

## Poster Presentations

### Electrocortical Evidence of Reduced Facial Threat Differentiation in Combat-Exposed Military Personnel without Clinically Significant Psychopathology Symptoms: An ERP Study

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#### Abstract

PTSD symptoms such as exaggerated fear response and overgeneralised threat perception have previously been suggested to be physiologically underpinned by functional abnormalities within key neural structures implicated in threat detection and fear learning. Symptom provocation studies have provided compelling evidence that PTSD status is associated with exaggerated neural responsivity to threat stimuli, however reduced differential responses indicative of impaired threat/non-threat discrimination have also been shown. Whilst such abnormalities have been well examined in PTSD, evidence suggests that trauma exposed groups without significant clinical symptoms nonetheless exhibit threat processing abnormalities reminiscent of PTSD. The potential presence of PTSD-like threat processing abnormalities within healthy trauma exposed groups represents an area of considerable importance, particularly in the contexts of high risk subpopulations such as military combat forces. Military personnel are at greatly elevated risk of initial, and repeated traumatic exposure. Furthermore, these high risk groups routinely encounter, and are required to assess, and respond appropriately to a range of potentially life threatening situations. As such, the potential presence of threat processing abnormalities [e.g. elevated threat sensitivity and/or deficits in threat differentiation] within such groups may have a broad range of implications regarding critical decision making [e.g. use of lethal force] as well as social, occupational and long-term mental health outcomes [e.g. elevated vulnerability to future PTSD development]. As such, the current study aimed to extend previous findings from PTSD and civilian trauma groups to a high risk population of military personnel. Specifically, this study examined electrocortical N170 amplitude responses to masked fear and neutral facial expressions within a cohort of asymptomatic military personnel, both with and

without prior history of significant combat exposure [i.e. healthy combat-exposed and healthy combat-naïve military controls].

As predicted, results provided support for the hypotheses that combat exposure, in the absence of clinically significant symptoms, would nonetheless be associated with abnormal neural response patterns, reminiscent of those observed in PTSD. Specifically, whilst both groups responded similarly to fearful expressions, combat-exposed personnel failed to exhibit normal patterns of reduced N170 amplitudes to neutral expressions, resulting in an absence of threat/non-threat response differentiation. Conversely, reduced amplitude response to neutral relative to fearful expressions were observed in combat-naïve controls. Although it is difficult to determine causality, correlational analyses revealed a linear associations between higher N170 amplitudes within the combat-exposed group and increasing number of prior combat experiences, thus suggest that abnormal neural response patterns observed in this group potentially result cumulative combat exposure. Whilst speculative, these findings may indicate a deficit in facial threat discrimination within combat exposed subjects, and that such impairments may be driven by an acquired default tendency to respond to non-threatening expressions as potential threats.

Although current results bear striking similarities with previous findings from PTSD research, it remains unclear whether such patterns reflect clinically important markers such as increased vulnerability to future PTSD develop [particularly in the context of high re-exposure likelihood]. An ongoing longitudinal investigation of this population will aid in clarifying this possibility. Similarly, the potential impact on present cognitive and behavioural functioning [e.g. threat perception and critical decision making] also warrants further investigation. Whilst questions remain, the current results do provide support for the suggestion that combat exposure has measurable altering effects on threat processing systems consistent with those observed in PTSD, and that such effects may be present despite lack of clinically significant symptom presentation.

#### Biography

*PhD student focusing on neurocognitive markers of battlefield trauma exposure, as well as PTSD risk and resilience.*

## HKM the Key to Unlocking a Digitized Defence Health Capability

Lieutenant Colonel David Bullock

### Abstract

JP2060 is the overarching Joint Project for the modernisation of the Deployed Health Continuum for the ADF. Having completed Phases 1 & 2, which were both incremental and evolutionary improvements to deployed health equipment. The remaining Phases include: Phase 3 (Health Clinical Care) and Phase 4 (Health Knowledge Management), both of which cover the complete spectrum of the Deployed Health Continuum (DHC).

Phase 4 (Health Knowledge Management) has been sanctioned by VCDF and the Parliamentary Investment Committee to investigate the feasibility of developing one "harmonised" solution to support Garrison and Operations. The outcome is the most optimal model representing best e-clinical practice. There are few e-health systems across the globe which included such a wide clinical practice and geographic scope. As such, the development of this capability represents leading edge technological capability development.

The first stakeholder workshop has been completed in Mar and Apr 17, whereby the HKM lead staff conducted a series of workshops across all stakeholders to ascertain the level of understanding across defence of e-health systems including e-health data, e-health information systems and e-health knowledge management including what systems are currently available and utilised across the ADF including the deployed health continuum (DHC). The second component of this inaugural workshop is designed to allow stakeholders to express 'what it is that they want' which informs the project team of defence needs and wants in achieving digitised clinical best practice.

The intent of this presentation is to provide feedback from the series of first workshops, displaying trend analysis of the current level of e-health knowledge / awareness and common emergent threads that are informing future capability and project development. I intend to work with KPMG to build a smart phone app facilitates a live interactive educative session.

### Biography

*Lt Col Bullock joined the RAAMC as a Lateral Transfer from the British Army in 2007 as a Health Services General Support Officer. 35 Years of military service have witnessed him deploy with, in support, and in command of combat health units to Northern Ireland,*

*the Balkans, North Africa, Iraq, Afghanistan and other Middle East countries, providing health support to the complete spectrum of operations.*

*Within the ADF he has been employed as a Coy Comd at 2 HSB, lead health planner HQ 1 Div, OPSO 2 GHB, DCI at the Land Warfare Centre and SO1 Joint Health Capability Joint Health Command where he is currently the lead for JP2060 Ph4 (Health Knowledge Management).*

*LTCOL Bullock is a keen academic with a passion for the professionalisation of ADF health services management. He has a Masters in Public Health, Health Management, Business Administration and an MSc and holds a lecturing position at the UQ School of Public Health.*

*He is the founder and chair of the Australasian College of Health Services Management Defence Special Interest Group. As the College's only Defence Fellow, he is currently and is mentoring two College Fellowship candidates in 2017.*

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## That was Close: 'Near misses', 'Dangerous Occurrences' and 'Hazardous Exposures' in the Australian Army

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### Abstract

**Introduction:** Occupational health and safety incidents, such as 'hazardous exposures', 'near misses' and 'dangerous occurrences', place the safety of military personnel at serious risk. These incidents, which can differ between service type (e.g. full-time and reserve personnel) can serve as a warning to the Australian Army as to where future potential injuries and fatalities may occur if risk management strategies are not implemented.

**Aim:** The aim of this study was to investigate reported incidents in Australian Army personnel and compare differences between full-time (Australian Regular Army [ARA]) and part-time (Army Reserves [ARES]) personnel.

**Methods:** A retrospective cohort study was conducted using data sourced from the Workplace Health, Safety, Compensation and Reporting (WHSCAR) database. Non-identifiable data spanning the period 1st July 2012 to 30th June 2014 were provided. Data were included in the study if the incident: (a) involved ARA or ARES personnel; (b) occurred when the soldiers were on duty or in training, (c) occurred during service between 01 July 2012 and 30 June 2014. Data were excluded if the incident: a) was an injury or fatality, or b) was to service animals. The Australian Defence Human Research Ethics Committee (Protocol LERP 14-024) and the Bond University Human Research Ethics Committee (Protocol RO1907) granted ethics approval for this study.

**Results:** Of the reported 3,791 incidents, 96% involved ARA personnel and 4% ARES personnel. When accounting for population size and days of service the ARA reported 6.18 incidents per 100 soldiers-years of active service and the ARES 3.29 incidents per 100 soldiers-years of active service. Across both populations, the leading activity for which an incident was reported was operations (n=2,096, 99.4%) followed by weapon firing (n=304, 8.0%) and unknown (n=206, 5.4%). In the ARA, 84% of incidents were hazardous exposures (68.2% due to operations), 14% near misses (22.0% due to driving) and 2% dangerous incidents (36.9% due to weapon firing). In the ARES, 55% of incidents were hazardous exposures (30.2% due to unknown causes, 24.4% as a passenger), 38% near misses (45.5% due to driving), and 7% dangerous incidents (41.4% due to weapons firing). The Private / Private equivalent ranks had the higher rate of incidents (37%) across both service types, followed by Corporal / Corporal equivalent ranks (27%).

**Conclusions:** Apart from exposure reported by ARA personnel due mostly to operations, weapon firing and driving present as leading incidents placing the health and wellbeing of ARA and ARES personnel at risk. Risk mitigation strategies, focussing on operational exposures, weapons firing and driving are recommended to reduce the level of risk and possibly injury, mortality and illness suffered by Australian Army personnel. These strategies should be targeted towards the Private / Private equivalent and Corporal / Corporal equivalent ranks.

### Biography

*Rob served for over 20 years in the Australian Regular Army as an infantry soldier, physical training instructor, physiotherapist and human performance officer. Still serving in the Army Reserve on various human performance projects, Rob took up an*

*appointment at Bond University where the majority of his teaching is on maximising human potential. With a PhD in occupational load carriage for military personnel, Rob has over 40 peer reviewed publications specialising in tactical populations alone and has been invited to present his research both nationally and internationally for a variety of tactical organisations.*

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