

## Keynote Speaker

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### The combat casualty care revolution

*Tim Hodgetts*

*Colonel Hodgetts was educated at Woodhouse Grove School, Bradford, and Westminster Medical School, from where he qualified with distinction in 1986; he joined the Royal Army Medical Corps as a cadet in 1983. He graduated from Joint Command & Staff College (psc[j]) in 2011.*

*Colonel Hodgetts was first appointed as Professor of Emergency Medicine in 1998 at the European Institute of Health and Medical Sciences, then at the University of Birmingham from 2001 to date. He was the inaugural Defence Professor of Emergency Medicine with the College of Emergency Medicine (2007-2010) and the Penman Foundation Professor of Surgery for 2011. Within the Defence Medical Services Colonel Hodgetts has been responsible for nurturing the specialty of emergency medicine from infancy to maturity. He has implemented concept, doctrine, equipment and practice changes to transform the early management of combat injury (point of wounding to the field hospital). He introduced and led major trauma governance in UK Defence from 1997-2010. His clinical leadership appointments have been Specialty Adviser in EM to the Defence Secondary Care Agency (1997-2000); Defence Consultant Adviser in EM to Surgeon General (2000-2008); and Consultant Adviser in EM to DGAMS (2001-2009). He has served on operations as a practising emergency physician in hospitals in Northern Ireland, Kosovo, Oman, Afghanistan (3 tours), Kuwait and Iraq (4 tours). On 6 of these tours he was appointed the hospital's Medical Director, including the multinational Danish-UK-US hospital in Afghanistan in 2009. Since 2011 he has been the Medical Director within NATO's Allied Rapid Reaction Corps.*

*Colonel Hodgetts has published extensively (over 30 books & 110 papers/editorials) and has been the clinical leader for medical research projects generating >£12 million of funding. He was named in a British Medical Association dossier as one of the most innovative doctors in the country.*

*Colonel Hodgetts' passion for medical education has led to the development and propagation of an international 'comprehensive approach' to disaster medical preparedness in Europe, Asia, Australasia and NATO (Major Incident Medical Management and Support); since 2002 he has developed the National Disaster Preparedness Course for Hospitals within India, supported by the British Council, British High Commission and the United Nations. He has led the development of Battlefield First Aid and Battlefield Advanced Trauma Life Support programmes, as well as numerous civilian emergency care curricula. Colonel Hodgetts was made Officer of the Order of St John of Jerusalem in 1999 and Commander of the British Empire in 2009; he received the Danish Defence Medal for Meritorious Service in 2010. He was Queen's Honorary Physician from 2004 to 2010. In 2010 he received the Defence Scientific Adviser's Commendation and has been awarded 16 academic medals, including the prestigious Mitchener Medal of the Royal College of Surgeons of England. His academic department was twice recognised nationally as the "Training Team of the Year" and in 2006 he was honoured with the personal accolade of Hospital Doctor of the Year throughout the UK.*

Contemporary advances in combat casualty care have led to unprecedented survival rates, but have the advances genuinely been revolutionary?

This lecture will explore the advances in concepts, clinical doctrine, organisation and technology over the last 15 years and test the assumption that they constitute a 'Revolution in Military Medical Affairs'.

In parallel a new theory is introduced to determine if the advances have been proportionate to the clinical needs of the combat casualty—this is the 'Homunculus Casualty Theorem'.

Looking forward, the lecture will identify how the revolutionary advances must be embedded into civilian healthcare practice in order to endure for the next major campaign, and will discuss the barriers to innovation adoption.

## Mental Health

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Using mobile technology to improve patient compliance and manage Posttraumatic Stress Disorder (PTSD) symptoms: PTSD Coach Australia

*Kym Connolly, Jacqui Derriman, Liam Connor*

*Kym Connolly is a communications professional with a career in government and community sector. Kym is leading the Department of Veterans' Affairs' engagement with contemporary veterans to reduce mental health stigma and encourage help-seeking behaviours. This has seen the development of a range of resources that use online and mobile technology to reach clients and their health professionals to promote mental health self-sufficiency, well-being and quality of life and enable practitioners to respond to the needs of veterans of all conflicts. See [www.at-ease.dva.gov.au](http://www.at-ease.dva.gov.au).*

*Dr Liam Connor completed his undergraduate honours degree in psychology at the Australian National University where his thesis research dealt with restorative and retributive justice systems. His clinical doctorate was completed at Queensland University of Technology where his research interests turned to adolescents with congenital heart disease focusing on their psychosocial development. Liam had several years experience working as a clinical psychologist in hospitals and private practice before joining the Veterans and Veterans' Families Counselling Service and developing his long-term interest in post-traumatic stress and associated therapies. He has been involved in research with ACPMH into PTSD treatments and trained in Cognitive Processing Therapy. He has a special interest in psychodynamic psychotherapy. Within VVCS Liam has been involved in development of information systems supporting clinical work including the PTSD Coach Australia smart phone application. Currently, Liam is a clinical supervisor for a number of ADF psychologists undertaking their training with VVCS.*

The changing veteran demographic and the need for change in service delivery to meet the needs of the emerging contemporary cohort has been highlighted in various Department of Veterans' Affairs (DVA) strategic documents and reports. Research conducted by ORIMA Research Pty Ltd (ORIMA) indicated that contemporary veterans are more receptive to receiving information and accessing services online. ORIMA reported that the adoption of new technologies by the Department had the potential to improve communication and better meet service delivery expectations of contemporary veterans.

Following a positive reception to the release of the US smart phone app PTSD Coach by the United States Department of Veterans Affairs in 2011, DVA contracted the Australian Centre for Posttraumatic Mental Health to customise the app for use by Australian veterans and serving members, released as PTSD Coach Australia in February 2013.

The app uses mobile technology to facilitate treatment of and recovery from PTSD. While not an alternative to treatment, PTSD Coach Australia engages with device-savvy PTSD sufferers in a manner not previously attempted and provides them with the opportunity to take greater responsibility for their own self-management and recovery. The Australian app offers a more interactive experience for the user, and allows clinicians to use the app during consultations with their patients to tailor self-management and recovery options, including the capacity to schedule the use of particular tools, activities and clinical appointments. Enabling a smoother and more tailored approach to ongoing treatment, the app facilitates different methods of recovery and enables users to send the results of a PTSD self-assessment to a nominated health professional.

PTSD Coach Australia can be used in combination with evidence-based therapies for PTSD, such as trauma-focussed Cognitive Behavioural Therapy, Cognitive Processing Therapy and Eye Movement Desensitisation and Reprocessing.

The PTSD Coach Australia was downloaded around 4000 times from Google Play and Apple Store in its first 3 months. To increase usage by clinicians, Dr Liam Connor will deliver a hands-on presentation for conference members with iOS and Android devices, demonstrating the functions of the app and explaining how these can be used in practice and as an adjunct to treatment.

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## The Longitudinal ADF Study Evaluating Resilience

*Monique Crane, Virginia Lewis, David Forbes, Andrew Cohn, Helen Benassi, Russell Reid*

*Russel Reid is the Senior Research Officer with the Directorate of Strategic and Operational Mental Health, Department of Defence.*

In November 2009, the Australian Defence Force (ADF), in collaboration with the Australian Centre for Posttraumatic Mental Health (ACPMH), launched a

longitudinal study of psychological resilience, dubbed LASER-Resilience (Longitudinal ADF Study Evaluating Resilience). The study explores the way different individual characteristics, experiences, cognitions and behaviours affect functioning through the variety of circumstances and situations that may be experienced as part of a career in the Australian Defence Force (ADF). LASER-Resilience is gathering evidence about the risk and protective factors that affect ADF personnel at different stages in their early career, with a particular focus on those factors that are amenable to intervention or mitigation through policy initiatives, targeted training or appropriate allocation to role. Respondents are surveyed upon enlistment to the ADF, at the completion of initial training, and then annually over their first three years of service. This will allow for an analysis of pre-military factors in the prediction of psychological resilience over time and develop a better understanding of the factors that influence the maintenance of good mental health, wellbeing and optimum functioning. Based on the data available by the end of December 2012, an initial description of the health and wellbeing status of ADF members following the first year of full-time service is possible.

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### Development of the Deployment Reflections Scale and its relationship with stress and psychological health

*Breanna Wright, Andrew Forbes, Helen Kelsall, David Clarke, Jill Blackman, Malcolm Sim*

*Breanna Wright has a Bachelor of Arts (Honours) in psychology from the University of Melbourne and is currently undertaking a Doctor of Philosophy in the Department of Epidemiology and Preventive Medicine at Monash University.*

**Introduction:** The post-deployment transition that combat veterans experience and their reflections on their deployments can be difficult to quantify. There is emerging evidence around posttraumatic growth arising from a crisis event, and extensive literature on the adverse health consequences of military deployment. However, currently there are no established measurement instruments that assess veterans' common reflections around their deployments in terms of positive outcomes, such as personal growth or maturity, or non-health adverse consequences such as feeling unacknowledged, and what these experiences may mean to veterans.

**Aim:** To develop a Deployment Reflections Scale, assess its reliability and investigate the relationships

between military exposures, stress, deployment reflections and psychological health.

**Methods:** As part of the Australian Gulf War Veterans' Health Study 2000-03 a set of questions capturing post-deployment attitudes and experiences were developed by the researchers in collaboration with a veteran focus group. The questions were then applied to 1,938 veterans (1,424 Gulf War veterans and 514 deployed comparison group members) and the answers were factor analysed.

**Results:** A three factor solution was found for the Deployment Reflections Scale; representing Factor 1: Personal Development, Factor 2: Lack of Recognition and Factor 3: Appreciation. Military-service related stress predicted all three factors to some degree. Personal Development and Lack of Recognition predicted psychological health. However, there was no support for mediation of the relationship between stress and psychological health by any of the Deployment Reflection factors.

**Discussion:** The Deployment Reflection Scale measures three important attitudes and concerns experienced by veterans after deployment. These factors highlight thoughts, feelings and attitudes felt by veterans on return from deployment functioning. Personal Development and Appreciation capture the beneficial aspects that veterans feel about their deployment, whilst Lack of Recognition highlights an area of concern and discontent. The analysis also indicated that there was a relationship between stress and the three Deployment Reflections factors; that military service-related exposures and associated stress affected the perceptions that veterans had of their deployment; most strongly with Lack of Recognition and Appreciation. The scale may be useful in studying and understanding veterans' subsequent mental health, and integration back into society.

**Conclusions:** The Deployment Reflection Scale may help address a need in available resources. The data generated from the Deployment Reflections Scale better informs our understanding of how veterans view their deployments and particular areas which may require attention, either in addressing veterans' discontent with recognition or expressing value for work done. This scale also allows for comparisons across deployment/s and time within a person; which may be valuable in assessing improvements and/or decline in veterans.

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### Mental Health Screening in the ADF: Are we getting it right?

*Helen Benassi, Nicole Sadler*

*COL Nicole Sadler is currently the Director Strategic and Operational Mental Health within Joint Health Command. COL Sadler joined the Regular Army in 1994 as a psychology officer and throughout her career has worked in recruitment, assessment, counselling, training, policy development and operational psychology. She was the Commanding Officer of 1st Psychology Unit from January 2010 until 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.*

*Ms Helen Benassi is currently the Assistant Director Mental Health Research and Evaluation within Joint Health Command. Ms Benassi joined the Department of Defence in 2005, where she has managed various research projects including the ADF Mental Health Prevalence and Wellbeing Study, and mental health screening and surveillance. Ms Benassi completed a psychology internship with Defence, registering as a psychologist in 2010.*

For over 10 years the ADF has conducted structured, post-deployment mental health screening. The intent of this operational screening program is to provide targeted early intervention, validation of the operational experience and the opportunity for education, which allows individuals to make informed choices about their mental health in the post-deployment/reintegration period.

Presenting data from an array of sources, including a trial of psychological decompression and the ADF Mental Health Prevalence and Wellbeing Study, we look at what we currently know about screening and its effectiveness in the ADF. This will include an assessment of the screening tools and referral criterion, how we compare to best practice, and the broader benefits of mental health screening in an organisation such as the ADF. We will also explore the limitations of screening programs and the risks associated with assumptions made about the process.

Having asked, 'Are we getting it right?' we will explore where we need to go next, including looking at recent improvements and future directions of mental health screening in the ADF.

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### Detailed associations between operational deployment and mental disorder in the Australian Defence Force

*Amelia Searle, Kate Fairweather-Schmidt, Elizabeth Saccone, Miranda Van Hooff, Thao Tran, Lisa Hedges, Michelle Lorimer, & Alexander McFarlane*

*Amelia completed her PhD in 2011 through the University of Adelaide and the Women's and Children's Hospital within the broad area of child development and mental health, and received a letter of commendation from the Dean of Graduate Studies for the high quality of her thesis. In her current role as a Postdoctoral Research Officer at the Centre for Traumatic Stress Studies at the University of Adelaide, Amelia is investigating the precursors of adult mental health problems in several large cohort studies. In particular, Amelia is investigating predictors of mental disorder among currently-serving military personnel within the Australian Defence Force Mental Health Prevalence and Wellbeing Study. Amelia has worked in various areas relating to mental health for almost a decade, and also has research and clinical experience within the area of sleep disorders.*

**Introduction:** In the 2010 Australian Defence Force (ADF) Mental Health Prevalence and Wellbeing Study (MHPWS) (McFarlane, Hodson, Van Hooff & Davies, 2011), the prevalence of mental disorder (such as post-traumatic stress disorder and depressive episodes) was no different between deployed and non-deployed personnel. This finding was unexpected and stands in contrast to the substantial body of international military research suggesting that deployment is associated with increased risk of mental disorder. It is important to explore this finding in greater detail, as there are several possible reasons as to why no apparent deployment effect was found. The broad aim of this study was to investigate the apparent lack of association between deployment and mental disorder in the ADF.

**Method:** In the MHPWS, 24 481 currently-serving Navy, Army and Air Force members completed a self-report survey in study Phase 1. Then in Phase 2, a carefully-selected subsample (n = 1798) completed a structured diagnostic interview assessing trauma and mental disorder. Using demographic information from military records, data were then weighted to represent the entire ADF population (n = 50 049).

**Results:** Compared with non-deployed personnel, deployed personnel were more likely to be male, older, non-commissioned officers, married/partnered, and in better health. These demographic differences suggest a 'healthy worker effect' may at least partially explain the lack of a deployment effect on mental disorder.

Excepting deployment-related trauma, there were few differences between deployed and non-deployed personnel on all other traumatic events examined. As lifetime trauma history was strongly associated with mental disorder (particularly PTSD) regardless of deployment status, it is possible that deployed and non-deployed personnel share a similar level of risk for disorder.

Deployment showed stronger associations with (1) PTSD and depressive episodes for commissioned and non-commissioned officers than for all other ranks, and (2) PTSD for members serving for over 9 years, and (3) weaker associations with MDE for single personnel, relative to married members. Thus, deployment may be a risk factor for mental disorder, but only among specific subgroups.

Conclusions: These results underscore the fact that despite belonging to the same overall ADF cohort, deployed and non-deployed personnel differ in various fundamental ways other than simply deployment status. Mental disorder depends on a range of risk factors beyond deployment; a detailed consideration of factors including demographic attributes and trauma exposure is pivotal in promoting the mental health of all personnel (including those who do not deploy), whom otherwise may not receive appropriately tailored health-related support. Nonetheless, certain ADF subgroups (e.g., officers, married/partnered personnel) may need greater support during/following deployment.

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### The Well-being of Australian Serving Mothers

*Davy CP, Lorimer M, McFarlane A, Hodson S, Crompvoet S, Lawrence-Wood E, Neuhaus SJ*

**Purpose:** Australian women have served overseas in support of conflict operations in many roles since World War I. In recent years the deployment of women in support of Australian Defence Force (ADF) operations has also included mothers with dependent children. A number of researchers in other countries have suggested that service mothers are particularly vulnerable to mental health problems post deployment because of their additional family responsibilities. One of the few studies which has focused on servicewomen in an operational situation found that single mothers, in particular, were at most risk of developing high levels of depressive symptomatology post deployment. Disruptions to the mother/child relationships, in turn, may have a lasting effect on the mental health of their children.

This three part study aims to better understand this unique social change and the implications of deployment on the health of these women and their families. This is the first study of its kind into the effect of deployment on Australian servicewomen with dependent children.

**METHOD:** Part one of this study compared self-report mental and physical health data from a total of 196 servicewomen with dependent children who deployed to the Middle East Area of Operations, with service women who were not mothers at the time of their last deployment (n=567).

Building upon the findings from part one, parts two and three aim to gather qualitative data which will provide a more in-depth understanding of the psychosocial factors experienced by service mothers. Approximately 100 of the servicewomen with dependent children will be re-contacted and invited to participate in an in-depth telephone interview in order to explore factors that affect relationships with their child/children during and immediately after their last deployment. Participants will also be asked to describe the types of personal, social and/or organisational supports which were, or would have helped to maintain the mother/child relationship whilst deployed.

In addition, servicewomen with dependent children will be invited to document their experiences in the form of a social diary and/or provide examples of the type of communication methods used to maintain relationships between themselves and their children whilst on deployment.

**RESULTS:** Results from part one of the study, a quantitative analyses of non-specific psychological stress, post-traumatic stress symptoms, alcohol misuse, as well as somatic symptoms such as headaches, fatigue and sleep difficulties, are presented and discussed.

**CONCLUSION:** Deployment of servicewomen with dependent children to conflict zones represents a significant social change in Australia, and the implications of deployment on these women and their families is not fully understood. Findings from part one, together with qualitative data from parts two and three will ensure a more mature and developed understanding of the types of issues confronting deployed servicewomen.

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## Veterans Health

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Planes and Brains: Jet fuel, noise and the central auditory nervous system

*Rachelle Warner, Adrian Fuente, Louise Hickson, Peter Nasveld*

*Rachelle is an Assistant Director and Specialist Adviser at the Defence Centre for Occupational Health and Safety. She is a qualified toxicologist and environmental risk assessor and currently heads up the Targeted Reduction, Investigation and Prevention Capability. Prior to her movement to WHS Branch in 2009, Rachelle worked in personnel operations in Army and HQJOC, Commissions and Boards of Inquiry for CDF, ministerial liaison and statutory reporting; and has some experience in international and operations law. She is mid-way through her PhD at the University of Queensland studying the effects of cumulative noise and solvent exposure on RAAF personnel at Amberley.*

As at October 2009, 132,693 veterans had accepted disabilities eligible for treatment under DVA arrangements. Of these, 10,667 veterans have hearing related disabilities only and 68,756 have multiple disabilities that include a hearing related disability [1]. Over the next 10 years, based on the DVA information available, a forecast of the future liability is that total costs for hearing related claims and services will be in the order of \$1 billion [2].

The association between military service and hearing impairment is well known, with studies conducted in many countries finding the problem in the various Services. It is well documented that occupational noise exposure is a significant health hazard that leads to permanent occupational noise-induced hearing loss. Likewise, exposure to solvents in the workplace can lead to occupational solvent-induced hearing loss as many of these chemicals have been internationally recognised as hazardous to hearing. Organic solvents, including jet fuels, have been identified as agents that may induce hearing loss in humans [3,4]. Animal studies have demonstrated that solvents induce loss of outer hair cells in the inner ear [5-7]. Additionally, cross-sectional studies in workers exposed to solvents have found that these agents may induce central auditory dysfunction [8-11]. However, unlike noise exposure, standards for permissible exposure levels to solvents in Australia and other countries do not consider the adverse effects of solvents on human hearing.

Although there is some research on the combination of solvent and noise exposure and their effects on auditory dysfunction, there is virtually none that

specifically investigates occupational exposure to jet fuel and noise on the central auditory nervous system. In the Australian Defence Force, and particularly the Royal Australian Air Force, where exposures to both are an almost constant feature of daily work for some trades, it is important to identify any adverse effects on the human central auditory nervous system.

This research has three main aims:

1. to investigate the influence of cumulative jet fuel and noise exposure on the central auditory nervous system in humans.
2. to investigate the effect of interactions between jet fuel and noise, and other factors such as alcohol and tobacco on the central auditory nervous system.
3. to investigate the impact of possible central auditory dysfunction associated with jet fuel and noise on level of functioning in daily life.

All volunteers have been initially screened (otoscopy and tympanometry) for possible external-and middle-ear abnormalities and conductive hearing losses.

Those who are found suitable for the Study are evaluated twice, before (T1) and after their annual leave (T2) using electrophysiological and behavioural tests in order to investigate chronic effects vs acute effects.

Where past hearing assessment records and exposure data (noise and solvents) exists, this will be interrogated and examined as a longitudinal/retrospective study, potentially with some modelling of exposure where there may be gaps in the data.

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### A pilot study to investigate persistent Strongyloides in South Australian Vietnam Veterans

*Rahmanian H, Rowland K, Lawrence-Wood E, McFarlane A, Neuhaus SJ*

Hany Rahmanian is a MPH student from University of Adelaide. She successfully completed a Bachelor of Science with major in Human physiology and a Graduate Diploma in Public Health. She is currently finalising Masters of Public Health in University of Adelaide. She is current undertaking a Masters project at the University of Adelaide: "A pilot study to investigate persistent Strongyloides in South Australian Vietnam Veterans" (Funded by the Repat foundation).

**Purpose:** *Strongyloides stercoralis* is a parasite that infects the intestinal tract (gut) of humans. It is unique in that an infestation can last decades, and can frequently “auto-infect” the human host. Studies of American veterans from conflicts in the South East Asia region have shown higher than normal infection rates with this parasite. Vietnam is known to be endemic for *Strongyloides stercoralis*.

Studies in the Australian Vietnam veteran population report a *Strongyloides* infestation incidence of 1.6-3% (Government 1998). However, the true incidence is likely to be higher than this estimate, because the 1.6-3% incidence rate was based on self-reported measures, and therefore, would not have identified asymptomatic carriers. In addition, faecal testing carries a low sensitivity and serological testing (ELISA) was not available prior to 1975.

*Strongyloides* is a possible cause of chronic ill health or may remain asymptomatic as the immune system keeps parasite numbers relatively low. DVA advises ‘at risk’ veterans to be tested for *Strongyloides* prior to undergoing treatment with drugs that suppress the immune system, including treatment with steroids, chemotherapy agents and drugs used to prevent transplant rejection, due to the small but recognised risk life threatening disseminated strongyloidiasis.

This pilot study investigated the prevalence of persistent *Strongyloides* in a South Australian cohort of Vietnam Veteran cohort. *Strongyloides* is not endemic in South Australia.

**Methods:** This single arm cohort study recruited South Australian Vietnam Veterans by open advertisement and voluntary participation. In order to be eligible to participate in the *Strongyloides* study the participants must:

have served on Vietnam territory in the ADF between the years 1962-1975; and be currently be resident in South Australia.

The prevalence of *S. Stercoralis* infection was assessed utilising questionnaire data about symptoms, exposure and previous treatment combined with sero-prevalence data using ELISA *Strongyloides* assay and eosinophil count (single blood test). The secondary aim of this pilot study was to measure the accuracy of a *Strongyloides stercoralis* self-reported testing instrument. Participants with a positive ELISA test underwent faecal sampling for detection of parasites and participants with evidence of persistent *Strongyloides* were offered treatment.

This study was approved by the Ethics Committees of DVA and the University of Adelaide.

**Results:** This study is approaching completion and has recruited >250 participants. Preliminary analysis has indicated a higher than expected positive ELISA. Full details relating to the analysis of results will be available at the time of the conference.

**Conclusion:** A better understanding of the incidence of *S. stercoralis* infection in Vietnam veterans would enable targeted education and early detection in patients at risk of persistent infection, raise awareness within the community of the need for testing prior to immune suppressive treatment and contribute to future health policy for veterans deploying to affected areas.

Depending on the final result, a higher than expected rate of prevalence may lead to a new expanded national study of the entire Veteran population. This pilot study also has implications for Veterans deployed to other endemic areas.

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### How do we treat veterans with muscle invasive bladder cancer?

*Darren Foreman, Lovelace Osei Tutu, Sheryl Edwards, Sophie Plagakis*

*Lovelace Osei Tutu is a Urology Registrar working at the Repatriation General Hospital. He is actively involved in research into bladder and prostate cancer.*

**Introduction:** Bladder cancer is the ninth most common cancer diagnosis worldwide, with an estimated male to female ratio of 3.8:1 (1). At initial bladder cancer diagnosis, 30% of patients have muscle invasive disease (2), and approximately one third have undetected metastases (3). Radical cystectomy is the gold standard for treatment of muscle invasive bladder cancer, with other options including radiotherapy and palliative management, which are often considered with elderly patients with medical comorbidities precluding major surgery. The Repatriation General Hospital maintains a Bladder Cancer Outcomes Database which collects data from bladder cancer patients within the southern Adelaide catchment area. There are no studies documenting treatment received by veterans with muscle invasive bladder cancer within Australia or internationally.

**Methods:** Following ethics approval, the Bladder Cancer Outcomes Database was used to identify patients between January 2001 and December 2012 with newly diagnosed muscle invasive bladder cancer. A case note review was performed to determine which treatment the veteran population received and reasons listed for treatment choice.

Medical co-morbidities were reviewed and comparisons were made between data of the veteran and non-veteran populations.

Results: 152 patients were identified with newly diagnosed muscle invasive bladder cancer. 28 (18.4%) of these were veterans, and the mean age was 81.4 yrs (range 53 – 95 yrs). 23 (82%) were World War II veterans and three had lymph node positive disease at diagnosis. Eight patients had concurrent carcinoma in situ of the bladder. Two patients were treated with radical cystectomy, and 18 received external beam radiotherapy. Reasons for treatment choice, presence of co-morbidities and comparisons with non-veteran patients will be made.

Conclusion: Veterans were diagnosed with muscle invasive bladder cancer at an advanced age, with multiple medical co-morbidities. More conservative treatment is offered to these patients leading to a lower proportion undergoing radical cystectomy.

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From randomised controlled trial to national rollout: outcomes of a national implementation program of Cognitive Processing Therapy across the Veterans and Veterans Families Counselling Service

*Couineau A, Lloyd D, Hawkins K, Kartal D, Nixon R, Perry D, Forbes D*

*Ms Anne-Laure Couineau is a Senior Clinical Specialist at ACPMH with extensive experience in the treatment of posttraumatic mental health problems in hospital and community settings. She has specialised in the treatment of war veterans and emergency personnel diagnosed with PTSD and the effects of long-term childhood sexual abuse and neglect. Anne-Laure has a strong background in education and knowledge translation and has led several projects aimed at improving the uptake of evidence-based practice among mental health practitioners including the*

*national CPT implementation program for the Veterans and Veterans Counselling Service and a Department of Veterans' Affairs national training initiative to up-skill mental health practitioners. Anne-Laure has also completed a fellowship with the National Institute of Clinical Studies focusing on the implementation of evidence-based treatment of PTSD*

Following an initial Randomised Controlled Trial (presented at AMMA in 2011) this paper reports outcomes from the national rollout of Cognitive Processing Therapy across the Veterans and Veterans Families Counselling Service (VVCS). This research was conducted in parallel with international dissemination programs in the US and Canada. The implementation model included introduction of PTSD screening, a rigorous staff training and support process and evaluation of client outcomes. This presentation will report the findings from 12 months of monitoring and evaluation. Thirty seven practitioners were trained from across all states. Staff practitioners developed a high degree of expertise, applied the treatment to 135 veteran clients of VVCS and achieved clinically and statistically significant client outcomes in self-reported PTSD (ES =1.0; F(1,68)=58.37, p<0.001). Veterans on average received 8.4 sessions of treatment. Intent to treat analysis found that 47% of clients dropped from above to below the diagnostic threshold for self-reported PTSD following treatment. Treatment gains were also evident in depression, anxiety, stress and alcohol use. This paper demonstrates the impact that well designed training and organisational implementation programs can have on a service system, and the value of implementation monitoring in understanding and facilitating this impact. Furthermore it demonstrates the transferability of evidence-based treatments to naturalistic clinical setting with outcomes comparable to those observed in research trials.

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## Health & Safety

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Aircrew spectacles: Pitfalls and limitations reported by ADF aircrew.

*Bret Power, Adrian Smith*

*Dr Adrian Smith is Head of Research at the RAAF Institute of Aviation Medicine. Bret Power is a final year medical student at Flinders University who undertook an elective rotation at AVMED under Dr Smith's supervision.*

Spectacle use for vision correction is common in the community, but their use by ADF aircrew is unknown. In light of a number of recent anecdotal reports of problems arising from the use of spectacles by aircrew, AVMED undertook a review of spectacle use by ADF aircrew. Method. Information was solicited by an anonymous survey completed voluntarily during aviation medicine refresher training. Following a verbal and written brief,

consent was inferred from the return of the surveys. Results. 170 surveys were distributed, and 164 were completed and returned; participation rate was 96.5%. Completed surveys reflected fast jets, transport/maritime, and rotary wing platforms, and included pilots (63%) and non-pilot aircrew (37%). Of the respondents, 30% wore spectacles during flying - slightly more common in non-pilot aircrew (39%) than pilots (25%). Spectacles were most commonly used for distance vision (60%), with only 30% using them solely for reading; 10% used spectacles for reading and distance. Of the 30% of respondents who used contact lenses, 53% attributed this to problems using spectacles during flight. Only 24% of spectacle-wearing aircrew took their helmet or mask to the optometrist during the fitting process, and only 33% assessed the adequacy of their new spectacles in the cockpit before going flying with them the first time. Only 11% discussed the visual environment of the cockpit with the optometrist when selecting frames and lenses. The most common problems reported by spectacle-wearing aircrew are: fogging of lenses (32%), sweat on lenses (30%), and poor fit with helmet or mask (30%); 10% have experienced a lens fall out during flight. When faced with these problems, 33% of spectacle wearing aircrew tolerate the problem as long as possible, but many admit to removing their spectacles during flight (30%) or choosing sometimes to not fly with spectacles (17%); many (18%) accept that must wear their spectacles in a manner that does not provide optimum field of view or visual acuity. 6% of spectacle-wearing aircrew reported a flight safety incident arising related to spectacle use - including one report where a pilot had to land at night wearing prescription sunglasses because the lens of his non-tinted spectacles fell out during the flight. Conclusions. Spectacle use by ADF aircrew is common. Selection of spectacles without due consideration of the possible flight conditions can lead to significant flight safety problems. As a result, aircrew who wear spectacles should be better educated to select spectacles that provide them with optimum visual correction without compromising flight safety. AVMED will pursue options to provide aircrew with spectacles designed specifically for the rigors of the military flight environment.

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### Custom Moulded Communication Ear Plugs for Operational use by RAN Aircrew

*Glenn D. Pascoe*

*Dr Glenn Pascoe, MBBS, DAvMed, MPH, FRACGP, FACAsM, is employed by Joint Health Command as the Royal Australian Navy's Senior Medical Advisor Aviation Medicine. Glenn joined the Royal Australian Air Force in 1994 as an undergraduate medical student. He served in the Permanent Air Force for 14 years, working in the fields of Primary Care, Aeromedical Evacuation and Aviation Medicine at base medical facilities, overseas operations, courses and postings, and with postings to the RAAF Institute of Aviation Medicine (AVMED) as Chief Instructor and Commanding Officer. He has continued his service with AVMED as a Specialist Reservist for the last 5 years while working in his full time position at Headquarters Fleet Air Arm, HMAS Albatross. Glenn is an AsMA Associate Fellow, a Fellow of the Royal Australian College of General Practitioners and a Foundation Fellow of the newly formed Australasian College of Aerospace Medicine.*

**Introduction:** Hearing protection for aircrew is a safety challenge requiring a balance between enough noise attenuation to prevent distraction, communication break down and noise induced hearing loss, and too much attenuation resulting in communication difficulties. The cockpit noise environment of >100dB requires high level hearing protection, achieved through the use of helmets and ear plugs. Formable foam ear plugs will attenuate all sound including safety critical communications. Standard communication ear plugs (CEP) provide aircrew with the advantage of attenuating ambient (aircraft) noise but allowing un-attenuated transmission of radio communications. Although these CEPs are often preferable to basic formable ear plugs, they are problematic for some aircrew and resulted in several Navy aviation safety occurrence reports (ASORs).

**Methods:** We explored the use of Hush kit modification to the Alpha helmet ear cups, and Custom-moulded CEPs (m-CEP), as potential solutions to this problem.

**Results:** Flight test trials found the m-CEP to be a satisfactory solution. The m-CEP was able to fit snugly and comfortably in the ear canal and be anchored securely to the ear and the communications transducer. HQ-FAA took the available evidence and progressed to a trial of m-CEP in Navy aircrew. Survey Responses from users were extremely positive. HQ-FAA commissioned a further study to be conducted by the RAAF Institute of Aviation Medicine (AVMED) on Navy aircrew that showed the

m-CEP to offer superior hearing protection than the standard CEP.

Discussion: Cost analysis demonstrated the m-CEP was cheaper than using disposable foam tips for the standard CEP. Subsequently the HQ-FAA has negotiated supply of the m-CEP to all Navy aircrew.

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Aeromedical risk assessment of smoke and fumes incidents.

*Adrian Smith*

*Dr Adrian Smith is Head of Research at the RAAF Institute of Aviation Medicine, and a Specialist in Aviation Medicine for Forces Command.*

The ARH Tiger has generated a number of smoke and fumes reports. Although some incident aircrew

have experienced symptoms that have lead to impairment of flight performance and near-incapacitation, the majority of 'fumes events' have involved awareness of smell without the person developing any significant symptoms. The aeromedical response to this issue has highlighted the value of AVMOs taking a comprehensive clinical history following reported exposure to smoke or fumes, and demonstrates the value of a good clinical history in placing a context around an occupational health concern as well as the benefit of a good history in helping identify the nature and cause of the events. This presentation will explore the aeromedical response to the ARH smoke and fumes events, highlight the important role that AVMOs have in helping obtain relevant information for a response to the events, and emphasise the importance of a good, targeted, clinical and occupational history.

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## Training

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Responding to identified knowledge gaps in secondary mental health workers

*Kym Connolly, Tim Adams*

*Kym Connolly is a communications professional with a career in government and community sector. Kym is leading the Department of Veterans' Affairs' engagement with contemporary veterans to reduce mental health stigma and encourage help-seeking behaviours. This has seen the development of a range of resources that use online and mobile technology to reach clients and their health professionals to promote mental health self-sufficiency, well-being and quality of life and enable practitioners to respond to the needs of veterans of all conflicts. See [www.at-ease.dva.gov.au](http://www.at-ease.dva.gov.au).*

This presentation outlines the approach taken by the Department of Veterans' Affairs (DVA) in response to research indicating that a lack of access to veteran-specific resources and information was impeding improvements in clinical practice by secondary mental health workers treating veterans.

Encouraging the development of appropriate competencies among secondary care providers is an important strategy adopted by DVA to improve access to evidence-based best practice for veterans in the community. The Training for Secondary Mental Health Workers Initiative was initiated in partnership with the Australian Centre for Posttraumatic Mental Health in 2009. This initiative increased the competency of secondary care providers delivering community based treatment for veterans.

The project sought to define core competencies required to deliver evidence-based treatments and then deliver training to address gaps using a case formulation approach through a 9-month learning collaborative training and implementation model. The initiative concluded in late 2011 and not only increased the competencies of those providers who participated, but provided DVA with an indication of further knowledge gaps that the Department should address with the sector.

This presentation will outline DVA's approach to build the workforce capability and support for mental health providers treating DVA clients and increase the confidence and ability particularly of new providers to manage complex veteran cases. This approach has involved the development of online training programs, an online clearing house for evidence-based resources and research relevant to the treatment of veterans, and clinical resources.

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Continuing professional development in aerospace medicine.

*Adrian Smith*

*Dr Adrian Smith is Head of Research at the RAAF Institute of Aviation Medicine, founding co-director of the Australasian College of Aerospace Medicine and Chair of its CPD sub-committee. He is interested in encouraging junior AVMOs to develop skills in the*

*academic and scientific aspects of aviation medicine.*

The practice of aerospace medicine draws heavily on the disciplines of clinical medicine, physiology, psychology and mental health, as well as occupational medicine and toxicology. Aeromedical examiners and specialists in aerospace medicine must also maintain up-to-date knowledge of new aircraft and their life-support systems and flight equipment, as well as the regulatory framework(s) within which they operate. It is important to understand how advances in clinical medicine can be applied in an aviation context. With the increasing focus on continuing professional development and medical education within the broader discipline of medicine, it is important to consider how the principles of CPD/CME can be applied to the practice of aerospace medicine, in order to ensure that aeromedical examiners and specialists in aerospace medicine

can not only manage aircrew and aviation workers in accordance with current 'best practice' in clinical medicine, but are able to apply emerging research and the current understanding of physiology, human factors, and occupational health that are unique to aviation medicine, and apply this knowledge meaningfully for current aircraft systems within extant rules and regulations. Aviation medicine is more than just 'practicing medicine in an aviation setting'. This presentation will describe some of the ways aeromedical examiners and specialists in aerospace medicine can ensure their practice remains current and relevant to their unique clinical domain.

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### The Brain

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Are soldiers at risk of developing chronic traumatic encephalopathy?

*Jeffrey V Rosenfeld*

*MAJGEN Jeffrey V Rosenfeld AM is the immediate past Surgeon General ADF Reserves and currently Chair, Australian Defence Human Research Ethics Committee. He has an extensive operational experience and is a senior Australian military surgeon with an international reputation in the management of blast injury. He joined the Army Reserve in 1984. He was Chair, Editorial Board of ADF Health and is Adjunct Professor to the Centre for Military and Veterans Health, University of Queensland. He trained in general surgery and neurosurgery in Australia, Oxford, and Cleveland, Ohio. He is currently Professor and Head Division of Clinical Sciences and Dept Surgery, Central Clinical School, Monash University and Director, Department of Neurosurgery, The Alfred Hospital and an Honorary Professor to the University of Papua New Guinea. His major research interests are bionic vision and neurotrauma. He has published over 210 peer reviewed articles, 40 book chapters and 2 books.*

Chronic traumatic encephalopathy (CTE) is a rare progressive tau protein-linked neurodegenerative disease first described in boxers (punch-drunk syndrome), and then footballers. The neuropathology includes widespread cortical perivascular tau pathology, disseminated microgliosis and astrocytosis, myelinated axonopathy and progressive neurodegeneration. There is some pathological overlap with other neurodegenerative disorders. Repeated mild traumatic brain injury (mTBI) has

been linked to the development of CTE. However, it is a post-mortem diagnosis and only a few cases have been reported in the literature and without adequate numbers of control subjects in the series. These include a few US veterans who have been exposed to repeated blast injury in addition to the US footballers and other athletes. There is controversy concerning CTE as a condition, its prevalence and its causation. What is the frequency and magnitude of repeated blast mTBI which could cause CTE? This presentation will review the current experimental and clinical evidence particularly in relation to repeated blast mTBI in military personnel.

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Non-Invasive Brain Stimulation – an adjuvant for rehabilitation of the future?

*Dr Lynley Bradnam*

*Lynley is a Senior Lecturer in the Discipline of Physiotherapy at Flinders University. She is the Head of the Brain Research Laboratory, at Repatriation General Hospital. Research in this laboratory is concerned with understanding neuroplasticity in the brain following musculoskeletal and neurological disorders and novel interventions to enhance neuroplasticity such as non-invasive brain stimulation. In particular, the link between neuroplasticity and how this impacts on function is an important research focus. Researchers in the Applied Brain Research Laboratory study how the brain changes and responds to therapy in a range of conditions, including stroke, dystonia, lower limb amputations and shoulder pain.*

*Studies also investigate the role of the cerebellum in motor and cognitive function and the use of non-invasive stimulation of the cerebellum as a therapy for dystonia.*

Non-invasive brain stimulation is fast becoming a reality as an assessment tool and as an adjuvant to rehabilitation in clinical settings. While still considered as a research method at present, studies proving its efficacy for many disorders mean translation into clinical practice is only a matter of time. While this technology is exciting, there is a need for consumers to understand the principles and processes underlying this new technology. Transcranial magnetic stimulation (TMS) is a painless and non-invasive method to study brain function in humans. In terms of rehabilitation, TMS can be used to understand how the brain reorganises after injury and during the rehabilitation process, to map recovery, to predict therapy outcomes or to stratify patients for therapy. Brain activity can be compared with functional recovery to understand how the brain reorganises over time. In contrast, non-invasive brain stimulation is a method to promote neuroplasticity in the brain and can be applied as Transcranial direct current stimulation (TDCS) or as repetitive Transcranial magnetic stimulation (rTMS).

Research has shown rTMS and TDCS can be used as an adjuvant to rehabilitation to improve functional outcomes after stroke and other neurological disorders. These devices can be considered to act by 'priming the brain' prior to or during exercise therapy. rTMS and TDCS can also be used in conjunction with other rehabilitation contemporary practices such as virtual reality training, robotic training and functional electrical stimulation. However, these devices are not just for physical rehabilitation. Non-invasive brain stimulation is also showing promise as a novel treatment for depression and chronic pain. New studies into stimulation of the cerebellum show there may be positive effects on mood and cognition. Therefore, non-invasive brain stimulation has direct relevance for the veteran population in promoting both physical and mental well-being. This presentation will provide an over view of non-invasive brain stimulation, how it is being used in current research studies at Repatriation General Hospital and how this exciting technology may shape the future of physical and non-physical rehabilitation for veterans in Australia.

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## Innovations

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### Introduction into Australian Service of Oral Transmucosal Fentanyl Citrate for Battlefield Analgesia

*Isaac Seidl, Dan Corkery*

Dr Isaac Seidl is a specialist medical administrator and general practitioner. He completed his medical degree at UWA, then undertook a variety of Army appointments across all military environments, including deployments to East Timor and Pakistan, before being appointed to Qld Health as Deputy Executive Director Medical Services in Townsville. Following a period of study sabbatical, he returned to the Australian Army at his former rank of Lieutenant Colonel, and deployed to the Middle East Area of Operations as J07. Dr Seidl has published in the literature and presented at national and international conferences. His academic interests include crisis leadership, clinical governance and ethics. He is Adjunct Associate Professor in Public Health at James Cook University. Dr Seidl lives in Frederick, USA with his wife and two children.

Various presentations of morphine sulfate have been the gold standard for battlefield analgesia throughout Australia's modern military history. It has served us

well. Most recently, the preferred presentation has been the auto injector, which is not approved by the TGA. This has presented logistical and governance challenges for deployed forces.

This presentation outlines the limited introduction of oral transmucosal fentanyl citrate (OTFC) into Australian service in 2012. It will cover advantages of this method, international experience, procedure followed for approval, and clinical governance/patient safety aspects. Of note, OTFC is TGA approved, but use as a battlefield analgesic constitutes 'off-label' use.

Ease of administration (including self-administration), safety for patient and provider, and short duration of action are amongst the advantages of OTFC, along with the minimal training required for safe use. Moreover, it can be safely used during tactical aeromedical evacuation, compared with injected morphine or inhalational methoxyflurane. A formal training program was instituted, in the operational environment, and OTFC was carried by specified groups of combat troops.

It is expected that use of this method of analgesia will broaden beyond specified combat troops on operational deployment to the wider ADF, including

potential use in the maritime and air environments, on both operations and exercises.

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A novel formulation of sublingual ketamine with consistent bioavailability : a potential analgesic for the battlefield

*Rolan PE, Lim CBS, Sunderland B, Liu Y and Molnar V*

**INTRODUCTION:** Ketamine is a general anaesthetic licenced for use by the intravenous route and has been in clinical practice for over four decades. In recent years there has been an increase in interest in its use at non-anaesthetic low doses as an adjunct in acute and chronic pain management as an alternative to opioids. A wafer formulation of ketamine suitable for sublingual administration has been developed.

**STUDY OBJECTIVES:** To assess the bioavailability of the novel sublingual ketamine wafer formulation and to assess its local tolerability. The study was of open label, two way randomised balanced cross over design in eight healthy male volunteers who all gave written informed consent. Each participant received a single 10mg IV dose as a constant rate 30 minute infusion or 25mg sublingual dose of ketamine on each occasion with a seven day wash out. Blood sampling for drug assay was taken at intervals of 24 hours. Local tolerability was assessed using Likert scales and general tolerability by Bond and Lader scales. Plasma ketamine was measured using a non-stereo selective assay.

**RESULTS:** Ketamine was well tolerated with very good local tolerability. Systemic tolerability was as expected for the doses. Ketamine was rapidly absorbed from sublingual formulation with Tmax ranging between 15 and 60 minutes; median 0.75 hours. The absolute bioavailability of ketamine was 29% with a very narrow range from 23-38%.

**CONCLUSION:** This novel formulation of sublingual ketamine has comparable bioavailability to other sublingually administered formulations of ketamine but with markedly improved consistency. It is suitable for further development as an analgesic and analgesic adjunct. Further studies are ongoing as an alternative to opioids in burns dressing changes. It has attractiveness as an alternative to injected opioids as a battlefield analgesic, being devoid of respiratory depressant properties and does not require injection.

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Elastin-based wound repair materials

*Anthony S. Weiss*

*Tony Weiss is Professor of Biochemistry & Molecular Biotechnology at the University of Sydney, Professor at the Bosch Institute, Professor at the Charles Perkins Centre, Professor at the Royal Prince Alfred Hospital (Honorary) and biotech company founder. Awards include FAIMBE, FAICD, Fulbright Scholar, NIH Fogarty International Fellow, Australian Academy of Science and Royal Society Exchange Scholar, David Syme Research Medal, Amersham Pharmacia Biotechnology Medal, NSW Commercialization Expo Prize, Australian Innovation Challenge Award, Sir Zelman Cowen Exchange Fellow, Pauling Prize Medal. National appointments include the Australian Biotechnology Advisory Council, National Enabling Technology Strategy Advisory Council, and Biological Sciences and Biotechnology, Australian Research Council College of Experts where he was national Chair. He holds multiple international patents and is on the Editorial Boards of Biomacromolecules, Biomaterials, Biomedical Materials, BioNanoScience and Tissue Engineering. The Weiss Laboratory at the University of Sydney is the leading research site for tropoelastin and synthetic elastin biomaterials.*

Improvised explosive devices are generating a new type of conflict-related blast injury because they result in facial soft tissue injuries that encompass facial skin lacerations and intense flash burns that penetrate the elastic dermis. Severe burn injuries are a major health problem as they can compromise whole body function and result in extensive emotional trauma exacerbated by prolonged hospital stay. Burn injury treatment has improved dramatically to increase the probability of survival but burn survivors still suffer from excessive scarring and skin contractures which substantially compromise their health and quality of life. We have developed a set of synthetic human elastin sheets to repair damaged human skin. These constructs are stable during storage over a wide range of temperatures and can be stored sterile prior to use. They are intended to surgically replace either severely burned or currently scarred tissue by effective excision and dermal substitution. These constructs are suturable and promote human cell growth in the laboratory. Fibroblast differentiation into contractile myofibroblasts is reduced on more elastic substrates. Myofibroblast de-differentiation is known to be induced by increasing the elasticity of the cell culture substrate in vitro. We find that human dermal fibroblasts respond through a combination of migration and tissue synthesis to our elastin-based materials. Tissue contraction is minor in culture. In vivo studies show that early stage repair is accompanied by transient signalling, our

elastin-based dermal scaffold is well tolerated and the scaffold is replaced by an undistorted matrix with a normal collagen I distribution that is almost indistinguishable from the surrounding tissue. This repair is accompanied by vessel ingrowth.

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### Bioactive scaffolds in skeletal muscle repair and regeneration

*Danielle E. Dye, Beverley F. Kinnear, Vishal Chaturvedi, Elizabeth Grenick, Deirdre R. Coombe*

*Professor Coombe obtained her PhD from the University of Adelaide and completed post-doctoral appointments at both the Australian National University (Canberra) and Oxford University (UK). Deirdre returned to Australia in the early 1990s and since then has run her own research laboratory in Perth, Western Australia. Deirdre's primary interest is the interaction between cells and their environment, specifically the extracellular matrix (ECM). Deirdre is recognized internationally for her work in cell-matrix interactions, and in particular for her expertise in the contribution of carbohydrates to the ECM. She has both national and international collaborators and her laboratory is currently funded by an NHMRC grant and by commercial partners. Deirdre's interest in cell-matrix interactions means her work includes research into muscle regeneration, cancer and wound healing.*

Military personnel injured in combat often sustain injuries that involve the loss of large amounts of soft tissue and muscle. Loss of large amounts of muscle tissue is known as volumetric muscle loss (VML), and this often leaves the victim with a permanent disability because the remaining muscle can't grow across the gap. Instead, scar tissue forms and muscle is permanently lost. Better treatment options for VML are required and a new approach currently being explored is tissue engineering. This involves inserting a scaffold in the area of muscle loss to help support and guide regenerating muscle fibres from either side of the injury to bridge the gap.

Such a scaffold must support the muscle both structurally and functionally. Thus, the material must be strong and elastic, to provide the mechanical support required. However, it must also provide some of the chemical cues that are present in the natural environment, as these are crucial for normal cell growth and behaviour. Both synthetic and natural scaffolds have been investigated as materials for muscle repair.

We have developed a novel serum free tissue culture system that allows us to test the efficacy of muscle cell proliferation and differentiation on different

scaffolds in the absence of confounding growth factors often present in in vitro laboratory work. We have used this system to test the ability of 1) a modified synthetic scaffold (polyhema), 2) a natural scaffold (silk) and 3) an acellular, muscle-specific scaffold to support the growth and proliferation of muscle cells in the laboratory. Data from these experiments show that all of these three-dimensional scaffolds can support muscle cell proliferation and differentiation to varying extents.

We are currently characterizing the composition of the extracellular matrix extracted from different muscle groups taken from mice. We know that some muscles regenerate better than others, and by comparing highly regenerative with less regenerative muscles we hope to identify specific biologically active factors that are critical to effective muscle regeneration. These specific molecules will then be tested using the in vitro models and scaffold systems we have already developed

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### Emerging bionic vision solutions for blinded veterans

*Jeffrey V Rosenfeld*

*MAJGEN Jeffrey V Rosenfeld AM is the immediate past Surgeon General ADF Reserves and currently Chair, Australian Defence Human Research Ethics Committee. He has an extensive operational experience and is a senior Australian military surgeon with an international reputation in the management of blast injury. He joined the Army Reserve in 1984. He was Chair, Editorial Board of ADF Health and is Adjunct Professor to the Centre for Military and Veterans Health, University of Queensland. He trained in general surgery and neurosurgery in Australia, Oxford, and Cleveland, Ohio. He is currently Professor and Head Division of Clinical Sciences and Dept Surgery, Central Clinical School, Monash University and Director, Department of Neurosurgery, The Alfred Hospital and an Honorary Professor to the University of Papua New Guinea. His major research interests are bionic vision and neurotrauma. He has published over 210 peer reviewed articles, 40 book chapters and 2 books.*

The eyes are vulnerable to blast injury, although ballistic eye goggles give some protection. There are a number of blinded veterans who served in the Iraq and Afghanistan wars, including an Australian soldier. Bionic vision prosthetics are advancing rapidly. If the retinal ganglion cells are intact, the retinal device may be an option, however if the retina or optic nerves are damaged, a cortical device may

be indicated. There are two European retinal devices currently being implanted, with some early success. These results will be reviewed. Bionic Vision Australia (BVA) based at University of Melbourne has developed a retinal device which has been implanted in three individuals with retinitis pigmentosa and is currently undergoing testing. The Monash Vision Group (MVG), based at Monash University is developing a multi-electrode cortical prosthesis which is implanted in the primary vision cortex (VI) in the occipital lobe. The first in human implant is planned for 2014 at the Alfred Hospital. The device is currently being tested in the laboratory. The challenges of developing a bionic vision device will be explored in this presentation. These technologies provide a prospect of patterns of visual percepts for blind individuals to improve their activities of daily living quality of life.

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### Re-building the soldier: prosthetic limb technology

*Sally Cavenett*

*Sally Cavenett holds a Bachelor in Prosthetics and Orthotics from La Trobe University (Aust) and has practised in clinical service delivery throughout Australia since 1992. She has managed Orthotics and Prosthetics South Australia (OPSA) based at RGH since 2001, leading the clinical team whilst participating in amputee based research projects. With special interests in prosthetic socket design and outcome measures in clinical practise, she is a current candidate for Higher Degree by Research Masters of Clinical Science, with the Joanna Briggs Institute, at The University of Adelaide.*

Persons with lower-limb amputation are often dependent on limb prostheses to regain independence. Design of prosthetic socket and choice of componentry may influence fit, comfort, mobility and therefore impact on independence. Ambulatory mobility in the community setting can provide the amputee with a degree of regained independence. Whether standing to prepare a meal, attending to self-care, returning to work or participating in high-level activities, mobility is a significant measure of ambulatory rehabilitation.

Following WW2 the need for prosthetic provision across Europe increased markedly, and provided the stimulus for prosthetic design and modular componentry development. Likewise, recent conflicts have had influence on research and product development to enhance function and mobility, quality of life, and contribute to the well-being of

all amputees. USA and UK military servicemen and women have sustained significant injuries including traumatic limb amputation in recent Iraq and Afghanistan conflicts since 2001. A great number of blast and burns injuries requiring specialised management and ongoing rehabilitation care have contributed to accelerated development and production of prosthetic technology and rehabilitation protocols. Whilst Australia has sustained few limb amputations from the Middle East conflicts in comparison<sup>1</sup>, our rehabilitation centres benefit through accessing programmes and protocols, outcome measures and prosthetic technology that have been developed or enhanced specifically to aid the rehabilitation of wounded soldiers.

US military funding has assisted in the development of Otto Bock microprocessor controlled (MPC) Genium knee to cater for returned soldiers and their impending rehabilitation. Upper limb prosthetic technology has advanced in a similar way with terminal devices developed with advanced hand function through multi-digit articulation, for example 'Michelangelo' and 'I-limb'. As returned soldiers search for more demanding activities to test themselves, engagement and participation in sporting and recreation activities have seen the development of Otto Bock's MPC X3 waterproof prosthesis, and 3S80 running prosthesis launched at London Paralympics 2012. The Comprehensive High-level Activity Mobility Predictor (CHAMP)<sup>2</sup>, an advancement on the AMPRO3 activity measure, was developed in order to objectively evaluate functional abilities and measure change in function throughout the rehabilitation process in servicemen. These prosthetic components and measures are now used in community clinical practise with appropriate prescription world-wide.

Prescription indicators for componentry selection take into consideration patient ambulation potential or actual mobility, patient body weight, activities of daily living and greater activities of participation and recreation. Objective outcome measures are increasingly used to justify clinical prescription through assessing mobility, function and quality of life of person's with an amputation using a prosthesis.<sup>4-6</sup>

This presentation will discuss advanced prosthetic componentry, supported by a case study of a bilateral trans-femoral Vietnam Veteran who underwent objective assessment via the RGH's Prosthetic Evaluation Programme (PEP) to determine suitability for MPC prescription.

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### Afferent Inhibition and Cortical Excitability Following Suprascapular Nerve Block in Shoulder Pain Patients

*Kirsty Hendy, Anri Visser, Brenton Hordacre, Assoc. Prof. Michael Shanahan and Dr. Lynley Bradnam*

*Kirsty completed her Bachelor of Medical Science majoring in neuroscience and physiology in 2008. Following that she completed her honours year in the Autonomic Neurotransmission Laboratory achieving a first class grade for her project 'Interactions between Angiotensin II type 1A receptor and a highly motile cell membrane'. Continuing in the field of neuroscience she investigated parasympathetic pathways in the distal colon as a Research Assistant for the Neurogastroenterology Laboratory at Flinders University. Currently, Kirsty is completing her Masters in Physiotherapy at Flinders University. She is also involved in research in the Applied Brain Research Laboratory, at Repatriation General Hospital. This laboratory is focused on understanding neuroplasticity in the brain following musculoskeletal and neurological disorders and novel interventions to enhance neuroplasticity including non-invasive brain stimulation. In particular, Kirsty is using non-invasive brain stimulation to investigate changes that occur in the brain following nerve block therapy in a chronic shoulder pain population.*

Shoulder pain is a common musculoskeletal complication in Western society, with up to a 66.7% prevalence reported over a lifetime period (Luime et al. 2004). Shanahan and colleagues (2012) recently highlighted a significant incidence of chronic shoulder pain due to rotator cuff pathologies in South Australia. With such high prevalence, treatment to improve outcomes for chronic rotator cuff pain has been a primary research focus in recent years (Killian et al. 2012). One intervention with promise is the suprascapular nerve block (SSNB). This safe and efficacious injection procedure results in an 80% satisfaction rate with pain relief amongst patients (Shanahan et al., 2012). In rheumatoid arthritis associated shoulder pain Shanahan and colleagues (2003) found the pain relief from SSNB extends beyond the pharmacological effect of the drug. However, the mechanisms underlying this phenomenon are unclear.

This study aimed to investigate the potential central mechanisms underlying the prolonged analgesic effect of the SSNB, using a safe, non-invasive technique for stimulation of the human brain, called transcranial magnetic stimulation (TMS) (Barker, Jalinous, Freeston 1985), in patients with chronic rotator cuff-related pain. When applied to the motor cortex TMS can result in a relatively synchronous

muscle response in the muscle of interest, termed motor-evoked potentials (MEPs) (Priori et al. 2009). MEP amplitude provides a quantitative indication of the integrity and excitability of the motor cortex and corticospinal pathways (Kobayashi and Pascual-Leone, 2003). By coupling TMS with peripheral nerve stimulation (PNS) sensorimotor integration can be investigated (Tokimura et al. 2000). Two phases of inhibition when stimulating the median nerve at the wrist have been reported, short afferent inhibition (SAI) and long afferent inhibition (LAI) (Di Lazzaro et al. 2004). We aimed to elucidate whether pairing TMS and PNS to the suprascapular nerve can evoke SAI and LAI in the infraspinatus muscle in healthy adults. Furthermore, we aimed to compare cortical sensori-motor integration in patients with chronic rotator cuff pathology and healthy controls to elucidate whether SSNB can normalise sensori-motor integration in this population.

Participants received single-pulse TMS over the contralateral primary motor cortex to assess corticomotor excitability in infraspinatus muscle representations in either the dominant upper limb (control group) or the affected shoulder (shoulder pain group). TMS was paired with PNS of the suprascapular nerve in the infraspinatus muscle representations. Three interstimulus intervals (ISIs) at 20 (short), 30 (medium) and 40ms (long) and a non-conditioned stimulus were randomly delivered during active muscle contraction to both groups. ISIs were calculated based on afferent and efferent conduction velocity of the suprascapular nerve and length of the reflex pathway. Additional ISI's were investigated in healthy subjects to elucidate the ISI where maximal SAI and LAI was observed.

Shoulder pain patients had TMS measures prior to and following SSNB and one week later. Pain was measured using visual analogue scales. The results of this novel study will be presented for the first time. This study has relevance for the veteran population as shoulder pain is prevalent across the range of ages encompassed by younger and aged veterans in Australia.

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### Evaluation of alternate solutions for the reconstitution of cryopreserved platelets to improve post-thaw recovery

*Lacey Johnson, Shereen Tan, Craig Coorey, Denese Marks*

*Dr Lacey Johnson has been a Senior Research Fellow at the Australian Red Cross Blood Service for the past 5 years. Her research focuses on improving blood*

*processing and component quality, with a focus on platelets. She has been particularly focused on setting up the methodology to enable platelet cryopreservation in Australia, for use by the Australian Defence Force. Further, her work examines the mechanistic affects of cryopreservation on platelet quality, with the aim to improve platelet quality.*

**Background:** Platelets for transfusion are stored at 20-24 °C for up to 5 days, making them unsuitable for use in austere military environments. However, freezing platelets at -80 °C enables extension of the shelf-life to 2 years and facilitates transport and storage. Frozen platelets have been used in military applications for more than 30 years [1], with several production methods trialled during this time. The most widely used protocol requires the addition of 5-6% dimethylsulfoxide (DMSO), washing to remove excess DMSO and freezing of the hyperconcentrated product at -80°C [2]. Upon thawing, platelets are reconstituted in fluid, typically fresh frozen plasma (FFP). Although the use of FFP is attractive for several reasons, there are also obvious disadvantages. The major disadvantage of FFP is the significant time required for thawing prior to use, which is up to 30 minutes. Alternative solutions, such as platelet additive solutions (PAS) may be advantageous as they are stored at room temperature and can be ready for use in the time taken for a platelet unit to thaw (5 minutes). Further, PAS have been specifically formulated to optimise platelet metabolism and reduce activation, with new generation additives containing glucose and/or bicarbonate to further aid platelet recovery.

**Study Design and Methods:** DMSO (5% final concentration) was added to buffy coat-derived platelets, followed by centrifugation to concentrate and freezing at -80 °C. Cryopreserved platelets (n=12 per group) were thawed at 37 °C, reconstituted in either a unit of thawed FFP or glucose containing PAS (PAS-G). In vitro platelet quality was examined prior to freezing, immediately after thawing and 6 and 24 hours post-thawing.

**Results:** After thawing and reconstitution, recovery was similar for platelets in FFP and PAS-G (69% and 73% respectively). All platelets maintained an acceptable pH and metabolic activity during post-thaw storage. Frozen platelets were activated, although the extent differed depending on the reconstitution solution, with platelets in PAS-G retaining better aggregation responses than platelets in FFP. The absolute number of platelet microparticles was significantly higher immediately after thawing, but the reconstitution solution did not significantly influence microparticle generation. Despite this, the platelets resuspended in PAS-G

had lower pro-coagulant activity (as measured by FXa-based clotting assay and TEG) than FFP-reconstituted platelets. This was likely due the absence of additional clotting factors present when platelets are reconstituted in FFP.

**Conclusion:** Thawing cryopreserved platelets in PAS-G, without plasma supplementation, resulted in platelets with similar recovery and in vitro quality indicators to those suspended in FFP. Importantly, using PAS-G enables the platelets to be ready for use significantly faster than when having to thaw FFP, which may be beneficial in trauma situations. This work demonstrates the potential to improve both the time at which platelets are available for transfusion and their recovery. As time and product efficacy are two critical factors affecting transfusion outcomes, these changes may result in improved trauma management, when used in the field.

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How changes in the control of DNA determine if someone develops chronic pain

*A/Prof Rainer Viktor Haberberger, Dr Robyn Meech*

*Rainer Haberberger is the convenor of the Centre for Neuroscience, Flinders Medical Science & Technology cluster and head of the pulmonary neurobiology lab Flinders. He studied Human Biology (Medical Research) at the Philipps-University in Marburg, Germany and has been a senior scientist and lecturer at the Institute for Anatomy and Cell Biology, Justus-Liebig University Giessen, Germany until 2005. He then was awarded the Mary Overton Neuroscience Fellowship and started to set up the Pulmonary Neurobiology Lab. Since 2009 he is Associate Professor for Neuroscience and in addition to his research also senior lecturer and course coordinator of the Medical Course at Flinders. His research areas of interest are the understanding of peripheral nociception and the control of peripheral airway function. He received the Collaborative Research Grant of the International Society for the Study of Pain 2006 & 2010, the Decima Strachan and Claire Lilia Wooton Estates Spinal Cord Research Award of the Australian Brain Foundation 2008 and the Australian Lung Foundation Ludwig Engel Grant-in-Aid for Physiological Research 2011.*

Pain and chronic pain after injury and nerve damage are major health problems for society but in particular for the Defence community. New therapies are urgently needed and new diagnostic tools and targets for therapy will provide better treatment. Pain is very individual, one person experiences more pain than another to the same stimulus. Moreover,

one person may develop chronic pain while another with the same injury does not. The reasons for these differences are unknown.

The overall aim was to discover the mechanisms which explain the differences in pain perception between individuals. We looked at the amount of messenger RNA for enzymes which had been shown to regulate the accessibility of DNA thereby determining if DNA can be read and used. Mechanisms that change the readability & use of DNA without changing the “code” are named epigenetic mechanisms. In particular we measured the quantity of RNA in those nerve cells that are the first in the chain of three populations of nerve cells that deliver pain information to the brain. We used mice which are mammals like humans and are very similar in the structure of their peripheral nervous system, for example of spinal cord and the nerves in legs. We compared 84 different enzymes in DRG and parts of the spinal cord. We compared mouse strains that were different in their response to pain. Both are mice but they respond differently to pain and have a different expression of a particular mRNA coding, an enzyme which seems to be a target for pain treatment named Sphk2. We compared pain sensing nerve cells in mouse strains with differences in their pain perception with and without injury and

inflammation at different time points.

We looked very carefully using the system with the highest accuracy and several layers of controls. We were able to discover for the first time that the enzymes which change the use of DNA in pain sensing cells change in response to inflammation and injury. Even if only one side was injured, pain conveying nerve cells of both sides responded to the inflammation. The response to injury and inflammation increased over time with increased number of mRNAs change after one week compared to 3 days. The sphingosine 1-phosphate system seems to play a role since we detected differences between C57/Bl6 mice and mice with deficiency in the enzyme Sphk2.

Even this is only a small step, we are excited about the results of their experiments suggest a new direction in pain research and will certainly lead to new strategies in the understanding and treatment of chronic pain. This is important since drugs that interact with certain gene-controlling molecules are already in use as anti-cancer drugs. This data will build the necessary basis for the specific use of these drugs for the treatment of chronic pain.

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## History

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### “Blood, Sweat and Fears” The 2014 Project

*Christopher J Verco*

*Christopher Verco, RFD MD FRCOG FRANZCOG, GROUP CAPTAIN, RAAF SR, is a Senior Consultant-Senior Lecturer in Obstetrics and Gynaecology, trained in Adelaide and London. He joined the RAAF in 1967 and has remained a member ever since. He has served overseas in Malaysia, Bougainville and East Timor; in Australia he has served with the South Australian University Squadron, 24 Squadron, and the RAAF SR. He was Hon ADC (Air) to HE the Governor of South Australia, Sir Marc Oliphant from 1973-1976, Director of Air Force Health Reserves in SA and variously WA and NT from 2001-2009 and Chairman of the Obstetrics and Gynaecology Consultative Group 2001-2012. He is the current chairman of the Army Health Services Historical Research Group [AHSHRG] and of their 2014 Project subcommittee: this includes Colonels Roger Freeman OAM RFD, Michael Jelly RFD, Annette Summers AO RFD, Robert Likeman CSM, Peter Byrne AM RFD ED, Surgeon Lieutenant Commander Tony Swain RANR Retd.*

There is good reason to recognise our military medical South Australian (SA) predecessors: “..the Adelaide

school [graduates exhibited] a fervour and scientific outlook and a professional standard which enabled the South Australian assembly to lead the way in the professional reaction to war needs”(1). The AHSHRG, through their “2014 Project”, seek to publish, by late 2014, a book in which the contribution of SA medical students and medical officers who served at home and overseas in World War 1 is documented, each in a one page biography. Over 160 names have been collected and 100 biographies completed.

SA medical officers and medical students contributed significantly to the AIF and subsequently to their profession and community in South Australia, Australia and the United Kingdom. Examples include: SR Burston DSO CBE, MH Downey DSO, HK Fry DSO, FN Le Messurier DSO, LW Jeffries DSO OBE, JR Muirhead DSO, G Tassie DSO, Sir Edmund Britten-Jones, Sir Hugh Cairns, Sir Raphael Cilento, Sir Trent De Crespigny DSO, Sir Arthur Cudmore, Sir Ivan Jose, Sir Leonard Lindon, Sir Francis Matters, Sir Henry Newland DSO CBE and Sir George Wilson CMG. Newland, Jose and Lindon were Presidents of the RACS and JS Verco the first President of the RACR.

This presentation will focus on three South Australians as a snapshot of the contributions made; Professor Archibald Watson(aged65), the charismatic Professor of Anatomy at Adelaide University and exponent an anatomical approach to surgery, joined IASH in 1914 and served until 1916; Fred Le Messurier, scholar and athlete, a surgical RMO at the RAH joined IASH in 1914, lost his appendix on Lemnos and was decorated with the DSO for rescuing the wounded under fire in France, and Hugh Cairns(aged19),a medical student, served on Lemnos, returned to complete his degree in Adelaide and returned to active service in France before taking up his Rhodes Scholarship in 1919; as Professor of Surgery in Oxford and Brigadier in the British Army he was able to enforce helmet wearing by despatch riders in North Africa, with a significant reduction head injuries. He was also the first to use penicillin in neurosurgery.

It is proposed that where an individual's one page biography does not fill the page extracts, from the BMJ and MJA, in particular, will be used to provide contemporaneous comment.

Examples include:

"The country has to meet a situation such as it has never before been called upon to face, for events moved less swiftly in the Napoleonic wars.."(2)

"What I wish to urge is a true knowledge of your foes, not simply of the bullets but of the much more important enemy- bacilli. In the wars of the world they have been as Saul and David- the one slaying thousands the other tens of thousands."(3)

"From the point of view of the wounded, the motor ambulance is a very urgent need...." "Rapid transport is everything"(4)

"If he is a wise man he will decide to bring out as little as possible and certainly to regard as superfluous many of the things pressed upon his notice by outfitters at home. Among positive superfluities may be written down revolvers, swords and whistles and many changes of garment."(5)

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Australian Naval and Military Expedition Force of 1914 ("Blood Sweat and Fears" the 2014 Project)

*Anthony Swain*

*Anthony (Tony) Swain graduated MB BS Sydney University in 1961. After 4 years Short Service Commission in the RAN with 2years at sea he moved to Adelaide to complete anaesthetic training and 20 years in the RANR. He worked as an anaesthetist in private practice and as a VMO in Public Hospitals retiring in 2007. He is currently a member of the Army Health Services Historical Research Group [AHSHRG] of South Australia and of their 2014 Project subcommittee: this includes Colonels Roger Freeman OAM RFD, Michael Jelly RFD, Annette Summers AO RFD, Robert Likeman CSM, Peter Byrne AM RFD ED, and Group Captain Christopher Verco RFD. As the lone member with a naval background he coordinated the information gathered for the role of the Australian Naval and Military Expedition Force (AN&MEF) in WW1 and lives of some of its Medical Officers.*

The Australian Naval and Military Expedition Force (AN&MEF) was formed in Australia at the request of the British Government on the 5th August 1914, after Great Britain had declared war on Germany at 11 pm (midnight 4th-5th by Central European time).

The Force was assembled under the guidance of Colonel J.G. Legge, and was separate from the Australian Imperial Force (AIF)forming under Major-General W.T. Bridges. The Expeditionary Force was commanded by Colonel William Holmes and departed Sydney aboard HMAS Berrima. Major Neville Howse VC, was appointed PMO and Captain Frederick Maguire the SMO.

A strong supporting fleet of the Royal Australian Navy led by the Flag Ship HMAS Australia provided escort for the attack force. The fledgling Flying Corps supplied two aircraft for the expeditionary force.

It was tasked to capture and occupy German colonial territories to our north which would cancel the effectiveness of their wireless communication to the ships of the German East Asian Cruiser Squadron in the near Pacific. Following the capture of German possessions in the region, the AN&MEF provided occupation forces for the duration of the war. A military government was subsequently set up and continued until 1921 when Australia received a mandate from the League of Nations to govern the territory; the Australian administration lasted until 1975 when Papua New Guinea gained its independence.

This force separate from the AIF ,had some unique circumstances associated with it. A NSW 24 year old AAMC Medical Officer, Captain Brian Colden Antill

Pockley, was an early casualty in the initial invasion of New Britain, two South Australian AAMC Medical Officers, COL Strangman and Major Flood, were taken prisoners and became POW's onboard a German raider for six months and finally released in Denmark. Also a newly graduated Captain Ralph Cilento AAMC of South Australia had his first exposure to tropical diseases. After the War he became a leading figure in the field of tropical medicine, Director-General of Health and Medical services in Queensland, he studied law and was admitted to the Bar. He also saw service in post WW2. He was appointed Major General by Montgomery; Chief of Operations UNRRA Europe and World Director of Social Security for the UN. He was Knighted in 1935 for his service to medicine.

More generally the Force consisted of the three arms on our defence force, collected some troops from New Zealand and it was the first time the full Australian Fleet saw action, sadly with the loss of one of a RAN's submarines off Rabaul.

When Col Strangman arrived in Rabaul as PMO in December 1914, the fighting had concluded, the wet season was in force and malaria was spreading rapidly. He took control and by February 1915 the crisis was over. When Captain Cilento left in September 1919 the lessons learned were imbedded in the minds of the military and used in the jungles of WW2.

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### Military and Civilian Hospitals in Brisbane in World War 2

*Cliff Pollard*

*General surgeon (ret), formerly Director of Trauma Services, Royal Brisbane Women's Hospital; Board Member MetroNorth Hospital and Health Service; Chair Queensland Statewide Trauma Clinical Network; RAAMC (ret), deployed Bougainville and East Timor.*

During WW2, there were some 21 US and Australian military hospitals, several convalescent depots and other medical facilities in the Greater Brisbane Area. The Brisbane and South Coast Hospitals Board was directed to prepare for air raid casualties. By November 1942, there were 1950 emergency beds across Brisbane; including a 200 bed emergency hospital with operating rooms in the nearly completed University building at St Lucia. The Board would supply and staff 58 First Aid Posts and 48 Dressing Stations. The USN Fleet Hospital No 9 at Camp Hill, was constructed in 1943 and would expand to

2600 beds. The US Army 42 General Hospital was established first at Stuartholme Convent, but moved to a new site at Holland Park in 1943; it would have 3000 beds. The 102 Australian General Hospital was at Ekibin; it could care for 2000 patients. It would move to Holland Park when the US 42 GH transferred to New Guinea. The 112 Australian General Hospital would move from Kangaroo Point (from the Yungaburra hostel, which had been 6 AGH during WW1) to Greenslopes; it had 1600 beds and after the War, would become the Repatriation General Hospital. There were five Australian Army Camp Hospitals (2nd, 3rd, 4th, 7th and 10th). This paper will overview the large military medical establishment, examine some of the case loads and look at the impact on the civilian sector.

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### The British Medical Journal during the first year of World War I (1914-1915)

*Christopher J Verco*

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The British Medical Journal (BMJ) was, more than likely, the main method of communication with doctors in 1914. The BMJ for the first twelve months of World War 1 has been reviewed and excerpts, which focus on the military, will be presented.

Pre-war articles in 1914 describe, inter alia, Medical Experiences in the Antarctic, Napoleon's wounds, the early history of tobacco, pregnancy and the potential to reduce antenatal maternal death. Examinations for commissions in the RAMC are announced on 7Mar14. We read of the 20Feb14

meeting of the Berlin Society of Military Surgeons on the 50th year of their foundation; they had over 300 members<sup>7</sup>. There are regular motor columns e.g. "Motoring Matters for Medical Men"<sup>8</sup>, "Motor Cars for Medical Men"<sup>9</sup>. The "value of medical services to the Navy is not adequately appreciated..."<sup>10</sup> starts a lively correspondence in which pay and conditions, including study leave seem to be significant issues.

The Royal Proclamation, ordering general mobilisation, was issued on Tuesday 4Aug14. The editorial of 8Aug14 describes the immediate duties of the profession which are to care for the civilian population and protect the practices of those who have joined up. Civilian medical officers are encouraged to submit their names to the War Office in order to serve in the RAMC. We learn of London's hospitals setting aside beds for the wounded and, later, that applications from medical practitioners, have taxed "to the uttermost the clerical staff at the War Office". The academic position of medical students who joined up is discussed and positions preserved, by agreement, until their return to civilian life. Later, the BMJ has 'no hesitation in advising medical men who have no urgent domestic ties, and are not yet in established practice.....the duty is clear. They should put their names on the waiting list...'. By 23Jan15 1138 temporary medical officers have joined up and medical losses in the RAMC and RN have been significant<sup>17</sup>. RAMC medical officer obituaries are regularly mentioned from 12Sep14. Readers are exhorted "Why have we been so slow to recognize that fresh air is the best tonic, the best

antiseptic..." and reminded that:-"

Fever follows flies

Flies follow filth

Filth fosters fever"

The motoring columns examine the value of motor ambulances and standardisation of their equipment. A motorised operating theatre is described.

Medical news from Germany describes 'a severe dearth of medical men, many thousands of whom have joined the colours' and that "In Berlin twenty-five hospitals have been improvised with accommodation for about 20,000 wounded" and "German surgeons with experience of the war of 1870 express boundless praise of the improved conditions towards which motor ambulances have contributed". There are papers on Insects and War covering Lice, Bed Bugs, Fleas, and Flies etc.; there are papers on the X-Ray location of foreign bodies, the management of wounds, a multi-part history of the Red Cross, allegations of the English use of Dum Dum bullets, and of the poor treatment of German doctors in English concentration camps (refuted and counter accusations made). News from South Australia on 2Jan15 tells of those who are en-route to the Middle East, of the dry winter and water rationing in Adelaide. The BMJ provides a valuable and interesting window on this time.

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## Musculoskeletal Injuries

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Prevalence of serum 25(OH)D deficiency and relationship to musculoskeletal injury in Australian Army recruits

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*Associate Professor Beck graduated from UQ with a degree in Human Movement Studies (Education) and from the University of Oregon (USA) with a Master of Science (Sports Medicine) and a PhD (Exercise Physiology). She completed a postdoctoral research fellowship in the Stanford University School of Medicine (California). She is currently an Associate Professor in the School of Rehabilitation Sciences at Griffith University, Gold Coast campus. Her work, primarily related to the effects of mechanical loading on bone, has involved both animal and human models, from basic to clinical research. Her particular focuses have been prevention and management of bone stress injuries, and exercise interventions for the prevention of osteoporosis and fracture. She has a developing*

*interest in multi-system exercise interventions for the promotion of bone health and prevention of overweight in children and adolescents.*

**Background:** Bone and muscle injuries sustained during Army training place great economic pressure on the Australian Defence Force. Low vitamin D (25[OH]D) levels are associated with poor musculoskeletal outcomes in older adults and deficiencies are increasingly recognized in the Australian population. It was not known if Army recruits are deficient in 25[OH]D, nor whether such deficiency is related to incidence of musculoskeletal injury during training.

**Aim:** To examine the relationship of serum 25(OH)D to rate of musculoskeletal injury in Australian Army recruits in basic training.

**Methodology:** We conducted a prospective observational study in a sample of new recruits to Kapooka Army Recruit Training Centre, and recruits

in the rehabilitation platoon with musculoskeletal injuries. On entry to the 12 week training program, we measured age, sex, height, weight, calcaneal broadband ultrasound attenuation (BUA), isometric lower extremity muscle strength, serum 25(OH)D, sun exposure, previous physical activity and previous injuries. At completion of training we reexamined BUA, muscle strength and 25(OH)D, and determined type and number of injuries sustained during training. We then examined the relationship between all preliminary measures and rates of injury. A T test comparison was performed to compare serum 25(OH)D levels of injured and non-injured recruits. Correlation and multiple regression analyses were employed to examine the ability of serum 25(OH)D, age, calcaneal BUA, muscle strength, prior physical activity and sun exposure to predict musculoskeletal injury. Univariate ANOVA was used to examine the effect of sex and lower extremity strength on rate of musculoskeletal injury, based on relationships identified in the regression analysis.

Results: 81 recruits (68M, 13F) volunteered for the study. There were 27 training-related musculoskeletal injuries (16.2% of men, 61.1% of women). The combined mean 25(OH)D was  $38.6 \pm 4.5$  nmol/L (M –  $38.3 \pm 15.2$  nmol/L; F –  $40.2 \pm 9.5$  nmol/L). Only 21% of the sample was sufficient in serum 25(OH)D ( $>50$  nmol/L), and 34.6% was deficient ( $<30$  nmol/L) (12). Serum 25(OH)D increased over the 12 week training period (mean difference = 9.83 nmol/L, 95% CI 5.50-14.15 nmol/L;  $p=0.0004$ ). There was no difference in serum 25(OH)D between injured and non-injured recruits, and serum 25(OH)D was not predictive of musculoskeletal injury. Recruits with musculoskeletal injuries were shorter, lighter and weaker than non-injured recruits ( $p<0.05$ ). Although female recruits were similarly shorter, lighter and weaker than male ( $p<0.05$ ), there was no main effect of sex on musculoskeletal injury. By contrast, injured recruits exhibited 40 kg lower isometric lower extremity muscle force at baseline than uninjured recruits ( $p<0.05$ ). Past physical activity and prior injuries were positively associated with musculoskeletal injuries for both men and women ( $p<0.001$ ).

Conclusions: Although over 79% of recruits were insufficient and 34% were deficient in serum 25(OH)D, no relationship was observed between serum 25(OH)D and incidence of musculoskeletal injury during Army recruit training. Instead, musculoskeletal injury was related to poorer leg muscle strength at entry. The lack of effect of serum 25(OH)D on training-related musculoskeletal injury observed in the current study is not definitive. Low injury

numbers reduced statistical power and widespread insufficiency in the cohort reduced sensitivity.

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The effect of anterior cruciate ligament injury on bone curvature over 5 years: The KANON Trial

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Professor Hunter is a rheumatology clinician researcher whose main research focus has been clinical and translational research in osteoarthritis (OA). He is the Florance and Cope Chair of Rheumatology and Professor of Medicine at University of Sydney and Staff Specialist at Royal North Shore Hospital. He completed a fellowship in Rheumatology at the Royal Australian College of Physicians and a Masters of Sports Medicine from UNSW. His research is focused on a number of key elements in OA including (but not limited to) the epidemiology of osteoarthritis, the application of imaging to better understand structure and function with application to both epidemiologic research and clinical trials, novel therapies in disease management and health service system delivery of chronic disease management. He has authored books on osteoarthritis and has over 250 publications in peer reviewed journals.

Objective: To investigate the 5-year longitudinal changes in bone curvature following an acute ACL tear, and to identify predictors associated with these changes.

Methods: 121 young active adults with an acute ACL tear to a previously un-injured knee were included in a treatment RCT comparing rehabilitation plus early ACL reconstruction with rehabilitation plus optional delayed ACL reconstruction. Serial MR images were acquired with use of a 1.5-T magnetic resonance imaging scanner; 106 (88%) had intact serial MR images from baseline (within 5 weeks from injury), 2 years and 5 years after injury. From these, a subset of 56 had additional intact MR images acquired at 3, 6 and 12 months after injury. Morphologic measures of articulating bone curvature were obtained from computer-assisted segmentation of magnetic resonance images. The curvature was measured using inverse millimetres with positive values for convex shapes (trochlea and femur condyles) and negative values for concave shapes (tibia plateaus). Average values were reported for the entire femur (F), entire tibia (T), Medial femur (cMF), Lateral femur (cLF), Trochlea (TF), Medial tibia (MT) and Lateral tibia (LT). Factors tested for association with bone curvature were age, sex, treatment of the ACL

plus meniscal injury and osteochondral fracture as visualized on baseline MR images.

**Results:** The mean age of the participants was 26 years, 27% were female and the mean BMI was 24kg/m<sup>2</sup>. Over the course of 5 years the change in curvature was statistically significant in each region of the knee. In each region the values for curvature decreased (Figure). Participants randomized to early surgery as opposed to rehabilitation plus optional delayed ACL reconstruction were more likely to have flatter curvature in the femur ( $P < .001$ ), medial femoral condyle ( $p = 0.006$ ) and trochlea ( $p = 0.003$ ). Any meniscal injury (largely medial meniscus) was associated with a more flattened curvature in the femur ( $p = 0.001$ ), trochlea ( $p = 0.011$ ) and lateral femoral condyle ( $p = 0.038$ ) and lateral tibia ( $p = 0.048$ ). In contrast, a lateral tibial osteochondral fracture was associated with a more convex curvature in the lateral tibia ( $p = 0.017$ ).

**Conclusion:** This study demonstrates that ACL injury leads to significant changes in articulating bone curvatures. These changes are measurable within a short interval (3 months) of the injury. Increased body mass index, meniscal injury and randomization to surgery (as distinct from rehabilitation plus optional delayed ACL reconstruction) all lead to decreased curvature.

**Figure.** Trajectory of bone curvature (inverse millimetres) change over the five year follow-up period by anatomic location

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The relationship of ipsilateral and contralateral projections to the quadriceps muscle on control of gait and balance in transtibial amputees

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*Brenton Hordacre is a Physiotherapist who has been working at the Repatriation General Hospital for three years since completing his physiotherapy degree at the University of South Australia. He is currently completing his PhD in the Department of Rehabilitation and Aged Care, Flinders University. His PhD is investigating lower limb amputee motor control using transcranial magnetic stimulation and assessments of gait and balance.*

Lower-limb amputee rehabilitation involves a complex process of gait and balance re-learning with a prosthetic limb. Typically, the majority of episodes admitted to Australian amputee rehabilitation are males in their late 60's (Hordacre et al. 2013), with

a percentage of these episodes considered veterans. Amputees typically have a longer rehabilitation length of stay (LOS) and use more resources when compared to other rehabilitation casemix groups (Hordacre et al. 2013; Simmonds & Stevermuer 2007, 2008) ultimately contributing to increased costs of rehabilitation. Despite the long LOS a high proportion of amputees still experience difficulty with prosthetic gait, with 20% experiencing a fall in rehabilitation (Pauley, Devlin & Heslin 2006), and 50% a fall in the community (Miller et al. 2001). These difficulties point to the need to investigate new approaches to improve amputee rehabilitation service provision, with the aim of improving patient outcomes.

Principles of neuroplasticity and motor control are commonly applied to other patient groups in rehabilitation, and its application to the field of amputee rehabilitation warrants investigation. Current literature indicates that the primary motor cortex (M1) in both hemispheres undergoes neural reorganisation following limb amputation (Chen et al. 1998; Schwenkreis et al. 2003). Up-regulation of M1 ipsilateral to the amputation may increase descending drive to proximal muscle representations via ipsilateral projections. The functional influence of ipsilateral projections to the amputated limb in unilateral transtibial amputees remains unknown. Therefore the objective of this study was to use Transcranial Magnetic Stimulation (TMS) to assess M1 activity bilaterally and investigate whether the balance in excitability between ipsilateral and contralateral M1 projections innervating the amputated limb quadriceps is related to lower-limb function (gait and balance) in community dwelling transtibial amputees.

TMS was used to evoke stimulus-response curves from M1 contralateral and ipsilateral to the amputated limb in 20 amputees. An Index of Corticospinal Excitability (ICE) was calculated. A comparator group of 20 healthy subjects were also assessed. Spatiotemporal gait parameters were collected from ten walking trials over a GAITRite mat and postural sway was recorded by a motion capture system during ten 60s standing trials (5 eyes-open, 5 eyes-closed, pairwise randomised). Linear regression models were used to assess relationships between ICE and gait and sway parameters.

Results indicated that amputees had significantly lower mean ICE compared to controls ( $0.29 \pm 0.36$ ; range  $-0.33$ - $0.92$  vs  $0.47 \pm 0.29$ ; range  $0.01$ - $0.94$ ,  $p < 0.05$ ). Amputees with negative ICE (more lateralised to ipsilateral M1) had greater amputated limb step length variability ( $r^2 = 0.18$ ,  $p < 0.05$ ), greater amputated limb step time variability ( $r^2 = 0.31$ ,  $p <$

0.01), and also demonstrated greater sway with eyes open ( $r^2 = 0.21$ ,  $p < 0.05$ ) and eyes closed ( $r^2 = 0.32$ ,  $p < 0.001$ ).

This study found that greater excitability of M1 ipsilateral to the amputated limb can negatively affect regulation of gait and postural sway in rehabilitated amputees. These findings have important implications for targeted neurophysiological interventions to optimise neural changes during the rehabilitation of mobility and balance in lower limb amputees.

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Pain-related musculoskeletal disorders, psychological comorbidity and wellbeing in Australian Gulf War veterans – 10 years after the Gulf War

*Helen L Kelsall, Dean P McKenzie, Andrew B Forbes, Minainyo H Roberts, Donna M Urquhart, Malcolm R Sim*

*Dr Helen Kelsall is a Senior Research Fellow at the Department of Epidemiology and Preventive Medicine, Monash University. She is an Investigator on the current follow up study of the health of Australian Gulf War veterans and military comparison group being undertaken by Monash University and was an Investigator and undertook her PhD on the 2000-02 baseline study. Her research interests include physical health assessment in veterans and other occupational groups, musculoskeletal disorders in other occupational groups, and the relationship between physical health, psychological health and exposures in veteran and military populations. Other interests include professional public health education.*

**Introduction:** Musculoskeletal disorders (MSD) encompass a range of conditions and are diverse in their pathophysiology. They have a capacity to cause severe, chronic pain and impaired physical function. While community studies have found MSD to be comorbid with psychological conditions such as depression and anxiety, evidence for a relationship between pain-related MSD and psychological disorders in representative veteran populations is limited.

**Aim:** This study aimed to: (i) compare the prevalence of MSD in Australian Gulf War veterans with a military comparison group, (ii) investigate comorbidity of MSD and psychological disorders, and (iii) examine associations between general physical and mental wellbeing and MSD in those with and without comorbid psychological disorders.

**Methods:** This cross-sectional study compared the prevalence of pain-related MSD, comorbidity of

musculoskeletal and psychological disorders, and wellbeing between 1456 male Australian 1990-1991 Gulf War veterans (veterans) and a military comparison group ( $n=1588$ ). At a medical assessment in 2000-2003, reported doctor diagnosed arthritis or rheumatism, back or neck problems, joint problems, and soft tissue disorders were rated by medical practitioners as non-medical, unlikely, possible or probable diagnoses. Only probable MSD were analysed. DSM-IV psychological disorders, including posttraumatic stress disorder (PTSD), depression, and alcohol use disorders, were measured using the Composite International Diagnostic Interview. The Short-Form Health Survey (SF-12) assessed physical and mental wellbeing, the lower the score the poorer the physical or mental health status.

**Results:** Almost one-quarter of veterans (24.5%) and the comparison group (22.4%) reported a MSD.

Overall, comorbidity of any MSD with any psychological disorder was more common in veterans than in the comparison group: a total of 102 participants (3.7%) (4.6% of veterans vs 2.8% of comparison group; OR 1.72; 95% CI 1.13-2.60) had comorbid any MSD and any psychological disorder (depression, PTSD or alcohol use disorder). In veterans, having any MSD or a specific type of MSD was associated with depression and PTSD, but not alcohol use disorders. Physical and mental wellbeing was poorer in those with a MSD compared to those without a MSD (e.g. in veterans with any MSD, the difference in SF-12 PCS medians = -10.49; 95% CI -12.40, -8.57), and in those with psychological comorbidity (e.g. in veterans with any MSD and depression or PTSD, the difference in SF-12 MCS medians = -20.74; 95% CI -24.3, -17.18). Similar patterns were found in the comparison group.

**Conclusions:** Comorbidity of any musculoskeletal and psychological disorder was more common in veterans, but MSD were associated with depression, PTSD and poorer wellbeing in both groups. Psychological comorbidity needs consideration in assessment and management of painful musculoskeletal conditions in Gulf War veterans and other military groups. The findings of this research will be used to inform the current follow-up study of the longer term health of Australian Gulf War veterans, which will look at the persistence or resolution of reported MSD and psychological comorbidity and health services use.

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## Systems in Healthcare

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Delivering quality healthcare in challenging environments

Mark Parrish

*Dr Mark Parrish has held strong clinical leadership and general management roles in the Australian and UK Defence Forces, and more recently in the private sectors. In the role of Regional Medical Director, Health Services at International Health and Medical Services (IHMS) Mark heads the clinical leadership team in governing the integrated health services including the IHMS clinics at each site, and managed healthcare for people in Community Detention. Mark is also the point of contact for the Department of Immigration and Citizenship in relation to all medically-related activities. Prior to joining IHMS, Mark was Director of Health Solutions for Microsoft where he led a team of health professionals across the Asia and Middle East regions. During his roles in the Royal Australian Navy, Mark led the medical support for multinational exercises off Hawaii and achieved ISO accreditation for these floating hospital facilities.*

This paper will outline the methodology of designing and delivering extended primary and mental health care services for a discrete population in two remote locations under foreign jurisdictions, with the requirement for rapid deployment and in challenging circumstances.

In August 2012, the Prime Minister accepted the recommendations of the Report of the Expert Panel on Asylum Seekers for offshore processing. International Health and Medical Services (IHMS) was tasked to design and deliver health services to transferees and the staff of stakeholders such as DIAC and service providers deployed in those locations. These services which are delivered in Nauru and Manus Island by a multidisciplinary health team amidst a high level of public scrutiny, include:

- extended primary health care;
- emergency and advanced life support services;
- ongoing mental health screening and care, including for those with a history of trauma;
- referrals and patient transfers to appropriate facilities for specialist and hospital care;
- immunisation;
- health promotion and education;
- pharmaceuticals; and
- an integrated malaria program on Manus Island.

The presentation will cover the process IHMS undertook to implement a customised health service

within tight timeframes during the set up of the Regional Processing Centres (RPC), including:

- site visits and detailed reviews of existing health conditions and capabilities on Nauru and Manus Island;
- key findings and recommendations to address any identified gaps in medical services and resources as well as minimising any adverse impact on the local health services;
- how health services could be designed to be broadly comparable with those available to the Australian community, while meeting local regulations;
- the transition of services from the Australian Defence Force (ADF) who had established a preliminary health capability;
- recruitment of staff with the required medical skills and experience;
- supply chain for medical equipment and consumables;
- working closely with DIAC, other service providers, and local authorities to establish processes to meet the health needs of transferees and identified stakeholders; and
- establishing clinical pathways for transferees.

Our presenter will also cover:

- how IHMS works with stakeholders to deliver health services when faced unique challenges such as limited existing medical services and resources, the need for quick relocation of transferees, and patients presenting with torture and trauma and medical conditions that are uncommon in Australia; and
- a case study demonstrating the complex health needs of transferees and people in immigration detention.

IHMS is engaged by the Department of Immigration and Citizenship (DIAC) to provide extended primary and mental healthcare for people in regional processing centres (transferees), as well as those in immigration detention. The services IHMS provides take into account the health needs of a culturally-diverse population at a standard of healthcare broadly comparable to that available to the wider Australian community. These services are delivered by more than 500 staff across 25 geographically dispersed sites.

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Postcard from America – our systems, our failures, and our aspirations for health care

*Isaac Seidl*

*Dr Isaac Seidl is a specialist medical administrator and general practitioner. He completed his medical degree at UWA, then undertook a variety of Army appointments across all military environments, including deployments to East Timor and Pakistan, before being appointed to Qld Health as Deputy Executive Director Medical Services in Townsville. Following a period of study sabbatical, he returned to the Australian Army at his former rank of Lieutenant Colonel, and deployed to the Middle East Area of Operations as J07. Dr Seidl has published in the literature and presented at national and international conferences. His academic interests include crisis leadership, clinical governance and ethics. He is Adjunct Associate Professor in Public Health at James Cook University. Dr Seidl lives in Frederick, USA with his wife and two children.*

The United States has a vastly different health care system from Australia, spending almost twice the proportion of GDP on health care, without significant cost benefit in terms of measurable public health outcomes. Yet making even modest changes (Health Care Reform, or “Obamacare”) has led to gargantuan political debate. At the same time, government debt has spurred calls for cuts to entitlement programs, including the Medicaid and Medicare programs (for underprivileged and aged persons respectively).

US medicine is characterised by private health care, in an interventionist milieu. Diseases, drugs and devices are promoted daily on TV, and even streptococcal sore throat results in a 14-day exclusion for schoolchildren who are not treated with antibiotics. The culture of intervention in healthcare also spreads to areas where there is no specific incentive, such as the Veterans’ Administration, in which physicians are salaried.

Military health care is not immune from controversy, some of which is shared with Australia. The concern for those with Post-traumatic mental health issues is high, yet innovative solutions are rare. As in Australia, communication between military and VA health systems is still difficult.

This presentation will provide a brief introduction to the US health care systems, both military and civilian, discuss salient controversies, and highlight areas where Australia can learn important lessons.

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Outsourcing defence healthcare to civilian contractors – towards a seamlessly integrated force

*Roger Farrow*

*Dr Farrow oversees the global delivery of medical assistance provided to International SOS clients, with a particular focus on air medical transport of patients. His role is to ensure medical personnel are equipped with the skills and technology to deliver the highest quality medical assistance and clinical services across the International SOS network.*

*Before joining International SOS in 1989, Dr Farrow spent 15 years in the Royal New Zealand Air Force and served for six of those years in the countries of South East Asia as a doctor and Commanding Officer of a military hospital. He later graduated with top honours in Aviation Medicine from Farnborough in England and holds postgraduate medical qualifications in Tropical Medicine and Obstetrics. Dr Farrow is a Fellow of the New Zealand College of Public Health Medicine.*

With the increasingly widespread placement of Western Defence Forces around the world, there has been an increase in non military contractors providing functions that were traditionally conducted by the military themselves. This concept is described in the Australian Defence Force document Force2020 as a ‘Seamless Force’ where traditional forces are not only seamlessly integrated with each other, but also externally integrated with a wider range of supporting organisations, agencies, and to an extent, the community. The US Department of Defence has fully embraced the idea of a ‘Seamless Force’ in its partnership with International SOS. International SOS supports the US Department of Defence with the provision of comprehensive healthcare under the TRICARE Overseas Program for Active Duty Service Members and Active Duty Family Members. Since the original TRICARE program started in 1998, International SOS has ensured that a high quality of healthcare is delivered to eligible TRICARE beneficiaries covered under the program, while they are outside of the continental United States. This medical support ranges from arranging and paying for outpatient and inpatient hospital care, and includes medical evacuation and repatriation services for deployed forces and those ground forces conducting military activities and exercises, excluding hostile territories. There are dedicated 24/7 International SOS/TRICARE regional Assistance Centres in Sydney, Philadelphia, London and Singapore. A case study of a recent evacuation and subsequent repatriation of a seriously burnt US Marine helicopter pilot is an example of the benefits of a ‘Seamless Force’ and illustrates the synergies and collective capabilities that can exist when the military and civilian contractors work closely together.

The pilot was moved from Pitsanulok, in central Thailand, to Bangkok by air ambulance before onward movement to the specialist burns unit in Singapore, also by air ambulance. Finally, there was onward movement by the USAAF to the Army Burns Centre at Brooke Army Medical Centre in San Antonio.

International SOS provides quality global customer services and network management through its 27 Assistance Centres and extensive global provider network of more than 76,000 service providers.

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The Veterans' MATES program: Using routinely collected administrative health claims data health outcomes for veterans

*Chris Alderman<sup>1,2</sup>, Andrew Gilbert<sup>1</sup>, V Tammy LeBlanc<sup>1</sup>, Lisa M Kalisch<sup>1</sup>, Nicole Pratt<sup>1</sup>, John Barratt<sup>1</sup>, Emmae N Ramsay<sup>1</sup>, Robert Peck<sup>3</sup>, Graeme Killer<sup>3</sup>, Elizabeth E Roughhead.<sup>1</sup>*

*Chris Alderman is Director of Pharmacy at RGH and Associate Professor, Pharmacy Practice, University of SA. He has been directly involved in clinical and research activities with Australian Veterans for more than 20 years, and has published and presented widely in this area.*

**Objectives:** To demonstrate how a health promotion based quality improvement program utilises administrative claims data to bridge the evidence-practice gap and improves use of medicines and health outcomes for veterans.

**Methods:** The Australian Government Department of Veterans' Affairs Veterans' MATES program joins health professionals and veterans in its interventions, which are delivered quarterly. Administrative claims data are used to provide direct patient-based feedback to medical practitioners. This is supported with educational material developed by a clinical panel, peer review and overseen by a

national editorial committee. Veterans who meet target criteria are mailed educational brochures. The program is supported by a national call centre, ongoing consultation with stakeholder organisations and, veteran and practitioner reference groups. Topic development is informed by the prevalence of medicine-related problems identified using DVA administrative claims data, Australia's national health priority areas, and the Quality Use of Medicines (QUM) policy framework. Evaluation includes surveys and observational studies.

**Results:** Thirty-four educational topics targeting 259,000 veterans, 30,000 doctors and 7,500 pharmacies and accredited pharmacists have been implemented. Over 80% of medical practitioners, 90% of pharmacists and 75% of veterans consistently reported the material was helpful. Of the twenty four topics for which evaluation is complete, twenty have improved medicine use, with the remaining four reinforcing existing messages. Health outcomes analysis shows a reduction in hospitalisations; a 45% reduction in time to next hospitalisation for heart failure was observed for those who received a home medicine review service. Other outcomes have included an increase in bone mineral density testing and use of osteoporosis medicines in men, and an increase in renal function monitoring amongst veterans dispensed medicines requiring renal function monitoring.

**Conclusion:** Veterans' MATES is a health promotion based quality improvement program that utilises administrative claims data to bridge the evidence-practice gap and improves use of medicines and health outcomes. Key factors contributing to the success of the program include its grounding in behavioural theory and strong stakeholder engagement. The program provides a model that could be replicated in other settings where bridging the evidence-practice gap is proving a challenge.

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### Miscellaneous

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Royal Australian Air Force Aeromedical Evacuation Capability – A capable force in response to disaster and Defence Assistance to the Civil Community (DACC).

*Shaun Robertson*

*Flying Officer (FLG OFF) Shaun Robertson, a PAF Nursing Officer, is currently posted to the Health Operational Conversion Unit (HOCU) at RAAF Base*

*Amberley in QLD. FLG OFF Robertson's clinical background is in Emergency Nursing, where he holds both a Master of Nursing (Advanced Practice) and a Post Graduate Certificate of Aeromedical Retrieval. He is also Military Critical Care Air Transport (MCAT) Team qualified. FLG OFF Robertson current position title is Instructor and his role includes course directing and instructing on the RAAF Fixed Wing Aeromedical Evacuation (AME) course, RAAF AME Refresher course, ADF Rotary Wing AME course, and Operational*

*Health Support Course. Previous to this he was posted to 1 Expeditionary Health Squadron for three years at RAAF Base Amberley where he was able to deploy on Pacific Partnership 2012 and on Operation RESOLUTE in 2012. FLGOFF Robertson's passion and keen interest lies with AME and expeditionary health.*

(Disclaimer: The content of the following are the thoughts of the author. Information has been derived from literary sources and in no way are these the express thoughts or opinions those of the Australian Defence Force.)

Aeromedical Evacuation (AME) in the military context is described as the process of moving a patient by air under medical supervision from the injury site to a higher level of care or from a level of care to an equal or higher level of care. A process designed to move the patient away from the battlefield based on clinical necessity towards the most appropriate level of care, AME as a means of transporting the sick and injured can be considered one of the most important innovations from numerous battlefields throughout history. Current RAAF AME capability includes the following airframes C-17, C-130J, KC-30A and the BK-200 which have specific capabilities and limitations.

Recent DACC and disaster response missions have seen the RAAF respond with these current AME capabilities to provide AME of both specialised groups and large scale mass evacuation of medical patients from natural and manmade disasters. Specialised groups have mainly included those patients either too large or with requirements for transport that cannot be met by current civilian airframes, for example the morbidly obese class of patients. From a disaster response perspective, AME missions conducted to evacuate bombing victims from Bali in 2002 and 2004, Cairns prior to cyclone Yasi in 2011 and from large scale flooding in Bundaberg in 2013 have demonstrated the application of AME capability as an example of RAAF Airpower in response to disaster and in support of civil authorities.

If history is anything to go by, the future application of RAAF AME capability suggests continued support to DACC tasking requirements and requests. The introduction of the C-27 Spartan airframe due into matured service around 2017 may see an enhancement to capability with the airframe designed to accommodate, from an AME perspective, up to 36 litter patients. This airframe within the domestic context may provide increased options for the movement of 3 or more patients and could result in an increased role for RAAF in the provision of AME within the civilian AME services environment. Although this should not be expected, the C-27

meets a current patient number limitation of civilian service providers with the added ability to land on many airfields unsuitable for current larger military AME capable airframes. This has the potential, in a similar context to how the Royal Air Force (RAF) provide Search and Rescue (SAR) to the British mainland and maritime territories, for the RAAF to provide AME services to the civil sector in a consistent domestic sense. With increasing publicity around an expectation of available AME capability, RAAF may be required more often to assist as an AME service provider. The implications of this include an increased training requirement to ensure familiarity and currency in the treatment and care of a broader spectrum of clinical conditions that would be expected across the entire life span, not those limited to the battlefield and/ or the defence demographic. In addition to this, AME training will need to continue to develop to cover the entire spectrum of health as well as the numerous service AME capable airframes, potential disaster and DACC AME mission allocations.

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### Maritime Medical Diplomacy as an Instrument of Soft Power

*Robert Curtis*

*Commander Curtis joined the Naval Reserve in 1979 whilst in his final year of high school in Melbourne, Victoria. He transferred to the Permanent Navy as a medical sailor one year later. As a medical sailor he served in numerous ships and establishments; the highlights of which were an exchange posting with the Royal Navy and service in HMAS SYDNEY during the first Gulf War. He attained his commissioned from the rank of Chief Petty Officer in 1994 and has since held a number of training, management, operational planning and command positions within his Medical Administration primary qualification. He was the Fleet Operational Medical Support Officer in Australian Fleet Sea Training Group between 2001-2004, during a period of extremely high operational tempo, readying the medical departments of minor and major warships to operational deployments. Between 2004-2006, whilst again on exchange, he held the position of Director US Navy Telemedicine Business Office in Bethesda, Maryland. In this role he was responsible for the governance of all telemedicine projects and programs for the USN and USMC. Upon his return to Australia he was seconded to the University of Queensland as the inaugural e-Health Officer at the Centre for Military & Veterans Health. He completed the Australia Command and Staff Course (Joint) at*

*the Australian Defence College in 2009. In 2010 he held the position of SO2 Health Intelligence within the Defence Intelligence Organisation, before becoming the Director for Complex Case Services – Navy in January 2011. He holds a MA (Strategy & Management), a GradDip (Defence Studies), GradCert (Maritime Studies), GradCert (Health Management), GradCert (Health Informatics) and a BAppSc (Environmental & Occupational Health). He is married to Fran, nee Miller, and lives in Jerrabomberra, NSW.*

This paper investigates questions relating to the employment of maritime medical diplomacy in the global maritime domain. What is Soft Power? As defined by Nye, it is the attributes or actions of a nation state, by the use of non-traditional forces that targets another nation's perception of the first nation. The desired outcome is that these forces produce a positive influence and persuade the target nation to adopt a sympathetic stance to the targeting nation, or even a desire to imitate the targeting nation. Diplomacy in that assistance is provided on a government to government level to support pre-existing host nation initiatives and development goals.

How can Maritime Medical Diplomacy be an Instrument of Soft Power? Medical diplomacy is either the delivery of healthcare, or the training of indigenous health staff to facilitate host nation objectives. Adding the maritime element; to paraphrase 1990s US Marine Corps doctrine, maritime medical diplomacy is the performance of humanitarian medical assistance 'from the sea'. The use of naval vessels to perform maritime medical diplomacy can be an extension of the historic role of naval diplomacy in 'shaping' the environment. Maritime medical diplomacy is either carried out onboard ships or health personnel are deployed from ships, to ashore, to perform primary health care, public health tasks or surgery, either in field facilities or in host nation hospitals or clinics. One of the unique characteristics of maritime medical diplomacy is it minimises the 'foot print' of foreign-flagged health staff and facilities in the

host country. Even when deployed ashore, health personnel can return to their parent ship each night for accommodation. This allows the host nation government to demonstrate to its people that it still maintains its sovereignty and responsibility for the delivery of health care to its people.

Is there anything special about the Asia Pacific Littoral? The region is exceptionally placed for the delivery of maritime medical diplomacy. The area encompasses one third of the world's surface and has approximately 250,000 kilometres of coastline. The numerous archipelagos are separated by some of the largest expanses of ocean on Earth. The Pacific Island Nations (PINs), in particular are characterised by disparate populations on smaller islands, remote from the population centres of their countries.

What are the Health Problems facing the Asia Pacific Littoral? Unfortunately, the region has few developed countries with first world health delivery systems. The countries of the region suffer from lack of health infrastructure, trained health personnel and resources. In many countries numerous communicable disease are endemic and the toll of non-communicable 'lifestyle' diseases is high, particularly in PINs. Countries of the Asia Pacific Littoral are in dire need of the extra resources that Maritime Medical Diplomacy can provide.

The paper evaluates how Maritime Medical Diplomacy can influence the populations of the Asia Pacific Littoral? Further, is Medical Soft Power best achieved by military or civilian government means? It examines this by detailing a number of recent examples. It also details the impact of the global financial crisis from 2008-12 on the deployment of maritime military health assets. In conclusion, the paper then asks whether Australia effectively employs in maritime military health assets to best effect in generating soft power.

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### Alternate Strategies

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The ADF Theatre Project: A performing arts rehabilitation project

*Alison Creagh*

*BRIG Alison Creagh was educated at Canberra Girls Grammar School, and attended the Australian National University and served in the Army Reserve before joining the Australian Regular Army in 1985. Alison's Army career has spanned 28 years, holding appointments across a range of areas*

*including operations, capability development, acquisition, personnel management, public affairs and strategic communication and information and communications technology. Alison served in Cambodia, East Timor, Iraq and Afghanistan. She also supported the Sydney 2000 Olympics; and disaster relief and border protection operations in Australia. Alison was awarded the Conspicuous Service Cross in 1994 for her work in the Force Communications*

*Unit in Cambodia; and the NATO Meritorious Service Medal in 2009 for her work in HQ ISAF. Alison holds a Master in Management Studies (Project Management), a Master in Defence Studies, a Graduate Diploma of Communications and Information Systems, and a Graduate Diploma of Strategic Studies.*

The Department of Defence and the Department of Veterans' Affairs (DVA) provide programs to support the recovery and rehabilitation of current and former Australian Defence Force (ADF) members. The two organisations work together to respond to the needs of wounded, injured and ill (WII) ADF members and their families.

Defence has historically relied on sport-related rehabilitation programs to support personnel in their recovery and build their self-esteem. However, sporting opportunities often require a level of physical ability that preclude many WII personnel.

Defence organisations in other countries have recently considered the rehabilitation value of the performing arts to support the recovery of personnel who have been harmed in the line of duty. 'The Two Worlds of Charlie F', a play based on experiences of British Troops in Afghanistan, was performed by wounded, injured and sick British soldiers in 2012 and provided significant rehabilitation benefit to participants.

Defence is working with Sydney Theatre Company (STC) to produce a stage play, 'The Long Way Home', that will provide audiences with a unique insight into Australia's recent experience of war; and the challenges faced by those who have been harmed in the line of duty. The play will open in Sydney in February 2014, before touring major centres across Australia.

The ADF Theatre Project is the first time the ADF has used the performing arts as a vehicle to support the rehabilitation of serving personnel; and has the potential to provide similar psychosocial benefits as sporting rehabilitation programs.

Applicants of the ADF Theatre Project participated in a selection centre, involving mini acting workshops and sharing their personal stories with a selection panel. Participants appreciated meeting colleagues with similar experiences; and felt the ADF Theatre Project was an opportunity to share an important story with the Australian public.

The panel considered applicants' medical suitability; potential rehabilitation benefit; and relevance of operational service before short listing 19 servicemen and women to participate in the Development Phase of the Project, where they shared their story with the playwright and participated in acting, movement

and speech workshops during August-September 2013. The STC creative staff mentored and coached the ADF participants, as part of the rehabilitation process.

The health support arrangements for the Project are pivotal as participants have a range of physical and psychological injuries, covering the full WII spectrum, and require ongoing, personalised and focused care from a health support team of nurses and a psychologist as well as treating medical support from across Defence. Individual health assessments have been conducted as a baseline for measuring the effectiveness of the Project.

Without exception, the cast of 'The Two Worlds of Charlie F' described their involvement in the production as "profound" and "transformational"—in an entirely positive sense. At this stage of the ADF Theatre Project, it is premature to speculate on the rehabilitation value to participants, however, we expect that many will, at the least, be validated and proud of what will be an inspiring contribution to Australian theatre.

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Contemporary Veterans' experience of an Australian Peer Outdoor Support Therapy (POST) Program

*Kendall Bird*

*Kendall Bird is a Provisional Psychologist completing Masters of Clinical Psychology at the University of South Australia, under supervision by Nadine Pelling, PhD, Clinical Psychologist and Senior Lecturer at the University of South Australia.*

A peer outdoor support therapy (POST) program was explored as a therapeutic tool for increasing wellbeing for contemporary returned post-deployed (CRPD) veterans experiencing mental health issues via archival data. Non-clinical structured peer support interventions for veterans have the potential to be more accessible than clinical therapies, directly enhance mental health and retention, and also encourage earlier access to professional mental health support.

Method: To research the efficacy of a POST program with veterans experiencing ongoing mental health issues, two analyses were completed using participant data from Trojan's Trek 6-day camps from 2010 to 2012. Part One employed a longitudinal quantitative analysis of self-report questionnaires at baseline, day 6 and 2 months after camp participation for 20 male veterans. Part Two analysed diary entries 26 male

veterans completed whilst on camp using grounded theory content analysis. It was hypothesised that POST program participation would be positively associated with self-reported wellbeing over time.

Results: Repeated measures ANOVA indicated that depression, anxiety and stress were significantly reduced for participants at day 6, and remained significantly lower at 2 months follow up compared to baseline. Self-efficacy, overall life satisfaction and satisfaction with mental health also improved significantly. The qualitative analysis identified that hopes for the future were clarified for participants, with the main focus of the journals being self-reflection in observing change particularly regarding increasing self-determination and personal competence. The application of sessions to their own experience led to the expression of self-instructions for ongoing personal development. A key element

noted involved a sense of shared identity, experience and belonging with others, with clear benefits and sense of value gained from the POST program conveyed.

Implications: Results demonstrate that structured POST programs appear to be an acceptable and effective non-clinical treatment option for mental health care for CRPD veterans, and may be an important adjunct or precursor to other forms of therapeutic support. Further research and program development including both greater formalised ongoing support and spousal involvement after program participation is recommended to maintain outcomes long-term and improve relationship wellbeing for participants.

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### Alcohol Use / Sexual Assault

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#### Australian Defence Force Alcohol Management Strategy (ADFAMS)

*Maurie O'Connor*

*Maurie O'Connor is the Director of the Australian Defence Force Alcohol, Tobacco and Other Drugs Service within Joint Health Command. He has a substantial background in the alcohol and other drug field, mental health policy and service delivery through his prior employment with the Department of Veterans' Affairs, the Rural Health Education Foundation, the Australian Institute of Sport and Sports Medicine Australia. He is an experienced AOD practitioner, educator and health promoter.*

The ADF is committed to achieving a balance between encouraging the responsible use of alcohol and preventing its misuse as an ongoing element of our core business.

The Australian Defence Force Alcohol Management Strategy known as ADFAMS provides the overarching framework for this goal. ADFAMS is based on contemporary evidence from the fields of public health and change management; it focuses on leadership, capability building and shared responsibility and builds on the foundation of our existing work in managing alcohol related issues. The implementation of ADFAMS across the Army, Navy and Airforce is guiding current and future initiatives to ensure we meet our intent across the three domains of supply reduction, demand reduction and harm reduction.

Through ADFAMS, we have sought innovative and contemporary methods to educate and inform our members about responsible alcohol use;

we have designed strategies and pathways to manage the availability and supply of alcohol with accountability; we have strengthened the role of leadership in monitoring and responding to alcohol related incidents and we have introduced a stepped care approach to the service provision of treatment and support for those members who require it. ADFAMS maintains our focus on supporting members and managing alcohol related incidents while strengthening our focus on systemic cultural change.

This presentation will provide a comprehensive outline of ADFAMS and the Stepped Care Approach to Alcohol Management in the ADF. Challenges and pathways to implementation will be profiled in terms of both clinical and organisational factors. Lessons learned will demonstrate the advantages of a whole of organisation approach and future initiatives will highlight the importance of integrating prevention focused interventions with strong monitoring and reporting systems.

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Reducing alcohol-related incidents over 12 months in at-risk naval trainees post participation in the in-hospital trauma prevention program, P.A.R.T.Y. (Prevent Alcohol & Risk-related Trauma in Youth): a pilot evaluation.

*Jason Watterson*

*Jason is currently employed as a Research Officer with the National Trauma Research Institute*

(NTRI) at the Alfred hospital. Jason graduated with a BHSc in 1995 following which he worked in the specialty of cardiothoracics and heart lung transplantation. This included work in major cardiac units in London. Upon his return to Australia in 2003 Jason undertook postgraduate studies in advanced nursing (Intensive Care) whilst employed in the general intensive care unit at The Alfred. It was during this early part of his Intensive care career that Jason found his passion for trauma nursing. Over the past 16 years of working in intensive care Jason has continued to explore trauma nursing in intensive care and has had the opportunity to work with a colleague to explore the advanced role of the trauma nurse in ICU. Jason accepted a commission with the Royal Australian Navy in 2008 and currently holds the rank of Lieutenant. Jason completed a Master of Education in 2006 having been employed as a clinical educator at The Alfred for the previous 2 years.

Risk-taking behaviours resulting in reported incidents with or without traumatic injury are highly correlated with alcohol and substance abuse issues amongst trainees in the Australian Defence Forces<sup>1</sup>. Issues arising from inappropriate use and abuse of alcohol and to lesser extent illicit drugs are neither new nor novel in the young. We know for example, that 40% of all traumatic injury occurring in Australia as a result of alcohol abuse happens to those under 25 years of age<sup>2</sup>.

A cluster of factors describing the young defence force trainee has led to a number of recommendations to address the cultural issues relating to alcohol consumption, but “ compared to civilian settings in Australia where there are strict legislative controls over alcohol access and accompanying law enforcement activities, alcohol control in the ADF is mostly devolved to the level of the local command<sup>3</sup>. Thus, Command at HMAS Cerberus has investigated and implemented a number of strategies, one of which is the Prevent Alcohol and Risk-related Trauma in Youth Program (P.A.R.T.Y.) in conjunction with the National Trauma Research Institute (NTRI) at The Alfred hospital, in Melbourne.

P.A.R.T.Y. is a full day, in-hospital, injury awareness and prevention program. Originally established in Canada in 1986, P.A.R.T.Y. now operates at over 100 sites around the world. In Australia, sites have been established in Perth, Melbourne, Brisbane, and Sydney. It aims to provide participants with information about trauma that will enable them to recognise potential injury-producing situations, make prevention-oriented choices, and adopt behaviours that minimise unnecessary risk. The program is designed to engage young people

through interaction with emergency services personnel, health professionals, and patients who have experienced trauma and survived - often with significant disabilities. Holding the program within a hospital environment enhances the experience for the participants, and leaves a significant and lasting impression of the consequences of preventable trauma and risk taking behaviours.

Research so far undertaken by P.A.R.T.Y. sites around the world into the impact of the program on senior school students whilst very limited, has shown a statistically significant reduction in major trauma presentations in those who attended compared to their matched controls<sup>4</sup>. Other P.A.R.T.Y. research published in 2012 in Australia demonstrated a reduction in recidivism in juvenile justice young offenders who attended P.A.R.T.Y.<sup>5</sup>. According to P.A.R.T.Y. Headquarters in Canada, none of the 100 sites around the world have established a program for defence force trainees.

A P.A.R.T.Y. Defence (PD) pilot program was commenced in November 2011 for “at-risk” Naval trainees from HMAS Cerberus. PD differs from the school program by specifically targeting young adult trainees aged 18-25 rather than senior school students aged 15-19 as is usual for the P.A.R.T.Y. model.

Collection of 12 month follow up data has commenced with completion of data collection due in March 2014. Pre and post program risk assessment data together with the 12 month follow up data will be presented.

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Development of an alcohol management mobile application to encourage healthy drinking amongst young serving ADF personnel

*Kym Connolly*

*Kym Connolly is a communications professional with a career in government and community sector. Kym is leading the Department of Veterans' Affairs' engagement with contemporary veterans to reduce mental health stigma and encourage help-seeking behaviours. This has seen the development of a range of resources that use online and mobile technology to reach clients and their health professionals to promote mental health self-sufficiency, well-being and quality of life and enable practitioners to respond to the needs of veterans of all conflicts. See [www.at-ease.dva.gov.au](http://www.at-ease.dva.gov.au).*

ON TRACK with The Right Mix is a mobile application (app) developed to encourage young veterans and

serving members to actively manage their drinking behaviours and learn about healthy drinking. This presentation offers a case study of the development of a technological solution to respond to alcohol misuse behaviour in a serving military environment.

Self-report data from the 2010 Australian Defence Force Prevalence and Wellbeing Study showed high levels of harmful alcohol use, indicating binge drinking amongst serving members. Alcohol use in this setting was not as readily translated to disorder, however where there was disorder, it was in males in the 18-27 age group. At the same time, DVA research into mental health literacy indicated that a multi-faceted approach to health promotion was necessary for a younger demographic, with online and social media possible vehicles for engagement.

DVA partnered with the Department of Defence to use new technology to deliver The Right Mix messages of healthy drinking to a new generation of veterans and serving members. The Right Mix – Your Health and Alcohol was a suite of resources released in 2001 in response to the 1998 Vietnam Veteran Morbidity Study, to educate Vietnam veterans about healthy drinking behaviours and had been popular amongst this cohort.

ON TRACK with The Right Mix app is designed to assist current and former serving members manage their alcohol consumption. The presentation outlines DVA's approach to identifying the motivations for young serving members to actively manage their alcohol consumption, the development of a technological response to these motivations and a demonstration of the On TRACK app. The app is designed for self-management and as a tool to be used in a clinical setting.

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### Introducing SeMPRO SORT Model

*Sue Penn-Turrall, Jill Buckfield*

*Susan Penn-Turrall is currently the Director of Critical Response and Recovery within the Sexual Misconduct Prevention and Response Office, (SeMPRO). SeMPRO was established as part of the Department of Defence's response to the recommendations contained in the Review of the Treatment of Women in Defence Phase 2 report. Sue has spent the majority of her career working in child protection including working with survivors of childhood and adult sexual assault. Within the Official Solicitors Office, Lord Chancellor's Department in the UK, Sue worked as a Guardian ad Litem in many high profile child protection cases, including working with those under Mental Health Act*

*Section in Family Court hearings. She has worked in the International Child Abduction Unit and sat on the UK committee into the treatment of Unaccompanied Refugee Children. Sue worked in Child Protection within the ACT Government as a Practice Leader and worked as a rape crisis counsellor.*

*Sue has an undergraduate BA from ANU, and a Masters in Child Studies from Kings College London, which covered paediatric law. She has undergraduate and post graduate law from both the College of Law in the UK and ANU. She is a Barrister and Solicitor with the ACT Supreme Court and has postgraduate Diploma in Child Protection from LSE. Other post graduate qualifications include Criminal and Forensic Psychology, Government Investigation, Counselling and Working in Trauma. She will graduate her Masters in Social Work at the end of next year.*

*Jill Buckfield- After leaving school CMDR Buckfield worked for Telecom, as it was then, for 8 years prior to joining the Navy in 1986. During her 21 years in the permanent Navy she worked as:*

- *an acoustic analyst, identifying the ships and submarines from their acoustic signatures;*
- *an intelligence officer;*
- *the operational requirements manager for the acoustic suite on the Collins Class Submarine;*
- *a military support officer – working with ADF members and their families in crisis;*
- *a staff officer in numerous areas;*
- *a project officer;*
- *a psychologist at Russell Health Centre and Duntroon Hospital; and*
- *the Officer Commanding the Administration Cell in the Australian Headquarters in Baghdad.*

*After leaving the permanent Navy in 2007, she joined Defence as an APS psychologist and has worked at both the Australian Defence Force Academy and Duntroon Health Centres in clinical roles and staff officer positions in Mental Health Clinical Programs and Standards.*

*CMDR Buckfield has maintained her active reserve status, drafting the Defence Fatigue Management policy and working as the Deputy Director Reserves Navy. CMDR Buckfield completed a one year CFTS contract in 08/09, working in a clinical role as a psychologist at Duntroon Health Centre and then as the SO2 in the Directorate of Psychology. CMDR Buckfield rejoined on a two year CFTS contract in Feb 2013 and is working in SeMPRO as a Support Coordinator.*

*CMDR Buckfield has a degree and post graduate qualifications in Psychology and is a registered*

*psychologist with the Australian Health Practitioners Regulatory Authority.*

*CMDR Buckfield is currently single and lives on a country property where she pursues her passion for equestrian activities of horse riding and coaching.*

Defence has been working on how to better manage and respond to sexual offences, including sexual assault, within its community for sometime now. The Victim Care Project (VCP) was commenced in 2010 and, in 2012, The Review into the Treatment of Women (RTW) in the ADF by Human Rights Commissioner, Elizabeth Broderick and her team, was published. The RTW Report made a series of recommendations, one of which, when approved by the ADF in later 2012, established the Sexual Misconduct Prevention and Response Office (SeMPRO). Since Head SeMPRO was appointed in October 2012, the Office has developed and implemented a trauma-informed, principle-based framework for engagement with anyone who discloses or reports a sexual assault. The response model itself is an adapted form of the Sexual Assault Response Team (SART) Model. The Sexual Offences Response Team (SORT) Model

has been developed as a dynamic evidence-based model designed to utilise existing Defence support systems to respond appropriately and holistically to anyone reporting or disclosing sexual assault. The SORT Model is intended to develop alongside a growing understanding of the nature and form of sexual assault and other sexual misconduct within Defence. The Model draws on the primary research work currently being undertaken within Defence, such as the VCP by Amber McKinley and within the primary data being received by SeMPRO. This talk will introduce the SORT Model, outline the driving trauma-informed principles, and discuss the concept of sexual assault and sexual misconduct within the context of Defence. We will touch on the assumed barriers to disclosure which also connect to the lack of conviction of offenders. We will conclude with a short overview of the educational program which is proposed to run alongside the application of this Model to drive significant changes to the way Defence responds to sexual assault.

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### CASPEAN / RAAF Session

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#### The Role of CASPEAN

*Amanda Garlick*

*CMDR Amanda Garlick joined the RAN as a Nursing Officer in 1993. Since then she has had numerous postings and has been deployed to Rwanda, Iraq & Afghanistan.*

*CMDR Garlick holds a Master of Nursing, Master of Public Health, MBA & Doctor of Nursing (Adel.)*

*CMDR Garlick is currently posted as the Manager of Nursing Services at the Maritime Operational Health Unit (MOHU), Sydney.*

The role of the Casualty Preventative Equipment Analysis (CASPEAN) Officer was first deployed in mid-2011. This tri-service Nursing position was based in Tarin Kot, Afghanistan, jointly sponsored by HQJOC, J07 and DSTO, Human Performance and Physical Protection Division (HPPD).

The CASPEAN Officer was responsible for collecting and collating data on Australian battle casualties. This data focussed on the effect of the mechanism of injury on the member's protective equipment, including vehicles that they may be travelling in. Post-event CogState data was also collected on the member's involved in an incident with comparisons drawn from pre and post event readings supported by the member's clinical presentation. From mid-2012 data was also drawn from blast sensor gauges and correlated with CogState and their clinical presentation.

This presentation will discuss the CASPEAN role providing an overview of data collected, how this was done and the application of the findings. It will also highlight the benefits of this role to the ADF.

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## Plenary Speaker – Dr Werner Madei

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### Massive Transfusion Protocol Blood in the German combat support hospitals in Afghanistan

*Werner Madei*

**Background:** Approximately 0.6-3% of trauma patients require massive transfusions (MT), “massive” being defined as the transfusion of > 10 red blood cell units. Because of limited blood resources the German combat support hospitals (GCSH) in Afghanistan were advised by the German Transfusion Medicine Committee (GTFMC) to implement special blood management protocols to meet unanticipated urgent transfusion needs in case of mass casualty incidences. For this reason the GTFMC has approved and recommended cell saver technology and thrombelastometry in the emergency room, the use of certain blood products like rFVIIa (Novo Seven®), Tranexamicacid (TXA) and Fibrinogen (RiaSTAP®), the transfusion of cryoconservedlyophilized plasma and cryopreserved platelets, the early use of Plasma:PRBC:Platelets (1:1:1) during the resuscitation of severely injured casualties.

**Aims:** One of the major tasks of the GTFMC is to follow up on the GCSH if the enforced transfusion protocols are met and whether the resources of blood and blood products are sufficient.

**Methods:** Therefore the TFGTFMC has initialized a survey of the year 2010 which should list all

transfused blood and blood products of the German combat support hospitals in Afghanistan (Mazar-e-Sharif, Kunduz, Feysabad)

**Results:** Table 1 shows that all the GCSHs in Afghanistan are applying the recommended protocols of the GTFMC. Especially in the case of Kunduz CSH, where there is still a high incidence of severely injured casualties, the recommended 1:1:1 ratio of PRBC, Plasma and Platelets was taken into account. Due to the remoteness of the location of the German Combat Support Hospital in Feysabat there is a high probability of shortage of blood products in case of bad weather conditions. This was the reason for the use of Fresh Warm Blood utilized in this facility.

**Summary/Conclusions:** There is clear evidence that a significant proportion of severely injured casualties are coagulopathic on admission to Combat Support Hospitals in Afghanistan and that there is a need to proactively treat the condition. Relevant supporting evidence needs further to be derived from observations on combat casualties, and it is foreseen, that sufficient data will soon be available to assess the full benefits of damage control resuscitation of critically injured casualties in Afghanistan. The enforcement of blood management protocols could be used to limit the potential waste of unused blood deployed far-forward with German Combat Support Hospitals.