory factor.

**Objective:** to examine the association between post-traumatic stress disorder (PTSD), antipsychotic use and risk of dementia in veterans

**Method:** Retrospective cohort study using the Australian Government Department of Veterans' Affairs (DVA) health claims data. The study period was Jan 2001 to Jun 2013. Baseline data were assessed during the period 2001 to 2002, with follow up commencing from 2003. Male veterans aged 55 to 65 years with no record of dementia at baseline

were included. Three groups were created for PTSD status; patients with a hospital admission for PTSD, patients with PTSD recorded in their service disability file and those with no recorded PTSD diagnosis. Cohorts were further stratified according to whether an antipsychotic was dispensed in the base-line period. Time to dementia diagnosis was assessed using Cox-proportional hazards models, with age as the time scale.

**Results:** 15,599 veterans were included. Veterans hospitalised for PTSD and using antipsychotics in the baseline period had a 2.6 fold increased risk of dementia (Hazard Ratio (HR)=2.63, 95% Confidence Interval (CI) 1.23-5.63), however, risk was not statistically significant in those hospitalised with PTSD and not receiving antipsychotics in the baseline period (HR=1.49, 95% CI 0.88 -2.53). Veterans with PTSD recorded in their service disability file but with no hospital admission for PTSD had no increased risk of dementia (with or without antipsychotic use); HR 1.19, 95% CI 0.51,2.78 for those on antipsychotics, HR 0.97, 95% CI 0.71-1.31 for those not dispensed antipsychotics. Veterans with no record of PTSD at baseline but receiving antipsychotics at baseline had more than five-fold increased risk of dementia (HR=5.56, 95% CI 2.82 -10.96) compared to those with no PTSD record and no antipsychotics.

**Conclusion:** Our results suggest there may be a complex interplay with underlying disease, medication use and risk of dementia. Antipsychotics are not recommended first line for post-traumatic stress disorder but are commonly used. Our results suggest cautious use in PTSD until more robust evidence is available.

### Biography:

*Libby's research interests include public policy concerning medicines, quality use of medicines, pharmacoepidemiology and adverse drug events.*

*She is director of the Quality Use of Medicines and Pharmacy Research Centre, lead investigator of the Centre of Research Excellence in Post-Marketing Surveillance of Medicines and Medical Devices, and Director of a national prescriber intervention and feedback program targeting Australian general practitioners, pharmacists and veterans; Veterans' MATES ([www.veteransmates.net.au](http://www.veteransmates.net.au)). She is currently a member of the Australian Government Drug Utilisation Sub-Committee of the Pharmaceutical Benefits Advisory Committee and the Medication Safety Reference Group of the Australian Safety and Quality Commission.*

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## Posttraumatic Stress Disorder in 1990-1991 Gulf War, Afghanistan and Iraq War Veterans: A Systematic Review and Meta-Analysis

Dr Helen Kelsall, Prof Mark Cremaer, Dr Matthew Page, Prof Andrew Forbes & Prof Malcolm Sim

**Presenter: Dr Helen Kelsall**

## Abstract:

**Introduction:** War veterans are susceptible to various psychological disorders post-deployment including posttraumatic stress disorder (PTSD). Systematic reviews, which synthesise literature reported across individual studies, can provide a reliable estimate of risk factors that clinicians and policymakers need to be aware of when managing veterans' health. The aim was to conduct a systematic review and meta-analysis of studies which compared PTSD in 1990-1991 Gulf War, Afghanistan and Iraq War veterans and military comparison groups who were non-deployed to the corresponding conflict.

**Methods:** Literature was searched (1990-2014) in multiple electronic databases. Studies were assessed for eligibility and quality, including risk of bias.<sup>1</sup> Random effects meta-analyses were conducted. Sources of variability were assessed by subgroup analysis to explore the factors most likely to result in study heterogeneity: outcome measure used, odds ratios adjustment, risk of bias, theatre of deployment, and duty status (regular, reservist). Sensitivity analyses were conducted.

**Results:** After removal of duplicates, of 14,771 records assessed the meta-analysis of PTSD included

18 studies in Gulf War veterans and 16 studies in Afghanistan/Iraq War veterans. Pooled analysis yielded an increased odds of PTSD in Gulf War veterans compared with non-deployed personnel (odds ratio (OR) 3.39, 95% CI 2.79-4.13, I<sup>2</sup>=53%). Stratification revealed a larger OR in the high risk of bias studies but no important differences between other subgroups. The overall OR did not vary after excluding any individual study in sensitivity analyses.

Pooled analysis indicated an increased odds of PTSD in Afghanistan/Iraq War veterans (OR 2.12; 95% CI 1.65-2.72). However, there was a very high amount of statistical heterogeneity (I<sup>2</sup>=97%), so the meta-analytic effect should be interpreted with caution in terms of the actual level of the increased odds. Stratification did not reveal important differences between subgroups, the overall OR did not vary after excluding any individual study, and the high level of heterogeneity persisted. Gulf War veterans had a statistically higher odds of PTSD than Afghanistan/Iraq War veterans relative to their non-deployed comparison groups (p=0.004).

**Conclusions:** Our findings indicated that military personnel from several countries deployed to Middle East area of conflicts over the past 20 years were at increased risk of PTSD compared with non-deployed military comparison groups. The summary odds of PTSD were slightly greater in Gulf War veterans than Afghanistan/Iraq War veterans.

## Biography:

Dr Helen Kelsall is a public health physician/epidemiologist who is a Senior Research Fellow at the Monash Centre for Occupational and Environmental Health. She was a lead investigator on the 2000-02 and 2011-12 Australian Gulf War Veterans' Health Study and other collaborative studies investigating physical, psychological and social health and wellbeing in military and veteran populations. She is also a member of the Editorial Committee of JMVH.

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## The Prevalence and Predictors of Mental Disorder Amongst Australian Defence Force (ADF) Personnel Deployed to Iraq/Afghanistan

*Dr Amelia Searle, Ms Elizabeth Saccone,  
Dr Ellie Lawrence-Wood, Dr Miranda Van Hooff,  
Dr Blair Grace & Prof Alexander McFarlane*

**Presenter: Dr Amelia Searle**

### Abstract:

**Background:** Studies of Coalition Forces illustrate that various aspects of deployment to the Middle East Area of Operations (MEAO) are associated with risk of mental disorder. A large body of research (including a study of Australian Defence Force (ADF) personnel) has reported the prevalence of probable disorder (using cut-offs on symptom scales) among groups of personnel deployed to the MEAO. However, no study has estimated the prevalence of mental disorder among MEAO-deployed personnel using a structured diagnostic interview. The broad aim of this report is to examine the prevalence and predictors of mental disorder in ADF personnel deployed to the MEAO.

**Methods:** The Mental Health Prevalence and Wellbeing Study (MHPWS) provided estimates of ICD-10 mental disorder in all currently-serving regular ADF personnel (N = 50049). This population comprised personnel who (1) had previously deployed to the MEAO (N = 16991), (2) had not deployed to the MEAO but had deployed elsewhere (N = 14096), and (3) had never been deployed anywhere (N = 18961). Participants (n = 24481) completed a Phase 1 survey of physical/mental health and wellbeing, and a proportion of these personnel (n = 1798) also completed a structured diagnostic interview assessing 12-month mental disorder. Using demographic information from military records, data were weighted to represent the entire ADF population (N = 50049).

**Results:** All ADF personnel showed a low prevalence of 12-month mental disorder, which was similar to Australian community estimates. Among MEAO-deployed personnel, the most prevalent overall disorder grouping was any anxiety disorder, followed by any affective disorder, and then any alcohol disorder. Additionally, the most prevalent individual disorders were PTSD, panic attacks, depressive episodes, and specific phobia. MEAO-deployed personnel showed similar rates of disorder to

Elsewhere-deployed, and Never-deployed personnel. While there was a pattern for MEAO-deployed personnel to show the lowest odds of disorder in adjusted logistic regression analyses, these were small and non-significant effects. Among MEAO-deployed personnel, both deployment-related and lifetime trauma showed strong associations with mental disorder in adjusted logistic regression analyses.

**Conclusion:** Low disorder prevalence among ADF personnel is consistent with a 'healthy worker' effect, with the potential for higher rates of disorder among personnel who have since discharged. Disorder may have less to do with broad deployment status/location, and thus is worth monitoring equally in all ADF personnel. Obtaining a comprehensive account of lifetime trauma history may provide a better indication of the likelihood of subsequent disorder among personnel.

### Biography:

*Amelia has been employed as a Post-doctoral Research Fellow at the Centre for Traumatic Stress Studies since 2012. In this role, Amelia investigates the precursors of adult mental health problems in several large cohort studies. In particular, Amelia has extensive experience within military mental health research, having conducted detailed analysis into the predictors of mental disorder including PTSD and depression among currently-serving Australian military personnel in the large-scale Military Health Outcomes Program (MilHOP). Amelia is currently a lead investigator on the 2015 Transition and Wellbeing Research Programme, a partnership study between the DVA, the University of Adelaide, and Joint Health Command.*

*Amelia has a background in psychology, completing a PhD through the University of Adelaide in 2011 within the area of child mental health, and receiving the Dean's letter of commendation for the high quality of her thesis.*

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## Psychological Health in Australian Veterans of the 1990-91 Gulf War, 20 Years After Deployment.

*Dr Jillian Ikin, Dr Dean McKenzie, Stella Gwini, Dr Helen Kelsall, Breanna Wright, Prof Malcolm Sim*

**Presenter: Dr Jillian Ikin**

### Abstract:

**Background:** Ten years after the 1990-1991 Gulf War, Australian veterans were found to have significantly elevated levels of posttraumatic stress disorder (PTSD), major depression and alcohol use disorder, and significantly poorer mental wellbeing, compared to a military comparison group. At approximately 20 years post-Gulf War, the veterans and their comparison group have been re-assessed for the presence of PTSD, depression and alcohol disorder and other indicators of psychological health.

**Methods:** The Composite International Diagnostic Interview (CIDI) was administered to Gulf War veteran and comparison group participants to measure the presence of DSM-IV 12 month psychological disorders, in a baseline study in 2000-2002 and again at follow up in 2011-2012. Additional structured self-report instruments administered to measure psychological health included the Short Form 12 Health Survey, 12-item General Health Questionnaire, 9-item Patient Health Questionnaire, Posttraumatic Stress Disorder Checklist, Demoralization Scale and the Connor Davidson-Resilience Scale. Several questions about suicidal ideation were also administered.

**Results:** At follow up the risk for both PTSD and alcohol use disorder in Gulf War veterans was approximately twice that in the comparison group (PTSD adj relative risk (RR) 2.37, 95% CI 1.37-4.09; alcohol adj RR = 1.93, 95% CI 1.10-3.38). Gulf War veterans were not at significantly excess risk of major depression at follow up, however they reported more severe depressive symptoms than the comparison group and were more likely to have filled scripts for anti-depressant medications. Other DSM-IV psychological disorders were infrequent in both study groups. Veterans reported significantly poorer mental health status than the comparison group, had higher levels of demoralisation and were more likely to report thoughts of suicidal ideation; however the two groups were equally resilient.

**Conclusions:** Twenty years post-deployment, Australia's veterans of the Gulf War have poorer psychological health than their military comparison

group, with increased PTSD and alcohol use disorder, depressive symptom severity, demoralisation and suicidal ideation. The finding that the two study groups are equally resilient is a positive finding for the Gulf War veterans, resilience being a measure of their ability to thrive despite adversity. Our study findings indicate that at 20 years post-Gulf War, psychological morbidity remains increased in Gulf War veterans relative to a military comparison group and effective strategies are needed to continue to identify and treat existing psychological conditions and to prevent future cases.

### Biography:

*Dr Ikin is a Research Fellow at the Monash University Centre for Occupational and Environmental Health. She was an investigator on both the baseline and follow up Australian Gulf War Veterans' Health Studies and on the Korean War Veterans' Health Study. Her PhD was titled War stressors, mental health and well-being outcomes in Australian veterans and service personnel.*

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## Psychological Impacts of Military Service Among Australian Defence Force Females

*Dr Miranda Van Hooff, Dr Ellie Lawrence-Wood, Dr Amelia Searle, Dr Stephanie Hodson & Prof Alexander McFarlane*

**Presenter: Dr Miranda Van Hooff**

### Abstract:

Mental Health Prevalence and Wellbeing Study (MHPWS) data showed ADF females to have greater rates of affective disorders (particularly depressive episodes) than the Australian community. Rates were also higher in ADF females than ADF males. Overall, ADF females also reported significantly higher rates

of a number of anxiety disorders compared to ADF males. This may be related to the increased risk of particular traumatic events among ADF females compared to males. While PTSD is the hallmark disorder of military service, and trauma exposure, recently there has been a movement towards a trans-diagnostic approach to traumatic stress. In this context trauma exposure can result in a range of other disorders, above and beyond PTSD. This paper will discuss this concept using data from the MHPWS and MEAO Prospective Health Study, with a focus on the impacts of military service on the mental health of ADF females.

### Biography:

*Dr Van Hooff is the Director of Research at The University of Adelaide, Centre for Traumatic Stress Studies. She has been an author, lead researcher and program manager of a number of large-scale longitudinal epidemiological studies of child and adult trauma survivors. Dr Van Hooff was the lead researcher on the 2010 ADF Mental Health Prevalence and Wellbeing Study, the first study to examine the prevalence of Mental Disorder in the entire Australian Defence Force. She is currently Chief Investigator for The Transition and Wellbeing Research Programme, Australia's most comprehensive research programme to examine the impact of contemporary military service on the physical, social and mental health and wellbeing of serving and ex-serving ADF personnel. Embedded in this programme is the first longitudinal follow-up of over 24,000 people who completed the MilHOP programme of research in 2010, which has a particular focus on ADF members who deployed to the MEAO.*

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## Qualified Privilege - What does it mean for Joint Health Command

*Dr Darrell Duncan*

**Presenter: Dr Darrell Duncan**

### Abstract:

A submission has been made to the Minister for Defence to establish a system of qualified privilege to be applied within Joint Health Command. This will require changes to the Defence Act with subsequent regulations before implementation can occur.

Qualified privilege in health care is an almost every day process within Australian public health services and has been since the Health Insurance Act was amended in the early 1990s followed by the various States and Territories enacting laws to provide this.

BUT

What does this actually mean and what are the potential implications for Joint Health Command. This paper will provide an overview of the history of qualified privilege as it applies to health care settings, how it operates across Australian jurisdictions and outline the implications for Joint Health Command when the required legislative cover is available.

### Biography:

*Darrell Duncan has been in the Defence environment for 38 years including service in the Regular Army and continuing service in the Army Reserve. He is a Fellow of the Royal Australasian College of Medical Administrators and holds Masters in Health Administration, Public Health and Clinical Epidemiology. His interests are in applying statistical thinking to everyday problems, use of information on the management and delivery of health care and assessing and improving the quality of health care.*

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### Rations of the Australians at Gallipoli

WG CMDR Derek Moore

**Presenter: WG CMDR Derek Moore**

#### Abstract:

The combat rations supplied to the Australians at Gallipoli in 1915 consisted of a very limited range of foods – predominantly Bully Beef, Hard Tack Biscuits, Tea and Sugar.

Consequently, the Australians suffered significant nutritional problems. These included general malnutrition, which contributed to the morbidity and mortality from both disease and battle injuries.

Scurvy, due to insufficient Vitamin C in the rations, was one of the specific nutritional deficiencies suffered by many of the servicemen. A chronic lack of water was an ever present challenge too.

This poster examines the food and nutrition issues experienced by the Australians at Gallipoli.

#### Biography:

*Derek has been a member of the RAAF Specialist Reserve for over 30 years. His roles have included both consultancy e.g. to senior Health Services and ADF Catering personnel, plus training. The latter has embraced Health Services training at both RAAF Richmond and RAAF Williams, whilst Catering training has been delivered at RAAF Wagga and HMAS Cerberus, to a variety of both Air Force and tri-service courses.*

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### The Red Cross Information Bureau: Vital Aid to the Homefront.

Steve Campbell-Wright

**Presenter: Steve Campbell-Wright**

#### Abstract:

The Australian Branch of the British Red Cross Society was established in 1914, within a fortnight of the declaration of World War I. By the end of 1914, hundreds of local branches were established across Australia. Throughout the war, the Society concentrated its efforts on providing comforts for those deployed overseas and assisting those who returned wounded. As an international welfare organisation, the Red Cross was well placed to seek detailed information about prisoners of war and the circumstances around deaths in battle or captivity. In the case of deaths, the Red Cross was often able to provide a more humane explanation for the loss than official condolences and correspondence could. The Red Cross Information Bureau was formed in 1915 to coordinate information and conduct research relating to wartime captives, deaths and burials. Through a case study of the twin Lord brothers, who enlisted in the Australian Flying Corps in 1915— one who returned and one who died in captivity— this paper shows the Information Bureau at work and the extensive efforts that were made to provide accurate and reliable information to worried and grieving families. Air Mechanic Will Lord died in Turkish captivity during the infamous death march to the Taurus Mountains after the 1916 Siege of Kut in modern-day Iraq. Investigations by the Bureau spanning three years finally determined his likely outcome. The important work of the Bureau provided answers and a degree of comfort for thousands of families and was a major factor in helping families to cope with their loss and adjust to life after the war.

#### Biography:

*Steve Campbell-Wright is a PhD candidate in the School of Historical and Philosophical Studies at the University of Melbourne. He is also a serving officer in the RAAF with over thirty years' experience. His studies focus on military aviation history and cultural heritage. His 2014 publication, *An Interesting Point*, charted the history of Point Cook, Victoria in its centenary year as the birthplace of Australia's military aviation and the subsequent home of the RAAF. Steve also likes his history to be practical, and he volunteers on historic aircraft restoration and replica projects at the RAAF Museum in his spare time.*

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### Rehabilitation and Transition Continuum of Care

*Mr Jim Porteous*

**Presenter: Mr Jim Porteous**

Abstract:

The ADF approach to rehabilitation and recovery is a comprehensive one aimed at restoring an individual member's satisfaction with daily life following their wounding, injury or illness. This includes their psychological and physical needs as well as social, economic, employment, relationship and other needs. In the Defence approach, this includes a strong focus on activities that promote and maintain their physical, cognitive and emotional health, including ongoing contact and support with their Unit.

The ADF Rehabilitation Program (ADFRP) aims to support wounded, injured or ill military personnel in their return to work in current or different duties or trade or, if this is not possible, they will be rehabilitated, medically separated and supported to transition to the civilian environment.

One outcome of ADFRP is to ensure personnel are "separation ready". We prepare uniformed members discharging on medical grounds for transition to civilian life through assessment of their needs, and focus their rehabilitation and recovery on reducing the impact of their condition(s), thereby removing or reducing their need to rely on compensation benefits and/or disability support pensions.

The ADF actively prepares members who are medically separating for transition to civilian life by providing information and assistance such as referral to other identified health providers, to ensure a safe and effective transfer of care. In the case of ADF members with an accepted compensable condition, the ADFRP team involve the Department of Veterans' Affairs in the member's care at the earliest opportunity, and utilise a handover checklist and formal process to transfer any ongoing rehabilitation and health care to DVA.

Biography:

*Jim Porteous is the Director Rehabilitation and Compensation within Joint Health Command. He is responsible for occupational rehabilitation strategy, policies and reporting in the Australian Defence Force (ADF).*

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### The Right Mix- Balancing Good Health and Alcohol.

*Dr Stephanie Hodson, Ms Veronica Hancock*

**Presenters: Dr Stephanie Hodson &  
Ms Veronica Hancock**

Abstract:

The Department of Veterans' Affairs (DVA) has partnered with the Department of Defence (Defence) to connect with a new generation of veterans by redesigning its mental health promotion and early intervention resources. The Right Mix is an online mental health literacy website that has been very popular in delivering the message about maintaining a healthy balance between alcohol consumption, diet and exercise. This resource has undergone a major redevelopment to provide a more sophisticated level of interactivity to facilitate healthier drinking patterns.

The new Right Mix website uses motivational enhancement and cognitive-behavioural (CBT) self-help strategies to promote behaviour change. A meta-analysis of health change websites found that those that dealt with beliefs/expectations and behavioural intentions produced the greatest change in behaviour (this is consistent with including a Motivational Interviewing approach). The site enables users to 'log in' and develop self-management plans and goals and track their progress interacting with their data collected by the ON TRACK with The Right Mix mobile app. Content was aligned with recent research findings on the effects of alcohol across all domains of an individual's functioning, increased risk of cancers, other health problems, the risk of injury



from drinking above the recommended low-risk guidelines, and evidence for effective interventions. Furthermore, the resource is consistent with the aims and messages in the Australian Defence Force (ADF) Alcohol Management Strategy, particularly in relation to harm minimisation in drinking settings, the role that 'mates' can play in keeping others safe, and a focus on incentives relating to physical wellbeing and work performance.

The ON TRACK with The Right Mix mobile app complements the website and uses smart phone technology to make the health promotion information and monitoring of drinking patterns more accessible. The app is designed to help users track the number and type of drinks they consume; track the amount of money spent; and review the impact to their health and wellbeing by showing the amount of exercise required to burn off the alcohol kilojoules consumed. The app makes tracking drinks quick, engaging, and easy to do 'on-the-go', as well as functionality which allows users to upload their drinking patterns to the website or email to a treating clinician.

This presentation will provide an overview of the new The Right Mix alcohol management website, the clinical evidence base for 'motivational enhancement' as a central design feature, and its relationship with the ON TRACK with The Right Mix mobile app. The benefits of using The Right Mix resources in conjunction with a treatment regime will also be discussed through series of case studies.

### Biography:

Ms Veronica Hancock is the Assistant Secretary, Mental & Social Health Branch in the Health & Community Services Division of the Department of Veterans' Affairs. She is responsible for mental and social health policy and programmes, and the development of a range of e-mental health tools and resources.

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## The Role of the Family in Australian Defence Force Member Rehabilitation.

*Dr Stewart Muir, Ms Kelly Hand, Ms Jess Murray & Ms Julie Wilson*

**Presenters: Ms Julie Wilson**

### Abstract:

The Joint Health Command Rehabilitation Research Investment Program was initiated by the Simpson Assistance Program, designed to enhance research in areas of rehabilitation within Defence. This study on the role of family in Defence member rehabilitation has been completed by the Australian Institute of Family Studies (AIFS) to explore the impact of families on ADF member's rehabilitation.

There is increasing recognition, particularly in the USA, of the critical role that families can play in ensuring the success (or otherwise) of Defence member rehabilitation from injury or illness. However, to date there has been little empirical research on just how families can and do contribute to rehabilitation, particularly in the Australian context. This study reports on findings from a research project exploring the role of families in the rehabilitation of Defence members with a complex health condition. The research explores how families contribute to the rehabilitation of Defence members with a complex health condition and how Defence supports and interacts with the Defence members' family. This study outlines the key themes of the research, including an overview of the rehabilitation context and factors that broadly influence rehabilitation experiences; the impacts of members' illness/injuries and rehabilitation on families; the contribution of families to rehabilitation and how families are engaged with the rehabilitation process. Findings of the study will be used by Joint Health Command to inform rehabilitation service delivery.

### Biography:

*A socio-cultural anthropologist by training, Dr Stewart Muir is a Research fellow at AIFS. Previously, Stewart was a member of the Centre for Research on Socio-cultural Change (CRESC) and the Morgan Centre for Relationships and Personal Life, both at the University of Manchester. Stewart has research interests in family and kinship, intergenerational relations and qualitative research methods.*

*Kelly Hand is a Senior Research Fellow at the Australian Institute of Family Studies and is involved research in the areas of families and employment, and in service provision to families – particularly those in vulnerable and disadvantaged communities.*

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## The Role of the Uniformed Physiotherapist in the Modern Australian Army

MAJ Joanne Shepherd

**Presenter: MAJ Joanne Shepherd**

### Abstract:

Deployment of a Physiotherapist on overseas Operations has become standard procedure for many of our coalition partners but in Australia it is not standard practice. Many papers have been written by both American and British Physiotherapists highlighting the need for deployed Physiotherapists and their valuable contribution treating Musculoskeletal, respiratory and ICU patients. They describe how they have been kept fully utilised not only during the war fighting phase but also in quieter periods when personnel started playing sport. The British Army works on a formula of 2 Physiotherapists per 25 bedded hospital, with a 200 bedded hospital having 10 Physiotherapists. In an alternative approach the US Army in Iraq had a travelling Physiotherapist visiting different locations over the course of a month. In between a Rehabilitation Assistant; a Medic that had undertaken a short rehabilitation course, treated the patients. In order to develop the Physiotherapy branch in the Australian Army for future Operations we needed to look internally and ascertain the qualities that make an Australian Regular Army (ARA) or Army Reserve (ARES) Physiotherapist different from their civilian counterparts. A survey was conducted of ARA and ARES Physiotherapists to which 15 ARA and 2 ARES Physiotherapists responded. We then looked at the roles currently performed by Physiotherapists, such as in a Health Centre, on a sports tasking, as an instructor, deployed on exercise or overseas. We then determined the skills we have as Physiotherapists that are either under-utilised or not utilised that

could enhance Army or ADF capability. After self-reflection we then looked at what training and skills we needed to give our Physiotherapists on joining and throughout their career to develop a professional framework for the modern Army.

### Biography:

Major Jo Shepherd joined the British Army from the Royal Navy as a Physiotherapist in 1997. She subsequently served in Military Primary Care Rehabilitation Centres (PCRF) and Regional Rehabilitation Units in the UK, Germany, Gibraltar and at the Defence Medical Rehabilitation Centre Headley Court as well as deploying on Operations at both Role 1 and 2. During her time she saw the British Army Physiotherapy Branch grow from 20 to over 100 physiotherapists. With the raised profile of Physiotherapy having at least 2 Physiotherapists on Operations became the norm. She transferred to The Australian Defence Force Army in October 2013. She is currently based at the Second General Health Battalion (2GHB) in Brisbane and become the Senior Physiotherapist Army in January 2015

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## Self-reported and Recorded Deployment-Related Exposures, Knowledge Gained from the Australian Gulf War Veterans' Health Study

Dr Jillian Ikin, Assoc Prof Deborah Glass, Dr Helen Kelsall, Ms Stella Gwini, Ms Breanna Wright & Prof Malcolm Sim

**Presenter: Dr Jillian Ikin**

### Abstract:

The 2000-2002 Australian Gulf War veterans' Health Study was conducted approximately ten years after the Gulf War. In that study, exposure assessment was primarily based on participant's self-reported recall of Gulf War-related events and activities. An

advantage of self-report exposure data is the ability to collect detailed information at an individual level. Disadvantages include the possibility of inaccurate reporting for complex exposures and the risk of recall bias. Several exposures were found to be associated with health outcomes in Gulf War veterans, however interpretation of the results was limited because of the risks inherent to self-reported data.

In the follow up study approximately ten years later, the researchers conducted an enhanced exposure assessment and reviewed a number of additional sources of documentation relevant to Gulf War exposures. These included Ship's Logs, Ship's Medical Journals, Reports of Proceedings and other reports for the Gulf War deployment period. The reviewed documents provided some support to the robustness of the self-reported levels of exposure, including for dust storms, malaria prophylaxis and pyridostigmine bromide. Limitations of the recorded data, however, included that the absence of a record could not be equated with the absence of an exposure and, conversely, that the record of an exposure could not be equated to any individual's level of exposure.

Future veterans' health research would benefit from the detailed collection of self-reported exposure data during or immediately after deployment, augmented, where possible, by objective exposure monitoring during deployment and the timely review of all available recorded information sources.

### Biography:

*Dr Ikin is a Research Fellow at the Monash University Centre for Occupational and Environmental Health. She was an investigator on both the baseline and follow up Australian Gulf War Veterans' Health Studies and on the Korean War Veterans' Health Study. Her PhD was titled War stressors, mental health and well-being outcomes in Australian veterans and service personnel.*

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## Simulation Training in a Combat Zone

*FLTLT Bernard Clarke*

**Presenter: FLTLT Bernard Clarke**

### Abstract:

Simulation training has a number of valuable benefits including rehearsing clinical procedures, assessing team dynamics and communication; and identifying areas for improvement. This training is usually completed on Mission Rehearsal Exercise prior to deployment but does not involve health practitioners from coalition nations. This required members of the Australian Specialist Health Group to participate in clinical simulation very early in the deployment to the Kandahar Airfield NATO Role 3 Multinational Medical Unit (MMU). This was at a time where clinical presentations were different to previous years and the number of clinical staff had been significantly reduced.

Initially, simulation training was conducted within hospital sections but progressed to a 'whole of hospital' simulation effort and later a 'whole of base' simulation effort. At all levels, training was conducted using minimal resources but achieved positive outcomes as it was common for real-time clinical presentations shortly after rehearsing similar presentations during the simulation scenarios.

Simulation training at the MMU demonstrated that despite the environment, simulation training is achievable using minimal resources. The training identified a need to include non-clinical sections of the hospital in the simulation and prepared all members of the MMU for the majority of presentations.

### Biography:

*FLTLT Clarke is a Nursing Officer at No. 1 Expeditionary Health Squadron Detachment Townsville. He has a background of Intensive Care and Burn Nursing with a strong interest in Medical Education and Clinical Governance. He is a member of the teaching faculty of the Emergency Management of Severe Burns Course and is an Associate Fellow with the Australasian College of Health Service Managers. In 2014, FLTLT Clarke was deployed to the NATO Role 3 Multinational Medical Unit in Kandahar with the Australian Specialist Health Group.*

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### Sleep and Mental Health in Australian Defence Force Personnel

*Prof Gerard Kennedy, Dr Melinda Jackson, Catherine Stevens, Carolyn Deans & Prof Dorothy Bruck*

**Presenter: Prof Gerard Kennedy & Dr Melinda Jackson**

Abstract:

Military personnel returning from operational deployment often suffer sleep difficulties due to deployment factors, and there are indications that for some personnel, without treatment these can remain longstanding. Sleep difficulties can lead to poorer mental health outcomes if left untreated, and sleep problems themselves can also become a chronic mental health issue. The treatment of sleep difficulties leads to better mental health outcomes and also enables people to take better advantage of counselling for anxiety, depression and stress-related conditions. This presentation will discuss the current evidence for the prevalence of sleep disturbances and impact of sleep treatments on mental health in military personnel. Our team is currently conducting a randomised controlled trial to examine whether treatment of sleep in ex-ADF personnel improves both sleep and mental health outcomes. In this study 2 treatments, the gold standard cognitive-behavioural therapy for insomnia and a bright light therapy for insomnia, will be separately provided to two groups of recently returned ex-military personnel. Sleep and mood outcomes will be compared across the 2 treatment groups and the control group prior to and after a 6-week intervention and then again at 3 and 4.5 months after the end of treatment. This presentation will also discuss the methodology and preliminary findings of this study. The outcomes of this research may assist in providing recommendations for the standardisation of treating sleep difficulties in returning military personnel to assist in the minimisation of ongoing mental health issues in this important group of people.

Biography:

*Dr Melinda Jackson is a newly appointed Vice Chancellor's Senior Research Fellow in the School of Health Sciences at RMIT University, Melbourne. Dr Jackson is a registered Psychologist, specialising in the treatment of sleep disorders, and she is also a Research Fellow at the Institute for Breathing and Sleep, Austin Health. She completed her PhD in Neuropsychology and Sleep at Swinburne University in 2009, before moving to the Sleep and Performance Research Centre, Washington State University, USA as a postdoctoral researcher from 2009-2011. In 2012 she was awarded an NHMRC Early Career Fellowship to research the effects of sleep on mood. Her main research interest is in memory function and mood in obstructive sleep apnoea and other sleep disorders, and the role of treatment for sleep for improving mental health outcomes.*

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### The Soldier's Load - How Much is Enough?

*BRIG Stephan Rudzki*

**Presenter: BRIG Stephan Rudzki**

Abstract:

The recent wars in the Middle East have seen Australian and Allied soldiers carrying significant weights while on operations. In some operational cases, these loads have been near to or exceeded bodyweight. There has also been a corresponding increase in both the incidence of low back pain and rates of discharge of soldiers for disability due to low back pain.

Loads carried by soldiers has fluctuated over the centuries and the dilemma of how much a soldier should carry was faced by the Roman General Marius



and others. But history tells us that most loads have varied in the range of 30-40 kg. The advent of technology has seen the loads carried by soldiers increase progressively with each new conflict. While technology often adds new items, something else is rarely displaced, despite regular efforts to lighten the soldier's load.

Limits of no more than 25% of body weight have been placed on loads carried by trainees in Australia and occupational health and safety laws define a safe individual lift as 20kg. On operations no limits apply, primarily because the mission remains paramount.

Load carriage capacity is related to fat free mass and absolute oxygen consumption (VO<sub>2</sub> L/min). But most fitness tests measure run time which is relative (standardised by weight) oxygen consumption (VO<sub>2</sub>max mls/kg/min).

There is now a competition between armour and associated combat load and mobility and there are parallels that can be drawn between the French knights at Agincourt who were defeated by smaller numbers of agile bowmen. Thus commanders have a dilemma.

But as we move a gender free environment for selecting and employing soldiers, relative weights are not appropriate. Operational loads tend to be absolute with some variation legitimately based on body size.

This paper will place load carriage into a historical perspective and look at the physiological effect of load on the spine. It will also examine whether training can improve load carriage and if upper limits for load should be defined.

### Biography:

*BRIG Rudzki retired from the Regular Army in 2012. He now works in a Reserve Capacity for the Directorate of Army Health. He is currently working in Private Practice as a Sports and Exercise Medicine Specialist in Canberra*

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## Sophisticated Three Dimensional Motion Analysis Using Portable Computer Gaming Technologies: Calculating in Vivo Muscle and Knee Joint Forces Following Knee Reconstructive Surgery

*Assoc Prof Adam Bryant, Mr Alessandro Timi, Dr David Ackland, Mr Tim Sayer, Ms Karine Fortin, Mr Gino Coates & Assoc Prof Peter Pivonka*

**Presenter: Assoc Prof Adam Bryant**

### Abstract:

Background: Computer gaming hardware - including the Nintendo Wii balance board (WBB) and Microsoft Kinect (M-Kinect) motion sensor/camera - has made it possible to analyse different aspects of healthy and pathological human movement at very low cost (i.e., combined value of <\$500 AUD) with a degree of accuracy similar to that provided by expensive laboratory-based systems. That being said, the WBB and M-Kinect systems have not been used concurrently to derive comprehensive 3-dimensional (3D) motion data (i.e., movement of the body segments and associated forces exerted on the ground). Advances in computer modelling have enabled us to use 3D motion data to calculate the forces generated by the thigh and leg muscles in combination with the resultant loads on knee joint structures including the anterior cruciate ligament which keeps the joint stable and operating normally. Unfortunately, ACL injury is common amongst physically active ADF personnel and, despite subsequent ACL reconstruction (ACLR), a return of pre-injury knee function is not predictably achieved. Moreover, the majority of ACLR patients will develop early knee osteoarthritis (OA) - a painful and debilitating condition for which there is no cure. Using portable gaming technologies, we propose to calculate muscle and knee joint forces as ACLR patients perform a routine diagnostic test - the single-leg squat - in order to enhance our understanding of the role that muscles play in knee joint stability and degeneration. Our findings will lead to the development of exercise interventions designed to maintain ACLR-knee joint health.

Methods: Participants - Thirty patients (15 f; 15 m) having undergone ACLR using a combined semitendinosus and gracilis tendon (STGT) autograft at least 9 months prior will be recruited. An additional 30 individuals (15 f; 15 m) with no history

of neuropathology or trauma/disease in either knee will be selected as controls. Experimental Protocol - In single-leg stance on a WBB, participants will fold their arms across their chest and squat down as far as possible 5 times consecutively, in a slow, controlled manner, maintaining their balance at a rate of  $\approx 1$  squat per 2 seconds. A M-Kinect for Windows sensor will be positioned 2.5 m in front of the participants. Data will be obtained from the M-Kinect and WBB via a laptop. Data Analysis - Following calculation of kinematic and kinetic parameters from the portable technologies, data will be transferred into OpenSim for musculoskeletal modelling. Inverse dynamics will be used to calculate joint torques that, in combination with ground reaction force data (GRF), will enable us to use static optimization to predict forces generated by the quadriceps, hamstrings and triceps surae muscles. Muscle forces and corresponding GRF data will be used to calculate knee joint contact forces (i.e., shear and compression). Independent samples t-tests ( $p < 0.05$ ) will be used to compare muscle and joint forces generated by the ACLR and control groups during the SLS test.

Results & Discussion: Will be presented.

### Biography:

Associate Professor Adam Bryant is based at The University of Melbourne, Department of Physiotherapy. He is a current NHMRC Biomedical Fellow. Adam's research has predominantly focused upon the anterior cruciate ligament and the consequences (i.e., biomechanical, neuromuscular and structural) of rupture and surgical reconstruction.

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## Spirituality and Spiritual Care in the Deployed Australian Military Nursing Context

WG CMDR Andrew Ormsby

Presenter: WG CMDR Andrew Ormsby

### Abstract:

Operational deployments pose unique challenges for military nurses in delivering spiritually directed care. Long absences from home, austere conditions, arduous work hours and the risk of disease, injury and death all contribute to the complex and unique nature of deployed military nursing. This paper presents the findings of the author's PhD research which examined how Australian military nurses experience spirituality and spiritual nursing care on deployed military operations.

Despite an increasing body of literature on spirituality and spiritual care in a variety of acute, chronic and palliative care nursing settings there was little research identified that examined the application of spiritual care in the context of deployed military operations. Research was undertaken to address an identified gap in the nursing literature and improve the understanding of spirituality within a unique nursing practice context

Semi-structured interviews were conducted with ten Australian military nurses on their experiences of spirituality and spiritual care on deployed military operations. Gadamer's (1976/2004) philosophical hermeneutics provided the underpinning philosophical approach to the research. Philosophical hermeneutics acknowledges understanding as an interpretive act that finds expression in language and dialogue.

Analysis revealed five main themes within the data that provided the foundation for a new model of spiritual care. The themes comprised:

- The military nurse – identified the unique nature of military service and its effect on the provision of spiritual care;
- Deployment – the defining characteristic of military nursing that presents challenges to spiritual care and spiritual resilience;
- Family – the nature of the military family was revealed through parent and sibling like relationships that support the spiritual needs of its members;
- Spirituality – understanding spirituality is central to the provision of targeted and meaningful

spiritual care;

- Spiritual care - is most effective when it is accepting, tolerant, respectful and trusting. Spiritual care may be directed to patients, peers or nurses on deployment.

The new model of spiritual care will be explored through the phases of military operations. Each stage of deployment presents different demands on the spiritual needs of military personnel on operations.

The findings suggest that improving spiritual resilience pre-deployment may protect against the long-term mental health sequelae of deployment, such as post-traumatic stress disorder.

### Biography:

*WGCDR Ormsby is the commanding officer of 3 Aeromedical Evacuation Squadron based at RAAF Richmond in NSW. He is a registered nurse who commissioned in the Air Force as a direct entry nursing officer in 1990.*

*During his military career WGCDR Ormsby has worked in a variety of clinical, instructional, staff and command positions. He deployed to Rwanda in 1994 and East Timor in 1999 and again in 2005. During his time in Rwanda WGCDR Ormsby developed an interest in spirituality in military nursing practice.*

*WGCDR Ormsby has published and presented the results from his earlier Master's Thesis on spiritual nursing care in an Air Force context. He is also a contributing author, on the topic of spirituality, to an Australasian nursing assessment textbook.*

*WGCDR Ormsby completed his PhD studies in 2014 in the area of spirituality in deployed military nursing practice.*

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## Suicide Prevention in the Departments of Defence and Veterans' Affairs – Developing a Comprehensive Picture.

*Ms Carole Windley, Mrs Helen Braun & Stephanie Hodson*

**Presenter: Mrs Helen Braun**

### Abstract:

Any suicide is tragic. Suicide is the leading cause of death in Australia for men under 44 years and women under 34 years, and serving and ex-serving personnel are not immune from this. The issue of suicidal behaviour and death by suicide of serving and ex-serving Defence members is a priority for the Departments of Defence and Veterans' Affairs and one that arouses considerable public concern.

Over the past few years significant enhancements have been made to the provision of mental health care for current and ex-serving members across both the Australian Defence Force and the Department of Veterans' Affairs. Both Departments continue to learn through the experience of supporting our wounded, injured and ill personnel.

The ADF has put an enormous amount of effort into improving our understanding of, and screening for mental health conditions, treatment and rehabilitation programs. In doing so we have reviewed our policies on suicide prevention and management of Defence members at risk of suicide, provided training to our health providers and enhanced our education and training for Defence members.

Some individuals may not present with or become aware of mental health concerns while they are still serving. The Departments of Defence and Veterans' Affairs work closely to encourage earlier identification of mental health concerns, provide a range of programs and initiatives to assist serving and ex-serving members, and their families to support a smoother transition for those ADF members leaving military service.

Specifically, within the veteran community Operation Life is a suite of prevention resources and the most recent addition is a mobile application. This app has been designed to help clinicians manage at-risk serving and ex-serving Australian Defence Force (ADF) personnel. Most clients, especially in the contemporary cohort have access to smart phone technology. This application leverages that fact, to provide self-management tools to help patients' deal with thoughts of suicide between clinical sessions.

This paper will outline the challenges and progress

in identifying rates of suicide within the serving and ex-serving community. It will also highlight the methodology underway to better understand suicidality within this population. Importantly, it will summarise the significant work done over the last decade to break down barriers to care and encourage serving and ex-serving personnel to take action to seek help but also the enhancements to the current support systems. A case study will be used to demonstrate how one of the tools the OP Life app can be used by professionals as an adjunct to treatment.

### Biography:

*Helen Braun is a mental health nurse employed within the Directorate of Mental Health Clinical Standards and Practice, in the Department of Defence. She began her Defence career in 2012 and is responsible for the ADF Suicide Prevention Program.*

*Helen has had a long mental health nursing career both in the UK and Australia working across adult inpatient, forensic and adult community mental health.*

*Helen's interest in military mental health stems from being married to a serving Royal Australian Air Force member with too many postings, deployments and house moves to count over the last 20 years!*

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## Systematic Approach to Aeromedical Evacuation (SAAME). A framework for the Delivery of High Level Clinical Care in the Aeromedical Evacuation System

*FLTLT Bernard Clarke, FLTLT Shaun Robertson & FLTLT Tassie Smith*

**Presenter: FLTLT Bernard Clarke & FLTLT Tassie Smith**

### Abstract:

Evacuation provides the processes, personnel and equipment required to move a casualty from point of retrieval to the most appropriate facility to receive definitive care... failure to provide en route care can compromise the continuum of care required to minimise morbidity and mortality rates' (ADFP 1.2.3)

This concept sounds easy, but no systematic framework or algorithm currently exists for the delivery of clinical care in the Aeromedical Evacuation (AME) System. This is in a complex environment where additional stressors to both the patient and healthcare providers directly influence clinical outcomes. With this in mind, AME Instructors at the Health Operational Conversion Unit introduced a six-step framework for healthcare providers to take when preparing for the evacuation of patients, named the Systematic Approach to Aeromedical Evacuation (SAAME). The intended outcome of using the SAAME is that healthcare providers approach an AME in a structured manner, decreasing the chance of adverse outcomes while using allocated time more efficiently with better utilisation of resources. The framework establishes a link between equipment and patient requirements and requires healthcare providers to work within Crew Resource Management principles. The SAAME is not limited to the learning environment and has practical implications for use in real-time AMEs on all fixed-wing and rotary-wing platforms.

### Biography:

*FLTLT Clarke is a Nursing Officer at 1 Expeditionary Health Squadron Detachment Townsville. He has a background of Intensive Care & Burns Nursing with an interest in Medical Education and Clinical Governance. In 2014, he deployed to the NATO Role 3 Multinational Medical Unit in Kandahar Afghanistan.*

*FLTLT Smith is a Nursing Officer Instructor at the Health Operational Conversion Unit. She has a background of Paediatric Nursing and an interest*



in Crew Resource Management in the Aeromedical Evacuation environment. In 2014, she deployed to Al Minhad Air Base in support of Operation Slipper.

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### "The Little Doctor" Lieutenant Colonel Charles Thomas MRCS LSA NZMC. KIA, The Dardanelles 28th August 1915

MAJ Brendan Wood

**Presenter: MAJ Brendan Wood**

Abstract:

"The Dardanelles undertaking is a ghastly business. To see the wounded lying all over the decks, some already dead, some dying, others with the stump of a limb just amputated and others slightly wounded helping their more severely stricken mates, is a very tiring ordeal and to the tune of a fierce battle still raging ... Add to this the uncertainty of who may be the next man you may have to render aid to, makes long of responsible work drag and weigh more heavily than they otherwise would".

(Lt-Colonel Charles Thomas, NZ Mounted Field Ambulance, writing to his wife on the trials of operating on the hospital ship, Galeka)

Affectionately known as the "Little Doctor" Lt-Colonel C.E. Thomas was a loved doctor of Timaru, New Zealand. Born in Bangalore, India in 1864 he served in the Boar War and in the Gallipoli Campaign. He was killed in Action in the Dardanelles on the 28th August 1915 and is laid to rest in the Embarkation Pier cemetery, ANZAC Cove.

This poster will cover the story of his life and dedication to service to his community and the New Zealand Defence force. We will remember them.

Biography:

I have been a member of the New Zealand Defence Force (NZDF) for more than 35 Years and hold the rank of Major in the RNZAMC. As a St John youth member attending weekly parades, I would walk into the St John hall in Timaru beneath a plaque dedicated to the life of "Lieut Col C.E. Thomas N.Z.M.C. Killed in action, at the Dardanelles, 28 August 1915". I hope to share the story of his life with you in a poster.

As a Company Commander (OC) of a local reserve until I travelled to Gallipoli and visited the graves and memorial of all the South Canterbury Soldiers and Officers who died on the Gallipoli peninsular. One of these graves was that of Lieut Col Thomas.

I currently serve on the St John National Governance Committee as an elected member and sit on the St John Clinical Governance Committee.

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### Tranexamic Acid in Trauma: Controversies, Emerging Evidence and the Applicability to the ADF

CAPT Elissa Milford

**Presenter: CAPT Elissa Milford**

Abstract:

Tranexamic acid (TXA) has dominated the trauma literature since the publication of the seminal clinical trial CRASH 2 in 2010 (Shakur et al 2010). Despite many strong proponents for the use of TXA in trauma, other clinicians are concerned that the benefits of TXA in modern trauma systems are overestimated, and that the harms are underestimated.

TXA targets the initial hypocoagulable state that is a feature of severe trauma primarily by inhibiting the breakdown of formed blood clots. But this state often progresses to a hypercoagulable state hours to days post-injury where patients are at increased risk for

life threatening thromboembolic complications such as pulmonary embolism and deep vein thrombosis, and TXA may exacerbate this risk. But this, and the risk of other adverse events, cannot be quantified with available data.

The two most influential studies of TXA use in trauma patients are the CRASH 2 study (Shakur et al 2010), a large multi-centre randomised control trial, and the MATTERS study (Morrison et al 2012), a retrospective observational study conducted in a Role 3 facility in southern Afghanistan. Both studies suggested that there is a mortality benefit if TXA is given to severe trauma patients within three hours post-injury. However, both studies have a number of significant limitations including a selection bias that create gaps in the evidence. The true rate of thromboembolic complications and other adverse events is unknown, and the applicability of the results to a modern, advanced trauma system is questionable. Only 1.4% of the hospitals in CRASH 2 were outside of the developing world and the baseline mortality rate was 16%, which is much higher than that seen in a modern, advanced trauma system (Gabbe 2012). In addition, the preventable death rate in modern trauma systems has fallen in the last decade, so it is possible that the magnitude of benefit in a modern trauma system would be less than that found in the CRASH 2 study, and may even approximate the risk of harm from administering TXA.

There are currently two randomised control trials underway in Australia and the United States that hope to provide definitive answers about the risks and benefits of administering TXA in a modern trauma system. Until these results are known, current ADF policy will need to be guided by current evidence in the context of ADF trauma system capabilities.

Gabbe, BJ et al 2012. Improved functional outcomes for major trauma patients in a regionalized, inclusive trauma system. *Ann Surg*, 255, 1009-15.

Morrison, JJ et al 2012. Military Application of Tranexamic Acid in Trauma Emergency Resuscitation (MATTERs) Study. *Arch Surg*, 147, 113-9.

Palmer, L & Martin, L 2013. Traumatic coagulopathy-Part 1: Pathophysiology and diagnosis. *J Vet Emerg Crit Care (San Antonio)*.

Shakur, H et al 2010. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. *Lancet*, 376, 23-32.

### Biography:

*CAPT Milford is a full time Army general duties medical officer. She is also a part time intensive care medicine trainee and hopes to enter the ADF medical specialist program. She is undertaking a part time PhD in trauma associated coagulopathy.*

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## Transition for Employment - A Program to Place Employment at the Centre of Rehabilitation for Soldiers Transitioning from Army

*COL Andy Williams*

**Presenter: COL Andy Williams**

### Abstract:

The importance of employment as a component of rehabilitation has been long recognised. Traditionally, rehabilitation programs encompassing employment for those transitioning Defence have focussed on training and education opportunities in preparation for longer term employment.

Army is seeking to champion an approach that places early employment at the heart of rehabilitation, believing that the most powerful determinant of successful rehabilitation is the nature of employment itself and not training, education and skills acquisition for employment. The program, initially known as "Rehabilitation through Employment" (RtE) makes employment the central pillar of recovering long term physical and psychological health. The purpose is not to find the most lucrative employment. Rather, it is to place an individual in the job that best supports their agreed physical and psychological rehabilitation outcomes as they transition from Defence.

Key to the program has been developing a direct relationship with selected senior figures from the Australian commercial and corporate world. They needed assurance that partnering Army represented

a sound commercial prospect and was not just a philanthropic "cost". While aware of our combat casualties, they had much less visibility of the typically 800 personnel leaving Army each year with non-combat related injuries/illness. The key message to this group is that the highly selective nature of military service means that the majority of those discharged remain or can become physically and mentally capable of employment in the overwhelming majority of civilian jobs.

This engagement led to a series of workshops aimed at identifying the other stakeholders with whom we would need to partner in the program. Some were clear, such as Joint Health Command (JHC), the Department of Veterans Affairs (DVA), others less so, such as the Department of Education and trade union organisations. The workshops identified a number of key clinical, legal, inter-departmental and structural issues that will need to be addressed both before and during the progress of a trial. The need to involve a third party - expert employment agencies - to facilitate the program was identified as 'mission critical'. Their involvement in later workshops also led to a name change for the program - "Transition for Employment" - as it was they who identified that "Rehabilitation through Employment" had negative connotations for the current generation of soldiers. Implicit in the name was "charity for the disabled" rather than the employment of individuals who saw themselves as fit members of society worthy of employment on their own terms.

The program will shortly move to the pilot stage with up to 100 personnel to be identified as a trial cohort. This will be a multi-disciplinary/multi-agency effort including health and personnel professionals from DAH, JHC, DVA and ex-Service organisations. In the longer term DAH will sponsor a longitudinal trial to assess the efficacy of the program, comparing this group with those transitioning from defence through traditional rehabilitation programs as well as the general military community in transition. DAH would hope to present findings at future AMMA meetings.

### Biography:

*Colonel Andy Williams trained in the UK National Health Service as a psychiatric nurse, general nurse and also completed post-graduate courses in behaviour therapy and later neonatal intensive care. He joined the UK Regular Army in 1987, where his appointments included base and field medical units, as well as staff appointments. Andy deployed to South Africa during the transition from apartheid to democracy and, in 2003, to Iraq as the Deputy Commander Medical, CJTF 7. His last position was Colonel Force Development, Army Medical Directorate.*

*In 2006, Andy transferred to the Australian Army as General Service Officer. He was initially appointed as the Senior Health Officer, HQ Special Operations Command. He has since held appointments as Director Health Capability Development, Joint Health Command; Commanding Officer 2nd General Health Battalion and SO1 Health Governance in the Directorate of Army Health.*

*Colonel Williams was appointed Director of Army Health in December 2013.*

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## Traumatic Stress in the ADF: Is Physical the New Mental?

*Kristin Graham, Dr Amelia Searle, Dr Miranda Van Hooff, Dr Ellie Lawrence-Wood & Prof Alexander McFarlane*

**Presenter: Kristin Graham**

### Abstract:

War-related stress and trauma create substantial physical and mental strain that can disrupt the body's ability to function effectively. In particular, experiencing multiple traumas and repeated cycles of stress can affect the body in a number of ways, including physical symptoms (somatic e.g. pain), mental symptoms (e.g. anxiety) or a combination of the two (comorbid). Often, however, the physical and mental effects of war-related and other lifetime trauma take years to develop, and therefore identifying early indicators of risk across the physical-mental health continuum is essential for effective early intervention. This presentation will discuss the role of war-related and lifetime trauma in the development and progression of physical and mental health problems of contemporary Australian military personnel. This will incorporate data collected as part of the ADF MEAO Prospective Study conducted in 2010-2012 and will discuss planned longitudinal analysis using data from the 2015 Transition and Wellbeing Research Programme.

### Biography:

*Kristin has over 20 years' experience as a clinical podiatrist including providing treatment to RAAF personnel at the Edinburgh Base as well as Veteran's in the community. She recently returned to study and completed her Bachelor of Psychological Science (Honours) at Flinders University, Adelaide. She is also a mentoring coordinator for new graduate podiatrists. In this role she has translated research into practice in developing a program to support graduate podiatrists in their transition to the work force. Her experience in both psychological research and as an allied health practitioner, together span the complementary fields of psychology and physical health. Consequently she is uniquely placed to conduct research regarding associations between the physical and mental health of veterans.*

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Kristin Graham<sup>1</sup>, Dr Amelia Searle<sup>1</sup>, Dr Miranda Van Hooff<sup>1</sup>, Dr Ellie Lawrence-Wood<sup>1</sup>, Professor Alexander McFarlane<sup>1</sup>

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## Treatment of Anger in the Context of PTSD: The ADF Managing Anger Trial

*LTCOL Jacqueline Costello & Dr David Said*

*Presenter: Dr David Said*

### Abstract:

This presentation will report on the initial findings of a pilot study of a clinical intervention for ADF personnel with problematic anger in the context of co-occurring PTSD. The "Managing Anger Trial" project was a collaboration between Phoenix Australia and the ADF Joint Health Command and involved the development and evaluation of the intervention and a training and mentoring program within a military mental health service setting.

The anger intervention comprises a 12 session cognitive behaviourally based treatment, delivered one-to-one by Defence mental health providers, and intended to reduce the impact of problematic anger. The intervention was piloted with a cohort of 15

serving ADF personnel, predominantly with recent combat deployments, who experienced problematic anger in the context of diagnosed PTSD. The project involved the development of a manualised intervention, training of a small group of Defence mental health providers, delivery of the intervention at two sites within the ADF garrison Health services environment, provision of expert clinical supervision, and evaluation of the clinical and program outcomes of the project.

The presentation will report on the trial outcomes, including the effectiveness of the training structure in imparting intervention skills and clinical outcomes for the participants involved.

### Biography:

*LTCOL Jacqueline Costello has served with the Australian Army Psychology Corps since 2001 across a range of staff, clinical, organisational and training roles in both the garrison environment and on operational deployment. She holds a Masters Degree in Organisational Psychology and is the current Officer-In-Charge of the ADF Centre for Mental Health.*

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## Understanding the Impact of Exposure to a Combat Zone

*Dr Ellie Lawrence-wood & COL Nicole Sadler*

**Presenters Dr Ellie Lawrence-wood & COL Nicole Sadler**

### Abstract:

The Transition & Wellbeing Research Programme is the first Australian research to examine the long-term psychological, biological and neuro-cognitive outcomes of deployment to the Middle East Area of Operations (MEAO). Some 1871 ADF members who deployed to the MEAO between 2010 and 2012 were assessed pre- and post-deployment as part of Defence's MEAO Prospective Study, creating a baseline data set for longitudinal work. Among



the participants in this study, 655 of those who deployed into Afghanistan (a combat zone and who had the highest probability of combat exposures) were also assessed using a variety of biological and neurocognitive measures. These groups of individuals represent a unique resource for documenting the longitudinal health outcomes of deployed Australian Defence Forces members. The Impact of Combat Study, as part of the Transition & Wellbeing Research Programme, will invite these members for a follow-up assessment to track the long term effects of their MEAO service. This paper will outline how the current research methodology is building on the previous MEAO findings, while addressing emerging issues from the international literature.

### Biography:

*Dr Lawrence-Wood is a Senior Research Fellow in the Centre for Traumatic Stress Studies at the University of Adelaide. She has been involved in a number of large scale research projects focussed on the health and wellbeing of Australian Defence Force personnel. As the Study Manager for the Impact of Combat Study (Transition and Wellbeing Research Programme), a longitudinal follow-up to the MEAO Prospective Health Study, her current research focus is on the physiological and psychological impacts of deployment to a combat zone. She was also responsible for the Mothers in the MEAO project, aimed at understanding the specific health and psychosocial wellbeing impacts of deployment, for Australian mothers who have deployed to the MEAO. This research forms part of a broader area of research interest regarding the health and wellbeing of women and families in the military and other services.*

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## Updates in Management of the Difficult Airway- What does this Mean for the ADF?

*SQNLDR Michael Lumsden-Steel*

**Presenter: SQNLDR Michael Lumsden-Steel**

### Abstract:

Management of the difficult airway continues to evolve with new theories, equipment, drugs, techniques and team composition. This presentation will provide an update on the current theories, new equipment, drugs, and techniques and draw this back what this means for the ADF for now and the future

### Biography:

*SQNLDR Michael Lumsden-Steel is a full time Anaesthetist in the Royal Australian Air Force, posted to HQSW and on clinical placement at the Royal Hobart Hospital.*

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## A Whole of Community (WoC) Approach to Disaster and Humanitarian Management

*Mr Anton Kuruc*

**Presenter: Anton Kuruc**

### Abstract:

Typically a disaster is described as "a serious disruption in a community, caused by the impact of an event, which requires a significant coordinated response by the State and other entities to help the community recover from the disruption." (QLD Disaster Management Act Definition). In shorthand it is where the incident overwhelms the resources of the community to respond. Consequently it is generally couched as a Whole of Government response.

People often think only in terms of disaster response which occurs in the immediate aftermath of an incident. However disaster management and humanitarian response is much broader and occurs over the following phases: Prevention and Preparation, Response and Recovery.

The private sector can bring significant capability to disaster and humanitarian response in all phases whilst recognising Government and even International leadership is critical to an effective response. We think of the Whole of Community response, which is typically Government or UN-led but includes Public Sector agencies, NGOs, local community groups and the Private Sector.

Aspen Medical has recently been involved in all phases of WoC disaster management in the international community's humanitarian response to West Africa's 2014-2015 Ebola Outbreak. Aspen Medical has worked with International, Governmental, NGO, Charitable, Private Sector, Local Community and Religious Groups.

Initially Aspen Medical was involved in the Response Phase through the Department of Foreign Affairs and Trade (DFAT) and USAID programs. More recently Aspen Medical has been engaged by the UK Government's Department for International Development (DFID) in the Recovery Phase. USAID has recently engaged Aspen Medical to be involved in Ebola Prevention and Preparedness programs in West Africa. This presentation will highlight some of the significant benefits and opportunities that the private sector can bring to a WoC approach.

This presentation will give a brief description of the unique capabilities that the private sector can bring to disaster management and humanitarian response throughout all phases. It will highlight how Aspen Medical was able to make a very meaningful contribution to a WoC effort in the Humanitarian Response to the West Africa Ebola Outbreak in 2014-15.

### Biography:

*Anton Kuruc is the Director Strategic Implementation at Aspen Medical.*

*Anton is a former Army Officer and Operational Analyst. He has served in the infantry in a variety of command and operational positions. He deployed as an operational analyst in East Timor and Afghanistan where he was instrumental in embedding social network analysis into operational planning. He also supported a range of social studies and consensus building activities.*

*Since leaving the military, Anton has worked in senior management including analysing risk, training journalists to work safely in hostile environments, military simulation and as the senior analyst at the Department of Defence's Rapid Prototyping, Development and Evaluation organisation. In 2011 Anton joined Aspen Medical and currently is responsible for the company's innovation and improvement programs.*

*Anton is a published author in refereed journals in Australia and overseas. He holds a Bachelor of Arts, a Masters of Defence Studies and an MBA.*

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## Working with Veterans with Mental Health Problems: An Online Training Program for Australian General Practitioners

*Assoc Prof Darryl Wade, Ms Alexandra Howard, Dr Olivia Metcalf, Dr John Cooper & Mr Tim Adams*

**Presenters: Assoc Prof Darryl Wade & Ms Alexandra Howard**

### Abstract:

Over the past decade, members of the Australian Defence Force (ADF) have been involved in a significant number of overseas and domestic operations. For some serving and ex-serving ADF personnel, exposure to traumatic events and other occupational stressors can contribute to the development of mental health, relationship and family problems.

General Practitioners should have a good understanding of military and veteran experiences to deliver high quality primary care mental health services to veterans. To assist with meeting this objective, Phoenix Australia and The Royal Australian College of General Practitioners developed a 1 hour online training program for GPs – Working with veterans with mental health problems – with

funding from the Department of Veterans' Affairs. After release of the online program onto the gp learning platform on 9 October 2014, the Minister for Veterans' Affairs - Senator the Honorable Michael Ronaldson – officially launched the Activity on 11 December 2014. The program focuses on providing information and practical strategies to assist GPs to effectively engage with veterans and provide early and effective treatment for mental health and related problems. The program covers the following topic areas:

1. The veteran experience – an introduction to the unique aspects of a military career and the experience of a veteran from training through to deployment.
2. Veteran mental health and related services – information on the common mental, physical and cognitive health issues experienced by veterans of all generations.
3. Practical strategies to assist veterans with mental health problems – strategies and tools to help engage with veterans and address their common problems.
4. Helpful veteran-related services – provides a range of resources available to GPs, veterans and their families.

This presentation will provide details of the Working with veterans with mental health problems program, as well as enrolment and completion data for the program since its launch in late 2014.

### Biography:

*Associate Professor Darryl Wade is a clinical psychologist with many years' experience in public and private mental health settings. He is Director of Education and Training at Phoenix Australia and Department of Psychiatry, The University of Melbourne. He has published widely on youth, disaster and post-traumatic mental health issues. Darryl is an experienced presenter, practitioner and project leader in post-traumatic mental health.*

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## ZERO : How an Integrated Health, Safety and Clinical Training Program Ensured a Zero Rate of Infection Amongst Australia's Ebola Response Team in Sierra Leone.

*Mr Leo Cusack*

**Presenter: Dr Nicole Gilroy**

### Abstract:

On 5 November 2014, the Prime Minister announced that Australia would increase its contribution to the global fight against Ebola Virus Disease (EVD). This response involved commissioning and managing an Ebola Treatment Centre (ETC), constructed by the UK Government in Sierra Leone. The Department of Foreign Affairs and Trade (DFAT) chose Aspen Medical to manage the ETC.

Within a fortnight the Aspen Medical Project Management Team had selected the multidisciplinary health team to deploy to Sierra Leone. The first cohort of health professionals (HPs) was invited to Canberra to undertake pre-deployment training. Their suitability was assessed, and deployment details finalised. This training program was developed by Aspen Medical and incorporated clinical and non-clinical aspects. The non-clinical aspects included sessions around cultural orientation, safety and security, appropriate use of social media and personal administration matters. Clinical training incorporated sessions on the epidemiology of the disease through to practical sessions on the correct use of Personnel Protective Equipment (PPE).

In all, 73 Australian and New Zealand nationals underwent pre-deployment training with Aspen Medical prior to departing for Sierra Leone. Members of the first deployed team undertook a 'Train the trainer' course with Médecins Sans Frontières (MSF) in Sierra Leone. On completion of that initial and once-off course, the Australian-managed ETC became self-sufficient.

Ebola has become known as the 'Carer's Disease' due to the high rate of infection in health professionals of around 20%. In Sierra Leone, it is estimated that 10% of national healthcare professionals died from Ebola. Consequently, Aspen Medical is particularly proud of the fact that a large team consisting of 73 Australian and NZ HPs, supported by a team of 250+ locals recorded a zero infection rate.

This abstract will share details of the pre-deployment training in Canberra including the establishment of a mock-up ETC with scenarios and role playing as key

elements of the training experience. Pre-deployment training became an opportunity to assess the mental strength of the volunteers with a realistic overview of what was ahead of the team both in terms of the reality of infections amongst HPs and the clinical impact of the disease on patients.

Training continued in-country and our team also learnt through experience. These learnings were passed onto our partners and NGOs, and our team also learnt from their experience around procedures, equipment etc. Aspen Medical developed SOPs in the treatment of Ebola.

Senator Richard Di Natale, who visited West Africa in December 2014, commented on the high standard of training at the Aspen Medical ETC in Sierra Leone. "It must be said that the work they were doing was of a high standard, that the training they were offering to their team — and I met with the training facilities there — again was of a high standard. They were doing all the right things in the lead up to opening up the training centre," he said.

### Biography:

*Leo Cusack is Aspen Medical's Project Manager - West Africa. He is responsible for the company's Ebola Treatment Centre operations in Sierra Leone and Liberia.*

*Having worked with Aspen Medical on a number of projects over the years, Leo joined Aspen Medical in November 2014 specifically for the Ebola Response project.*

*Leo's career has seen him complete his Bachelor's degree at ANU, postgraduate studies in Project Management from UNSW and graduate as an Army Officer from the Royal Military College, Duntroon, where he served as an Infantry Officer until 2005.*

*Upon leaving the ADF, Leo has had a broad and successful career in business including a role as the General Manager of a multinational company in the region, as well as an extensive small business career with interests in project consulting and commercial property.*

*Dr Nicky Gilroy is a Sydney-based Infectious Diseases (ID) Specialist with professional interests in infection prevention and control, the epidemiology of hospital-acquired infections, the control of vaccine preventable diseases and the management of complex infections in those with impaired immunity.*

*Dr Gilroy has postgraduate qualifications in epidemiology and public health. She has deployed with humanitarian missions to Burundi (1994), the Russian Caucasus (1996) and Sri Lanka in the wake*

*of the Boxing Day Tsunami (2004). In 2014 she joined a team of Australian and New Zealand doctors, nurses and environmental health officers to work at the 100-bed Aspen Medical managed Hastings Airfield Ebola Treatment Centre (HAETC) in the Western Rural District of Sierra Leone. More recently she has returned to Sierra Leone with Aspen Medical to work in the Kerry Town Ebola Treatment Unit (KTTU), a facility established to provide a medical capability for managing high-risk occupational exposures and Ebola Virus Disease (EVD) involving healthcare workers.*

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# Epidemiology of Medical Discharge in the New Zealand Defence Force

G.S. Iremonger<sup>1</sup>, K. Atalag<sup>2</sup>, B.J. Johnston<sup>3</sup>, A.D.K Campbell<sup>1</sup>

## Abstract

**Objective:** The aim of this study was to determine the reasons for medical discharge from the New Zealand Defence Force (NZDF). Additionally it sought to establish research priorities for reducing training attrition and improving retention, selection standards and overall health and wellbeing of military personnel.

**Methods:** A retrospective review of medical files and work force personnel data of all service members discharged under a medical release category between January 2006 and January 2013. A comparison was made between the reason for release, demographic and service for those medically discharged.

**Results:** In total, 402 Regular Force members were medically discharged between the 1st of January 2006 and the 1st of January 2013. Of these, nearly half did so for musculoskeletal injury and disease and 19% for mental illness and behavioural disorders. Many were discharged with a condition or predisposition held prior to service. Females we found to be at significantly higher risk of discharge in comparison to male counterparts.

**Conclusions and implications:** This is the first study which describes with sufficient data the epidemiology of medical discharge in the NZDF. Rates of discharge are similar to those observed in other militaries but highlight opportunities to improve relevant selection and training policies.

**Key words:** injury, military, training, discharge, medical

**Conflicting Interests:** Some authors are employees of military armed forces or affiliated organisations. The views expressed in this article are those of the authors and may not reflect the official policy or position of any institution with which the authors are affiliated. The NZDF approved the release of the paper at the time of submission for publication.

## Introduction

The military demands a high level of physical and psychological health of its members throughout their career. Physical or mental illness may render service members disabled or at least unable to achieve minimum health standards required for their role, at which point they may be discharged from service. Discharge and release from service is an inevitable and necessary part of business. However inappropriate discharge can disrupt future force planning through the number of personnel available for operations, and financially through lost investment and knowledge base. There can also be significant costs associated with the treatment, rehabilitation and compensation of service related medical conditions which are not necessarily recognised and not easily accountable. Although the majority of these costs are covered through New Zealand's Accident Compensation Corporation (ACC), a number will also receive government funded care in hospital and compensation through New Zealand Veterans' Affairs. It is therefore of great importance to identify and understand the factors that lead to discharge and to develop appropriate preventive strategies.

Several studies of military populations around the world indicate that initial training is the highest period for discharge from service<sup>1-9</sup>. These studies also indicate that musculoskeletal related injuries is one of the most common reasons for discharge<sup>1,2,5-7,10-12</sup> and is almost always followed closely by mental illness and behavioural disorders<sup>9,13,14</sup>. It may be suggested that militaries, and more specifically services, will share similar rates and cause of medical discharge, as most engage in relatively similar activities. However, significant differences exist in entry standards, risk acceptance, service culture, physical requirements and environmental exposure between and within countries. All of these may play key roles in the development of preventable Service related medical conditions.

There are no reports in the scientific literature regarding the epidemiology of medical discharge in the New Zealand Defence Force (NZDF). The aim of this study was to describe the current epidemiology of medical discharge in the NZDF as a first step towards identifying research priorities for improving medically- related attrition and evidence- based selection standards.

## Methods

We conducted a retrospective study reviewing medical files and work force personnel data of all Regular Force NZDF Service members discharged under a medical release category over a six year period between the 1st of January 2006 and the 1st of January 2013. The main source of the data was the NZDF electronic health recording (EHR) system, which has been operating across the NZDF since late 2005.

For each discharge the reason for medical discharge was determined and coded using the International Classification of Diseases, Tenth Revision, Australian Modification (ICD-10-AM), World Health Organisation, Geneva, Switzerland. Two additional codes in order of importance were used to denote other significant medical conditions that were identified by the reviewing Medical Officer at the time of discharge. These conditions may have contributed to the decision but were not the reason for discharge. The release category (DG1 and DG2) allocated by medical officers at the time of discharge was also recorded. Service members suffering a condition causing a permanent disability are discharged category DG1, and those who have fallen below an acceptable medical standard are discharged category DG2.

All medical discharges were reviewed to identify if the reason for medical discharge was a result of a condition present prior to entry into the military. Cases were simply grouped 'yes', 'no' or 'not known'. Whether the condition was known to the service at the time of recruitment was not explored in this study. Demographic data also collected included gender, age, rank (Officer, Officer Cadet or Enlisted), time in service and service type, Royal New Zealand Air Force (RNZAF), Royal New Zealand Navy (RNZN) and New Zealand Army (NZ Army). Information on the New Zealand Special Operations Force was not included in this study. Demographic data for the study population were compared with the NZDF population data to generate a prevalence rate per 1,000 individuals. Data were analysed using Microsoft Excel (Microsoft® Corporation, USA, 2010). The influence of gender on the incidence of discharge across the NZDF was examined and an odds ratio was determined and 95% confidence intervals (CI) were calculated. Two-sample t-tests were used to look at differences in rates by gender. A statistical significant level was set at  $p < 0.05$ . Ethical approval was obtained in accordance with the NZDF Authority to Conduct Personnel Research, Defence Force Order 21/2002.

## Results

Between the 1st of January 2006 and the 1st of January 2013 a total of 7,511 (9.2%) Regular Force Service members left the NZDF, of which 402 (0.5%) were discharged for medical reasons. This equated to an annual medical discharge rate of 6.2 per 1,000 with respect to the total NZDF population during this period.

Most service members (88.1%) were medically discharged DG2 for falling below an acceptable medical standard yet there were still a significant number (11.9%) who were discharged DG1 due to permanent disability (Table 1). For the period studied the NZ Army was found to have the highest proportion of discharge through permanent disability (20.5%). Conversely the RNZN had the lowest proportion of discharge for permanent disability (4.2%) yet the highest overall rate of medical discharge (13.2 per 1,000). This was double that of the NZ Army at 5.32 per 1,000 and significantly higher again from the RNZAF at 1.6 per 1,000. The RNZN annual discharge rate varied between years, in contrast to the other two services where it remained relatively stable (Figure 1).

Mean age  $\pm$  Standard Deviation [SD] at the time of release was  $26.40 \pm 7.93$  years for NZ Army,  $26.22 \pm 10.80$  RNZAF and  $20.89 \pm 6.34$  years for RNZN. The majority (67.9%) of medical discharges across the services were male (Table 1) and were predominantly represented by younger members (Figure 2). In contrast to this overall trend, within the RNZAF 62% (14/37) of those medically discharged were female. The proportion of female discharges from NZ Army and RNZN were 23.3% and 34.4% respectively.

During the period of analysis females comprised 16.38% of the total Regular Force population. The odds of medical discharge among females compared with males was 2.39, (95% CI: 1.93–2.95), and was statistically significant ( $p < 0.0001$ ). Between the year 2006 and 2012 the female to male medical discharge rate ratio was 8.7:3.6

Females were also found to be medically discharged significantly earlier than males. The mean length of service prior to discharge for males was  $1478.5 \pm 211.0$  days and females  $870.0 \pm 107.8$  days and the median length of service for males and female was 806.0 and 321.0 days respectively. There were no significant differences in medical condition however; females were significantly younger at the time of discharge with a mean age  $\pm$  SD of  $22.1 \pm 5.4$  years in comparison to males at  $24.6 \pm 8.9$  years ( $p < 0.004$ ).

Table 1. Demographic characteristics of medical release between services. Cumulative number (n) and percentage (%).

	ARMY (n=176)		RNZAF (n=37)		RNZN (n=189)		TOTAL (n=402)	
	n	(%)	n	(%)	n	(%)	n	(%)
<b>Age (years) at time of discharge</b>								
17-24	97.0	(55.1)	21.0	(56.8)	161.0	(86.1)	279.0	(69.4)
25-29	39.0	(22.2)	7.0	(18.9)	18.0	(9.6)	64.0	(15.9)
30-39	24.0	(13.6)	6.0	(16.2)	4.0	(2.1)	34.0	(8.5)
40 ≥	16.0	(9.1)	3.0	(8.1)	5.0	(2.7)	24.0	(6.0)
<b>Gender</b>								
Male	135.0	(76.7)	14.0	(37.8)	124.0	(65.6)	273.0	(67.9)
Female	41.0	(23.3)	23.0	(62.2)	65.0	(34.4)	129.0	(32.1)
<b>Release category</b>								
DG1	36.0	(20.5)	4.0	(10.8)	8.0	(4.2)	48.0	(11.9)
DG2	140.0	(79.5)	33.0	(89.2)	181.0	(95.8)	354.0	(88.1)
<b>Time in service (months)</b>								
0 to 1	1.0	(0.6)	0.0	(0.0)	70.0	(37.0)	71.0	(17.7)
1 to 2	4.0	(2.3)	9.0	(24.3)	65.0	(34.4)	78.0	(19.4)
2 to 3	1.0	(0.6)	5.0	(13.5)	4.0	(2.1)	10.0	(2.5)
3 to 10	5.0	(2.8)	4.0	(10.8)	7.0	(3.7)	16.0	(4.0)
10 to 20	17.0	(9.7)	3.0	(8.1)	8.0	(4.2)	28.0	(7.0)
20 to 50	59.0	(33.5)	3.0	(8.1)	9.0	(4.8)	71.0	(17.7)
50 to 100	61.0	(34.7)	10.0	(27.0)	17.0	(9.0)	88.0	(21.9)
100 or more	28.0	(15.9)	3.0	(8.1)	9.0	(4.8)	40.0	(10.0)
<b>Rank</b>								
Enlisted	169.0	(96.0)	34.0	(91.9)	176.0	(93.1)	379.0	(94.3)
Officer	7.0	(4.0)	0.0	(0.0)	1.0	(0.5)	8.0	(2.0)
Officer Cadet	0.0	(0.0)	3.0	(8.1)	12.0	(6.3)	15.0	(3.7)
<b>Previous condition</b>								
Yes	16.0	(9.1)	9.0	(24.3)	36.0	(19.0)	61.0	(15.2)
No	51.0	(29.0)	6.0	(16.2)	47.0	(24.9)	104.0	(25.9)
Not known	109.0	(61.9)	22.0	(59.5)	106.0	(56.1)	237.0	(59.0)
<b>Discharge each year and as a % of total discharges</b>								
2006	24.0	(3.4)	16.0	(9.9)	16.0	(6.4)	56.0	(5.0)
2007	26.0	(3.7)	3.0	(1.6)	34.0	(11.5)	63.0	(5.3)
2008	23.0	(3.2)	3.0	(1.5)	47.0	(15.0)	73.0	(6.0)
2009	24.0	(4.9)	2.0	(1.7)	38.0	(16.5)	64.0	(7.6)
2010	27.0	(5.5)	4.0	(3.1)	9.0	(6.0)	40.0	(5.2)
2011	35.0	(5.1)	3.0	(1.3)	22.0	(8.5)	60.0	(5.1)
2012	17.0	(2.3)	6.0	(2.7)	23.0	(9.0)	46.0	(3.8)
<b>Rate of annual medical discharge per 1,000 population</b>								
							Average	
2006	5.3	-	1.4	-	8.0	-	6.3	-
2007	5.7	-	1.5	-	16.7	-	7.0	-
2008	4.8	-	1.3	-	23.3	-	7.9	-
2009	4.8	-	1.9	-	18.0	-	6.6	-
2010	5.5	-	2.1	-	4.2	-	4.1	-
2011	7.2	-	2.0	-	10.4	-	6.3	-
2012	4.0	-	1.0	-	12.1	-	5.4	-

Figure 1. Rate of medical discharge in NZ Army RNZAF and RNZN between 2006 and 2012 per 1,000 population.

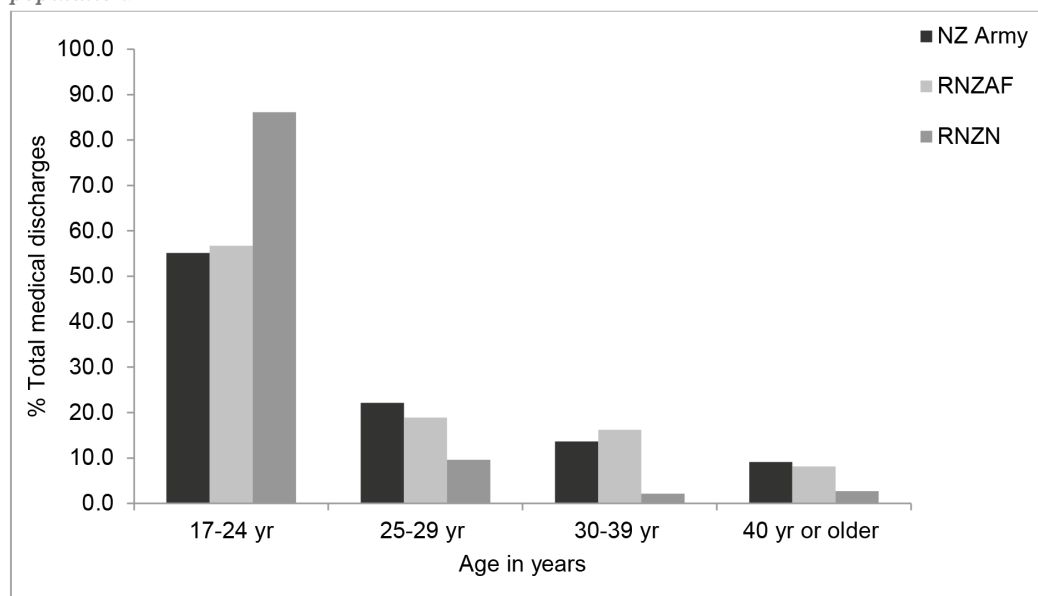


Figure 2. Age at time of medical discharge for NZ Army RNZAF and RNZN (n=402).

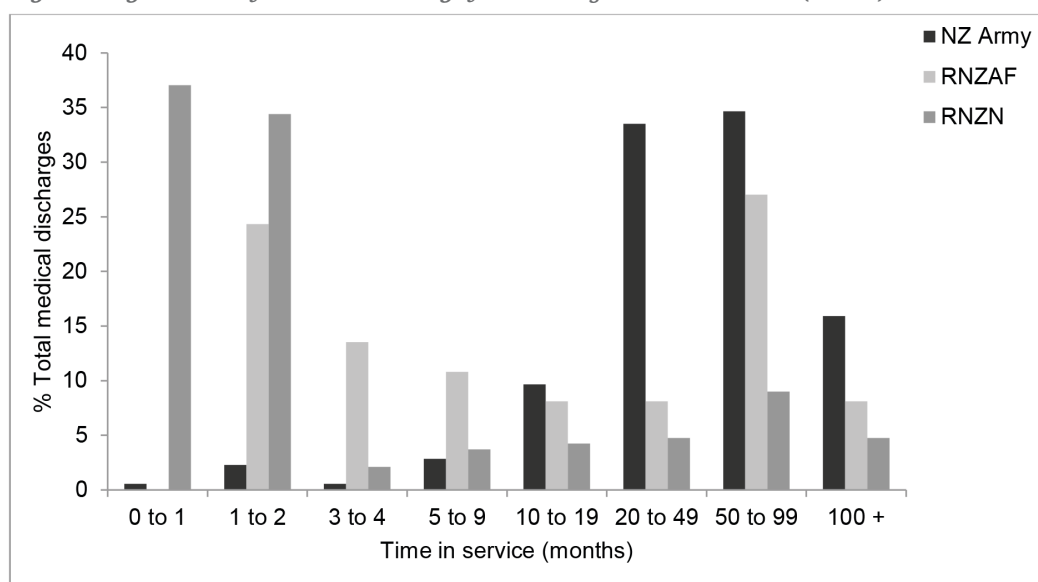


Figure 3. Service time in months prior to discharge for NZ Army RNZAF and RNZN (n=402).

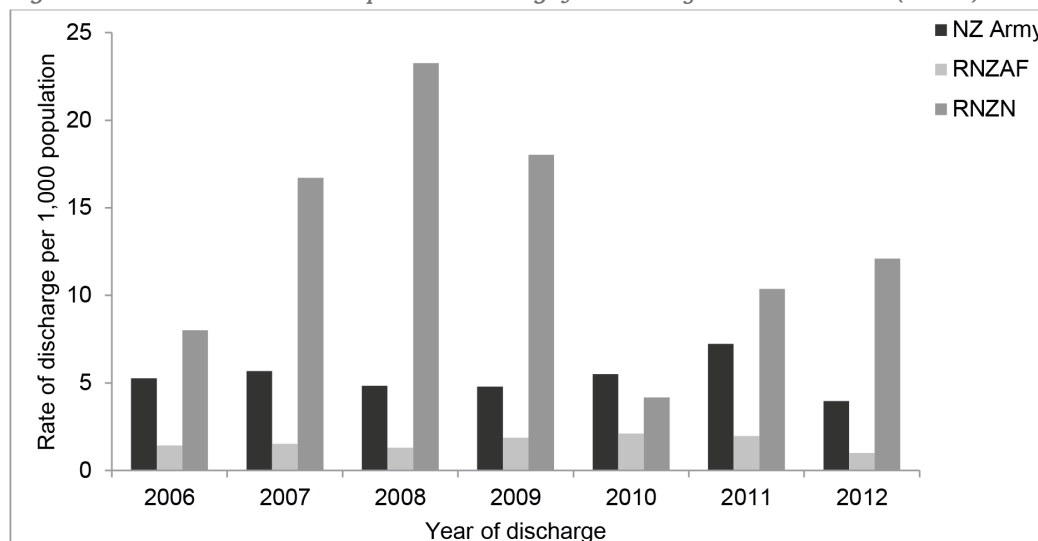




Table 2. Distribution of primary reason for release as percentage by ICD-10 chapter and most frequent individual primary reason for release within ICD-10 chapter. Only individual codes with a rate of  $\geq 0.5$  percentage of total are included. – no reported cases

ICD-10 CHAPTER		% ARMY n=176	% RNZAF n =37	% RNZN n=189	TOTAL COUNT	% OF TOTAL n=402
A00–B99	Certain infectious and parasitic diseases	0.6	5.4	1.6	6	1.5
	B27 Infectious mononucleosis	–	5.4	0.5	3	0.7
	B27.9 Infectious mononucleosis, unspecified	0.6	–	0.5	2	0.5
C00–D48	Neoplasms	1.7	2.7	0.0	4	1.0
D50–D89	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.0	0.0	0.5	1	0.2
E00–E90	Endocrine, nutritional and metabolic diseases	2.3	2.7	1.6	8	2.0
	E66.9 Obesity, unspecified	1.1	2.7	–	3	0.7
	E66.8 Other obesity	0.6	–	0.5	2	0.5
F00–F99	Mental and behavioural disorders	27.8	29.7	10.6	80	19.9
	F41.2 Mixed anxiety and depressive disorder	5.7	8.1	1.1	15	3.7
	F32.9 Depressive episode, unspecified	5.1	2.7	1.1	12	3.0
	F33.9 Recurrent depressive disorder, unspecified	1.7	2.7	1.1	6	1.5
	F31.9 Bipolar affective disorder, unspecified	2.3	–	–	4	1.0
	F07.2 Postconcussional syndrome	1.1	2.7	–	3	0.7
	F43.2 Adjustment disorders	0.6	–	1.1	3	0.7
	F09 Unspecified organic or symptomatic mental disorder	0.6	–	0.5	2	0.5
	F19.1 Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances, harmful use	–	2.7	0.5	2	0.5
	F33.2 Recurrent depressive disorder, current episode severe without psychotic symptoms	0.6	–	0.5	2	0.5
	F41.0 Panic disorder [episodic paroxysmal anxiety]	0.6	–	0.5	2	0.5
	F43.1 Posttraumatic stress disorder	1.1	–	–	2	0.5
	F99 Mental disorder, not otherwise specified	0.6	–	0.5	2	0.5
G00–G99	Diseases of the nervous system	5.7	5.4	2.6	17	4.2
	G35 Demyelinating diseases of the central nervous system	0.6	–	0.5	2	0.5
	G40.3 Generalised idiopathic epilepsy and epileptic syndromes	0.6	–	0.5	2	0.5
H00–H59	Diseases of the eye and adnexa	–	–	0.5	1	0.2
H60–H95	Diseases of the ear and mastoid process	–	–	1.6	3	0.7
	H83.0 Labyrinthitis	–	–	1.1	2	0.5
I00–I99	Diseases of the circulatory system	3.4	0.0	3.2	12	3.0
	I45.6 Preexcitation syndrome	0.6	–	0.5	2	0.5
	I47.1 Supraventricular tachycardia	0.6	–	0.5	2	0.5
J00–J99	Diseases of the respiratory system	0.0	0.0	5.3	10	2.5
	J45.9 Asthma, unspecified	–	–	4.2	8	2.0
K00–K93	Diseases of the digestive system	1.7	0.0	4.2	11	2.7
	K35.8 Acute appendicitis	–	–	1.1	2	0.5
	K50.9 Crohn's disease, unspecified	0.6	–	0.5	2	0.5
	K90.0 Coeliac disease	0.6	–	0.5	2	0.5
L00–L99	Diseases of the skin and subcutaneous tissue	–	–	1.1	2	0.5
	L05.0 Pilonidal cyst with abscess	–	–	1.1	2	0.5

M00–M99	Diseases of the musculoskeletal system and connective tissue	38.1	29.7	28.0	131	32.6
M22.2	Patellofemoral disorders	3.4	2.7	3.7	14	3.5
M54.5	Low back pain	2.8	2.7	4.2	14	3.5
M54.9	Dorsalgia, unspecified	3.4	–	3.7	13	3.2
M23.9	Internal derangement of knee, unspecified	0.6	–	4.8	10	2.5
M24.4	Recurrent dislocation and subluxation of joint	1.1	–	2.6	7	1.7
M15.9	Polyarthrosis, unspecified	2.8	2.7	–	6	1.5
M79.6	Pain in limb	1.7	–	1.6	6	1.5
M86.9	Osteomyelitis, unspecified	1.7	–	1.6	6	1.5
M25.5	Pain in joint	2.3	2.7	–	5	1.2
M51.1	Lumbar and other intervertebral disc disorders with radiculopathy	1.1	–	0.5	3	0.7
M62.2	Ischemic infarction of muscle	1.7	–	–	3	0.7
M76.5	Patellar tendinitis	0.6	–	1.1	3	0.7
M93.2	Osteochondritis dissecans	1.1	–	0.5	3	0.7
M16.1	Other primary coxarthrosis	0.6	–	0.5	2	0.5
M41.9	Scoliosis, unspecified	0.6	–	0.5	2	0.5
M45	Spondylopathies	0.6	2.7	–	2	0.5
M54.3	Sciatica	–	–	1.1	2	0.5
N00–N99	Diseases of the genitourinary system	0.6	–	4.8	10	2.5
N93.9	Abnormal uterine and vaginal bleeding, unspecified	–	–	1.1	2	0.5
O00–O99	Pregnancy, childbirth and the puerperium	–	–	–	–	–
P00–P96	Certain conditions originating in the perinatal period	–	–	–	–	–
Q00–Q99	Congenital malformations, deformations and chromosomal abnormalities	0.0	–	0.5	1	0.2
R00–R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	2.8	–	4.2	13	3.2
R69	Morbidity not stated or unknown	0.6	–	0.5	2	0.5
S00–T98	Injury, poisoning and certain other consequences of external causes	13.1	24.3	24.9	79	19.7
S82.9	Fracture of lower leg, unspecified	–	2.7	6.3	13	3.2
T79.6	Traumatic ischemia of muscle	4.5	8.1	1.1	13	3.2
S93.4	Sprain and strain of ankle	–	2.7	1.6	4	1.0
S09.7	Multiple injuries of head	1.7	–	–	3	0.7
S82.1	Fracture of upper end of tibia	–	–	1.6	3	0.7
S82.7	Multiple fractures of lower leg	0.6	–	1.1	3	0.7
S82.8	Fractures of other parts of lower leg	–	2.7	0.5	2	0.5
S83.0	Dislocation of patella	–	–	1.1	2	0.5
S83.4	Sprain and strain involving (fibular) (tibial) collateral ligament of knee	–	2.7	0.5	2	0.5
S83.5	Sprain and strain involving (anterior) (posterior) cruciate ligament of knee	0.6	–	0.5	2	0.5
S86.0	Injury of Achilles tendon	–	–	1.1	2	0.5
S92.0	Fracture of calcaneus	0.6	–	0.5	2	0.5
S92.7	Multiple fractures of foot	–	–	1.1	2	0.5
V01–Y98	External causes of morbidity and mortality	2.3	–	2.6	9	2.2
X60	Intentional self-harm	0.6	–	2.1	5	1.2
Z00–Z99	Factors influencing health status and contact with health services	–	–	2.1	4	1.0
Z33.1	Pregnant state, incidental	–	–	1.6	3	0.7
U00–U99	Codes for special purposes	–	–	–	–	–

\*Only individual codes with a rate of  $\geq 0.5$  percentage of total are included. –: no reported cases

The time spent in service before discharge varied considerably between all three services (Figure 3). Thirty seven percent of all RNZN medical discharges occurred within the first month and 71.4% in the first two months of service. Conversely, NZ Army discharged a mere 2.8% in the first 2 months with the majority occurring significantly later in their careers between 20-100 months (Table 1). Close to half (48.6%) of medical discharges from the RNZAF were in the first 10 months of service. There were differences in the rate of discharge between officers vs. enlisted personnel (Table 1). The majority of NZDF members medically discharged were enlisted (94.3%) with far fewer Officer Cadets (3.7%) and even fewer Officers (2.0%). No Officers were medically discharged from the RNZAF over the duration of analysis.

A number of discharges were found to be a result of pre-existing medical conditions held prior to service (Table 1). The RNZAF discharged 24.3% for pre-existing conditions, while the RNZN discharged 19.1% and NZ Army 9.1%. The most common pre-existing condition resulting in subsequent discharge was asthma (9.8%).

Of all medical discharges, 72.1% were characterised by three chapters of the ICD-10 coding system (Table 2). The majority were classified within diseases of the musculoskeletal system and connective tissue (32.6%), mental and behavioural disorders (19.9%) and injury, poisoning and certain other consequences of external causes (19.7%). Within the musculoskeletal system, patello-femoral disorders, internal derangement of knee, fractures of the lower limbs, and back pain were common. The most common mental illness or behavioural disorders reported as reasons for discharge were affective, anxiety and personality disorders. Discharges having significant co-morbidities allocated as part of their overall reason for discharge accounted for 30.6% of cases. This study chose not to investigate any time course differences in discharge rates of specific chapters or diagnosis.

### Discussion

This is the first known published descriptive epidemiological report regarding NZDF medical discharges. The results of this study demonstrate significant variations in the characteristics of medical release between the services. Many studies have shown significant losses early in training<sup>1,6,14</sup> which was true of the RNZN and somewhat of the RNZAF yet it was in stark contrast to that of the NZ Army. The differences in discharge rates over the years investigated and between the services do not imply a difference in disability rate yet may reflect

the local practice of medical management, policy of training units, intensity of training and differences in workplace exposure. The spikes in discharge rates for the RNZN were a result of how medical conditions were managed during initial training at that time. The RNZN tended to formally discharge members from service immediately if they are unable to continue with basic training. If they were to regain medical fitness in the future they would be eligible to re-enlist. This policy was divergent to that of the other services, where members with minor injuries were able to be retained, rehabilitated and re-coursed to the next available intake.

Discharge for health conditions must comply with relevant New Zealand legislation such as the Human Rights Act 1993, which requires employers to take 'reasonable steps' to accommodate employees with disabilities. The NZDF can justifiably exclude those who cannot perform the duties required of a service person, or those who would be placed at increased risk to the health of self or others. The results indicate the three services differ in their approaches to accommodating service personnel who are injured or unwell. Although a standard management approach is justified, recruitment and accommodation is highly dependent on the proposed occupation of the individual and hence individual service capacity to safely manage those individuals may vary. Further studies are recommended to consider differences in medical discharges between trades to identify problem areas.

Females were significantly over represented in medical discharges. Compared to their male equivalents, females were 2.42 times more likely to be discharged for medical reasons; furthermore, they were discharged earlier in their service career and at a younger age. This is consistent with observations of many other studies which show higher rates of injury and discharge from the military in females<sup>4,15-18</sup>. The findings present a direct challenge to both Equal Employment Opportunities legislation and Health and Safety legislation. To ensure that the selection and training processes are equitable under Equal Employment Opportunities and Health and Safety legislation, it is recommended that further analysis needs to be conducted to identify the reasons for, and the factors that lead to, increased medical discharges among female service members within the NZDF.

This study identified that at least 15.2% of NZDF personnel were discharged as a result of pre-existing medical conditions. Health screening is an important aspect of the military recruitment process. Although medical and psychological screening processes attempt to identify individuals with significant predispositions or active health problems, there are

instances where individuals can pass through the system undetected. It is not known if these discharges were a failure of the applicant to disclose pertinent information or deficiencies with the medical screening process. In either case, unsuitable enlistment can have negative consequences for the member and the service. This includes increased risk of injury or harm to the individual – for the service there is an increased risk of harm to others, reduced individual or unit performance and potentially increased costs associated with their treatment and management. Notwithstanding the inherent limitations in the collection and interpretation of this data, it does indicate the need for further investigation. Continued surveillance and reporting of medical discharge data should in part provide important information for the validation of current screening systems to improve medical recruiting standards.

The prevalence of mental health conditions in the NZDF population is unknown. The level may be different to that of the general population due to initial screening and training that may create a healthy worker effect<sup>15</sup>. It is accepted that some mental health conditions may develop in military personnel confronted with considerable occupational stress through combat and day to day operations<sup>16</sup>. Yet there is a significant number of mental health conditions that do not develop as a result of combat or deployment exposure. A significant proportion of medical discharges in this study were a result of mental illness and behavioural disorders. The most commonly reported were affective and anxiety disorders and disorders of personality. It should be noted that a disorder of personality would be pre-existing condition, but was diagnosed during service.

This finding supports other studies that have shown mental illness to be one of the leading causes of morbidity in the military<sup>9,13,14,19</sup>. Further analysis of mental health discharge data is required regarding specific areas of concern rather than a statistic of common mental health codes. Although differences in classifications and methodologies of other studies make it difficult to compare overall discharge rates, the NZDF rates do appear higher than the Australian Defence Force at 10-15%<sup>20</sup> and that of the Royal Navy at 8%<sup>21</sup>.

Discharge rates do not provide an appreciation of the true burden of mental health. It is not known how many of those who seek or are directed to medical support for a mental health condition are subsequently discharged. Multiple avenues for mental health support do exist in the NZDF which include Medical Officers, Psychologists and Chaplains. However, significant barriers exist in the military due to stigmatisation of mental illness and

the seeking of care<sup>22-24</sup>. Seeking care for mental health is often perceived as a sign of weakness and many are sceptical that mental health services can remain confidential to those who are required to know<sup>23</sup>. Gould et al<sup>22</sup> and Warner et al<sup>24</sup> both demonstrated that scepticism in military personnel more often arose from their concern of how they would be treated by peers and most importantly by their own leadership. A recent study by Rand<sup>25</sup> showed that 20% of military service members returning from Iraq and Afghanistan reported symptoms of post-traumatic stress disorder or major depression, yet only about half have sought treatment. Considering that stigma exists and perceived barriers are similar to other national military services including the NZDF<sup>22,26</sup>, one must question how many personnel are not seeking or getting the medical support they require. Analysis of the mental illness and behavioural discharges against current entry medical screening processes and policy is recommended. Further analysis is also required to investigate the aetiology and epidemiology of mental illness and behavioural disorders in the NZDF along with an examination of the barriers to receiving mental health care in day to day operations at home and overseas.

Musculoskeletal injury and disease is well recognised to be a leading cause of morbidity in most military populations<sup>5</sup>. Musculoskeletal injuries, especially to the lower limbs, are known to contribute significant morbidity in the NZDF<sup>27</sup> and unsurprisingly form part of the leading cause of medical discharge as described here. The majority of injuries are known to result from individual or team physical training and sports and not operational activities or military training<sup>27</sup>. However, the true burden of musculoskeletal injury and disease may not be reflected by the service discharge rates because of differences in their medical management and training policies. Further examination of the data is recommended to investigate areas of commonality between musculoskeletal morbidity codes across ICD-10 chapters.

It must be acknowledged that this study is not exhaustive of the aetiology and epidemiology of NZDF medical discharge. However, it does provide a preliminary investigation into the demographics of personnel and prevalence of conditions among the services. It also provides a rationale for future research into preventative approaches for the health and wellbeing of NZDF personnel.

There are some limitations to this report. Firstly, it is important to highlight the possible inaccuracy of the data entered into the EHR and how personnel were managed. Despite there being some processes in place to ensure that there is standardisation



of reporting and management, not all cases were managed equally, an example being that some cases were “medicalised” when they should have been administratively discharged and vice versa. Local practice, a lack of policy and the seniority of staff may all contribute to how cases are managed within the NZDF. Therefore it is important that this error is considered when interpreting the results of this study. Secondly, the study was unable to link clinically important co-morbidities, relationships and areas of commonality beyond ICD-10 chapters. Some of the terms and phrases used to refer to a reason for discharge were in fact synonyms of the same concept. Misclassification bias can therefore result where poorly defined descriptions for medical release are given. Further research is required to investigate mapping epidemiological data like this from strict mono-hierarchy taxonomy like ICD-10<sup>28</sup> to poly-hierarchical systems like SNOMED CT<sup>29</sup> that may reveal richer relationships of common codes.

The NZDF has a challenge to recruit the right people with the right skills to meet both force element and business roles. In order to do this they must ensure that scientifically reliable and valid physical training and medical standards exist to meet these requirements and relevance to current and future military operations. A balance is required to optimise health-related operational capability by maximising the recruiting pool without impairing operational capability through preventable morbidity, mortality and unnecessary costs. Health practitioners and personnel managers must work together in order to

enhance force preparation and sustainment through evidence-based advice. Innovative surveillance and meaningful reporting of health data such as this is crucial to validate health initiatives and provide a policy that seeks to train and sustain a force economically.

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# Australian Doctors at War. A literature review. Part Two: After Gallipoli<sup>1</sup>

S.Due<sup>2</sup>

History article from *JMVH* Volume 7 Number 2, August 1998

## Introduction

After the evacuation of Gallipoli, the AIF was reorganised in Egypt, and divided in two. The larger part, I Anzac Corps, under the Australian General Birdwood, was moved to France in March 1916. The smaller part, comprising II Anzac Corps, under the New Zealander General Godley, and later including the famous Anzac Mounted Division under General Chauvel, remained to protect Egypt, and to pursue the enemy in Sinai and Palestine. However a number of Australian doctors, who had enlisted with the RAMC, had already seen service in both these theatres of war.

## World War I (1914-1918) (continued)

The AIF arrived in France and were trained there in time to take part in the battle of the Somme in July 1916. While the number of dead and injured at Gallipoli had been appalling (Australian losses were over 8,000), the Somme was a slaughterhouse. On the first day of the Somme offensive 60,000 British troops fell, a number equal to the total Australian losses for the war. In the first few days of its first action on the Somme (23-27 July 1916) the 1st Division AIF, at Pozieres, suffered 5,000 casualties. It was replaced by the 2nd Division AIF, which suffered 3,500 casualties in a few days. By 3 September 1916, when the Australians were replaced by Canadians, I Anzac Corps had lost 23,000 men in the space of 6 weeks.<sup>42</sup> The AIF divisions still had nearly two years of fighting in France ahead of them.

From early in the war a number of Australian doctors served in France, mainly with the RAMC but also in other units, notably the Australian Voluntary Hospital.<sup>110-113</sup> This unit was raised in England under Lt-Col W.L.E. Eames, who had served with the NSW Army Medical Corps in the Boer War. It hurried into action, and was on active service in France by 29th August, 1914 (war was declared on the 4th August). A number of Australian medical women made their way to France and served in hospitals run by women

independently of the army (see below). After Gallipoli many more Australian doctors went to France with the AIF.

There are several good first-hand accounts of Australian doctors' experiences in France. Most notable is that of R.M. Allan, whose letters home were published by his father.<sup>114</sup> A number of shorter contemporary accounts appeared, mainly in the University medical journals and in the *Medical Journal of Australia*. These included articles by doctors Dawson,<sup>115</sup> Fooks,<sup>116</sup> MacLaurin,<sup>117</sup> McLean,<sup>118-120</sup> Ramsden<sup>121</sup> and Stacy.<sup>122-123</sup> The outstanding writer in this group is A.L. McLean, whose beautifully composed pieces rank the best writing of the war. Gassed twice in France in 1918, McLean died of tuberculosis in Sydney in 1922 while still in his thirties. He left uncompleted a superb fictional or dramatised account of soldiers in France which was published posthumously.<sup>124</sup>

Several doctors published reminiscences of the Western Front in later life: F.A Maguire after ten years recalled the confusion of life near the front;<sup>125-126</sup> R.L. Forsyth gave a lively account of his experiences at Villers-Bretonneux after more than twenty years;<sup>127</sup> A. Birnie recounted his experiences vividly after an interval of fifty years;<sup>128</sup> and C. Huxtable devoted thirty pages of his recent autobiography to his World War I experiences from when he joined the RAMC in 1914- after an interval of over 70 years.<sup>129</sup>

## Mesopotamia

The British campaign in Mesopotamia ended with the surrender of their army at Kut to the Turks in 1916, after a siege of several months. A British force had been sent, early in 1916, in an unsuccessful attempt to rescue the besieged troops, and with it were several Australian medical officers. The main work by an Australian doctor in this campaign is R.M. Allan's *Mesopotamia and India*.<sup>130</sup> Allan also wrote a short piece for the *Medical Journal of Australia*.<sup>131</sup> In addition there are articles by H.M.Moran<sup>132</sup> and

<sup>1</sup>S.Due *Australian Doctors at war. A literature review. Part Two: Gallipoli Aust Mil Med* 1998; 7(2):15-20. This is the second part of a two part series. The first part was published in Dec 1997 and reprinted in *The Journal of Military and Veterans' Health* July 2015.

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A.G. Anderson.<sup>133</sup> A small unit of the embryonic Australian Flying Corps also served in Mesopotamia. One of their pilots was Dr G.P. Merz of Melbourne, who was killed by Arabs after a forced landing.<sup>134</sup>

### Sinai and Palestine

Compared with the grim scenes which awaited the AIF in France, the campaigns of the divisions which stayed to protect Egypt, and to fight in Sinai and Palestine, appear in a relatively romantic light. Certainly the legendary exploits of the Australian Light Horse brigades of the Desert Mounted Corps, who were brilliantly led and repeatedly victorious, captured the Australian imagination and their story has been told and retold with great pride.

An important medical work from this campaign is *The Desert Trail*, by 'Scotty's Brother'.<sup>135</sup> This gives a detailed account of medical life in the desert war, in addition to fulfilling admirably its purpose as a memorial for the author's brother and the men of the Light Horse. The same gifted author, under his real name of C. Duguid, records his experiences of desert warfare at Gaza in a chapter of his autobiography.<sup>136</sup> J. Brown, who was serving with the RAMC near the Suez Canal when he was taken prisoner by the Turks, wrote a book recording his experiences.<sup>137</sup>

### Medical Women and World War I

Women who were doctors were not allowed to serve as medical officers in the Australian armed forces in World War I. Perhaps partly because of their determination to serve no matter what obstacles were put in their way, the efforts of these women have been more extensively recorded than those of medical women in World War II. A. Mitchell estimates that fourteen of Australia's one hundred and twenty-nine medical women made their own way to the war, and joined various British units.<sup>59</sup> There are accounts of the work of three Australian doctors Cooper,<sup>138</sup> DeGaris,<sup>139,140</sup> and Bennett<sup>141</sup> who served with the Scottish Women's Hospitals in Serbia. Other Australian medical women served in England and France: the Australian Dictionary of Biography, and the article by Mitchell,<sup>59</sup> give brief accounts of the war service of Phoebe Chapple (RAMC England and France), Eleanor Bourne and Vera Scantlebury Brown (Endell Street Military Hospital), and Lucy Gullett and Hannah Sexton (France).

### Unit Histories and Unit Publications

Unit histories are listed by Tregellis-Smith et al, along with some of the other unit publications, including honour rolls and newspapers.<sup>5</sup>

## World War II (1939-1945)

Most readers will be familiar with the broad outlines of World War II, which will therefore not be recapitulated here. Australian military casualties were less in this war than in World War I (in round figures 40,000 dead compared with 60,000), while the number of men and women who served in the armed forces was greater (about 700,000 compared with 400,000). However the total destruction of human life in World War II (55,000,000) was far greater than that of any previous war, and included a high proportion of civilians (over 50%).<sup>142</sup>

At the height of World War II, the Australian armed forces included about two thousand five hundred doctors,<sup>143</sup> amounting to more than one third of the medical profession in Australia.<sup>144</sup> Succinct histories of the medical services in this war were written by G. Jacobson,<sup>145</sup> and in a shorter version by A.J. Sweeting,<sup>146</sup> in the Australian Encyclopaedia (unfortunately this was not included in the current edition of the Encyclopaedia). A masterly overview of Australian military medical experience in the war was given in a short article by A.S. Walker, the official historian.<sup>147</sup>

### The Official History

The official Australian medical history of the Second World War was written by Allan S. Walker. It comprises four volumes produced over sixteen years, the last volume being completed by others after his death, and published in 1961.<sup>148</sup> Like Butler before him, Walker produced a monumental work compiled largely from military and personal records. However Walker's work is organised somewhat differently. He devotes his first volume to clinical experiences at war. He then devotes one volume to the Middle East and Far East, and one volume to the Island campaigns. His final volume covers medical services in the RAN and RAAF. Like its predecessor, Walker's history is a work of great authority, celebrating national pride and individual heroism.

### The Middle East

Early in the war Australian troops went to the Middle East to support the British Army, and there they helped defeat the Italian forces in the Western Desert. Part of the Australian force was then sent to help defend Greece against the Italians and Germans. The allies were defeated and retreated to Crete, which in turn was taken by the Germans in May 1941. A total of 2,065 Australians were captured in Greece, and a further 3,<sup>109</sup> on Crete. Three doctors – Thomas,<sup>149-150</sup> Le Soeuf,<sup>151</sup> and King<sup>152</sup> – wrote of their experiences in the campaign, the latter two being taken prisoner by the Germans.



Meanwhile, German reinforcements in the Western Desert forced British and Australian troops to retreat, some being left behind in April 1941 to defend the fortress of Tobruk. A book by J. Devine is devoted to his experiences at Tobruk,<sup>153</sup> a subject also covered by I. Wood in his autobiography.<sup>154</sup> Two journal articles by doctors at Tobruk, S.J.M. Goulston<sup>155</sup> and C. Morlet,<sup>156</sup> capture something of the atmosphere of the siege. At the same time, British and Australian troops invaded Syria from Palestine. A full-length book by M. Kent Hughes, who was a radiologist serving with the RAMC, describes her experiences in this theatre of war.<sup>157</sup>

### The Far East: Malaya - Singapore - Prisoners of War

British and Australian troops were rapidly defeated in Malaya when Japan entered the war. Two doctors wrote about their experiences in the retreat to Singapore: A.P. Derham in an article,<sup>158</sup> and T. Hamilton in his book.<sup>159</sup> When Singapore fell, on 15 February 1942, over 15,000 Australians were taken prisoner.<sup>160</sup> Cobcroft notes that of these, 87 were medical officers.<sup>160</sup> In all the Japanese took 22,000 Australian prisoners, from early 1942 onwards. It is testimony to the brutality of their captors that by the end of the war, three and a half years later, over 8,000 of these prisoners were dead, and many of the remainder were crippled for life.

The contributions of Australian doctors who were prisoners of war of the Japanese are celebrated in a relatively large number of books and articles, the best of which have found a wide audience. It was said by McWhae<sup>143</sup> that the one of the greatest achievements of the medical service in this war was its work among the prisoners on the Burma-Siam railway: 'if it had not been for their medical officers... few would have survived'. The most notable published works are those by the senior officers Coates<sup>161-167</sup> and Dunlop.<sup>168-171</sup> In addition there are a number of pieces, including journal articles and full-length books, by other Australian medical officers in Japanese captivity, each of whom makes a valuable contribution to the literature.<sup>172-190</sup> There are a number of second hand reports not referred to here. A useful reference work is the recent publication by Brenda Heagney, which lists all the medical officers at Changi and on the railway.<sup>191</sup>

### New Guinea

The Japanese advance continued south through the islands of the Dutch East Indies to Timor and New Guinea, where it was finally halted in the now legendary campaign in the Owen Stanley Ranges. Notable works by doctors about their experiences in

the New Guinea campaign are those by Robinson,<sup>192,193</sup> Steward,<sup>194</sup> and Kingsley Norris.<sup>195-196</sup>

### Air Force Medical Officers

Two doctors who served in the RAAF in World War II have published their experiences recently in some detail. They are W. Deane Butcher<sup>197</sup> and C. Roe.<sup>198</sup>

### Unit histories

There are a number of published medical unit histories from this war, ranging from professionally written works to those which are largely collections of anecdotes. These are listed by Tregellis-Smith et al.<sup>5</sup>

### The Regimental Medical Officer in World War II

This is a subject which deserves more attention in the literature than it has received. Fortunately there are several full length books, by Regimental Medical Officers Richards,<sup>187</sup> Robinson,<sup>193</sup> Steward,<sup>194</sup> and Thomas.<sup>199</sup> There are short pieces by Patterson,<sup>200</sup> Robinson<sup>192</sup> and Braithwaite.<sup>201</sup>

### Medicine and literature in World War II

A. Meares, who was a RMO in New Guinea, published several poems inspired by the landscape there which reflect his experience of war.<sup>202</sup> Two novels by Australian doctors came out of the war: the surgeon H.M. Moran wrote a novel about the life of a Sydney GP, culminating with his death in England in the blitz;<sup>203</sup> and Mary Kent Hughes wrote a well rounded story set in the Middle East, which was the scene her war service as a radiologist.<sup>204</sup> She also wrote a war poem 'The Troopship .. .'

*But where the sea meets sky our cruiser lies*

*And over it appears the Southern Cross*

*The pointers first, twin lamps above the sea*

*Then all five stars bright like the star of old*

*Which lit the stone-capped hills of wild Judea.*

*But then the message was of joyous birth,*

*And now of noise, home-hunger, wounds and death.*

*Mary Kent Hughes, RAMC  
on a troopship coming home.<sup>205</sup>*

### Korean War (1950-1953)

Medical services in the Korean War are described by McIntyre in the official history of Australian involvement in this conflict.<sup>206</sup> There are also contemporary articles by Davis,<sup>207</sup> and Gandeia et al.<sup>208</sup>

### Malaya (1950-1960) and Vietnam (1962-1973)

The official medical history of Australia's involvement in Southeast Asian conflicts 1948-1975 by B. O'Keefe (with an appendix by F.B. Smith on Agent Orange) was published recently.<sup>209</sup> This is a major work in the tradition of the previous official histories. The author presents a detailed but readable, coherent picture of medical services in the Malayan Emergency and the Vietnam War.

The medical aspects of the Vietnam War were covered extensively at the time by Brass.<sup>210-212</sup> Articles on military medical experiences were published by Cole,<sup>213</sup> Crawford,<sup>214</sup> Gurner,<sup>215-216</sup> Knight,<sup>217</sup> Leslie,<sup>218</sup>

and Smithurst.<sup>219-220</sup> In addition, there were civilian medical personnel who formed what were known as the Australian Surgical Teams. Their experiences were recorded by Grove,<sup>221</sup> Santamaria,<sup>222</sup> and Villiers.<sup>223</sup>

### More recent conflicts

Since Vietnam, Australian doctors have been involved officially and unofficially in a number of regional conflicts, and there are published accounts of medical experiences in Timor,<sup>224</sup> Somalia,<sup>225-227</sup> Afghanistan,<sup>228-229</sup> Iraq,<sup>227</sup> Bosnia,<sup>230,231</sup> and Rwanda.<sup>233-236</sup>

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(Note: References are numbered from the previous article in this two part series)

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# Naval casualty management training using human patient simulators

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## Abstract

**Background:** Extended-evacuation or austere environments (e.g. naval, immature or depleted combat zones) are characterized by the lack of resources to facilitate medical evacuation in the “Golden Hour” from moment of injury. This may require the primary caregiver, often a relatively inexperienced general physician or EMT, to administer extended medical care in the field.

We describe the Shipboard and Underwater Casualty Care and Sedation Simulation (SUCCeSS) program in the Israeli Navy, intended to train caregivers for extended prehospital intensive casualty care using high fidelity life-size simulation mannequins set up onboard corvettes or submarines during maneuvers, in maximally realistic conditions.

Twenty two general physicians and EMTs in 12 teams were enrolled in the program in the years 2011–2013.

Two to three hour long training sessions were headed by senior surgeons and anesthesiologists using flexible scripts enabling the mannequin operators to react to caregivers’ actions and their consequences.

Trainee evaluation was performed by the preceptors using semi-structured forms taking into account both critical treatment decisions and observation on the effects of actions taken. Trainees also completed self-report CRM (Crisis Resource Management) questionnaires before and after the sessions.

**Results:** Success of the trainees correlated with an evaluation score above 72%. The mean overall CRM score for team leaders post exercise was 74.64%, an improvement of 10% over pre-exercise scores ( $p < 0.0001$ ).

**Conclusion:** Caregiver self-perceived competence and self-sufficiency in treating casualties at sea was improved via high fidelity simulation in theatre using realistic naval casualty care situations. We discuss the relative strengths and weaknesses of our training program for the teaching of “NCM”, or Naval Casualty Management, as well as the emergent concepts of the military extended evacuation environment.

**Keywords:** Simulation; Casualty care; Naval medicine; Austere environments; Prehospital

### Background

This paper presents the SUCCeSS (Shipboard & Underwater Casualty Care & Sedation Simulation) program conducted by the Haifa Naval Base Medical Department with the support of the Maritime Medicine Branch of the Israeli Navy and the Trauma Instruction Section of the Israeli Defense Forces Medical Academy. The program began in 2011, undertaking to train naval trauma teams in Naval Casualty Management (NCM) onboard a ship or submarine at sea using high fidelity medical simulators. Twelve teams have undergone the program over its two years. Each team was led by a military physician (not exceeding General Practitioner by academic training), and included an EMT, a total of 22 personnel trained thus far. Teams were selected from the Israeli Missile Ships and Submarine Flotillas.

The aims of this paper are to delineate the need for extended evacuation training for naval personnel; to demonstrate the feasibility of instituting such a program; and to demonstrate the efficacy of one such program.

The military naval milieu is characterized by relative isolation from immediate logistic support; long distance from Level I trauma centers, and a possible lack of airborne means of evacuation. In the case of combat casualties, this may lead to extended evacuation time and a necessity for continuous critical care. Furthermore, the onboard medical team may be limited in size, with no possibility of shift changes or reinforcements. The caregiver may rely only on limited or depleted resources and supplies at hand, thus demanding a rational utilization of limited resources, and at times requiring some improvisation.

An emergent concept in military trauma care is that of the austere or extended-evacuation environment. Previously, the “Golden Hour” concept of trauma drove caregivers to evacuate casualties to a hospital-based trauma team within 60 minutes of injury by “scoop and run” or “scoop, treat and run”<sup>1</sup>. This has been successfully achieved by the allied forces in Iraq and Afghanistan<sup>2</sup>. The Israeli Defense Forces (IDF) have also successfully achieved this goal in recent conflicts. However, the medical and airborne logistics that must be in place for rapid evacuation to an adequate trauma center are not readily available in immature, winding down, naval or Special Forces theaters of operation. In such environments, the caregiver, be they a medic, EMT, or physician, may find themselves treating the casualty for hours before evacuation to a medical facility. This has slowly led to a paradigm shift in the military medical approach

to evacuation. While the concept of the “Golden Hour” is as relevant as ever, steps are being taken by military forces throughout the world to better equip and train medical providers for the eventuality of unavoidable extended care prior to evacuation<sup>3,4</sup>.

Characteristic incidental trauma teams in the Israeli Navy (in contrast with our designated surgical/resuscitation teams) include, in addition to enlisted medics, general practitioners, emergency medical technicians (EMTs) or both. EMTs are by the nature of their training focused on pre-hospital care, having undergone 16 months of EMT training including Tactical Combat Casualty Care (TCCC) and performing regular civilian EMS shifts. Deployed medical officers in the Israeli Defense Force are also trained in combat casualty care. This includes surgical rounds during medical school and internship, A 5 day ATLS course adapted to the military setting, periodic trauma drills in one of the IDF’s Medical Simulation Centers, operational drills practicing trauma care in the military setting and ongoing (albeit brief) hospital trauma training.

However, neither group has extensive training or experience in critical care in an extended-evacuation setting. Both groups are comprised of young, inexperienced caregivers, having little prior experience (no longer than 2 years).

High fidelity life-size simulation mannequins are rapidly gaining acceptance and widespread use in university hospitals and military medical branches alike<sup>5,6</sup>.

Common uses include combat medical training and skills assessment (i.e. in armed forces) and training and competency evaluation elsewhere. Simulation-based training has proven itself highly effective and efficient in improving trauma care skills, both in hospital and prehospital settings, and in the sometimes remote or austere environment of the military setting<sup>7-9</sup>.

However, the locale of the classroom or military training facility may neglect to simulate genuine aspects of on-site care, especially as pertains naval medicine - isolation, ambient temperature, heaving of the naval vessel, or cramped quarters. Naval forces employing medical simulation for training of primary caregivers often use labs or remote, littoral facilities in lieu of using naval vessels<sup>10</sup>.

### Methods

SimMan II and later, SimMan Essential mannequins, (Laerdal, Stavanger, Norway) were used. Moulage was applied to simulate specific combat injuries. A team of a paramedic-level operator and a senior

anesthesiologist/intensive care specialist (“Preceptor”) operated each mannequin. Training sessions were video-recorded and the videos later used for trainee feedback, coupled with the “patient’s” vital signs and procedure scoring. All training sessions took place during naval maneuvers of an Israeli missile corvette or submarine. For a list of resuscitation devices and specifications please refer to Appendix 1.

Prior to the training session at sea, all teams underwent a day-long presail “priming” session in order to become familiarized with the mannequins, equipment, and doctrine. Classes were given on the subjects of sedation and treatment of shipboard medical crises, covering nearly all common scenarios. To promote standardization, Preceptors were briefed in the use of the training facilities (simulators, scripts and evaluation tools). The authors were available on hand in all the sessions, and cross-consultations were made in real time to ensure correct course of the exercises.

As an added measure of realism and contrary to the teams’ prior experience, simulation mannequins would “expire” due to incorrect critical treatment decisions resulting in probable human death, i.e. “Dead is Dead”. This was done to motivate the teams and prevent the false reassurance of a “reboot-able patient”.

The teams were trained and assessed in the elements and scenarios listed in Table 1.

Table 1: life support elements addressed in training

Advanced trauma life support elements	Medical (non trauma) elements	Technical elements	Pharmacological elements
Airway management	Arrhythmias	Loss of electrical power supply	Management of sedation
Tension pneumothorax	Anaphylaxis	Use of adjunct devices – NGT, Foley catheter, intercostal drain	Fluid and blood product resuscitation
Blast injuries	Hypothermia	Ventilator malfunction/ disconnection	Toxic gas inhalation (CO, CN)
Electrocution (leading to VF, rhabdomyolysis)	Management of the severe burns patient		
Head Injury	Supportive (i.e. nursing) care		
Smoke inhalation	Prolonged care of the casualty in the absence of immediate evacuation (all sessions lasted 3.5 hours).		
Triage			

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Twenty two primary caregivers were trained over the program’s three years. Of these, 15 were physicians and 7 were EMTs.

#### Flexible scripts

Scenario descriptions began with initial history and condition of the casualty. Further events and complications were suggested in each scenario based on time elapsed and possible trainee actions. However, we gave the preceptors allowance for divergence from the written scenario. They were encouraged to do this if it was felt that the individual trainee made a questionable treatment decision or if a learning opportunity arose. The mannequin operator would then simulate changes in the mannequin’s vital signs or symptoms based on the preceptor’s suggestions. Additional suggestions for script events were made throughout the training sessions by the

authors overseeing the exercise, reflecting treatment decisions of the trainees. The basic scenarios used were:

1. While working on a mast a sailor falls and sustains head injuries. The apparent cause of his fall is electrocution.
2. Following an explosion in one of the sections, a sailor presents with chest trauma and smoke inhalation.

“Additional file 1” contains example scenarios.

In addition to preplanned complications, the teams had to deal with complications arising throughout the treatment due to errors in patient management or incorrect management techniques. Problems such as pulmonary edema from fluid overload in burn patients and misdiagnosis of drug induced anaphylaxis in ventilated patients as airway



obstruction, were encountered and would have to be dealt with successfully for the simulated patient to survive.

### Evaluation

Evaluation of medical simulation sessions is a challenging area having a plethora of evaluation devices, at different levels of validation. There exist dozens of clinical skill evaluation tools, most without reported reliability or constant validity. While consensus in the medical education community seems to point to the mini-CEX (Clinical Evaluation Exercise) as a valid and reliable assessment tool<sup>11</sup>, its use in medical simulations has scarcely been researched. In addition, the nature of the exercises was formative rather than summative, i.e. the caregivers were being trained rather than being tested. Thus, the authors composed a novel tool relevant to the goals of the SUCCeSS program. Its purpose was to assist the preceptors in recording and assessing the trainees' actions. In addition, one other team offered peer-based critique in every exercise.

The primary evaluation questionnaire comprised two sections (see Additional file 2 section for the forms used):

1. Critical Treatment Decisions
2. Observation - Effect of actions taken.

The critical treatment decision (CTD) section included nine care decisions generally agreed to be pivotal in resuscitation, and suited to the scenario at hand. Each CTD was marked Yes/No. Failure to identify and perform the CTD elicited a possible deterioration of the casualty, to the point of demise. The CTD section served to record and evaluate the trainee's decision-making process and his or her understanding of the casualty's pathophysiology in life-threatening conditions. The focus of the session was employment of a rational algorithm-based approach to the casualty as opposed to trial and error. The CTDS for each session were tailored to the script and scenario being practiced. Preceptors were encouraged to lead the exercise to each of the CTD junctions described in the script and evaluation form.

The observation on effects of actions taken included nine to ten possible interventions performed on the casualty. The possible observations were "Not Undertaken", "Deleterious", "Indifferent" or "Beneficial". This section aimed to evaluate the trainees' technical skills and medical knowledge, in non-critical treatment actions. For example, a failed intubation attempt on a patient judged in error to be

apneic would not be beneficial, and would be valued as deleterious or indifferent, as the case may be.

In both sections the primary subject of the evaluation was the primary caregiver who also led the team.

In addition, teamwork was subjectively evaluated in terms of leadership, cooperation, and inclusion of all team members in the care process. The debriefing section of each exercise emphasized critical treatment decisions and failures, and focused on teamwork and leadership exhibited during the drill.

Team leaders also provided self-evaluation using a validated self-efficacy instrument, the Crisis Resource Management Questionnaire<sup>12</sup>. This instrument has been shown to correlate with crisis resource management skills. It comprises four elements: situation awareness, team management, environment management and decision-making. Questionnaires were filled out and submitted anonymously. Pre and post training data were compared using a paired t-test.

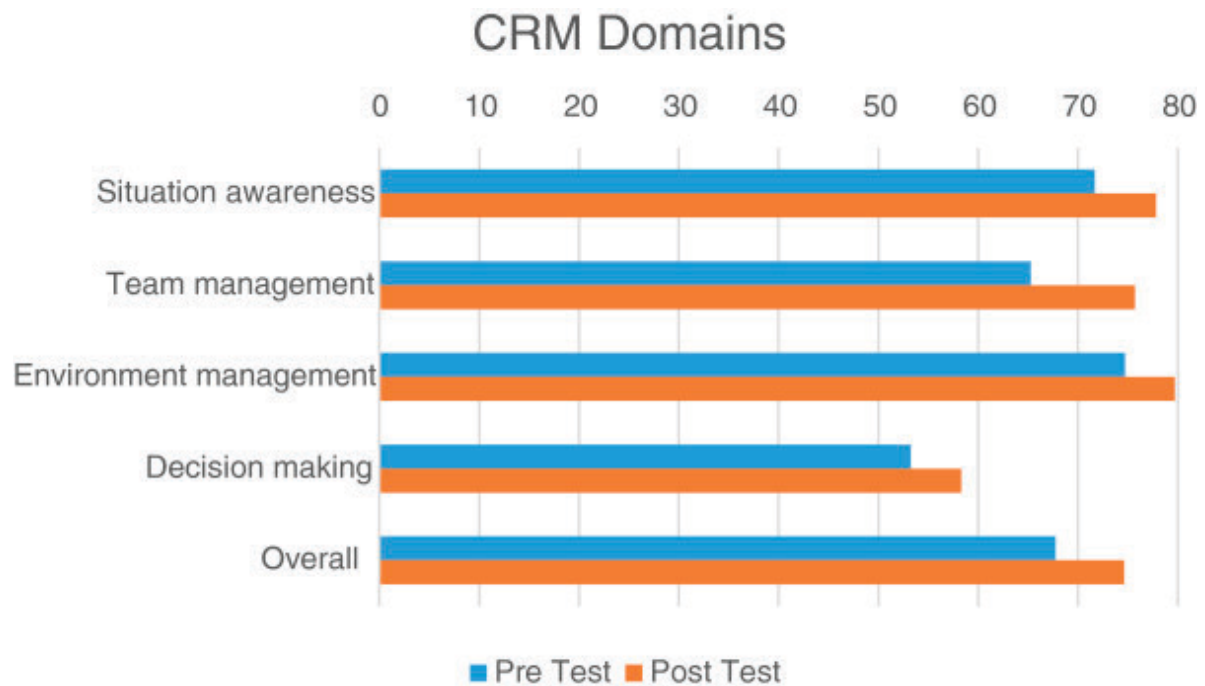
### Results

All teams were monitored as to their success in managing each individual critical care scenario, as well as the 2–3.5 hour long maintenance of the casualty.

Trainees were scored using the evaluation forms presented in the Additional file 2. The CTD and observation sections were awarded 50 points each, divided evenly among the items. The average score in our training scenarios was 79.39%. Of the twelve simulated casualties, two expired in failed exercises. These two teams were debriefed in detail as to the reasons for expiration and how it may have been avoided. Successful management of the scenarios (meaning that the simulated patient survived the exercise) correlated with a score of 72% or above.

All twenty two trainees completed the CRM self-report questionnaire. The average Crisis Resource Management (CRM) self-efficacy score of the team leaders post exercise was 74.64% (2.27% standard deviation). Overall self-sufficiency scores improved by 10% following training (statistically significant improvement,  $p < 0.0001$ ). Figure 1 displays pre- and post-training scores in the four CRM domains: situation awareness, team management, environment management and decision-making. A paired t-test shows a statistically significant improvement in all domains separately, and for the entire questionnaire (Table 2). Due to the small number of trainees we did not perform separate analyses for physicians and EMTs.

Figure 1. CRM pre- and post-training scores.



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Table 2: Average CRM scores

Average CRM scores			
	Pre-training (% score)	Post-training (% score)	P value
Situation awareness	71.68	77.85	0.0002
Team management	65.26	75.73	0.0003
Environment management	74.71	79.71	0.002
Decision making	53.23	58.29	<0.0001
Overall	67.74	74.64	<0.0001

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### Discussion

The “Extended Evacuation Environment” is an emerging concept in military medical doctrine and so far relatively undescribed in the naval milieu. In contrast with prior doctrine whereby the trauma team would be deployed closer to the casualty or all efforts were made to shorten evacuation times, it is anticipated that immature, austere, outdistanced or depleted combat environments may pit a primary caregiver against complex and prolonged casualty management. It is imperative that relevant training modalities are developed for this emerging entity. We feel that we have taken some steps toward the realization of this goal. A pertinent question concurrent with “How to train” is certainly “What

do we need to train?” Currently, the authors would humbly suggest that the realm of military extended prehospital care is underdeveloped and limited to catchy mnemonics (e.g. HITMAN)<sup>3</sup>, basic ATLS/TCCC skills and existing equipment. The challenge for the next few years may be to develop a coherent set of guidelines and instruments for the primary caregiver experiencing extended evacuation scenarios.

Crisis resource management, an aviation concept often borrowed into emergency medicine, may be pertinent to the case of naval casualties. However, as medical CRM is far removed from the cockpit and requires some revision, care of naval casualties is even further removed. We therefore propose our own adaptation – NCM, or Naval Casualty Management.

This is comprised of A. the ATLS/TCCC skills subset; B. The use of Crisis Resource Management tools for team leaders; C. Making contingencies for extended evacuation; and D. Damage control resuscitation. We have also begun to establish a fifth foundation - the introduction of checklists in trauma.

The training of naval (or military) trauma teams poses ethical and practical challenges. Ethical considerations include those of best standards (i.e. of patient care and education), error management and patient safety, patient autonomy and the need to use live animals for training<sup>13</sup>.

Practical considerations include the rarity of trauma casualties at sea during peace times (compared to a hospital setting for physicians in training) and the limited amount of time available for hospital-based training for enlisted medical personnel.

The training and evaluation modality presented differs from those formerly (and sometimes currently) used in common military medical simulators, i.e. simulation facilities in medical educational institutions<sup>14,15</sup> or virtual reality<sup>16,17</sup>, where short scenarios are the standard. Our trainees were given extended care scenarios where a continuum of care was practiced, requiring a constant process of re-evaluation, diagnosis and treatment. Training was performed onboard a military naval vessel, in maximally realistic conditions, thus rehearsing a scenario of care in the genuine theater of operation. Medical immersion training is emerging as a teaching standard. Its use in medical simulations for training emergency care teams is expanding to civilian settings<sup>18</sup>, military, including naval, settings<sup>19</sup>, and the various domains of aerospace medicine<sup>20-22</sup>.

A special and extreme case of austere environments may be found in spaceflight. As the traditional mentor/apprentice model of medical teaching is largely irrelevant for spacecraft crew medical officers, simulation and remote teaching modalities are gaining acceptance as possible and likely tools for skills training and maintenance. This may entail an effort to immerse the trainees in environment analogous to space, as can be seen for example in the experience described by Musson and Doyle in the Canadian Arctic Eureka weather station<sup>20</sup> or NASA's use of medical simulators in microgravity, as described by Doerr et al.<sup>22</sup>.

The various studies and experiences cited above all share characteristics similar to ours such as the austerity of the target environment or the cramped, noisy quarters involved (e.g. onboard a spaceship, helicopter or corvette). All made a point of proving the feasibility of deploying a simulator on their

various platforms, and are in agreement that moving the teaching experience to the target environment is worthwhile. However, additional points present themselves from our experience for further consideration. For example, removal of the simulators from the training facility to the theater of operations has an added benefit. Simulation of battle injuries and prolonged treatment ratifies the adequacy and sufficiency of the medical instruments and supplies onboard that would otherwise only be tested in the case of actual casualties. A case in point: the first SUCCeSS exercise identified key medical supplies where modifications were necessary (e.g. length of IV extension tubes, number of cricothyroidotomy kits onboard, etc.). These were corrected before additional exercises and deployment, subsequently re-evaluated and found to be satisfactory.

A full script for a 3–4 hours scenario is impossible to write in advance and the patient's situation may change in unforeseen ways following trainees' management. It is therefore imperative that the instructor conducting the exercise be an experienced critical care physician who can logically change the condition of the simulated patient according to the actions of the trainees in a realistic manner (e.g. lowering blood pressure following an overzealous dose of certain anesthetics or inducing bradycardia if hypoxemia is not promptly dealt with). The presence of senior critical care specialist preceptors improved the level of teaching as they drew on rich medical and teaching experience and added credibility to the exercise.

In all our exercises, the CRM self-efficacy instrument displayed relatively high scores in team and environment management, with lower scores for situation awareness and decision-making. The latter may point to the physicians' lower confidence in tasks related more directly to resuscitative care, emphasizing the need for such training sessions.

### Conclusion

Caregiver self-sufficiency and their self-perceived competence in treating casualties at sea was improved via high fidelity simulation in theatre using realistic naval casualty care situations. It is feasible to use medical simulation mannequins at sea, despite the logistic difficulties involved in their deployment. Ingenuity and enthusiasm during initial implementation may be required in order to overcome these. In light of the current technology and literature, we feel that striving for maximally realistic conditions in simulation at sea and elsewhere, should be the rule, not the exception.



*Figure 2. Author DH (background, wearing navy cap) training a physician and EMT on board a corvette. In the figure, a Foley catheter is being applied.*



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*Figure 3. A submarine surgeon and his team of medics is resuscitating a simulated patient after smoke inhalation. The team is wearing standard breathing apparatus for flooding or smoke.*



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### Limitations:

1. The simulation model is a plastic-silicone mannequin, without the tissue qualities of animal/cadaver models (e.g. in the performance of initial resuscitative procedures such as cricothyroidotomy)<sup>23</sup>. This may induce false confidence in the military physician's actual skill level.
2. In the model used, certain clinical features were lacking, such as capillary refill, palpable body temperature, temperature differentials between limbs, perspiration and pupillary dynamics and bleeding, thus impeding the realism required from such drills. More advanced mannequins include some of these features.
3. Artillery and gunfire were routinely heard during the corvette exercises, but we did not attempt to further simulate the emotional stress and physical conditions of naval battle. We feel that performing these exercises underway provides realistic naval conditions without causing excessive distraction. Figures 2 and 3 provide examples of onboard deployment on a corvette and submarine, respectively.
4. Additional training modalities and considerations that are regularly practiced elsewhere in the training of our personnel, but not concurrently within the SUCCeSS program:
  - a. Single model – our current program utilizes only a mannequin simulation model, without the use of live tissue or actors employing moulage.
  - b. The lack of a mass casualty event may be deemed as a pitfall as we focused on a single patient, in a single location, per training team. Our exercises began as multiple casualty for the sake of triage, and were later reduced to a single casualty.
  - c. No evacuation – the current program focuses only on the therapeutic aspect of Extended Prehospital Intensive Casualty Care, with no evacuation phases.
  - d. Teleconsultation – while this is well established for medical caregivers in the Israeli Navy, its use and training are beyond the scope of this paper.

### Information security

This text has been certified by the Information Security bureaus of the Israeli Navy and Techno-Logistic Division of the Israeli Defense Force as Unclassified.

### Appendix 1 Resuscitation devices and specifications

Resuscitation instruments included Uni-Vent 731 (IMPACT Instrumentation Inc. West Caldwell NJ, USA) and Versamed iVent201 (Versamed, GE Healthcare, Pearl River NY, USA) ventilators, Aitecs SEP-10S Plus syringe infusion pumps (Viltechmeda, Vilnius, Lithuania), and Nonin Model 9847 pulse-oximeters/CO<sub>2</sub> detectors (Nonin Medical Inc., Plymouth MN, USA). Blood pressure was measured using a manual sphygmomanometer; temperature was measured using standard digital oral thermometers capable of detecting hypothermia.

CO<sub>2</sub> exhalation was simulated using pressurized tanks at a pressure of 120 bar (maximal outflow pressure regulated to 2 bar), connected to the mannequins through the SimMan control module. Medical oxygen was supplied using naval/aviation standard oxygen tanks. Other medications and instruments included the trauma standard supplied to missile ships and submarines, including medications for sedation, antibiotics, ACLS etc.

### Competing interests

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper, and the views expressed are their own and not those of the Israeli Defense Forces Medical Corps.

### Authors' contributions

IN and DH participated in all stages of the work and writing. AW participated in one drill and in writing and approving the manuscript. All authors read and approved the final manuscript.

### Authors' information

DH is a senior anesthesiologist and intensivist, and is a volunteer reservist in the IDF engaged in training and doctrine of naval medicine, forward resuscitation companies and ATLS. AW was formerly chief of the Trauma Instruction Section of the IDFMC Academy. He currently specializes in medical informatics and information technology. IN is a Lieutenant Commander in the Israeli Navy, and former Chief Surgeon of the Haifa Naval Base. He has also trained as an OB/GYN.

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## Additional Files

Additional file 1. Casualty no. 1-electrocution and head injury.

## Supplementary material I

### Casualty no. 1 – electrocution and head injury

Description: as the senior caregiver enters the room, the casualty is administered BLS by a combat medic who was on site during electrocution.

Moulage: entry and exit burns on both palms. Bleeding from head.

Casualty: Unconscious, no breathing or pulse. There is some bleeding from the scalp and palpation reveals deformation of the head.

Condition of the casualty	Required treatment	Complications
Unconscious, no pulse or breathing	Jaw thrust, bag ventilation, c-spine fixation. Primary survey reveals no pulse -> continued BLS -> use of automatic defibrillator reveals VF -> electric defibrillation – sinus rhythm returns with only carotid pulse returning at this point	If not defibrillated -> death
Pulse returns, bradycardia, bradypnea, some moaning. Does not regain consciousness (GCS 4)	<ul style="list-style-type: none"> <li>Definitive airway</li> <li>Ventilation with CO2 maintained at 35 mmHg due to increased ICP</li> <li>Sedation: lidocaine, ketamine, midazolam. IF BP low additional midazolam drops BP</li> <li>Mannitol administration</li> </ul>	Vomiting, aspiration Slowed respiration
Immobile for a long time. Pale and with cold skin	<ul style="list-style-type: none"> <li>Heating of room, warm fluids, blanket</li> <li>Position changes and padding</li> </ul>	Worsening of hypothermia Pressure sores
Complementary monitoring: <ul style="list-style-type: none"> <li>Sedation</li> <li>Pupils</li> <li>Urine output</li> </ul>	<ul style="list-style-type: none"> <li>NG tube and foley catheter</li> <li>Treatment of electrical burns</li> <li>Warm fluid resuscitation</li> <li>Medications: furosemide, bicarbonate, mannitol</li> </ul>	
Comments: consider raising head of bed by 30 degrees to reduce.		

**Evaluation sheet – Casualty no. 1, electrocution and head injury**

Name of trainee:

Additional observer:

Critical Treatment Decisions (CTDs): Did the trainee –

	yes	no	
1	<input type="checkbox"/>	<input type="checkbox"/>	Correctly prioritize treatment
2	<input type="checkbox"/>	<input type="checkbox"/>	Display an organized approach to management
3	<input type="checkbox"/>	<input type="checkbox"/>	Perform evaluation, management and extended care well and in correct order
4	<input type="checkbox"/>	<input type="checkbox"/>	Identify and treat ventricular fibrillation
5	<input type="checkbox"/>	<input type="checkbox"/>	Manage definitive airway
6	<input type="checkbox"/>	<input type="checkbox"/>	Adjust ventilation and sedation for head injury
7	<input type="checkbox"/>	<input type="checkbox"/>	Identify hypothermia and take correct steps
8	<input type="checkbox"/>	<input type="checkbox"/>	Perform complementary treatment (antibiotics, hydration, raise head and torso)
9	<input type="checkbox"/>	<input type="checkbox"/>	Treat burns

If the trainee ignores a CTD or manages it wrongly, consider deterioration and death of the casualty.

Observation of actions taken and their effect on the casualty

	not taken	deleterious	Indifferent	Beneficial	
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Use of capnometer/pulse-oxymeter
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mechanical ventilation
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Warming the casualty
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Secondary survey
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Care and fixation of spine
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Antibiotics administration
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sedation
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Use of mannitol / hyperventilation
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preparation for evacuation
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Use of NGT, foley, other tubes

Comments:

Evaluation:  Succeeded       Unsuccessful

## Reprinted Article

### Casualty no. 2 – blast injury

Description: The casualty is conscious, his voice is hoarse, is dyspneic. Burns on upper extremities, thorax and abdomen.

Moulage: Burns on upper body.

Condition of the casualty	Required treatment	Complications
Hoarseness, dyspnea	Immediate intubation. Cricothyroidotomy if trismus	Bradycardia-> death
After 20 minutes: casualty exits sedation (blinks, trismus, motion). SPO2% decrease BP rises, airway pressure rises	Sedation medications using syringe pump (reduce BP if overdose). Begin nursing care – NGT, foley, padding, bandages	If sedation administered by bolus, casualty inadequately sedated after 10 more minutes. If sedation not undertaken worsen vital signs.
After 1.5 hours: ventilation pressure rises, decreased ventilation left side, SPO2% decrease (tension pneumothorax)	Needle thoracostomy Thoracic drain	Deterioration -> death
Blood in chest drain – BP decreases If hypothermic – cardiac arrhythmias (at 33°C)	Warm up the room Warm hydration using Parkland formula Check urine output	Ventricular arrhythmias. If hypovolemia not corrected->death
Immobile for a long time.	Prevention of pressure sores-padding, position changes every 2 hours	Pressure sores
Complementary treatment: antibiotics (consider anaphylaxis) Treatment of burns Tranexamic acid administration	Treatment of anaphylaxis	Deterioration if untreated, death
Comments: Record treatment and responses After intubation SPO2% does not exceed 90% (due to pulmonary contusion) Energy depletion of battery operated devices		

### Evaluation sheet – Casualty no. 2 blast injury

Name of trainee:

Additional observer:

Critical Treatment Decisions (CTDs): Did the trainee –

	yes	no	
1	<input type="checkbox"/>	<input type="checkbox"/>	Correctly prioritize treatment
2	<input type="checkbox"/>	<input type="checkbox"/>	Display an organized approach to management
3	<input type="checkbox"/>	<input type="checkbox"/>	Perform evaluation, management and extended care well and in correct order
4	<input type="checkbox"/>	<input type="checkbox"/>	Identify awakening from sedation, titrate medications
5	<input type="checkbox"/>	<input type="checkbox"/>	Identify breathing problems, pneumothorax
6	<input type="checkbox"/>	<input type="checkbox"/>	Perform needle thoracostomy and chest drain
7	<input type="checkbox"/>	<input type="checkbox"/>	Identify hypothermia and take correct steps
8	<input type="checkbox"/>	<input type="checkbox"/>	Perform complementary treatment (antibiotics, tranexamic acid)
9	<input type="checkbox"/>	<input type="checkbox"/>	Identify extended care complications (anaphylaxis, arrhythmias) and treat accordingly



If the trainee ignores a CTD or manages it wrongly, consider deterioration and death of the casualty.

Observation of actions taken and their effect on the casualty

	not taken	deleterious	Indifferent	Beneficial	
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Use of capnometer/pulse-oxymeter
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mechanical ventilation
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Warming the casualty
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Secondary survey
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Care and fixation of spine
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Antibiotics administration
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sedation
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preparation for evacuation
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Use of NGT, foley, other tubes

Comments:

Evaluation:  Succeeded       Unsuccessful

**Additional file 2. Navy primary Caregiver CRM questionnaire.**

Navy primary Caregiver CRM questionnaire

Adapted from Plant JL, van Schaik SM, Sliwka DC, Boscardin CK, O'Sullivan PS. Validation of a self-efficacy instrument and its relationship to performance of crisis resource management skills. *Adv Health Sci Educ Theory Pract.* 2011;16(5):579-90.

Please rate your level of agreement with the following statements by circling the response that most closely represents how you currently judge yourself in these areas

RATINGS: SD=Strongly Disagree D=Disagree N=Neither Agree nor Disagree

A=Agree SA=Strongly Agree

<b>1. In dealing with sick sailors, I am confident in my ability to</b>					
a. recognize clinical deterioration	SD	D	N	A	SA
b. anticipate events	SD	D	N	A	SA
c. plan how to handle such events	SD	D	N	A	SA
<b>2. When called to an emergency situation or code, I am confident in my ability to</b>					
a. gather information about the situation effectively	SD	D	N	A	SA
b. access additional resources (other health care professionals) for additional help.	SD	D	N	A	SA
c. take charge as the team leader	SD	D	N	A	SA
<b>3. As team leader in an emergency situation or code, I am confident in my ability to</b>					
a. follow ATLS algorithms	SD	D	N	A	SA
b. make decisions	SD	D	N	A	SA
c. see the big picture	SD	D	N	A	SA
d. consider a variety of explanations for the symptoms	SD	D	N	A	SA
e. identify a number of different possible interventions	SD	D	N	A	SA
f. decide on the most appropriate interventions	SD	D	N	A	SA
g. prioritize the necessary interventions	SD	D	N	A	SA

h. re-evaluate the situation and change plans as needed	SD	D	N	A	SA
i. delegate tasks appropriately	SD	D	N	A	SA
j. coordinate all team members	SD	D	N	A	SA
k. identify and utilize the skills of the team members	SD	D	N	A	SA
l. instruct and correct team members regarding their performance	SD	D	N	A	SA
m. elicit suggestions from other team members	SD	D	N	A	SA
n. communicate my plan clearly to the team	SD	D	N	A	SA
o. ensure that my requested interventions have taken place	SD	D	N	A	SA
p. provide reassurance and encouragement to the rest of the team	SD	D	N	A	SA
q. stay calm yourself	SD	D	N	A	SA
r. create and maintain a calm atmosphere among the team	SD	D	N	A	SA

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