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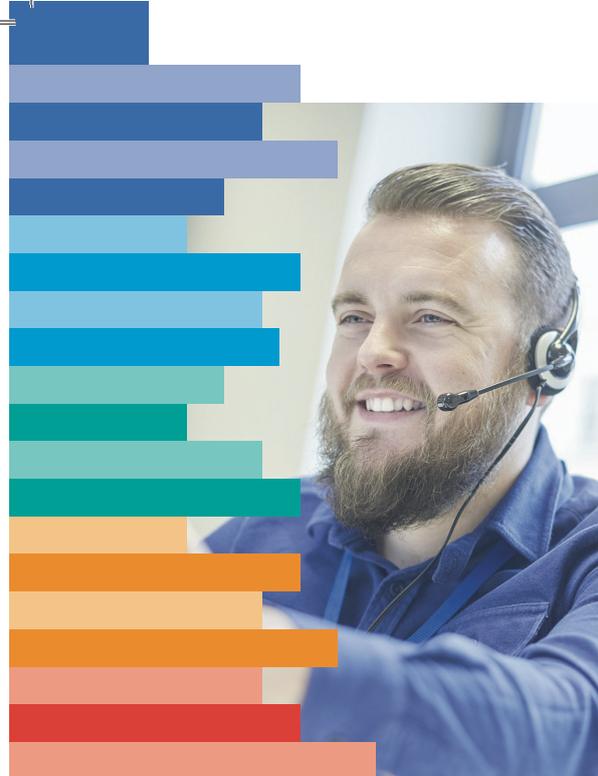
Journal of Military and Veterans' Health



- Epidemic of Processionary Caterpillar Dermatitis in Military Cadets
- Dispositional Anger and Experiential Avoidance in Veterans with PTSD
- A Comparison of Poisoned Patients at Military and Veterans Administration Hospitals

The Journal of the Australasian Military Medicine Association





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Photo Courtesy of Murray Hayes

Journal of Military and Veterans' Health

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STATEMENT OF OBJECTIVES

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

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

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

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Editorial

Medicinal cannabis

In February 2016, the Commonwealth Government amended the Narcotic Drugs Act 1967 to allow cultivation of cannabis and manufacture of cannabis-based products (CBP) for research and medical purposes. This was followed by the establishment of a license and permit scheme under the Act, run by the Commonwealth's Office of Drug Control, which opened on 1 November 2016.

On the same day, the Therapeutic Goods Administration (TGA) listed cannabis and related cannabinoids for medical and research use in Schedule 8, as controlled drugs. Cannabis for recreational use remained in Schedule 9 (prohibited substances) and continued to be captured by jurisdictional Drug Laws. As most states and territories adopt the Poisons Standard, by reference, into their Medicines and Poisons Act (however titled), this meant that these substances could now be legally prescribed and dispensed, including in the Australian Defence Force (ADF). Publications on the current ADF website, however, only address recreational use.

Most states and territories have now established processes under their Medicines and Poisons arrangements to deal with CBP prescriptions. Most involve specialist prescribing and some form of expert panel to advise the regulator. As most CBP are unregistered goods in Australia, medical practitioners must either obtain approval from the TGA to import or access an increasing range of local supplies from pharmacies supplied by various small importers.

The safety and efficacy of these drugs remains controversial. Several Australian medical Colleges have released statements recommending caution in prescribing until there is further robust research on efficacy and safety. While there is some scientific basis for the medical use of certain CBP as symptomatic

therapy for a limited range of serious medical conditions, the existing evidence for broader medical use is of limited quantity and quality, there is ongoing concern about long term benefit and safety, and there is an agreed need for further high-quality research. These factors, coupled with initial limited supply, have seen limited enthusiasm for prescribing these agents.

Over time, this will change, as medical practitioners become more comfortable with the agents and a broader range of accepted uses is established. The ADF will need to determine its policy on use by serving members, with several other countries' militaries having either a zero tolerance or unclear policy on its use. I would welcome any letters to Editor or articles on how the ADF should proceed in this area.

Our third issue of 2017 tackles a broad range of topics. Caterpillar dermatitis, poisoning in military and veterans' hospitals, and professional role conflicts in military teaching head up the articles. There are also several mental health articles, looking at anger in PTSD, web-based social support programs and the mental health of unmanned aerial vehicle operators. Finally, there are two interesting perspectives, one on command and technical authority and another on the Army Malaria Institute.

We continue to get a good range of articles, but other military and veterans' health articles are always very welcome and we would encourage all our readers to consider writing on their areas of military or veterans' health interest. As we head into our annual AMMA Conference, I would encourage all presenters to publish their presentations, to ensure they get to a wider audience.

Dr Andy Robertson, CSC, PSM

Editor-in-Chief

Letter to the Editor

Dear Editor,

JMVH ARTICLE: MALARIA OUTBREAK ABOARD HMAS NEWCASTLE

As one of its non-corresponding authors, the JMVH article by Rose et al regarding the malaria outbreak aboard HMAS *Newcastle* in June 2015¹ merits further elaboration.

I first became involved with this article on 22 July 2015, when I was asked by the Director Navy Health to comment on a brief from the Director Army Malaria Institute (AMI) regarding this outbreak (the first among seagoing Navy personnel since at least the early 1960's^{4,5,6}. DNH's request reflected my role as Fleet Medical Officer (FMO) and the health technical authority for *Newcastle*.

I was not aware of Director AMI's intention to develop his brief into a JMVH article, until I received the first draft (as part of the JHC publishing clearance process) via DGNHS on 24 August 2015. As DGNHS and I both wished to ensure that FHD was appropriately represented in the article, following further discussion with the corresponding author, I became an additional non-corresponding author. As a result, I reviewed the draft article and submitted my revisions in September 2015.

I received the next iteration of the manuscript in November 2015. I noted that parts of the article continued to imply that issues highlighted to FHD as a result of the outbreak remained outstanding, when in fact they had already been addressed at the FHD Medical Allowance List Working Group meeting on 13 July 2015. I amended the draft accordingly for the second time, and resubmitted it shortly thereafter.

The corresponding author emailed me on 14 March 2016, that the article had been cleared by HQJOC and would be published later in the year. When I reviewed the paper again on 10 June 2016, I found that, contrary to my expectations, my November revisions had still not been included. I resubmitted them for the third time the same day.

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- 1 Rose, G.L, Westphalen N, Shanks, G.D. Malaria Outbreak Aboard an Australian Navy Ship in the Indian Ocean. *Journal of Military and Veteran's Health* Vol 24 (3), Atg2016, [online], ship-in-the-indian:ocean . 12016, 07 SepN.
- 4 Telecon, CAPT F.J. Parkes RANR, 08 Sep 15.
- 5 Telecon, RADM G.J.A. Bayliss RANR (Rtd), 10 Sep 15.
- 6 Telecon, CDRE M.J. Flynn RANR (Rtd), 10 Sep 15.

On 09 August 2016, the corresponding author advised that the article was out in print. Review confirmed it continued to remain factually inaccurate, in implying that the issues highlighted to FHD as a result of the outbreak still remained outstanding 13 months later. Feedback from JMVH indicated that my March revision was received after the manuscript had been reviewed, accepted, and approved.

On 17 August, I contacted the corresponding author to express my concerns. Although he indicated that the decision not to incorporate all my revisions had been made by JHC and HQJOC, the necessary factual corrections had still not been made. Following a discussion with the Editor of JMVH on 07 September, I was informed that either the online version could be changed with the consent of the other authors, or I could write to the Editor.

As the corresponding author was unwilling to pursue the former, the primary intent of this letter is to highlight FHD's prompt staff work, in producing a non-urgent MAL amendment (among scores of others), once the need had been identified.

In addition, it is requested that the JMVH Editorial Board require concurrence from all future corresponding and non-corresponding authors that their article is ready to be published, on the same terms as I believe applies to other peer-reviewed journals.

In the interests of openness and transparency, it is also suggested that all future JMVH articles that require any form of clearance or other publishing approval process from the author's employer or other agencies be clearly identified as such, as part of the declaration of interest disclaimer process.

Yours sincerely

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Epidemic of Processionary Caterpillar Dermatitis in Military Cadets

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Abstract:

Not all epidemics are due to infectious diseases. We report an epidemic of processionary caterpillar dermatitis occurring in military officer cadets participating in a field exercise. The risk of caterpillar dermatitis was unappreciated by those on a map exercise near Majura, despite seeing such insects in the field. At least 103 ADFA and RMC cadets were affected with large areas of dermatitis with an urticarial rash, about 30 seriously enough to require topical steroids. Caterpillar dermatitis occurs commonly but only rarely does it present as a unit-incapacitating epidemic of severe dermatitis with urticaria.

Key words: dermatitis, epidemic, processionary caterpillars

Introduction:

Many illnesses can rapidly incapacitate a military unit but it is particularly disturbing when the agent is unknown or unsuspected. Outbreaks of gastroenteritis trigger a search for enteric infections; as outbreaks of respiratory symptoms trigger screening for infections such as influenza. In a similar way, an outbreak of dermatitis triggers a search for some contact exposure and is usually limited to one or only a few persons with a fairly obvious source to incriminate. Causes of epidemic dermatitis with urticaria and pruritus are few and can usually be traced to some natural source. Psychological problems may arise during war time if such outbreaks are imagined to be due to blister agents such as mustard gas or other toxic exposures. Accurate diagnosis coupled with symptomatic treatment is usually sufficient to calm an affected unit and get them back to duty.

Epidemic:

We report an epidemic of processionary caterpillar dermatitis with urticaria which occurred in officer cadets at the Australian Defence Force Academy (ADFA) and the Royal Military College (RMC), Duntroon ACT in February 2016. A company of officer cadets were participating in a field training exercise without troops. They were occupied with maps while in the open air under trees at the Majura Training Area. Suddenly several of the cadets began to develop severe itching and skin irritation. Figures 1 and 2. This rapidly spread to involve 54 ADFA and

49 RMC cadets (a majority of those present) and some of the directing staff. At least 21 of these cadets required an after-hours clinic visit at the Duntroon Health Centre due to intractable pruritus and insomnia, excoriation and pain. None of the cadets claimed direct contact with any insects or disturbed any possible nesting sites. On examination, large areas of urticaria and inflammation were seen as shown in the first two figures. Caterpillar dermatitis with urticaria was assigned as the likely diagnosis and the cadets were given symptomatic treatment with oral antihistamines and topical steroids. Pruritus severe enough to disturb sleep gradually resolved over a few days.

Dermatitis:

Caterpillar dermatitis was formerly called "erucism" deriving from the Latin *eruca* (caterpillar). It is caused by brittle hairs (setae) on the caterpillar which may readily break off and embed in skin on contact¹. Each caterpillar may produce greater than a million setae². The hairs can be direct mechanical irritants and can be broken, releasing a wide variety of chemical irritants containing enzymatic compounds and protein toxins^{2,3}. These proteins can cause both immediate and delayed-type hypersensitivity reactions. Direct contact with caterpillars is not required and aerosolised spines in heavily contaminated areas near bag-nests do, if rarely, cause epidemic urticaria. Indeed, a massive outbreak occurred in Shanghai, China in which 500,000 cases of dermatitis were attributed to airborne hairs of the Asian mulberry moth



Figure 1. Urticarial rash shown along trunk of an effected military cadet



Figure 2. Skin inflammation around another cadet's neck



Figure 3: Primary ground nest at the base of a tree and a secondary nest under surface debris about 1m away. Image: Julianne Farrell

caterpillar settling on garments hanging on clothes lines⁴. Forty-two of ninety persons became ill by such indirect contact with the oak processionary caterpillar in Germany⁵.

The most common moths implicated in caterpillar dermatitis seen in Australia are *Ochrogaster lunifer* - the bag moth, *Euproctis edwardsii* - the mistletoe browntail moth, and *euproctis lutea* - the freshwater mangrove moth⁶. A four-month outbreak of dermatitis in 2001 was eventually traced to mistletoe brown-tail moth caterpillars in a tree within three meters of a community centre in New South Wales⁷. A wide range of moths can cause such outbreaks globally with symptoms usually ranging from mild pruritus to dermatitis with urticaria⁸. Rarely severe events are noted such as osteomyelitis or corneal injury⁹. In Australia, Bishop and Morton (1968), reported 86 cases of eye injury due to setae of *Anthela nicotiae*, the hairymary caterpillar¹⁰. In Brazil, *Lonomia* caterpillars can rarely cause hemolysis and internal bleeding which can lead to death¹¹.

Previous outbreaks:

The only previously described outbreak in the Australian army we were able to locate occurred in 1944 when ten soldiers became ill from contact with *Ochrogaster lunifer* caterpillars in a north Queensland bivouac area¹². The Israeli army reported the largest outbreak of military caterpillar dermatitis in 1959 when 600 of 3000 soldiers camped in a pine grove were affected by contact with *Thaumetopoea wilkinsoni*, a relatively recent importation from Europe¹³. An outbreak of caterpillar dermatitis in a US military community in Germany in 1995



Figure 4: Line of Processionary caterpillars photographed in South Brisbane 2016.

affected 144 soldiers and civilians². The US military in Lavorno, Italy regularly monitors and controls for processionary caterpillars.

Processionary caterpillars are those that move in files of up to six metres in length, each caterpillar head to tail from their nests – found at the base of a tree, on the trunk, or in the canopy - to feed on forage before returning to their nests. Figure 3. They generally feed at night, leaving the nest in late afternoon or early evening and returning to the nest around dawn. Figure 4. Although specimens were not available to make a positive identification, the most likely insect involved is the coastal bag-shelter moth or inland bagmoth (*Ochrogaster lunifer*) based on insects known to produce such epidemic urticaria historically^{1,3}. A single contact is enough to discourage any future contact with such larval insects but unapparent contamination around their bag-shelters does occur¹⁴.

Differential Diagnosis:

While most cadets presented with a papular urticarial wheals, a few presented with a more petechial rash and pin-size papules. Scrub-itch mite ('kangaroo mite') was considered a possible causal agent and some directing staff sought topical insecticides to ensure that they were 'mite-free' after return to barracks. The distribution of these rashes tended to be on the chest and abdomen, unusual for mite bites that usually occur predominantly in the lower half of the body and particularly ankles. Close inspection failed to reveal any sign of mite activity and this was thought an unlikely cause. The Majura Training Range is mostly grassland and lightly wooded eucalypt and there are few reports of biting midges or fleas. The urticarial lesions were flat-topped and not typical of mosquito bites.

There are relatively few epidemic agents capable of incapacitating a military unit. Other non-infectious natural exposures besides caterpillars include a variety of trees and plants such as "poison wood" (*Metopium brownei*) and "blinding tree" (*Excoecaria agallocha*) in Central America with toxic excretions (e.g. sap) that contaminate soldiers resting under such vegetation. Noxious substances or toxins (e.g. jellyfish) to protect the organism are common in nature but most require direct contact and are obvious to the observer. Prevention of future caterpillar-caused epidemics depends on identifying the threat from the presence of bag-shelters in canopies, on tree trunks, or at the base of trunks or lines of caterpillars and carefully avoiding such areas likely to be contaminated.

Key Points:

- The military medical importance of caterpillar dermatitis is poorly appreciated
- Urticarial wheals are commonly reported from exposure to processionary caterpillars
- History of exposure can be vague
- Treatments are largely based on symptoms
- Topical steroids and oral antihistamines have good success

Those exposed to caterpillars, or their nest material should not scratch their face because they risk rubbing the setae (spines) into their eyes, which may cause severe pain.

First aid consists of using sticky tape over the skin to remove the setae

Contributors:

DCR, MJF and HRJ were the treating physicians, SPF was the consultant entomologist and GDS was responsible for initiating the report as well as the writing of the first draft of the manuscript. All authors participated in writing the final manuscript.

Conflicts of interest statement: The authors do not claim any conflict of interest.

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Disclaimer: The opinions expressed are those of the authors and do not necessarily reflect those of the Australian Defence Force.

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Dispositional Anger and Experiential Avoidance in Veterans with PTSD

M Toohey, A Santanello, O Van Orden, M Soll, S Batten

Abstract

Background: Anger is often indirectly addressed in posttraumatic stress disorder (PTSD) treatment despite reports that traumafocussed therapy may not be sufficient in improving anger responses¹. Thus, it is possible that anger in the context of PTSD might be related to additional factors such as personality traits and coping styles.

Purpose: We sought to identify additional elements influencing anger. We hypothesised that trait anger (a personality trait) and experiential avoidance (a coping style) would account for significant variance in state anger when controlling for PTSD symptom severity in a sample of treatment-seeking veterans with a history of PTSD.

Material and Methods: One-hundred and one veterans completed pencil-and-paper surveys including the Posttraumatic Stress Disorder Checklist, Acceptance and Action Questionnaire-II, and State-Trait Anger Expression Inventory-2, and a subsample of 79 veterans meeting screening criteria for PTSD were included in these analyses.

Results: Experiential avoidance, PTSD symptom severity, and trait anger had significant zero-order correlations with state anger while only PTSD symptom severity and trait anger had a significant partial effect in the

full model ($p < 0.01$). Stepwise multiple regression produced a three-predictor model accounting for 27% of the variance in state anger, explained partially by PTSD symptom severity and trait anger ($F(3, 75) = 12.86, p < 0.001$).

Conclusion: Implications include addressing anger directly in treatment and not as a symptom that will be indirectly reduced through the treatment of PTSD.

Key Words/Phrases: *State Anger, Trait Anger, PTSD, Experiential Avoidance, Veterans*

Conflicts of interest: none declared.

Anger is among the most common symptoms reported by veterans who have been diagnosed with PTSD². Veterans diagnosed with PTSD who served in Vietnam³⁻⁴ and who served in Operations Iraqi and Enduring Freedom⁵⁻⁶ tend to report a significantly higher degree of anger than veterans not diagnosed with PTSD. Congruently, partners of veterans diagnosed with PTSD often report observing higher levels of anger in their spouses when compared to partners of combat veterans without PTSD diagnoses⁷.

Anger is associated with the development and maintenance of PTSD. The presence of anger at initial assessment has been found to predict symptoms of PTSD four weeks post-assault in survivors of sexual and nonsexual assault⁸ as well as chronic PTSD fourteen years post-assault in a sample of Vietnam veterans⁹. Anger can interfere with motivation to engage in treatment¹ and is also associated with attenuated effectiveness of treatment in both combat¹⁰ and non-combat¹¹ veterans presenting with symptoms of PTSD. Among veterans and civilians diagnosed with PTSD, anger is associated with a variety of family, vocational, medical, and functional impairments^{2,3,12-15}. Despite the prevalence and salient consequences of PTSD-related anger, the lack of literature on the topic makes it difficult to conceptualise and treat effectively¹. As a result, available interventions for PTSD-related anger are limited in their effectiveness¹⁶.

Spielberger differentiated between two types of anger: *trait anger* and *state anger*¹⁷. While state anger is conceptualised as the episodic and momentary experience of angry affect, trait anger is defined as the general, dispositional tendency to experience

anger. State and trait anger have been shown to have a strong, direct relationship with each other in police officers diagnosed with PTSD¹⁸ and in male college students who report exposure to a traumatic event¹⁹. Iraq and Afghanistan war veterans who screened positive for PTSD symptoms were observed to have significantly higher trait anger than veterans who did not screen positive for PTSD symptoms⁵. In addition, trait anger appears to have a significant relationship with emotional numbing, hyperarousal, and aggressive behaviour in veterans of the recent conflicts in Iraq and Afghanistan²⁰.

Previous research suggests that experiential avoidance may also play an important role in the development and maintenance of a variety of psychological disorders including PTSD²¹⁻²³. Experiential avoidance is defined as a general coping style in which individuals engage in strategies intended to alter the frequency or experience of private events such as thoughts, feelings, memories or bodily sensations or the contexts that occasion them²². Studies have shown that experiential avoidance predicts PTSD in veterans²⁴⁻²⁵.

Experiential avoidance, that is avoidance of both trauma and non-trauma related internal experiences such as unwanted thoughts and feelings, might also contribute to maladaptive behavioural patterns related to anger²⁶⁻²⁷. For example, individuals might try to avoid feeling angry in the moment when it seems too intense, lasts too long, or occurs too frequently. Gardner and Moore proposed an “anger avoidance model” which suggests that strong motivation to avoid or terminate the experience of anger may play a central role in anger dysregulation²⁷. Specifically, it is proposed that an early-life history of abuse and neglect may contribute to the development of cognitive biases toward threat and an exaggerated sense of vulnerability that fuels chronic feelings of anger. Anger is experienced as intolerable, and difficulties in processing angry affect contribute to overgeneralised internal (e.g., cognitive rumination) and external (e.g., aggressive behaviour) coping strategies that function to decrease or prevent the experience of anger in the short term. Paradoxically, these strategies may simultaneously maintain and even create situations that are likely to occasion feelings of anger and vulnerability in the future. Similarly, Eifert and Forsyth proposed that anger-related behaviours aimed at reducing emotional discomfort (i.e., experiential avoidance), such as the experience of anger, are often ineffective in the long-term and are likely to interfere with life satisfaction and functioning in various domains of living²⁶. Treatment specifically targeting experiential avoidance has been shown to be a promising

approach to reduce the impact of anger on functional impairment²⁸.

The relationship between anger and avoidance coping may also have significant implications for individuals who have been diagnosed with PTSD. Anger in the context of PTSD may serve as an “active” form of avoidance which may afford the trauma survivor a feeling of agency that distracts them from feeling helpless or vulnerable²⁹. This may interfere with the processing of more “vulnerable” emotions such as fear, which is often a key in successful recovery from traumatic experiences^{8,30}. Many trauma survivors may begin to fear the experience of anger and the consequences of angry behaviour. Fear of (and perhaps subsequent avoidance of) anger and angry reactions that may be occasioned by trauma-focused therapy have been shown to partially account for suboptimal responses to treatment³¹. Unfortunately, few studies have examined the possible relationships between anger and avoidance coping directly, and these relationships are not well understood. Additional research in this area is needed as it may help to improve clinicians’ ability to treat individuals presenting for PTSD treatment with high levels of anger³².

In the current study, the authors sought to investigate the impact of experiential avoidance (a coping style), trait anger (a personality trait), and PTSD symptom severity on state anger in veterans with PTSD. The study included the following hypotheses: a) PTSD symptoms would predict state anger, b) experiential avoidance would predict state anger, c) trait anger would predict state anger, d) experiential avoidance would predict state anger independent of trait anger, and e) trait anger would predict state anger independent of experiential avoidance and PTSD symptom severity.

Method

Participants

Participants were drawn from a sample of 101 veterans receiving outpatient or residential treatment for PTSD at the Baltimore Veterans Affairs Medical Center (VAMC). Specific details regarding treatment setting (e.g., outpatient, residential) were not collected. Recruitment efforts were mostly directed toward veterans participating in outpatient group therapy with some participation by veterans receiving residential treatment. Therefore, at the time of their participation we estimate that approximately two-thirds of the sample was receiving outpatient treatment, and one-third was receiving residential treatment. All veterans seeking treatment for PTSD at

the Baltimore VAMC met full criteria for the disorder during a semi-structured intake prior to receiving a referral to the Trauma Recovery Program; the diagnosis of PTSD could have been given related to either a military or civilian trauma. No formal data were recorded for individual participants about the process of PTSD diagnosis, co-occurring psychiatric disorders, or substance use problems. However, the majority of the initial sample reported service in a war zone (75.2%) and exposure to potentially traumatising events such as receiving either friendly or hostile fire (76.2%), and a minority reported witnessing or participating in atrocities (48.5%), experiencing military sexual assault (16.8%), and being threatened with sexual assault in the military (10.9%). Only those participants completing the survey whose responses on the PTSD Checklist indicated that their past-month symptoms were suggestive of PTSD, based on the cutoff score of 50, as recommended by Weathers et al.³³, were included in the analyses for this study. Using this criterion, the study sample was predominantly male ($n = 73$) with six female participants. The average age of participants was 52.1 years ($SD = 9.99$), with a range from 25 to 74 years. The sample was 50.6% African American, 39.2% Caucasian, 2.5% Latino, and 1% Native American, with 6.4% from other, unspecified racial/ethnic groups. The majority of the sub-sample reported service in a war zone (70.9%) and exposure to potentially traumatising events such as receiving either friendly or hostile fire (70.9%), and again a minority reported witnessing or participating in atrocities (30.4%), experiencing military sexual assault (20.3%), and being threatened with sexual assault in the military (12.7%). Table 1 shows additional demographic and military service characteristics of the study sample.

Table 1.

Demographic Characteristics of Sample of Veterans with PTSD (N = 79)

Characteristic	
Age in Years M (<i>SD</i>)	52.07 (9.96)
Sex	n (%)
Male	73 (92.4)
Female	6 (7.6)
Ethnicity	
African American/Black	40 (50.6)
American Indian	1 (1.3)
Caucasian/White	31 (39.2)
Hispanic/Latino	2 (2.5)
Other	4 (5.1)
No response	1 (1.3)
Education	
Some High School	2 (2.5)
High School or GED	23 (29.1)
Some College	33 (41.8)
2-Year College Degree	13 (16.5)
4-Year College Degree	5 (6.3)
Some Graduate School	1 (1.3)
Graduate Degree	2 (2.5)
Period of military service	
WW-II	1 (1.3)
Korean War	2 (2.5)
Vietnam War	44 (55.7)
Between Vietnam and Persian Gulf Wars	14 (17.7)
Persian Gulf War to present	18 (22.8)
Employment status	
Employed part-time	7 (8.9)
Employed full-time	1 (1.3)
Retired	16 (20.3)
Certified 100% disabled	18 (22.8)
Unemployed, not disabled	34 (43.0)
Student	2 (2.5)
Volunteer	1 (1.3)

Measures

Posttraumatic Stress Disorder Checklist³³. The PTSD Checklist (PCL) is a 17-item, self-report measure of the frequency of posttraumatic stress symptoms (DSM-IV TR) in the past month. The PCL appears to have adequate sensitivity to the presence of PTSD symptoms in veterans³⁴. Cronbach's Alpha coefficient for the current sample was 0.798.

Acceptance and Action Questionnaire-II³⁵. The Acceptance and Action Questionnaire-II (AAQ-II) is a ten-item, self-report measure of experiential avoidance. The measure includes a list of ten statements (e.g., "It's OK if I remember something unpleasant") rated on a 7-point scale from *Never True* to *Always True*. Lower total scores reflect greater experiential avoidance, and higher scores indicate greater psychological flexibility. The AAQ-II appears to have good internal consistency (average Cronbach's Alpha coefficient of 0.83) and validity in preliminary validation research³⁵. Cronbach's Alpha coefficient for the current sample was 0.622.

State-Trait Anger Expression Inventory-2¹⁷. The State-Trait Anger Expression Inventory (STAXI-2; Spielberger,¹⁷) consists of 57 items representing dispositional and momentary anger rated from 1 (*Not at all*) to 6 (*Very much so*). The STAXI-2 internal reliability estimates range from 0.73 to 0.95 for the total scale and from 0.73 to 0.93 for the subscales. Spielberger¹⁷ also reported construct-related validity for the scales and subscales. Concurrent validity of the original STAXI was demonstrated by comparing it to several scales, including the Minnesota Multiphasic Personality Inventory (Hostility and Overt Hostility scales), Buss-Durkee Hostility Inventory, and the

Eysenck Personality Questionnaire (Psychoticism and Neuroticism). Chronbach's Alpha coefficient for the total scale in the current sample was 0.906.

Procedure

The study was approved by the medical center's designated Institutional Review Board to recruit participants from the population of veterans who were seeking treatment in the Trauma Recovery Program of the Baltimore VAMC. Veterans receiving outpatient or residential treatment for PTSD were approached by members of the research team and asked to participate in this study. Study personnel explained the general rationale for the study, described the procedures, and obtained informed consent. After completing the consent process, participants were provided with a demographic questionnaire, the AAQ-II, PCL, STAXI-2, and several other paper-and-pencil measures not included in the present analyses. Participants completed all study measures at the time of consent in the presence of a member of the research staff.

Data Analyses & Results

Multiple linear regression analysis was used to examine a model predicting state anger (STAXI-2: State) from past-month PTSD symptom severity (PCL), experiential avoidance (AAQ-II; with higher scores reflecting lower experiential avoidance), and trait anger (STAXI-2:Trait). Table 2 shows descriptive statistics as well as full-model and semi-partial regression coefficients for each variable in the model; raw scores were transformed into z-scores for ease of interpretation of coefficients.

Table 2.

State Anger as Related to PTSD Symptom Severity, Experiential Avoidance, and Trait Anger (N = 79)

Variable	Zero-Order <i>r</i>				β	<i>sr</i> ²	CI .95 for β
	PCL	AAQ-II	STAXI-2 Trait	STAXI-2 State			
PCL	--	-.485**	.282*	.370**	.235*	.198	.001, .477
AAQ-II		--	-.120	-.222*	-.064	-.056	-.295, .165
STAXI-2 Trait			--	.444**	.370**	.355	.170, .596
Mean	69.9	25.86	28.3	27.14			
SD	8.27	9.1	6.83	13.12			

p* < .05, *p* < .01

Table 3.
Hierarchical Regression Predicting State Anger (N = 79)

Predictor	β	R^2	Change in R^2	CI .95 for β
Step 1. PCL	.370**	.137**		.162, .592
Step 2. PCL	.343**			
AAQ-II	.055	.139	.002	-.304, .191
Step 3. PCL	.235*			
AAQ-II	-.064			
STAXI-2 Trait	.370**	.265**	.126**	.170, .596

* $p < .05$, ** $p < .01$

Each of the variables had a significant zero-order correlation with state anger, and both PTSD symptoms severity ($p < 0.05$) and trait anger ($p < 0.01$) had significant partial effects in the full model. Holding the other variables constant, for every one-standard deviation increase in PTSD severity, there was a 0.20-point increase in state anger and for every one-standard deviation increase in trait anger, there was a 0.36-point increase in state anger.

Next, hierarchical regression analysis was employed to predict state anger, with each variable listed in Table 3 entered in a sequential step.

PTSD symptom severity significantly predicted state anger ($p < 0.01$). The addition of experiential avoidance in step two did not improve the model. The addition of trait anger in step three demonstrated a significant effect in predicting state anger ($p < 0.01$), and the three-predictor model accounted for 27% of the variance in state anger, explained largely by trait anger, $F(3, 75) = 12.86$, $p < 0.001$.

Discussion

The purpose of the current study was to explore the impact of experiential avoidance (a coping style), trait anger (a personality trait), and PTSD symptom severity on state anger in veterans with PTSD. Experiential avoidance, PTSD symptom severity, and trait anger had significant zero-order correlations with state anger. As hypothesised, trait anger was observed to predict state anger independent of experiential avoidance and PTSD symptom severity. Although PTSD symptom severity was also a significant predictor of state anger in the final model, it is noteworthy that the trait anger was the strongest predictor. The relationship between state and trait anger observed in this study is consistent with previous findings demonstrating the strong relationship between these constructs¹⁸⁻¹⁹. Anger is a common residual symptom even when other

symptoms of PTSD are treated effectively and appears to be more closely related to symptoms of “dysphoric arousal” rather than “anxious arousal” symptoms that are most directly targeted by trauma focused treatment³⁶⁻³⁷. The unique relationship between trait anger and state anger, independent of PTSD symptom severity, observed in this study lends support to recent recommendations suggesting that anger-focused assessment and treatment be included for veterans and service members presenting with comorbid PTSD and anger dysregulation³⁸.

Consistent with the fear avoidance models proposed by Foa et al.³⁰ and Kulkarni et al.²⁹, we hypothesised that experiential avoidance would predict state anger independently of PTSD symptom severity and trait anger. Although experiential avoidance was not found to predict anger independently, a significant, zero-order correlation between experiential avoidance and state anger was observed. This suggests that avoidance-based coping may have a subtle relationship with anger in the context of PTSD that could not be adequately measured due to the limitations of this study outlined below. Another explanation for these results could be related to the constructs of state anger and experiential avoidance as measured by the STAXI-2 and AAQ-II, respectively. Experiential avoidance has been conceptualised as the tendency to cope with unwanted private events by avoiding or altering their form, frequency, or intensity or the contexts that occasion them²². State anger is conceptualised as the episodic experience of angry affect¹⁷, and may be a slightly different construct than anger as a form of active avoidance such as proposed by the fear avoidance model. State anger may be better conceptualised as the *topography* of the emotional state to which it refers, whereas “anger-as-avoidance” may be a new concept, reflecting the *function* of this affective state in the context of PTSD symptoms. There may be a need to develop a specific measure of “anger-as-avoidance” that more directly reflects this construct.

There are several limitations to the current study. First, given the small sample size, there may have been limited power to detect influences of experiential avoidance on state anger. Another possible limitation is the potential range restriction in anger scores due to the composition of the current sample. Because all of the study participants were participants in a PTSD treatment program, and because anger is a frequent component of the presentation of PTSD, it is possible that the relatively higher levels of anger and concomitant PTSD symptoms introduced some issues with multi-collinearity. However, the current study was designed specifically to look at the relationship of PTSD and anger within a PTSD treatment-seeking sample. Future studies will be needed to determine whether these relationships apply in samples with a wider range of anger levels and posttraumatic symptom scores that do not all rise to the level of requiring mental health treatment. Third, all observations occurred at one assessment point, precluding the use of more sophisticated statistical analyses and inferences regarding the relationships between factors over the course of time. This cross-sectional design provides only retrospective information on psychological factors that may influence momentary anger. Use of a longitudinal design (e.g., collection of study measures prior to initiating treatment for PTSD and following participation in a course of therapy) would afford the opportunity to investigate more complex hypotheses. However, we believe that a causal relationship between variables can be inferred due to the differences in the temporal nature of each measure (comparing a disposition, coping style, and disorder to a momentary construct). Fourth, methods used to determine inclusion in the current study sample, particularly those used to establish

the presence of PTSD, were suboptimal given that all veterans included in this sample were judged to meet DSM-IV criteria for PTSD based on an unstructured intake interview. Thus, only participants reporting significant symptoms of PTSD (PCL scores of 50 or higher) were included in the study sample. Utilisation of a structured, diagnostic interview such as the Clinician Administered PTSD Scale would have been a more reliable and accurate method of determining inclusion in the study sample.

Despite the limitations of the current study, trait anger and experiential avoidance might be useful factors to consider in future research with veterans presenting with symptoms of PTSD. The findings of this cross-sectional study are consistent with emotion-processing and cognitive theories of PTSD and might also suggest the importance of addressing a broader range of avoidance tendencies (emotional, experiential) that may uniquely influence the persistence of anger-related problems in veterans with PTSD. In treatment outcome research and prospective studies, inclusion of measures that examine these often excluded constructs of these variables would further elucidate the relationship between problematic anger and PTSD and may suggest novel approaches for intervention.

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A Comparison of Poisoned Patients at Military and Veterans Administration Hospitals

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Introduction

The state of California is home to greater than 168,000 active-duty military personnel, more than any other state in the United States of America¹. Additionally, there are more than 2 million military veterans in California², many of whom utilise Veterans Administration hospitals for their healthcare³. Little, if any, has been published in the medical literature regarding poisoning in these potentially unique patient populations. It is not known whether the active-duty population differs from the veteran population in terms of frequency and types of toxicologic exposures. We sought to compare poisoned patients at military and Veterans Administration hospitals that were reported to the California Poison Control System in order to determine whether any differences exist between the two populations with respect to frequency or types of exposures, as well as age and gender distributions.

Methods

The University of California-San Francisco Committee on Human Research (CHR) approved this retrospective observational case series. A retrospective chart review of the California Poison Control System (CPCS) electronic database (Visual Dotlab, Madera, CA) for cases between January 1, 2013 and December 31, 2013 was performed. Hospital codes specific to military and Veterans Administration hospitals were used to identify patients who presented to these hospitals. Cases were assessed by the principal investigator only after removal of all patient identifiers. Inclusion criteria included patients ≥ 18 years of age who presented to either a military (MH) or Veterans Administration (VA) hospital within the state of California for suspected poisoning or toxic exposure. Exclusion criteria included inability to follow the patient to a known outcome.

Descriptive data collected included demographic data, type of exposure (e.g., oral, dermal, inhalational, ocular), number of substances exposed to, whether or

not the exposure was intentional, outcome, and type of hospital (MH or VA). Medical outcomes were coded as no effect, minor effect ("minimally bothersome to the patient, symptoms resolve rapidly and usually involve skin or mucous membrane manifestations"), moderate effect ("more pronounced, more prolonged or more of a systemic nature than minor symptoms and usually some form of treatment is or would have been indicated"), major effect ("symptoms were life-threatening or resulted in significant residual disability or disfigurement") or death according to the criteria set forth by the American Association of Poison Control Centers (AAPCC)⁴. Coded outcomes were verified by the principal investigator to ensure that selected outcomes followed AAPCC criteria. All data abstracted were transcribed into a standardised Microsoft Excel 2011 for Mac (Microsoft, Redmond, WA) spreadsheet. Pearson's chi-square testing was used to compare differences between groups.

Results

A total of 500 cases meeting inclusion criteria were reported to the CPCS during 2013 (Table 1). Forty-one percent of MH patients were female, whereas only 13% of VA patients were female. A total of 280 MH exposures were recorded: 191 single-substance (SS) (68%) and 89 multiple-substance (MS). Mean age was 29.7 yr (range, 18-86 yr) in the SS group and 30.3 yr (range, 18-78 yr) in the MS group ($p=NS$). Eighty-four percent of MS exposures had suicidal intent, compared with 42% of SS exposures. A total of 220 VA exposures were recorded: 159 SS (72%) and 61 MS. Mean age was 53.3 yr (range, 21-90 yr) in the SS group and 48.6 yr (range, 21-72 yr) in the MS group ($p=NS$). Thirty-one percent of SS exposures had suicidal intent, compared with 49% of MS exposures. Likelihood of suicidal intent was significantly higher in MH patients for both SS [$\chi^2=44.1$, $p<0.001$] and MS [$\chi^2=41.1$, $p<0.001$] exposures.

Proportions of occupational and environmental single-substance exposures (inhalational, ocular, dermal, or bite/sting) were significantly higher in the MH group (57 pts, 29.8%) compared to the VA

Table 1.
Demographic, exposure, and outcome data of exposed patients.

	Military Hospitals (%), n=280	VA Hospitals (%), n=220	Total (%), n=500
SEX ($\chi_2 = 48.5$; $p < 0.0001$)			
Male	165 (58.9)	192 (87.3)	357 (71.4)
Female	115 (41.1)	28 (12.7)	143 (28.6)
AGE (years) ($\chi_2 = 7.9$; $p = 0.02$)			
18-40	228 (81.4)	58 (26.4)	286 (57.2)
41-59	38 (13.6)	87 (39.5)	125 (25.0)
≥ 60	14 (5.0)	75 (34.1)	89 (17.8)
ROUTE OF EXPOSURE ($\chi_2 = 9.0$; $p = 0.11$)			
Oral	215 (76.8)	190 (86.4)	405 (81.0)
Parenteral	6 (2.1)	6 (2.7)	12 (2.4)
Ocular	10 (3.6)	6 (2.7)	16 (3.2)
Inhalational	30 (10.7)	11 (5.0)	41 (8.2)
Dermatologic	6 (2.1)	3 (1.4)	9 (1.8)
Bite/Sting	11 (3.9)	4 (1.8)	15 (3.0)
OUTCOME ($\chi_2 = 4.7$; $p = 0.20$)			
None	39 (13.9)	33 (15.0)	72 (14.4)
Minor	171 (61.1)	144 (65.5)	315 (63.0)
Moderate	53 (18.9)	38 (17.3)	91 (18.2)
Major	17 (6.1)	5 (2.3)	22 (4.4)
Death	0 (0.0)	0 (0.0)	0 (0.0)

group (24 pts, 15.1%) [$\chi^2=10.6$, $p=0.001$]. Details of occupational and environmental exposures are listed in Table 2. There were 17 major (6.1%) and 53 moderate (18.9%) outcomes in the MH group, versus 5 major (2.3%) and 38 moderate (17.3%) outcomes in the VA group. No deaths were reported in either group.

Discussion

Occupational and environmental exposures were fairly common among military personnel; indeed, the proportion of occupational or environmental exposures was twice as high at MH compared to VA. Perhaps more significantly, the percentage of exposures due to suicidal intent was higher in patients attending MH compared to VA following both single- and multiple-substance exposures. Female patients accounted for a disproportionate number of MH exposures compared to their proportion within the military as a whole (41% vs. 15%)⁵, whereas the number of VA patients who were female (13%) was more consistent with the veteran population as a whole (10%)⁶. However, many of the female patients presenting to MH may have been spouses of active-duty personnel. Due to the limitations of poison

centre data, it is not possible to delineate which patients were active duty and which were civilian.

Some recent studies have suggested that both active-duty military personnel and military veterans may be at increased risk of suicidal ideation and suicide attempt⁷⁻¹². However, other studies have found no increased risk of suicide^{13, 14}. Our cohort demonstrated more intentional exposures with suicidal intent in patients attending MH compared to VA patients. The reasons for this are unclear; however, our data show a larger number of females in the MH patient group compared to the number of females in the VA patient group. This may be due in part to an increase in the number of active-duty female military personnel compared to the number of former military females currently utilising VA services. The vast majority of veterans from previous conflicts such as World War II, the Korean War, and the Vietnam War were male. These patients are now at an age where they are likely to utilise VA services more frequently than their younger cohort of former military members from the Gulf War and the wars in Afghanistan and Iraq.

Additionally, females generally attempt suicide more often than males in the so-called “gender paradox”

of suicide^{15, 16}. These suicide attempts often include self-poisoning with medications or other substances and are usually non-fatal. This is in contrast to attempted suicide in males, which is often by violent means (e.g., self-inflicted gunshot wounds or other intentional traumatic injuries) and thereby more commonly fatal.

Our study has several limitations. This was a retrospective study, which limits the amount of data that we were able to retrieve from each case. Our data set covers only a single year, so it is possible that the incidence of various types of exposures (e.g., route of exposure, intentional vs. unintentional) is not reflective of their long-term incidence over time. Our study likely did not capture all toxic exposures evaluated in military or VA facilities, given that reporting of such cases by healthcare practitioners to CPCS is voluntary. By the same token, some military and VA patients may have presented to non-military/non-VA hospitals with poisonings, so it is likely that a proportion of our patient population was not captured for this reason.

In this data set, there appeared to be an increased incidence of attempted self-harm following intentional exposures in patients attending MH compared to VA, although a large number of suicidal exposures were also seen at VA. Our data suggest a need for increased identification and treatment of both MH and VA patients at risk for intentional self-harm via toxicologic methods.

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Table 2.

Substances recorded in occupational exposures.

	Military Hospitals	VA Hospitals
BITE/STING		
Centipede	1	0
Jellyfish	1	0
Parrot	1	0
Scorpion	4	0
Sculpin (fish)	0	1
Spider	2	1
Stingray	1	0
Venomous snake	1	2
INHALATIONAL		
Carbon monoxide	0	1
Ethylene oxide	0	2
Halogenated hydrocarbon	19	1
Industrial cleaner	3	7
Fuel	4	0
Pesticide	1	0
Other (unspecified)	3	0
OCULAR		
Caustics (acid/alkali)	2	1
Cyanoacrylate (Super glue)	1	0
Glyphosate (herbicide)	0	1
Hydrocarbons	6	4
Soap	1	0
DERMATOLOGIC		
Alkali	3	1
Hydrofluoric acid	0	1
Mercuric cyanate	0	1
Fuel	3	0

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A Needs Assessment for Developing a Web-based Social Support Program for Student Veterans

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Introduction

According to the United States Office of Accountability,¹ more than 5 million members will transition out of the military by the year 2020. Many of these veterans are looking to higher education as their next step to re-enter civilian life. Since 2009, more than 1.4 million military veterans have taken advantage of their Post-9/11 GI Bill education benefits and entered institutions of higher education.^{2,3} This growing population on college and university campuses is faced with a unique set of challenges. Researchers indicate that student veterans often experience a sense of vulnerability and social isolation. They have been separated from systems and people they relied upon for years, and they do not feel that they can relate to traditional civilian students due to differences in age, maturity, and lack of understanding of the military experience.^{4,5}

How do student veterans overcome this sense of alienation and isolation? How do they find and stay connected with one another, and what mechanisms do they use to accomplish this? Are there measures we might take to assist them? The purpose of this study is to examine student-veteran perceptions concerning what is needed to integrate successfully into campus life, specifically regarding social support, by identifying the type and frequency of communication most often used by student veterans. Given the availability of social media and technology in society, the study seeks student-veteran perceptions concerning the development of a web-based social-support program whose function would be to connect, support, and maintain communication with, and among, student veterans on a college campus.

Literature Review

There is a wealth of information regarding student veterans and their transition to college. Many address

the different roles student veterans have to balance^{6,7} while others address some of the psychosocial issues student veterans face during reintegration to civilian and college life.^{8,9,10} Semer and Harmening⁷ identified seven factors that impacted student veterans' academic success and challenged institutions of higher education to be more empathic and receptive to the issues with which student veterans grapple and cope. Selber et al,¹¹ recognised the need for student veterans to feel a sense of belonging on the college campus as well as develop awareness of the social services available to them in the local community. They worked with the social work program at a local university to develop a course training Master's-level social work students to assist student veterans on campus as a way to address this need. It is clear that within higher education much remains to be done to assist this special student population to achieve academic success.

There are several studies that examine the use of web-based interventions to provide support for special populations, particularly people with specific medical conditions. Austrom, et al¹² discussed the use of a web-based videoconference support group for family caregivers with relatives who had Alzheimer's Disease. Kaltenbaugh et al¹³ explored the option of using web-based interventions to support caregivers of patients with cancer, while Damianakis et al,¹⁴ examined the use of a web-based social support group with caregivers who had a relative with traumatic brain injury. In all of the studies, the authors found that the group was helpful and provided an alternative to in-person support, but acknowledged that there is a need for much more research in this area. Additional studies explored the psychological benefits of participation in support groups. Binford, et al.¹⁵ studied the use of video chat support group for parents of adolescents in an eating-disorder treatment program. This study found that the sessions allowed parents to talk openly and honestly about feelings, and felt that it was an effective tool

to use, in conjunction with family-based therapy, to treat the disorder. Mo and Coulson¹⁶ studied the correlation between use of an online support group and psychological health for individuals with HIV/AIDS. They found that those individuals who actively participated often in the online group tended to have higher levels of psychological health compared to those who had lower levels of group participation.

Preliminary studies validate the use of web-based interventions to assist people in coping with specific medical concerns; however there is little research that discusses the use of web-based groups for social support in non-clinical areas. It is well documented that student veterans have challenges in the transition from military life to campus life.^{2,6,17,18} Several authors also have supported the use of support groups to assist veterans in this transition.^{5,19} Groups like the Student Veteran Association of America (SVA) have been formed to assist with student veteran needs as well. However, currently there is no specific research that explores the use of web-based support groups for student veterans specifically for the purpose of maintaining communication.

Methods

This qualitative, exploratory study sought to understand student veterans' perceptions regarding the development of a web-based support group. The population for the study was the student veterans attending a midsize, mid-western university. The student veterans were contacted via email by the researchers, as well as the campus staff member responsible for veteran services. They were provided with the rationale for the study and also the dates of focus groups, so they could select the date and time that were most convenient for them. Three focus groups were moderated by trained facilitators following a set of interview questions or prompts, and the groups lasted 90 minutes. The questions used in the focus groups were derived from discussion among the researchers when determining the focus for the study. Each group was posed a series of questions regarding the type and frequency of communication they have with fellow veterans, as well as their views concerning the feasibility of implementing a web-based support group. At the conclusion of each respective focus group meeting, participants in attendance were given a twenty-five dollar gift card to compensate them for their time and their contribution to the project.

The group proceedings served as the primary data-collection instrument and were audio-recorded. During the focus groups, facilitators took notes

individually. After the conclusion of the focus group meetings, facilitators compared observations of the group dynamics and comments. Each researcher summarised his/her notes and distributed them via email to other members of the research team for review and comment. Audio files were transcribed by a professional service.

Each researcher was provided with a copy of the transcripts and notes to review and use to identify themes independently. The research team then met and compared their notes, discussing the common trends and themes they found in the data. They listed all the responses to each of the questions per group, then transferred all group comments for each question to a spreadsheet and identified key words and phrases. They then looked for commonalities among the responses, and developed groupings and identified common themes.

There were multiple sources of reliability and validity used to analyse the data. First, the transcripts were reviewed by each research team member independently to look for errors. Once the transcripts were complete, the coding procedures were reviewed for consistency. One source of validity used in this study was triangulation. This involves the use of multiple sources of data to build a coherent justification for the themes of the study.^{20,21} According to Carter et al,²² the method triangulation includes interviews, observations, and field notes. The transcripts of the focus groups, as well as the individual research team members' notes and observations, provided the data required for this method of validation. Researcher triangulation was also used in this study. This involves "the participation of two or more researchers in the same study to provide multiple observations and conclusions"^{21,23} The researchers in this study come from different disciplines (Social Work and Theatre and Film), and thus view the study from different perspectives. Their respective disciplines and training provide a lens through which the group participants and overall importance of the study is viewed. In addition, the researcher-level of experience with veterans' issues is varied. One of the researchers has spent most of his academic career studying veterans' issues - particularly those of student veterans. Another has been researching veterans' issues involving older adults, while the third has had limited experience regarding veteran concerns. The research team brings different perspectives to the study, and each viewed the results from the lens through which they practice. However, all three researchers in this project independently identified similar themes and concepts, which reinforces the study's validity. Another validation strategy used

was member checking, which involved having each member of the research team present compare his/her results to the other team members' results, looking for commonalities in analysis and coding strategies.

The study obtained the approval of the Midwestern University Human Subjects Review Board. This process provided verification that the process was ethically sound, that the participants of the study were treated with respect, and that the participants would not suffer any undue hardship or unethical treatment as a result of their participation. To maintain confidentiality, the identities of the participants remained anonymous in any reporting of the data. Although excerpts or passages from conversations are embedded in the final document, the participants' identities are not disclosed.

Results

A total of 21 student veterans participated: 76.2% (16) were male, 23.8% (5) were female, and they ranged in age from 20-63. Three participants (14%) were Hispanic, and nineteen (86%) were Caucasian. Twelve of the participants were first-generation college students, while eleven of them came from families who had previous college experience. All branches of the military, except the Coast Guard, were represented. This included active military, as well as National Guard, members.

Communication was identified as a central component for many participants in the transition to civilian life, as well as maintaining contact with military friends. While communication frequency and type were umbrella themes throughout, several specific themes emerged from the study. The first was that participants felt a need to maintain communication with other veterans. The reasons for communication included needing practical information, such as a letter of recommendation or advice about college, and/or finding comfort in the realisation of shared experiences (children, divorce, returning to school). One subject stated,

"I've got interests in common with a number of my former colleagues, and we are interested in each other's projects." Another said, *"I found that a lot of them [veterans] find themselves in the same situation I'm in now where a lot of them have divorced, they have families, they're single parents, whether it's a male or female friend.* One participant, who was a military supervisor stated, *"I get a lot of requests if they need from me a letter of recommendation whether they should get out [of the military] or go to college,"* while another commented that communication was

important for assisting others, *"...for the telephone number for somebody that they might be trying to get a job and they need an old supervisor to talk on their behalf."*

While the student veterans were in agreement that it is important to maintain contact with other veterans, they were very diverse in the methods by which they communicate. The type of communication employed depended upon the degree to which they wanted a relationship. All of the participants used Facebook as a way to stay connected, but they also agreed that Facebook's purpose was more for superficial contact. They described it more as an "advertising forum" or a way to "catch up" with people without really talking to them, although they agreed that it is convenient for maintaining contact with international friends. Participants discussed the distance and time constraints that prevented face-to-face contact, as well as the convenience of social media like Facebook and Twitter. They also agreed that this type of social media, although providing some degree of communication, provided a boundary that permitted superficial contact and prevented more intense, or more personal, interaction.

One aspect of communicating with other veterans is involvement in established veteran focused organisations. The participants discussed participation in various groups like the Veterans of Foreign Wars (VFW), and veteran-support groups on the university campus and in the community. For example, they stated that their commanding officers, prior to discharge, encouraged them to join the local VFW posts. It is important to stress that while two participants were active in their local VFW posts, the majority of student veterans did not participate in the VFW, primarily because they felt out of place. The participants felt that while the organisation was important for older veterans, it did not provide the necessary camaraderie and support the younger veterans craved. A male participant offered,

"The reason I joined is members of the VFW are those who deployed and they can relate. So I don't have to sit there and try to explain things to people who don't have any idea what I'm talking about" while another admitted, *"I would say I 'm not so much engaged with that [the VFW] unless it's going to like a Thursday drawing and drinking beers. It seems outdated to me. It's not guys or girls that I would relate with personally."* And while a third admitted *"I mean we share a little bit of stories cause, you know, we're all war or whatever. But it's not the same to me,"* a third member underscored the idea that *"They are just so different than our generation I think."*

Several of the participants were active in developing and recruiting members for on-campus student veteran organisations, or participation in community-based support groups for student veterans. But many other participants were unaware that these groups existed. In addition, they all expressed frustration in the lack of time they had for social commitments. They had demanding academic schedules, and many of them had family responsibilities that prevented, or limited, their participation in social activities. Furthermore, some did not want to establish relationships that were transient.

"I am a mom and we don't have the flexibility of being single and a student. You know, we have other stressors that go with it," stated one female veteran, while a male veteran offered, *"I have relationships that I have enough trouble maintaining as it is with all the people I served with. Why would I create new ones and then have that much more trouble maintaining relatively thin relationships?"* An additional contribution clarified this position: *"I didn't feel any real desire to be a transient friend to anybody."*

One of the most significant themes related to the participants' contact with former "battle buddies." All of the student veterans in the study stated that they had a select group of people with whom they deployed and with whom they kept in regular contact primarily for personal reasons. They referred to other veterans as "family members" and close friends with whom they wanted to maintain a connection following service. In addition to being friends, student veterans also felt some allegiance and responsibility for their well-being. They expressed the need to be available to friends requiring support or experiencing a personal crisis. One veteran commented:

"I mean I do get those phone calls at 2:00 or 3:00 in the morning where people have nightmares and stuff. Or, if my husband's PTSD comes in then, you know I call my friends and talk to them or we'll talk about things that have happened. "Another stated: "I was having a rough time and I called him. It was like 3:00 in the morning here and I called him. He was down in Texas. And he picked up the phone immediately. Talked to him for two hours and calmed me down... hearing his voice...if I can just hear him say like chill out, it's fine, that's good enough for me."

The student veterans overwhelmingly preferred face-to-face contact, whenever possible, to maintain friendships and provide intimate, personal contact. This included social gatherings at bars, vacationing at one another's homes, or just spending time with one another. The participants acknowledged that, while face-to-face contact is most preferred, it is also

the least realistic given the distance between them and their friends. As one veteran noted,

"We tried to get together every year, which failed spectacularly after the second year" due to distance. Phone calls, text messages, and e-mail messages were the next preferred method of communication. Participants in the focus groups stated repeatedly the importance of being able to hear one's voice and vocal tone.

"I personally prefer calling or texting, mainly calling. I know I can tell if they're bullshitting me or if they're giving me the straights," one said. Another agreed, adding *"you can get tone, inflexion...all the things you can't get from reading a text message."*

A third subject admitted, *"we kinda like a group text thing going that all my buddies are in."* And another cited e-mail as being important: *"for me, the advantage of email is this is how I operate, as opposed to taking a call at any particular time, I know that email will always be there and I can respond if it's 2:00 in the morning when I've got some time and can think of what I'm doing."*

Finally, written correspondence was a method of communication that was appreciated, but rare. The participants expressed the joy they experienced when receiving handwritten letters or cards, and acknowledged that it was partially because they are so rarely received that such correspondence was treasured.

Developing a sense of identity as a student veteran is another aspect of communication that was identified in the study. The student veterans were generally non-traditional students who had family and work responsibilities, unlike many of their civilian peers. Even those without families perceived themselves as more mature than the average civilian undergraduate student. In fact, the student veterans voiced frustration about their peers' perceptions of unfairness, entitlement, and lack of boundaries. Participants also felt a lack of trust in the civilian student population and a need to protect their privacy.

"I don't think the population is so sensitive and so nice. People are like, oh you guys get benefits or you guys get discounts, or you guys get that...the word that bothers me most is lucky. Oh, you're lucky you get a free education." Another voiced concern over a fellow veteran who could not cope with civilian student peers. While *"he can't get a normal job because he doesn't have an education...he's sick and tired of dealing with kids that complain about mom and dad not giving them enough money. He's like,*

I can't stand these damn kids no more, so he just dropped out of school." Drawing attention to the age difference among student peers, a veteran added, *"And now I'm here and I really don't know anybody... and feel really weird talking to some of them cause we're like a ten year age gap is so hard to deal with."*

These comments clearly demonstrate the differences in perception between civilian and veteran students, and support the need for a mechanism to assist student veterans in transitioning from the military to the university.

The idea for the web-based program originated in comments from younger veterans involved in previous reintegration research conducted by the research team and was enthusiastically supported by the study participants. All of them stated they were literate in the use of social media, and felt that a web-based group would provide them with the connectedness they desired, without the barriers of distance. They wanted a mechanism to identify colleagues and support systems specific to student veterans, and acknowledged that nothing like that currently exists on any college campus in which they had been students. They suggested having a format similar to the Blackboard or Canvas programs utilised on campus, but insisted that access would be private. Specifically, the participants voiced concern about discussing matters such as suicidal ideation, symptoms of Post-Traumatic Stress Disorder (PTSD), and other mental health issues on a format accessible to civilian students. The veterans wished to protect the privacy of their personal struggles from the general public, and yearned for access to specific people or professionals who would not judge them, but could assist them in accessing appropriate resources and care. Ultimately, they feared their conversations would become public and potentially misinterpreted by the non-military population, which is a key concern given their perceptions about civilian students. They also suggested having different files or forms that supported specific areas important to the student veterans: places for information on GI (Government Issue) benefits, community resources, study and mentoring opportunities, student veteran organisations and activities on campus, and other areas of interest. One participant said,

"Some people we don't know are veterans on this campus and they could be needing assistance that they may be not know how to reach out." A second admitted *"it's so hard to find, like where do I go for this, what do I need to do with this? But having it at your fingertips without having to go [to a specific office would be valuable]."* *"Having something like this, structured like that, and having the links and*

separate discussions and separate area, separate entities, would be completely beneficial for somebody like me," stated another student veteran.

The participants felt that encouraging the web-based format in some type of student veteran orientation or course would be an important first step in gaining comfort using it. If it was initially an expectation, then once they became proficient at using it, they felt they would want to continue. Many of the participants stated that they use Canvas and Blackboard because it is an expectation for a course or university communication. They admit being hesitant to use it for other things. However, the participants felt that once a student veteran was able to see the benefits of a web-based support program, he/she would be much more likely to utilise it more effectively. Also, if the idea was presented in an orientation, and then encouraged in an academic course, the participants noted that they would feel more connected to resources and other student veterans, thus making their adjustment to, and their stay within the university much better.

Since only student veterans, or specific university staff who work with them, would have access to the program, the veterans would be able to chat with one another and have more open communication, knowing that the civilian population would not be involved. A major concern voiced by the groups was that the site be available after graduation, re-assignment, or deployment so that communication could be maintained without interruption. The participants felt that this type of program would allow them more ongoing relationships and reduce the "transient nature" of student veterans' relationships on campus because they could still maintain connections even after leaving the university. They also felt it would strengthen the campus student-veteran organisation because it would be easier to provide information concerning meetings and activities with other student veterans who were regularly using the program.

Overall, participants felt the proposed program would strengthen communication among student veterans on campus which would, in turn, assist them in their transition to higher education and civilian life. Initially we would develop a web-based communication program to meet the needs of student veterans on our campus. This program could later be standardised for employment by other institutions.

Conclusions

This study addressed issues of support and communication among student veterans. Although

the sample size was very small, and therefore not able to be generalised to the larger student veteran population, it provided rich qualitative data that can be the basis for ongoing research in this area. The study validated veterans' need to maintain communication with their "battle buddies" and comrades with whom they have significant relationships, as well as the need to maintain a sense of identity and privacy as a student veteran. Although the methods of communication varied depending upon the type of relationship addressed, all veteran participants agreed that face-to-face contact is the preferred method of interaction whenever possible.

All participants agreed that it is important to maintain contact with those with whom they deployed to provide support and assistance when needed. They articulated a sense of loyalty, camaraderie, and concern for one another's mental and emotional health, and felt a sense of responsibility to be available to talk with friends, no matter the time of day. They acknowledged the prevalence of depression, suicidal ideation, symptoms of PTSD, and feelings of loneliness that are common following re-entry into civilian life, and realise that formal services such as the VA (Veterans' Administration) or traditional outpatient counselling may not be available to fully address the need. Those who had experienced a friend's loss due to suicide felt passionate about the need to have services available at any time to assist them with coping.

In addition to providing support, the student veterans also suggested that universities need to be more cognisant of veteran needs. Traditional approaches for addressing student success have not proven to be

effective with student veterans for many reasons. The lack of a coordinated and easily navigated service-delivery system, the need for a specific location to access services (including emergency housing and food) and interact with other student veterans, a specific veteran-focused orientation to campus, and a one-stop shop website with information relevant to student veterans were all suggestions proposed as ways to better serve student veterans.

Overall, the development of a web-based student-veteran support system was a suggestion supported by all participants. The format would utilise common educational software, like Blackboard or Canvas, to provide a framework that was familiar to the student veterans and easily accessible. The system would provide restricted access so that veterans could feel comfortable discussing personal issues without fear of retaliation or ridicule from civilians who do not understand them. Links to various social service agencies and university offices providing information, support, and resources were essential. Finally, participants indicated that if such a program was presented during a veteran orientation, they would be much more likely to utilise it.

As the population of student veterans continues to grow, universities must discover avenues to address the needs of this special population. This study provides a foundation from which to build and engage in additional research concerning this important topic.

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Serving Two Masters: Professional Role Conflict in a Military Teaching and Learning Environment

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Abstract

Background: Students and nurse educators in a military teaching and learning environment experience role conflict as a result of being simultaneously a professional nurse and a soldier.

Purpose: The purpose of this article is to highlight the professional ambiguities experienced by students and nurse educators as a result of their dual roles as nurse and soldier within a military teaching and learning environment.

Methodology: A qualitative, grounded theory method was used. Data was collected by means of focus groups and critical incident narratives. The transcribed data was analysed using Charmaz's constructivist approach.

Results: Four themes emerged from the data, of which the most significant was the aspect of professional role conflict. Nurse educators and students experienced professional role conflict in terms of dual roles, military requirements, professional conduct, command and control, professional roles, humaneness, professional ranks, assertiveness, leadership styles, authority and ethical principles.

Conclusion: Neither nurse educators, nor students seem to be sufficiently prepared to deal with fulfilling dual roles as nurses and soldiers as it mostly causes conflict and confusion.

Keywords: *nursing professionalism, military professionalism, dual roles, military teaching and learning environment, nursing education*

Conflict of Interest: The first author received funding from the University of South Africa, Sigma Theta Tau International and the Safety and Security Sector Education and Training Authority to complete the study.

Introduction

The South African Military Health Service (SAMHS) Nursing College is responsible for the training of military nurses to meet the healthcare needs of the South African National Defence Force (SANDF). As such, the College is currently offering a 4-year programme leading to registration as a nurse (general, community, psychiatry) and midwife at the South African Nursing Council (SANC).

Students who are recruited and selected to follow this programme commence their careers with basic military training, followed by an officer's formative course aimed at equipping them with the necessary skills, knowledge and values to function as junior military officers in a specific, designated military environment. Afterwards, these students start with nursing training at the SAMHS Nursing College.

The SAMHS Nursing College is situated within a military environment. Students as well as nurse educators are therefore exposed to a unique teaching and learning environment inundated with military culture. The complexity of this environment led the researcher to investigate possible factors implicit to the military organisational structure, culture and learning environment, that may have an influence on the professional socialisation of student nurses. The focus of this article will be on the most controversial of these factors, especially the aspect of professional role conflict.

Methodology

A qualitative, constructivist grounded theory method was used to explore the nature of the hidden curriculum in a military teaching and learning

environment, and to determine its influence on students' professional socialisation.

The accessible population consisted of nurse educators and students of the SAMHS Nursing College. A non-probability sampling approach was employed to select the study participants. The nurse educators were selected by means of purposive sampling and were eligible to participate if they were a registered nurse with at least three years' experience as educator at the College. Ultimately 15 of the 23 nurse educators who met the criteria and consented to participate, were invited. The students were eligible to participate if they were registered for the four-year Diploma in Nursing (General, Community and Psychiatry) and Midwifery and were in the fourth year of training. Through convenience sampling the entire group of 56 students were invited and of which 12 students consented to participate.

Data was collected by means of focus-group interviews and critical-incident narratives. Two focus-group interviews were conducted with the nurse educators and students respectively. In addition the students were requested to write critical-incident narratives.

Each focus-group interview was audio-recorded and transcribed. The critical-incident narratives were thematically analysed. Thereafter Charmaz's constructivist approach¹ to data analysis was applied. This approach entailed a continuous loop of open coding, focussed coding, theoretical sorting, diagramming, theoretical integration and theoretical coding. Theoretical sensitivity, intuiting, memoing, reflexivity, constant comparison and theoretical sampling were further applied to ensure data quality. Ultimately, the data from all four focus groups and the critical-incident narratives were integrated to form one data set. A detailed description of the data collection and analysis is available in the original study².

The researcher obtained ethical clearance from the academic institution where the study was conducted and the Military Hospital Research Ethics Committee. Permission to conduct the study was obtained from the Nursing College and Defence Intelligence. This also ensured institutional protection. The ethical principles of beneficence, respect for human dignity, justice and respect for the scientific community as expressed in the Belmont Report³ were applied throughout the study.

Each participant was provided with an information letter which informed them of the full nature of the study, what would be expected of them and their rights. In the absence of any objections, an informed consent form was signed.

Findings

Four themes were derived from the integrated data. Each theme was metaphorically labelled to resonate with the experiences related by the nurse educators and students.

- **Theme 1: You're in the army now! – military acculturation**

This theme relates to the categories that emerged from the data which encompassed aspects associated to the participants' transition from civilians to soldiers.

- **Theme 2: Off to boot camp – professional knowledge acquisition**

Theme 2 relates to the processes taking place in the theoretical learning environment whereby students are taught the knowledge and skills necessary to execute their roles as nurses.

- **Theme 3: Off to the battlefield – clinical skills acquisition**

This theme represents the clinical learning environment where students are sent to apply the knowledge and skills they acquired in the theoretical learning environment.

- **Theme 4: Fighting a dichotomy – professional role conflict**

Theme 4 addresses the strong contrast between simultaneously being a professional soldier and a professional nurse.

As indicated earlier, the most controversial finding was the aspect of professional role conflict. The findings presented hereafter represent the categories and sub-categories which lead to the formation of Theme 4. It is significant to note that most issues related to professional role-conflict were raised by the nurse educators, although some students did acknowledge the existence of dual roles and how it affected them. The findings are substantiated by verbatim extracts from the data. Some verbatim extracts were modified for clarity purposes.

- **Command and control**

Military command vs functional control: The military hierarchical ranking system results in military rank taking precedence over professional rank, professional experience, professional qualifications and academic qualifications. A commander is assigned military command by virtue of rank and appointment, while a healthcare professional in control of a professional grouping is assigned functional control.

There are times when you are led by somebody who does not have insight into the nursing education. He doesn't have that knowledge that you are expected to do this many hours. You are expected to do this. But my problem is the interference of military into the professional development of the student where we are treated as equal irrespective of the expectations of the courses that we are doing.

- **Leadership**

Autocratic leadership style vs democratic leadership style: Participants agreed that whereas the Defence Force is generally seen as an autocratic organisation, the nursing profession is seen as being more democratic.

Then there are times where it becomes difficult for nurses because with the Defence Force we must deal with, I can say; autocrats. In the nursing profession, they are taught that you can't manage without the input of other people.. So there are periods of contradiction when you compare the military and the civilian people.

- **Authority**

Fearing authority vs respecting authority: It was said that, in the Defence Force authority tends to instil fear rather than respect.

I remember when you were a professional nurse at the civilian hospital, you will be in the ward controlling everything, doing something. But, you know you have got this Matron who will come for rounds. But when he comes, you stand up showing respect, but not fear.

So, what is happening is, in a way, a rank instilling fear in individuals. It is worse if you ... you were not socialised in the military.

- **Professional ranks**

Military rank vs professional rank: Military nurses are given both a military rank and a professional rank, but the military hierarchical ranking system results in military rank taking precedence over professional rank. The military rank does not always reflect the professional level nor does the professional rank always reflect the military seniority.

I would say a visitor visiting the patient, they know these ranks. They will go to the one-pip Lieutenant who doesn't know anything and say but you now help me with this and this and this and overlook the others who are actually more senior, but ignored because of the rank. So the rank actually

disadvantages the profession. In terms of the military, the rank is given higher attention than the professionals, the professionalism itself.

- **Assertiveness**

Being submissive vs being assertive: A lack of assertiveness, a sense of responsibility, inquisitiveness and self-confidence amongst students are ascribed to the nature of the military culture and the enforcement of discipline and obedience, which leads to what is perceived as respect and submissiveness. Assertiveness is an essential skill in order for nurses to be advocates for their patients. Being a disciplined, obedient soldier, however, requires nurse educators and students to be submissive rather than assertive.

The one thing that I have observed, when you are coming from the civilian world, compared to the military environment, what I have seen with the military students, they are more ... respectful or submissive. For I have seen submissiveness, which is regarded as discipline in the military. For me it is not okay.

- **Professional roles**

Disciplinarian vs carer: The military and the nursing professions are both seen as disciplined professions, but the need to discipline a student at the one moment, and then to act as a caring role model the next appeared to be very difficult for nurse educators.

Then, now you are calling the student ... because they have done something wrong... Now, on the other side, now that caring personality comes up ... So the roles now ... the student is confused. You have just finished disciplining the student in that soldiering manner to say this will not be allowed ... The next second you have changed completely.

Disciplinarian vs educator: Conflict between being a disciplinarian but also an educator were raised. They regarded nursing education as their core function and found it difficult to discipline students in a military fashion at the same time.

The difference would be the core, the core function. Me, I came here as a nurse educator. That is my core function. I have to develop this student as a professional nurse. But because I am in the military set-up, I have to know what military status entails, what I must do.

Emotionally undemonstrative vs empathetic: Being emotionally undemonstrative as a soldier

but empathetic as a nurse also posed a challenge to the nurse educators.

Then I will push students to come back to the hospital and how there they are a soldier and they had to do the military things and have to be this strong and an assertive type of person. But now, they come back and you have to be this caring type of person. I think it is very confusing sometimes

- **Humaneness**

Being treated as an object vs being treated as a human being: Military indoctrination deprives one of one's humanity and leads to depersonalisation, de-humanisation and de-emotionalisation. This results in the tendency to overlook the individual person behind the uniform and rank. Students regarded themselves as being treated like objects in the military environment as opposed to being treated like human beings in the civilian environment.

Our students now, with this culture and the civilian culture, because you are placing them here in the military environment and also outside, they would say outside, there in the civilian world they are treating us like human beings. But here at xxxx, they are treating us like objects.

- **Ethical principles**

Being a soldier first vs being a nurse first: The participants felt especially strongly about non-nursing duties taking precedence over nursing training. They claimed that military expectations often outweigh professional expectations.

... to a certain point, you have to stand up for your patient care, because that is, at the end of the day, your profession. That is what you want to do. Because your patient comes first, irrespective whether the military tells us that rank comes first or a soldier comes first, because that is what they tell us. They tell us you are a soldier first and then your profession... But if we don't teach them assertiveness, if we don't teach them that, you know, you have to be the advocate for your patient.

Inflicting harm vs beneficence and non-maleficence: The principles of beneficence and non-maleficence as taught to students during nursing training stood in strong opposition to what they are taught during Basic Military Training in terms of musketry and warfare.

Then there is also the aspect of, I don't know

[whether] it relates, but, do no harm. Beneficence, non-maleficence. You are taught to shoot here. You go to the shooting range and you are given a weapon. We have been there, we have done it. Now you come here and you have to care and you have to treat.

The rights of soldiers vs the rights of nurses and patients: The rights of soldiers – or rather their lack of such rights – was contrasted with the rights of nurses and patients.

They say ... you don't have the right as a soldier. This is our culture you know, our rights are taken off. But in a nursing profession, we teach students the patients' rights and the nurses' rights.

Military instructions vs patients' rights: Ethical conflicts were often experienced when students were confronted with a military order or instruction from a higher-ranking officer, especially when in contravention of the patient's right to privacy and confidentially.

The issue of ranks also come into play when you are taught to respect a higher-ranking [officer]. When higher-ranking officers come into the ward, you have been taught to respect this person. So, here comes this General, he is asking me as a CO about the Private's condition in the ward. We have spoken about the patient's right. Do I respect the patient's right to privacy and confidentiality or do I respect the higher-ranking officer who is asking me to divulge the person's private information and give [the information]?

Patient's rank vs patient's needs: The ability to oversee patients' ranks and treat them according to their health needs was regarded as a challenge by students.

I feel that in the military, as a nursing student or as a nurse ... how it has affected my profession is that you have to be a soldier and a nurse at the same time...You find people of higher ranks. There you have to consider their rank before you can treat them.

Discussion

The military setting presents one of the most complex dual relationship situations for health professionals. These complexities are derived from the fact that military health care professionals always act the dual roles of carer and commissioned military officer⁴.

Most of the topics around moral dilemmas and role conflict related to dual loyalties in the Defence Force

that have been discussed in the literature^{5,6,7} have been described against the backdrop of wars, violent conflict and operational deployment. After all, that is what soldiers, and by extension, military nursing students, are trained to cope with.

The types of military operations and the setting of the military operational theatre worldwide have changed over the last few decades. This has subsequently brought about a change in both the identity of the military officer and in the primary roles of military healthcare professionals⁸. The changes in the primary roles of military healthcare professionals may explain why the professional contradictions experienced by nurse educators and students in this study do not refer to the moral and ethical dilemmas that one would expect to encounter in a combat zone, but to day-to-day issues during times of peace².

The highly contrasting roles of nurse and soldier allow nurses to cross these boundaries with relative ease, each being clearly defined in terms of responsibility and authority. External pressures – such as a direct threat – are fundamental to the transformation from nurse to soldier: The highly contrasting roles of nurse and soldier allow for a degree of compartmentalisation of identities or mental fences that separates each role to be negotiated and overcome⁴. The current absence of direct threats in the working lives of nurse educators and students at the South African Military Health Service Nursing College may explain why they find it difficult to assume both roles or to switch between the roles.

In another study, also conducted on a military teaching and learning environment, Caka, Van Rooyen and Jordan⁹ highlight the dual transition of student nurse to professional nurse and from candidate officer to officer. These students, when qualified, were neither regarded as competent professional nurses nor competent soldiers. This could be ascribed to the challenging transition period where students are expected to fulfil military as well as nursing demands. In the same study, students gave an indication that they are not being adequately prepared for the dual roles throughout their training.

Caka and Lekalakala¹⁰ found similar experiences amongst military nursing students who indicated that they feel confused where they were expected

to undertake dual roles, especially conflicting ones. The same applies to the participants of this study, as they became confused most of the time between the two contrasting professions and not knowing to which they belonged.

This study revealed that military nurse educators and students need to be multi-skilled to respond to the dynamic and complex military teaching and learning environment and be adaptable and flexible to be able to reconcile the conflicting identities of nurse and soldier. The ability to adapt and adjust to changing circumstances is after all what makes military nurses unique and distinctive.

A situation where there is more than one obligatory course of action, constitutes a moral dilemma and prolonged exposure to moral dilemmas may lead to moral distress¹¹. It could therefore be deduced that the conflict of duty experienced by nurse educators and students as reflected in this article and the subsequent inability to resolve conflicting moral judgments may result in moral distress.

In order to assist nurse educators and students to effectively reconcile the two roles of nurse and soldier, it is recommended that proper socialisation and identification with the professional standing of military nursing be improved through strengthened education, training, and development opportunities for military nurses.

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Eye in the sky: Understanding the mental health of unmanned aerial vehicle operators.

D Wallace, J Costello

Abstract

Background: Recent conflicts in the Middle East have seen rapid developments in the use of unmanned aerial vehicles (UAV). The Australian Government plans to acquire a number of UAVs to perform a range of operations.

Purpose: To determine whether UAV operators are exposed to greater or special risks to their mental health than other combatants.

Method: A non-systematic, narrative literature search was undertaken into the mental health of UAV operators.

Results: The adverse effect of occupational stressors, such as long working hours, on well-being and mental health outcomes emerged strongly. Prevalence rates of clinically significant symptoms of PTSD (Post Traumatic Stress Disorder) for UAV operators were found to be low, ranging between 2 - 5%.

Conclusion: These outcomes were consistent with occupational stressors found in the military context and previous findings on other military personnel with low combat exposure. This review is a first step towards establishing an evidence base to inform the management of mental health problems in UAV operators.

Keywords: unmanned aerial vehicle, drone, pilot, mental health, moral injury

Background

Unmanned aerial vehicles (UAV) are remotely controlled aircraft operated by a pilot and a sensor/weapons operator located in small, air-conditioned containers at a ground control station that may be thousands of miles away from the focus of military operations. UAVs are equipped with optical sensors that provide high-resolution images of the battlefield for intelligence, surveillance and reconnaissance (ISR) operations, which may also include coordinating attacks by local air or ground forces or the launching of strikes directly from the UAV, when armed.

The recent conflicts in the Middle East have seen rapid developments in the use of UAVs.¹ In particular, the United States' use of UAVs for ISR, as well as combat and counter-terrorism operations,² has greatly expanded, so much so that the US Air Force (USAF) is currently training more UAV pilots than pilots for fighter and bomber aircraft combined.³

The Australian Defence Force (ADF) deployed the HERON Remotely Piloted Aircraft System to

Afghanistan from 2010 to 2014 to provide an un-armed ISR capability to the International Security Assistance Force. Over 400 members of all three services participated in these operations.⁴ In early 2015, it was reported that Royal Australian Air Force (RAAF) personnel were already training in the United States to operate armed UAV systems⁵ while the 2016 Defence White Paper announced the Australian Government's plans to acquire a number of UAVs to perform a range of ISR operations.⁶

Personal accounts of the experience of UAV operators have highlighted the emotional impact of combat operations and related ethical dilemmas,⁷ while concerns have also been raised in the US about high attrition rates among UAV pilots and the risks of developing PTSD as a consequence of their duties.⁸ Against this background, we ask are UAV operators exposed to higher or special risks to their mental health than other military personnel? We report the results of a literature review to in an attempt to answer this question.

Method

We conducted a non-systematic, narrative literature search using PubMed and Google Scholar employing the following search terms: unmanned aerial vehicle, drone, pilot, aircrew, mental health, depression, posttraumatic stress disorder, moral injury, intelligence, surveillance, reconnaissance and remotely piloted aircraft (RPA).

Results

The USAF School of Aerospace Medicine conducted a number of studies into the mental health of US UAV operators. Their first study⁹ administered the Malasch Burnout Inventory-General Survey (which assesses emotional exhaustion, cynicism and professional efficacy) anonymously to groups of armed UAV operators, unarmed ISR UAV operators and non-combatant airmen. They found the unarmed ISR UAV group had higher overall rates of occupational stress (e.g. long work hours, shift work, long commuting times, delays to career progression, limited base resources etc.), as well as higher rates of high emotional exhaustion and cynicism.

A subsequent study by the same group¹⁰ compared the results of anonymous, standardised self-report screening questionnaires measuring rates of clinical distress (Outcome Questionnaire - 45.2 (OQ-45.2)) and posttraumatic stress disorder (PTSD Check List - Military Version (PCL-M)) among armed UAV operators and non-combatant airmen. They found rates of clinical distress and PTSD were higher among UAV operators (20% and 5% respectively) compared to non-combatant airmen (11% and 2%). While these rates of PTSD were low compared to other US studies, which will be discussed later, the elevated levels of clinical distress in UAV operators seems to have raised the concerns of a command anxious to sustain a critical capability. As a result, the USAF embedded operational clinical psychologists with high-level security clearances within active duty drone units to improve access to mental health care and to try to reduce the effects of potentially traumatic events.¹¹

Further work by the School of Aerospace Medicine¹² continued to find the most problematic stressors were operational (e.g. low unit manning, rotating shift work, extra duties/administrative tasks and long hours) with 11% reporting high levels of psychological distress and less than 2% with results consistent with a diagnosis of PTSD. Another self-report study from the same group found just 4.3% of

armed drone operators reported clinically significant symptoms of PTSD¹¹ with personnel working longer hours in postings of longer duration more likely to meet criteria for PTSD.

Ortega (2013)³, described the distinct challenges that emerged when pilots are removed from the physical battle space when operating UAVs. He argued that traditionally, military operations have been expeditionary in nature with personnel deploying overseas. This is known to have the ability to foster the development of organisational identity and unit cohesion, which has been shown to protect against combat stress. In contrast, Ortega described how US drone pilots, were exposed to 'unique stressors' related to not being overseas on deployment, instead being 'deployed in place' then driving home to the family an hour after finishing a combat sortie over the Middle East, working long hours on rotating shifts.

Further, Otto and Webber '2103'¹³ retrospectively studied the mental health outcomes of USAF drone pilots and manned aircraft pilots from 2003 to 2011 via their electronic health records. They found 8.2% of drone pilots and 6% of manned aircraft pilots had recorded mental health outcomes, which consisted of diagnosed mental disorders and mental health problems, such as 'partner relationship problems' or 'family circumstance problems,' which required counselling only. Adjustment disorder and depressive disorder were the two most common diagnoses in both groups. Incidence rates for PTSD were 0.9 per 1000 persons for drone pilots (n=3, 95% CI 0.3-2.7) compared to 0.7 (n=20, 95% CI 0.4-1.0) for manned aircraft pilots. After adjustment, it was found that both groups had statistically equivalent rates of mental health outcomes despite self-reports of high levels of stress and fatigue reported among drone pilots. Also, the incidence of any mental health outcomes was lower in the two pilot groups compared to other USAF members from various employment groups.

Finally, Prince et al (2015)¹⁴ assessed USAF ISR operators, who were exposed to real-time, high definition imagery working in direct support of combat operations; duties that are similar to UAV operators. Using an anonymous, web-based survey that included a comparison group of non-intelligence based personnel posted to the same units; they found higher rates of psychological distress among the intelligence operators and similar, low rates of PTSD symptoms in both groups (2.5% intelligence operators and 2% non-intelligence personnel).

Moral injury

Moral injury is a new and evolving concept that has been defined as a 'psychological state'¹⁵ that may result from experiences that involved 'perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations'.¹⁶ Features of this proposed condition include: feelings of guilt, betrayal, being changed by exposure to death,¹⁷ relationship or spiritual difficulties and social alienation.¹⁸

While we considered that some of the duties of UAV operators had the potential to be 'morally injurious' e.g., incidents involving violence or property damage to civilians and disproportionate violence,¹⁹ our search failed to locate any relevant articles. Nevertheless, a recent review of moral injury etc¹⁵ concluded it was difficult to separate the features of PTSD and depression from the suggested effects of potentially morally injurious experiences, emphasizing that the construct of moral injury remains to be validated.

Conclusions

The available literature on the mental health of UAV operators and related personnel consists only of US military studies. These anonymous surveys consistently found high levels of occupational stressors (e.g., long work hours, shift work, low unit manning) and rates of symptoms of PTSD (2-5%) that were either below or at the lower end of the range of reported PTSD symptoms found in other US military personnel returning from combat operations. One review of electronic health records of US UAV operators and manned aircraft pilots found no difference in the incidence of mental health outcomes, despite high levels of self-reported stress and fatigue in the UAV pilots. Both groups had similar, low incidence rates of PTSD.

Prevalence rates of clinically significant symptoms of PTSD between 2-5% in UAV drone operators are low when compared to twelve-month prevalence of PTSD in US civilian adults (3.5%),²⁰ Australian civilian adults (6.4%)²¹ and members of the Australian Defence Force (ADF) (8.3%).²² However, it is important to note that rates of PTSD in persons exposed to combat vary considerably. A meta-analysis of prevalence studies²³ found rates of combat-related PTSD in Iraq war veterans from the US ranged from 4-17% and from 3-6% in UK personnel, with a range of methodological issues suggested to explain the variation. Subsequent work comparing US and UK personnel who had deployed to Iraq, stratified respondents into high and low levels of combat exposure and found that differences in self-reported combat exposures explained most of the

differences in reported prevalence of PTSD.²⁴ Despite the consistent findings of high levels of workplace/operational stressors among UAV operators, the risk of development of PTSD seems to be equivalent to other military personnel with low combat exposure.²⁴

It is worth noting that the figure of 4.3% prevalence of clinically significant symptoms of PTSD using the PCL-M reported by Chappelle et al 2014¹¹ included those personnel scoring moderate (37-49) and extreme (50-85) levels, where a score of 50 is the recognised cut-off for a diagnosis of PTSD.²⁵ Evidence is building that sub-threshold PTSD (i.e., where persons have some symptoms of PTSD, but not a sufficient number or level of disability to meet full diagnostic criteria) is associated with delayed-onset PTSD (i.e., longer than six months after the traumatic event)^{26, 27} and that delayed-onset PTSD may be more common in military populations.²⁸ Therefore, we believe including those with sub-threshold scores was appropriate.

With respect to the difference between prevalence rates of PTSD from anonymous surveys and the incidence rates of PTSD in the electronic health records of both UAV and manned aircraft pilots, military personnel have been found to be two to four times more likely to report symptoms of a mental disorder in anonymous surveys compared with identifiable health screens.²⁹ Aircrew are a highly screened and trained sample, who are known anecdotally to be particularly reluctant to present with mental health problems for fear of being grounded.¹³ Furthermore, rates of help-seeking behaviour in those who screen positive for mental disorders are particularly low for US military personnel^{30, 31} compared to US civilian,³² Australian civilian³³ and Australian military populations.²² Typical barriers to seeking mental health care reported by military personnel include: being seen as weak; concern about the risk of adverse effects on career; and believing that their leadership discouraged the use of mental health services.^{22, 34, 35}

Notwithstanding the lack of research on UAV operators and the risk of moral injury, there was much debate in the literature on the morality, ethics and legality of using UAVs in combat and targeted killing. While full coverage of these issues is beyond the scope of this article, much of the debate centred on whether the vast asymmetry of drone warfare violates the laws of a just war³⁶⁻³⁸ and whether they make war and killing 'risk-free',³⁹ even to the extent that this may erode the martial virtue of courage.⁴⁰ Counter-arguments suggested there is a duty to employ technologies, such as UAVs, to protect one's own personnel when they are engaged in a just war.⁴¹

Finally, there is emerging evidence of the importance of differentiating between the operational demands of different types of military units.⁴² Developing insights into the unique characteristics and profiling the occupational demands of UAV operations will be important to establishing practical and effective mental health prevention and support programs in the longer term. The authors recommend that UAV operators should undertake appropriately targeted psycho-education that is tailored to the unique psychological risks of the 'deployed in garrison' effect. They should be monitored long term for the likely impact of occupational stressors as well as measurement of the potential cumulative effect of their combat role. This could include the addition of a mid-tour screening activity that is tailored to address the psychological risk profile of the role. Lastly, they should be afforded the opportunity to participate in a tailored and standardised decompression and reintegration phase from the 'deployed in garrison' operational environment. While these measures

would take significant advocacy and resources to establish, this review is a step towards establishing an evidence base to inform the potential recruitment, selection, training and support plans to meet the emerging mental health needs of UAV operators in the ADF.

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Australian Military Malariology Comes of Age (Part 5 of 'Pioneers of Australian Military Malariology')

Ian Howie-Willis

Abstract

By the end of the War in Vietnam in 1975, the Australian Army's 1st Malaria Research Unit (called 1 Malaria Research Laboratory [1MRL] 1966 to 1970) had established itself firmly at the Ingleburn Army Camp near Campbelltown, south of Sydney. In the decades that followed, 1MRU (1970–1981) and its successors, the Army Malaria Research Unit (AMRU, 1981–1997) and later the Australian Army Malaria Institute (AAMI, since 1997), worked purposefully and productively at its appointed malariological tasks. In broad terms these were threefold: they entailed parasitological investigation of the *Plasmodium* organisms causing malaria, entomological studies of the *Anopheles* mosquito transmitters of the disease and the pharmacological assessment and development of anti-malarial drugs.

These endeavours depended on the recruitment and retention of a team of appropriately skilled and qualified professional scientists. Over the final three decades of the twentieth century and the early years of the twenty-first, 1MRU-AMRU-AAMI was fortunate in having secured the long-term commitment of a group of highly productive scientists who built their professional careers on the opportunities the organisation offered them. Through their efforts, the organisation developed into a world-class malariological institute fulfilling a range of functions. As well as serving the Australian Defence Force (ADF) by protecting military personnel posted overseas to malarious regions against malaria and other vector-borne infectious diseases, 1MRU-AMRU-AAMI cooperated with other scientific research institutes within Australia and overseas to help malariology advance further.

A continuing difficulty for 1MRU-AMRU-AAMI was that its role was not always sufficiently well understood nor appreciated by ADF commanders. Although the organisation faithfully fulfilled its functions, senior military officers tended to ignore it until an outbreak of malaria among personnel serving overseas suddenly focussed attention on the threat to operations that malaria continued to pose.

A further difficulty was one with ethical ramifications. This related to the chemical properties of the various anti-malarial medications. Most anti-malarial drugs will produce unwanted side-effects. For instance, quinine, the drug most commonly used to treat malaria since the mid-nineteenth century, may induce headaches, tinnitus, sweating, irregular heartbeat, eyesight problems, bruising and susceptibility to sunburn. In recommending the use of particular anti-malarial drugs the 1MRU-AMRU-AAMI pharmacologists accordingly had to achieve a delicate balance. The drugs of choice had to be effective in protecting soldiers by eliminating the malarial parasites, but they must also have minimal side-effects so as to safeguard soldiers' health.

In this connection, the article concludes by considering an on-going controversy in the news media that erupted in late 2015. The controversy arose from complaints from a group of ADF veterans who blamed their mental health problems on having received the anti-malarial drug mefloquine on overseas deployments during the late 1990s and early 2000s. The drug had been trialled among ADF personnel after consultation with the AAMI — a fact which prompted the emergence of a vociferous anti-mefloquine campaign by a group of disgruntled veterans who had taken the drug.

Introduction

Like the previous four articles in the five-part series 'Pioneers of Australian military malariology', this concluding article states its case through reference to the lives and careers of a group of eminent military malariologists.

The series has traced the development of Australian military malariology across some 115 years to 2015. In that period Australian Defence Force (ADF) personnel were deployed overseas to five major wars, various lesser conflicts and dozens of peace-keeping and humanitarian aid missions. Most deployments were to malarious regions.

During the first 16 years of the twenty-first century, concerted effort by international and government

health agencies, malariological research institutes, military-medical units and particular high-profile not-for-profit anti-malaria foundations succeeded in greatly reducing global malaria infection rates.

The trend was obvious in the statistics of malarial infection and mortality compiled by the World Health Organization (WHO) and subsequently published in the annual *WHO World Malaria Reports*. Among the WHO's 'flagship' publications, the *World Malaria Reports* are usually released every December and are freely available on-line to internet users.¹ Each report 'assesses global and regional malaria trends, highlights progress towards [WHO] global targets, and describes opportunities and challenges in controlling and eliminating the disease'.²

According to the 2016 *Report*, in 2015 an estimated 212 million cases of malaria occurred worldwide, with 90 per cent of these in Africa. Deaths from the disease totalled 429,000, a decrease of 62 per cent since 2000. The mortality was mostly among young children, fully 70 per cent of the deaths being of children who died before their fifth birthdays. In all, 91 countries were regarded as being 'malaria endemic', i.e. experiencing continuing malaria transmission, down from 108 countries in 2000. Despite these reductions, an estimated 3.2 billion people, or almost half the world population of 7.5 billion, were still at risk from the disease.³

While malaria remains among the world's major infectious illnesses, the progress of humanity's struggle against the disease has been continuous and cumulative. Over time, its incidence and mortality have accordingly declined. Between 2000 and 2015 the further extension of anti-malarial measures — 'interventions' in WHO terminology — succeeded in reducing malaria's incidence by 37 per cent worldwide and by an encouraging 42 per cent in Africa. As seen, at the same time malaria mortality fell by 62 per cent globally from about 692,000 deaths to 429,000.⁴

The 'interventions' were many and varied. They included the issuing of diagnosis and treatment guidelines to health workers, 'malaria awareness' education programs, public works aimed at eliminating mosquito breeding sites, the use of insecticide-impregnated sleeping nets, the spraying of dwellings with insecticides, the widespread use of 'rapid diagnostic test' (RTD) technology, the use of the most currently effective anti-malarial medications, the monitoring of malarious populations for evidence of drug-resistant plasmodial strains, and the adoption of national and regional 'epidemic preparedness' plans.⁵

The collective outcome of such strategies has been a slow but steady increase in the number of countries to which the WHO has granted 'malaria eliminated' status. The qualification for that achievement is 'three consecutive years of zero indigenous cases of malaria'. The most recent entrants to the select company of the 'malaria-free' have been Syria and the United Arab Emirates (both in 2007), Morocco and Turkmenistan (2010), Armenia and Iraq (2011), Georgia and Turkey (2012), Argentina (2013), Paraguay (2014), Azerbaijan, Costa Rica and Maldives (2015). Sri Lanka 'joined the club' in 2016 and one other, Kyrgyzstan, was poised to do so as well.⁶

Australia itself was declared 'malaria eliminated' in 1981. Nations which had achieved that status earlier included the previously malarious Bolivia, Bulgaria, Chile, Cuba, Cyprus, Greece, Hungary, Italy, Jamaica, Mauritius, the Netherlands, Poland, Portugal, Romania, Spain, Taiwan, the USA, Venezuela and the former Yugoslavia. Those following soon after included Brunei and Singapore.⁷

The heroes of the worldwide fight-back against malaria are the myriad officials in the international and government agencies, the health program delivery functionaries, the malariological research institutes and the international aid foundations responsible for organising, financing and implementing the 'end malaria' strategies. Their commitment to the struggle and their determination to see it through to its eventual successful conclusion are critical. The IMRU-AMRU-AAMI staff, too, are among the heroes, having been at the forefront of Australia's contributions to the global anti-malarial campaign.

Overview of the period 1970–2015

During the period 1970–2015, Australian military malariology matured, achieved continuity and through the structure and programs of IMRU-AMRU-AAMI became a permanent part of the array of Australian Defence Force (ADF) health services.

An extended account of how that happened has already been given in the pages of this journal in the series of articles by Karl H.W. Rieckmann and 13 of his AAMI colleagues. The series appeared under the general title 'The Army Malaria Institute: Its Evolution and Achievements', starting in *JMVH* 20(2) in April 2012 and concluding in *JMVH* 24(1) in January 2016.⁸ The collected articles were subsequently published in a single volume as *The Australian Army Malaria Institute: Celebrating its 50th Anniversary in 2016 to commemorate the AAMI's 50th anniversary on 14 June 2016*.⁹

As the Rieckmann *et al.* series and book have already provided a comprehensive overview of the organisation's achievements from the perspective of a key group of 'participant observers', this present article will not attempt to revisit that ground. Instead it focuses on the experience of five leading AAMI staff members. By so doing the article will endeavour to show how the attainments of the Institute — the term this article will henceforth use for convenience — reflected the high quality of the staff it recruited.

In the period 1970–2015, the Institute employed many dozens of individual staff members. They included research scientists, technicians, administrators, clerical staff and Army support personnel. Most of them were Army officers or other ranks, but some, including several of the Institute's Directors, were civilians.

While this article acknowledges the value that the Institute has generally added to ADF health programs, it profiles just five of the staff members — Lieutenant Colonels Anthony W. Sweeney, Michael D. Epstein and Robert D. Cooper and Professors Karl H.W. Rieckmann and G. Dennis Shanks.

But why these five from among all the many others?

The reason is that they have been not only eminent research scientists in their several fields of specialty but have been among the Institute's longest serving staff members. Their cumulative years of service to the Institute exceed 130 years and cover the entire 45-year period considered in this article. In that time they were at the forefront of its various malariological research programs and held senior management and command positions within the Institute. By profiling them, this article will now endeavour to demonstrate the critical importance to the ADF of the support service provided by the Institute.

Lieutenant Colonel Anthony W. Sweeney



(Photograph from *Journal of Military and Veterans' Health* 20(2), April 1912)

Anthony William ('Tony') Sweeney was born in Sydney in 1941. After schooling at Waverley College, he graduated in Agricultural Science from the University of Sydney at the end of 1962 with a major in entomology. In 1963 he was appointed entomologist of the malaria campaign in the New Guinea Islands region of the Territory of Papua New Guinea¹⁰ based in Rabaul, where he spent the next seven years. During his time there he became acquainted with two eminent malariologists who would strongly influence the direction his life and work took: Professor Karl H.W. Rieckmann and Professor Robert H. Black. Karl Rieckmann was the malariologist in Rabaul during 1963-1964; and he played a crucial role as Sweeney's mentor during this formative time in his professional life.¹¹ (Robert Black's career is described in Part 4 of this series.)

While working in Rabaul, Sweeney completed a MScAgr degree through the University of Sydney for research on the behaviour and distribution of the malarial mosquito *Anopheles farauti* in the Carteret Islands group in the Bougainville District of Papua New Guinea.

In 1970 Tony Sweeney accepted an offer from Professor Black to continue his entomological studies as a doctoral student in Black's Department of Tropical Medicine within the School of Public Health and Tropical Medicine at the University of Sydney. At the same time he would also work as an entomologist in the Army's 1 Malaria Research Laboratory (1MRL) established within Black's department in 1966. His research topic for his PhD thesis was the impact of the newly discovered mosquito fungal pathogen *Culicinomyces clavisporus* on mosquito populations.

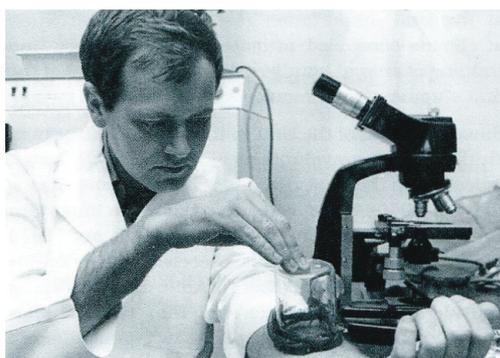
Because 1MRL was an Army unit, Sweeney joined the Army and was commissioned. He was eventually promoted to lieutenant colonel and became the CO of the unit, which in 1973 was renamed the Army Malaria Research Unit (AMRU).

Lieutenant Colonel Sweeney spent the remainder of his Army career at AMRU. He led its entomology section and supervised the section's field trips to northern Australia and Papua New Guinea to collect, identify and breed the various species of anopheline mosquitoes that AMRU was using in its experiments.

During the early 1970s Tony Sweeney undertook much of the responsibility for organising the relocation of 1MRU from the University of Sydney to new premises at the Ingleburn Army Camp. During 1996 in his last year at AMRU he took a leading part

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in organising the unit's relocation to the Gallipoli Barracks at Enoggera in Brisbane. In the meantime, during 1987–88, he spent a year as the AMRU Acting Director after the departure of the fourth director, Colonel Eric Donaldson, before the fifth Director, Professor Karl H.W. Rieckmann, took up duty.



Captain A.W. (Tony) Sweeney feeding anopheline mosquitoes in the laboratory of 1st Malaria Research Unit (photograph from AAMI records).

After retiring from AMRU, Dr Sweeney spent two years, 1997–1999, as the medical entomologist of the South Pacific Commission at its headquarters in Noumea, New Caledonia. The job required him to provide technical advice on the biology and control of the vectors of malaria and dengue in the Solomon Islands, Vanuatu and Fiji.

On returning to Australia, Dr Sweeney focussed on the research and writing of a history of the Land Headquarters Medical Research Unit, the Australian Army unit which undertook pioneering research on malaria in Cairns 1943–1946. He spent 12 years researching this work, spending much time in the archival collections of the Australian Academy of Science in Canberra, the National Archives of Australia in Melbourne and the US government archives in Washington DC. His research culminated in the publication in 2003 of the book *Malaria Frontline: Australian Army Research During World War II*.¹² This work became one of the classics of Australian military medical history.

Dr Sweeney's years at AMRU were highly productive. As well as *Malaria Frontline*, his published work included 90 articles in the professional journals of entomology and parasitology. Between 1980 and 2011 he held a series of part-time academic appointments at the Universities of Sydney and Queensland and the University of Technology Sydney. These included Adjunct Professorial positions at the University of Queensland and the University of Technology Sydney.

In 2012 Dr Sweeney began collaborating with Professor Rieckmann and other former AMRU colleagues in producing a serialised history of the Australian Army Malaria Institute. As seen, this work, appearing under the title 'Army Malaria Institute: Its Evolution and Achievements', was progressively published in the *Journal of Military and Veterans' Health* between 2012 and 2016. The collected articles were published in a single volume in 2016 to commemorate the AAMI's 50th anniversary.¹³

As an entomologist, Lieutenant Colonel Sweeney followed in a grand Australian Army tradition which included pioneers of Australian entomology such as Colonel Ian Mackerras and his wife Major Josephine Mackerras during World War II. Tony Sweeney's 27-year career at AMRU was a key factor in the unit's rise from a small under-resourced laboratory to prestige as a leading research institute in international studies in malariology.

Lieutenant Colonel Michael Douglas Edstein



Lieutenant Colonel Michael D. Edstein (photograph from AAMI records).

Michael Douglas Edstein is exceptional among AAMI staff members in having spent his entire salaried working career at the AAMI. He joined the staff of the Army Malaria Research Unit (AMRU) after graduating with a BSc from the Australian National University in 1975. On joining the AMRU staff he enlisted in the Army and was commissioned as a lieutenant. He spent the next 13 years as an AMRU research officer. During that time he was promoted to captain in 1979 and then to major in 1984. He was responsible for developing drug assay methods for standard anti-malarial drugs such as chloroquine and pyrimethamine. While performing these duties he researched and wrote a MSc degree thesis on the pharmacokinetics of the anti-malarial drugs Maloprim and Fansidar.¹⁴

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During the three years 1989–1991 Major Edstein was posted on secondment as a pharmacological research officer to the Armed Forces Research Institute of Medical Sciences in Bangkok, Thailand. While at that Institute he undertook studies of anti-malarial drugs to assess their safety and effectiveness.

After returning to his duties at AMRU in 1992, Major Edstein continued his work as a pharmacological research officer. Promoted to lieutenant colonel in 1996, he was appointed as CO and Deputy Director at AMRU, succeeding Lieutenant Colonel Tony Sweeney in these positions. Meanwhile he had been undertaking doctoral studies in pharmacology at the University of Sydney and in 1995 was awarded a PhD degree for a thesis on the pharmacokinetics and anti-malarial properties of the antifolate group of drugs.

When AMRU relocated to Brisbane in early 1997 and was renamed AAMI, Lieutenant Colonel Edstein took charge of the AAMI Department of Drug Evaluation. He also took up a part-time appointment as an Adjunct Senior Lecturer in the School of Pharmacy at the University of Queensland. In 2003 he was promoted to Adjunct Associate Professor within this School.



Lieutenant Colonel Michael Edstein (in civilian dress, seated second from right) in a group photograph of AAMI staff in 2014 (photograph from AAMI records).

Lieutenant Colonel Edstein published widely in the specialist journals of pharmacology. In his 39 years with AAMI and its predecessors, he published over 90 research articles. This represented a major contribution to AAMI's published output. His pharmacological publications were a key factor in AAMI's rise from a minor Army malaria laboratory to a respected research institute playing a significant role on the world stage of studies in malariology.

Lieutenant Colonel Robert Douglas Cooper



Lieutenant Colonel Robert D. Cooper (Photograph from AAMI records).

Robert Douglas ('Bob') Cooper was born in Sydney in 1951. He graduated from the University of New South Wales with a BSc degree, majoring in zoology and entomology, in 1975. His first job after graduating was as a research assistant to the Fox Inquiry into the Ranger Uranium mine in the Northern Territory.¹⁵

In 1976 Bob Cooper took a job in Papua New Guinea as an entomologist with the Malaria Control Program of the Department of Health. Based in Lae, he was in charge of two teams collecting mosquito larvae. One team worked around Lae, the other near Wau. The teams collected specimens of about eight known malaria vectors. Since then the number of vectors known to be indigenous to the region has grown to 26.

In 1980 Cooper returned to Sydney to take up a position as an entomological research assistant in the Army Malaria Research Unit at the Ingleburn Army Camp. He was to spend the next 32 years with AMRU and its successor, the Australian Army Malaria Institute (AAMI), where he remained until his retirement in 2012. While employed at AMRU he earned a MSc degree for a thesis on a comparison of the US and Australian strains of the mosquito fungal pathogen *Culicinomyces clavisporus*. After the degree was awarded in 1984 he began work on a doctoral research program. This time his topic was the identification and distribution of anopheline mosquitoes in northern Australia and Papua New Guinea. He was awarded a PhD degree for this work in 2002.

After joining the Army in 1980 Bob Cooper was commissioned as a captain. He was promoted to major in 1989 and to lieutenant colonel in 2002. On his promotion to lieutenant colonel he was also appointed as the CO of AAMI. In the period from 1984 until his retirement in 2012 Lieutenant

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Colonel Cooper fulfilled many entomological duties at AAMI. He took charge of the insectary, where he maintained several colonies of *Anopheles*, *Aedes* and *Culex* species. He undertook major mosquito surveys on behalf of AMRU/AAMI in northern Australia and Papua New Guinea between 1986 and 1998. He introduced DNA-based entomological techniques to AAMI to assist in the identification of both the anopheline vectors and their plasmodial parasites. From 1996 he was the head of the AAMI Entomology Department, succeeding Tony Sweeney in the position.



Lieutenant Colonel Robert Cooper allowing mosquitoes in a cage to bite him in his laboratory at the Australian Army Malaria Institute (photograph from AAMI records).

Lieutenant Colonel Cooper also proved highly successful in securing major research grants to support AAMI's research effort. He was a productive writer of research papers, contributing over 80 articles to the specialised journals of entomology and malariology. He was a frequent contributor of presentations to conferences and symposia. In addition he collaborated often with colleagues in Australian and overseas medical research institutes on projects in which AAMI was a joint-venturer.

After his formal retirement from the AAMI staff in 2012, Lieutenant Colonel Cooper continued serving at the Institute in his Army Reserve capacity. Part-time officers from the Army Reserve such as Cooper were an important element of the AAMI workforce.

Lieutenant Colonel Cooper's innovative and productive entomological research was a significant factor in AAMI's rise to international prominence after its early years as a minor malaria research laboratory.

Professor Karl H.W. Rieckmann



Professor Karl H.W. Rieckmann, fifth AAMI Director (photograph from Joint Health Command, Australian Department of Defence).

Karl Heinz Walter Rieckmann was born to German parents in Cairo, Egypt, in 1933. His father was a Christian missionary in Egypt. Karl grew up there, attending German-, French- and English-language schools. He completed his secondary education by obtaining the Oxford and Cambridge School Certificate. The family migrated to Australia in 1950. They arrived in Melbourne on 7 November 1950 — Melbourne Cup Day — but moved on to South Australia, where Rieckmann Snr. became a pastor in the Barossa Valley winemaking region.¹⁶

In 1951 Karl began medical studies at the University of Adelaide supported by a Commonwealth Scholarship. After graduating MB, BS in 1957 he spent a year as a resident at the Royal Adelaide Hospital. As a post-war immigrant, he readily acknowledges his deep sense of gratitude to the university and government for having made possible his medical career.

At the end of 1958 Dr Rieckmann moved to Papua New Guinea, where he joined the government medical service in Port Moresby. He was assigned a room next to the office of Dr Wallace Peters (1924-), an eminent British parasitologist who was the senior malariologist for the Australian-controlled Administration of the Territory of Papua and New Guinea and was participating in the World Health Organisation (WHO)-sponsored malaria eradication program. Peters persuaded Rieckmann to join him in conducting this program.

In 1959 Dr Rieckmann was posted to Minj, a town the Wahgi Valley in the Western Highlands of Papua New Guinea, where malaria occurred seasonally. After several months there, he spent three months in Manila in the Philippines undertaking a three-month

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malaria eradication course. He returned to Minj in January 1960 but was then posted to Rabaul, the capital of the pre-World War II of the Territory of New Guinea on the island of New Britain.

Dr Rieckmann spent 1961 studying under the malariologist Professor H. Black at the School of Public Health and Tropical Medicine at the University of Sydney, where he gained a Diploma in Public Health. After completing this course he returned to Rabaul in 1962. By this stage the WHO's worldwide malaria eradication program was faltering. Wallace Peters moved to Basel in Switzerland, then to a chair at the Liverpool School of Tropical Medicine and finally to the chair in Medical Protozoology at the London School of Hygiene and Tropical Medicine. In Papua New Guinea Peters was replaced by an ebullient Polish malariologist Dr Jan Saave (1920–2006), who had previously worked in Rabaul.

As an experiment in malaria eradication, Dr Rieckmann decided to try to eliminate malaria from Nissan Island, midway between the islands of New Britain and Bougainville, and from other nearby small islands. The islands had a population of 2000. The islanders willingly cooperated in the experiment. Within 12 weeks Rieckmann had rid the islands of both *vivax* and *falciparum* malaria and also elephantiasis, a disease commonly caused by mosquito-transmitted parasitic filarial worms. During this period Professor Black and the Parke Davis pharmaceutical company had developed CI-501, a long lasting form of the anti-malarial drug Paludrine, a project supported by the US Army. Dr Rieckmann tested the drug in the malarious Gogol Valley near Madang, but the parasites there quickly developed immunity to it.

In 1966 the University of Chicago invited Dr Rieckmann to become a visiting Assistant Professor supported by US Army funds. He went as a Senior Fulbright Scholar. The work, which involved developing a simple *in vitro* field test for assessing the drug resistance of malarial parasites, proved very exciting. Dr Rieckmann accordingly remained in Chicago for the next nine years. Through his research on drug resistance he emerged as one of the world's leading malariologists.

Professor Black and the Australian Army Director General of Medical Services (DGMS), Major General Colin Gurner, tried to persuade Dr Rieckmann to return to Australia to direct the Army's new 1 Malaria Research Laboratory. He was interested, but the best salary they offered was only a third of what he was earning in Chicago. Instead they eventually appointed Dr Ian Saint-Yves, a Scottish malariologist working in the Solomon Islands.

Karl Rieckmann's next move was to the University of New Mexico at Albuquerque in 1975 as a full professor. The position was supported by the US Agency for International Development (USAID), which had adopted malaria eradication as one of its priorities. Professor Rieckmann remained working in Albuquerque until 1983 but in the meantime also became a WHO consultant with involvements in over 20 countries in Africa and Asia. In 1973 he had joined the WHO's Geneva-based expert advisory panel on malaria. In 1984 Professor Rieckmann spent a year in Thailand with the WHO. Malariologists regarded Thailand as the world epicentre of drug-resistant malaria.



Professor Karl Rieckmann (fifth from left) hosting the visit to the AAMI of the US Army Surgeon General, Lieutenant General J. B. Peake (centre, front) in July 2002. He is pictured here at the entrance to the AAMI building with AAMI staff, ADF Health Services Officers and his US visitors. Left-right are Dr Q. Cheng, Lieutenant Colonel R.D. Cooper, Lieutenant Colonel M.D. Edstein, Commander S. Bennett, Professor Rieckmann, Lieutenant General Peake, Lieutenant Colonel D.E. Kyle, Lieutenant Colonel S. Boos, Captain M.G. Reid, Major S.P. Frances, Colonel P. Alexander (JMVH photograph).

Wishing to return to Australia, in 1985 Professor Rieckmann accepted a position in the School of Tropical Medicine and Public Health at the University of Sydney. In the course of his duties he linked up again with Dr Tony Sweeney, the principal entomologist at the Army Malaria Research Unit (AMRU), with whom he had worked in Rabaul 20 years earlier. He also met the Army's current Director General of Medical Services (DGMS), Major General Bill Rodgers. Sweeney and Rodgers persuaded him to accept an appointment as the AMRU Director of Medical Research, a position he held while retaining his professorial appointment at the University of

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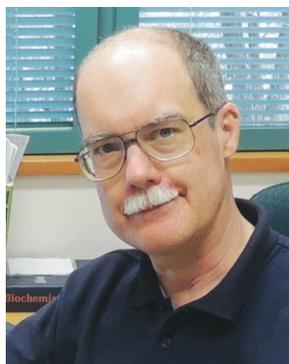
Sydney. He held his AMRU appointment as a civilian under the Director and Commanding Officer, Colonel Eric Donaldson.

In 1989 Professor Rieckmann was appointed to the vacant AMRU directorship, which he again held as a civilian. He became the fifth Director since the unit's formation in 1966. He remained in the position for the next 17 years, until his retirement in 2006. In that time the AMRU transferred from its base at the Ingleburn Military Camp south of Sydney to new purpose-built premises in the Gallipoli Barracks at Enoggera, Brisbane. In moving to Brisbane the unit also changed its name to the Australian Army Malaria Institute (AAMI). The new name was an acknowledgement of the status and prestige that the unit had gained under its fifth Director.

After retiring, Professor Rieckmann and his wife Rosemary moved to Caloundra, north of Brisbane on the Sunshine Coast. As seen, in retirement he wrote an authoritative history of the AAMI. Co-authored with 13 of his former AMRU-AAMI colleagues, this was serialised through successive editions of this journal between 2012 and 2016.

Karl Rieckmann was one of Australia's truly great malariologists, in the same tradition of imaginative, enterprising scholarship as Dr Anton Breinl (1880–1944) and Sir Neil Hamilton Fairley (1891–1966). His appointments as the AMRU Director of Medical Research and subsequently as the Unit's fifth Director helped the AMRU-AAMI's rise from being a relatively minor and obscure Army malaria research laboratory to prestige as a world-class malaria research institute.

Professor G. Dennis Shanks



Professor G. Dennis Shanks, sixth AAMI Director (photograph from Lancet Vol. 14, July 2014).

George Dennis Shanks, who is always known by his middle name, was born on 19 September 1954 in Atlanta, Georgia, USA. He received his medical training in Texas, first at the Texas A&M University then at the Southwestern Medical School in Dallas, from which he graduated with a MD degree in 1979. Specialising in paediatrics and preventive medicine, he undertook postgraduate training at the Vanderbilt University Hospital in Nashville, Tennessee, 1979–80, and later, 1980–81, at the Tulane School of Public Health in New Orleans, Louisiana, where he earned the MPH-TM degree in Public Health and Tropical Medicine.

Dr Shanks's postgraduate training continued at the Children's Medical Centre in Dallas, Texas, 1982–84, and then at the Uniformed Services University of the Health Sciences in Bethesda, Maryland, 1984–86, when he undertook research on the clinical aspects of human immunodeficiency virus (HIV). By this stage of his career Dr Shanks had become a specialist in medical science research and had undertaken research projects in various hospitals and research institutes in Central America (in Haiti, Belize, and Honduras) and in Africa (in Liberia and Kenya).

Dr Shanks developed an interest in malariology during a posting to the Armed Forces Research Institute of Medical Research in Bangkok, Thailand, 1987–91. His work in Bangkok focused on the treatment and chemoprophylaxis of drug-resistant strains of *falciparum* malaria. In pursuing this research further, he took a position at the Australian Army Medical Research Unit (AMRU) at Ingleburn near Sydney, where he worked with the AMRU Director of Medical Research, Professor Karl Rieckmann, in developing new anti-malarial drug compounds. After two years at AMRU, 1992–94, Dr Shanks moved to the USA Medical Research Unit in Nairobi, Kenya, where he spent four years undertaking the field testing of anti-malarial drugs, 1995–99.

In 2000 Dr Shanks returned to Thailand to become Director of the Armed Forces Research Institute of Medical Sciences in Bangkok, where he spent the next two years. He returned to the USA in 2003 to become Program Director at the US Army Centre for Health Aberdeen Proving Ground in Maryland. While in this position, in 2003 he spent a period as the Department of Defence Liaison Officer at the Centres for Disease Control in Atlanta, Georgia, during the outbreak of the viral disease Severe Acute Respiratory Syndrome (SARS), which had quickly reached pandemic proportions in the Northern Hemisphere.



Professor G. Dennis Shanks (sixth from right) with AAMI staff members with a party of Vanuatu health workers who had been undergoing training with AAMI staff. Left-right are: Sergeant Scott Smith, Mr Joshua Iakapas, Mr Iata Henri, Mr Malao J. Kalomuana, Lieutenant-Colonel Ken Lilley, Mr David G. Lawawa, Captain Robert Perrin, Professor Shanks, Lieutenant-Colonel Ivor E. Harris, Major Alyson Auliff, Ms Jennifer Iavro, Captain Joanne Baker and Mr Ken Mera (photograph from AAMI records).

In February 2006 Dr Shanks returned to Australia to become the sixth Director of the Australian Army Malaria Research Institute, which had relocated from Ingleburn to Brisbane nine years earlier. He succeeded the recently retired Karl Rieckmann in the position. He remained the Director as this article was being written ten years later. He filled the position as a civilian but had been an officer in the US Army Medical Corps for 22 years and had reached the rank of colonel.

During his earlier career, Dr Shanks had held honorary academic appointments at the Uniformed Services University of the Health Sciences in Maryland, the University of Sydney and the University of Oxford. On returning to Australia to become the AAMI Director he was appointed as an adjunct professor at both the University of Queensland in Brisbane and the James Cook University in Townsville.

Professor Shanks has been a highly productive research scientist. In the 34 years to 2014 he published 155 research papers. He was also greatly in demand as a lecturer at international scientific symposia. In the 18 years from 1996 he spoke at no fewer than 102 seminars and conferences in cities around the world.

As well as his medical research papers, Professor Shanks published widely in journals of medical history. A self-trained historian, he wrote characteristically sophisticated, elegant historical articles that he published in various international journals, including *The Lancet*, arguably the oldest and most prestigious of all medical journals. His special historical interests were the history of influenza and the history of malariology. (Because of

this latter interest, he was a major influence in the writing of this current series of articles, mentoring its author in both the scientific aspects of malaria and the history of the disease.) Away from medical research, Professor Shanks read theology, an interest that found expression in his contribution to the Uniting Church in Australia as a lay preacher.

Like Karl Rieckmann, his predecessor as AAMI Director, Dennis Shanks continued and developed further the Institute's enterprising research programs in malariology and arbo-virology. As with Rieckmann, too, his presence at the AAMI Director enhanced the Institute's reputation as a world centre of excellence in these fields.

The AAMI under attack: the mefloquine controversy

Late in 2015, as Dennis Shanks and his staff were considering how they might celebrate the Institute's 50th anniversary on 14 June 2016, the AAMI pharmacological research program suddenly and unexpectedly became the focus of a great controversy in the news media.

The controversy flared after a serving Army Officer, Major Stuart McCarthy, complained about the Army's use of the anti-malarial drug mefloquine to the press. *The Australian* newspaper broke the story on 11 September 2015.¹⁷ At the end of November newspapers of the Fairfax Media group followed up with a series of articles. McCarthy alleged that many veterans from East Timor and the wars in Iraq and Afghanistan were suffering paranoia, depression and suicidal mood-swings as a result of having taken mefloquine during overseas deployments. The veterans, he said, were demanding an inquiry into the impact of the drug on soldiers' health. Fairfax, publisher of the *Melbourne Age*, the *Canberra Times* and the *Sydney Morning Herald* newspapers, ran major articles and editorials on the issue in its newspapers on 30 November 2015.¹⁸



Major Stuart McCarthy at the time Fairfax Media publicised his complaints about mefloquine in November 2015 (Fairfax Media photograph).

Mefloquine, produced under the trade name 'Lariam', was a drug developed by the US Army at its Walter Reed Army Medical Institute of Research during the 1970s. It was used to treat chloroquine-resistant *falciparum malaria* during the early 1980s and subsequently for weekly anti-malarial prophylaxis.¹⁹ The Australian Therapeutic Goods Administration (TGA) registered the drug for malaria prophylaxis in 1993.²⁰ In November 2014 the TGA's updated product information for mefloquine indicated that:

*Lariam may cause psychiatric symptoms in a number of patients, ranging from anxiety, paranoia and depression to hallucinations and psychotic behaviour. On occasions, these symptoms have been reported to continue long after Lariam has been stopped. Lariam should not be prescribed in patients with a history of psychiatric symptoms and should be used with caution in patients with a previous history of depression.*²¹

The TGA product information also indicated that both anxiety and depression are common with between one and ten per cent of people taking mefloquine.²² This product information came more than a dozen years after the AAMI had recommended that the ADF should conduct a series of trials of various anti-malarials during the period 1999–2002. Among those to be tested were tafenoquine and mefloquine.²³

The background to the recommendation was that INTERFET, the Australian-led multi-national peace-keeping taskforce in Timor Leste (East Timor) 1999–2000, had suffered a major malaria epidemic. A total of 501 cases of malaria were reported among the 16,428 Australians who served in Timor-Leste, 374 of these in 2000 during the taskforce's first year. The overall rate of infection, 30.5 cases per thousand troops, was the Army's highest rate of malarial infection since the Vietnam War a generation earlier.²⁴ Doxycycline was the Army's 'first-line' or primary pharmaceutical defence against malaria at the time, and remained so; however, in view of the recent epidemic in East Timor, it seemed appropriate to have another anti-malarial available for individuals unable to take doxycycline; and mefloquine already had TGA registration. Mefloquine, as well as other drugs, was already among the 'second-line' anti-malarials.²⁵

Between July 2000 and September 2015 some 1,979 ADF personnel were prescribed mefloquine, the great majority of these (1,319) in Timor Leste in the years 2000–2002.²⁶ A further 1,017 ADF members took tafenoquine in Bougainville in 1998–1999 and in Timor Leste in 2000.²⁷ More than 2,300 ADF

personnel accordingly received either mefloquine or tafenoquine in the 17 years to September 2015. When mefloquine was prescribed after the trials had been concluded, it was in cases where individuals were unable to take the 'first line' anti-malarial, doxycycline. In addition to the 1998–2002 trials, AAMI staff also conducted trials of the drugs in Thailand in cooperation with the Thai military health agency under bilateral inter-agency agreements.²⁸

Among the adverse consequences of taking mefloquine are certain neuropsychiatric side-effects in a relatively small proportion of the people taking the drug. Sleep disturbances and vivid dreams are the most common, occurring among about 13 per cent of people taking mefloquine. Less common, experienced by fewer than 1 per cent of those who have taken the drug, are hallucinations, anxiety, aggression, depression, mood swings, panic attacks and suicidal ideation. Such side-effects generally disappear within days after ceasing to take the drug but may continue for several weeks. Other side effects included tinnitus and vertigo, which could persist for months after the administration of the drug had ceased and in some cases could be permanent. Unfortunately, however, not only mefloquine but *all* anti-malarial drugs have unwelcome side effects. For the consumer, the choice is stark: either take an anti-malarial drug and accept the risk of side-effects or not take it and risk dying from *falciparum* malaria. Despite mefloquine's side-effects, the drug has been widely used by Australian civilians travelling overseas to malarious areas. Thus, between 2010 and 2015 almost 85,000 prescriptions for the drug were filled in Australia. Mefloquine also remains in widespread use for the treatment of malaria elsewhere, particularly in Southeast Asia.²⁹

In the months that followed the newspapers' publication of Major McCarthy's complaints, the Fairfax newspapers and other news media organisations periodically continued running news items about the Army's use of mefloquine. One media report attacked the ADF for continuing to use mefloquine as an anti-malarial 14 years after first becoming concerned about the drug's side-effects.³⁰ Another accused Army medical officers of having administered tafenoquine, another, newer anti-malarial. This report claimed that the Therapeutic Goods Administration and the manufacturer, GlaxoSmithKline, had issued warnings that the drug had not yet been registered. This same article also accused AAMI staff of covertly conspiring to use tafenoquine by trialling the drug in Timor-Leste.³¹ Yet another report alleged that the ADF had conducted a 'massive cover-up' of the 'permanent psychological damage' suffered by troops who had taken mefloquine.³²

Such reports commonly referred to Major McCarthy, depicting him as a 'whistle-blower' who was endeavouring to make veterans' complaints heard despite attempts by the ADF's leaders to hush up the controversy.³³ Major McCarthy himself emerged as a spokesman for and co-founder of a veterans' advocacy group calling itself the International Mefloquine Veterans Alliance, which had formed during the second half of 2015. With branches in Australia, Canada, Ireland, the United Kingdom and the USA, the Alliance opened a website to publicise its cause. Closely linked with the Alliance, and possibly an Alliance 'sub-set', was another advocacy group calling itself Aussie Mefloquine Vets.

The Alliance website includes an 'Our Stories' section retailing accounts of members' experiences with mefloquine and tafenoquine. McCarthy's own 'Story' accused AAMI staff of making him the subject of an 'unethical drug trial' involving tafenoquine during his posting to Bougainville in 1999. It also claimed he had suffered 'neurotoxic brain injury' after being administered mefloquine while serving with a UN peace-keeping mission in Ethiopia and Eritrea in 2001. As a result of these experiences he said he had become 'deeply suspicious of the AAMI's activities'.³⁴

In September 2015 Major McCarthy appeared as a witness before a Commonwealth Parliamentary inquiry, the Senate Inquiry into the Mental Health of Australian Defence Force Personnel, to which he also provided a written submission describing the allegedly 'manifestly unethical' AAMI-conducted tafenoquine and mefloquine trials in which he said he had participated.³⁵ He also alleged that in trying to promote the idea of an outreach program for veterans adversely affected by the drugs, he had 'encountered a culture of denial, deceit and impunity that extends to the most senior officers in the ADF [and] the Assistant Minister for Defence'.³⁶ He continued in this vein in his opening statement to the Senate Inquiry:

There was a decade of lies, denial, deceit and cover-up. For those who did try to help, there were threats, intimidation and abuse. The negligence of the senior leadership of the ADF in this scandal is breathtaking. There was a complete lack of oversight of the AAMI for decades. The ADF's health system, which is supposed to provide for the health care of our 50,000 men and women in uniform, was instead co-opted to do the dirty work of the pharmaceutical industry — right under their noses.³⁷

Major McCarthy was in effect propounding a conspiracy theory in which the AAMI, the ADF's Joint Health Command, the ADF Commanders, the Department of Defence and the Commonwealth Ministers with Defence portfolio responsibilities were colluding in doing the bidding of sinister 'Big Pharma' interests.

How could AAMI respond to such attacks? The assault on the Institute's reputation at once raised doubts about the integrity of the AAMI research programs and the scientists conducting them, the reliability of the advice it provided to the ADF Command and its ability to help protect the health and well-being of Australia's military personnel.

Because of its situation as a unit under the ADF Joint Health Command, the AAMI Director, Professor Shanks, could not respond directly to public attacks like those in the news media. Instead the Institute was constrained to provide the Joint Health Command, and through that the ADF Commanders, with briefings on its mefloquine and tafenoquine research programs.

Using information provided by AAMI, the Department of Defence took a proactive approach to addressing the allegations made during the controversy. It responded by posting a series of detailed 'fact sheets' about mefloquine and tafenoquine on the 'Defence Health' internet website. These included 'Mefloquine FAQs' [frequently asked questions], 'Mefloquine/doxycycline trials' and 'Tafenoquine/mefloquine trials'. These addressed the mefloquine-tafenoquine debate frankly, in layperson's language, answering questions about the drugs that intelligent members of the public might be expected to ask. They provided details of the manner in which the AAMI had conducted its studies on the drugs and provided links to the research reports the Institute had produced.³⁸

As the fact sheets pointed out, the AAMI had indeed conducted trials of both mefloquine and tafenoquine, but there was nothing secretive, deceitful or unethical about them and they had been fully reported in medical journals. For example, a tafenoquine and mefloquine trial had been conducted among 694 ADF personnel deployed to East Timor in 2001–2002. The fact sheet outlined the procedure in these terms:

Participation in the study was offered to a battalion group....It was optional and voluntary....Deploying personnel were fully informed of the risks and benefits of participation before they made their decision [about taking part]. They were

*given a written information sheet and were asked to sign a consent form... [and] were also advised of the option... to withdraw from the trials at any time with no detriment to their career or future health care....Those who chose not to participate were prescribed [other] anti-malaria medication....[Participants] were monitored closely during the study and for six months afterwards.*³⁹

Some soldiers did withdraw from the trial; and deployment to East Timor was never conditional upon volunteering for the trial.

The fact sheet concluded by directing readers to an internet hyperlink providing direct access to the journal article in which the AAMI study team had reported the trial. This had the title 'Randomized, Double-Blind Study of the Safety, Tolerability, and Efficacy of Tafenoquine versus Mefloquine for Malaria Prophylaxis in Nonimmune Subjects' and had been published in the American Society for Microbiology journal *Antimicrobial Agents and Chemotherapy* in February 2010.⁴⁰ An earlier AAMI study of the use of mefloquine and doxycycline in East Timor, 'Mefloquine and doxycycline malaria prophylaxis in Australian Soldiers in East Timor', had been published five years earlier in the *Medical Journal of Australia*.⁴¹

Other studies elsewhere were also relevant to the Australian debate over mefloquine. Among the most comprehensive was that carried by a research team from the Epidemiology and Analysis Section of the Armed Forces Health Surveillance Branch of the USA Defence Health Agency over five and a half years between 2008 and 2013. The results of the study were reported in an article titled 'Neuropsychiatric Outcomes after Mefloquine Exposure among U.S. Military Service Members' in the *American Journal of Tropical Medicine and Hygiene* in early 2017.⁴²

A remarkable aspect of this study was the enormous size of the test population, which comprised 367,840 individual members of the US military forces. The test population was divided into three main groups: 36,353 individuals who received mefloquine, 318,421 who received doxycycline and 12,881 who received atavaquone/proguanil (also known as Malarone®). It was also divided by age group, sex, military service (Army, Navy, Air Force, Marine Corps and Coast Guard), military grade (rank), the year in which the anti-malarial drugs were administered, whether the individuals were deployed or non-deployed for active service and if deployed whether or not exposed to combat. In addition, the test program

examined whether or not the members of the experimental population had been diagnosed with a neuropsychiatric condition in the year before they entered the test program. The test program therefore included most variables in the administration of anti-malarials to members of the US armed services.⁴³

The study was undertaken because of the need to estimate the occurrence of 'neuropsychiatric outcomes' among service personnel for whom mefloquine had been prescribed. It was undertaken at a time when the US military was moving to a policy decision to confine the administration of mefloquine to service personnel with contraindications for doxycycline but not for mefloquine, i.e. to people who for whatever reason could not take doxycycline but could take mefloquine. (A contraindication is a condition or factor serving as a reason for withholding a particular treatment that would harm the patient.) This restriction came into force in 2009 under a new policy, 'HA Policy 09-017', which made doxycycline the first-line antimalarial drug for US military personnel in all areas except for sub-Saharan Africa.⁴⁴

The findings of the 2008–2013 US study were highly relevant to the mefloquine debate in Australia. While the study found that 'serious adverse events after mefloquine are rare', the risk of a neuropsychiatric diagnosis' (NPD) was significantly higher for individuals with a previous NPD than it was for people without such a diagnosis. The NPD rate was also higher among the 'deployed' group than among the 'non-deployed'. The most common conditions suffered by the 'deployed' group who had taken mefloquine were 'adjustment disorder' (an 'incidence rate' of 13.6 to 56.9 per 1000 of the test group); the next three most common were 'insomnia' (15.8 to 27.3 per 1000), 'anxiety disorder' (14.5 to 23.5 per 1000) and 'tinnitus' (10.2 to 18.3 per 1000). Interestingly, in view of claims about suicide rates made by the International Mefloquine Veterans' Alliance, 'suicide ideation' was relatively uncommon among both the 'deployed' and 'non-deployed' groups and was actually higher for the 'doxycycline' group (4.4 and 4.2 per 1000 for 'deployed' and 'non-deployed' respectively) than for the 'mefloquine' group (2.05 and 1.5 per 1000 for 'deployed' and 'non-deployed' respectively).⁴⁵

No amount of such information could convince the members of the International Mefloquine Veterans Alliance, however. As the Alliance website alleged, in words provided by Major McCarthy, senior ADF officials had been guilty of 'extensive criminal misconduct' in the matter of the ADF's use of mefloquine and tafenoquine. As for the AAMI,

according to Major McCarthy its 'contemptuous treatment of Australian soldiers as human guinea pigs is a dark stain on the hard-earned reputation of the Australian Army'.⁴⁶



Logo used by the International Mefloquine Veterans' Alliance.

Meanwhile, the Parliamentary inquiry to which Major McCarthy gave evidence had conducted a series of four public hearings in Canberra, Brisbane and Sydney between August and September 2015. The inquiry was conducted by the Senate Standing Committee on Foreign Affairs, Defence and Trade, which the Senate had directed to investigate and report on 'the mental health of Australian Defence Force personnel who have returned from combat, peacekeeping or other deployment'. The committee presented its report to the Senate in March 2016. The report, titled *Mental health of Australian Defence Force members and veterans*, subsequently became available on-line on the Parliament's website.⁴⁷

The Senate inquiry was not conducted to investigate the mefloquine-tafenoquine controversy in particular. Rather, it had the broader task of generally inquiring into 'the mental health of Australian Defence Force personnel who have returned from combat, peacekeeping or other deployment, with particular reference to the extent and significance of mental ill-health and post-traumatic stress disorder among returned service personnel [and other related matters]'.⁴⁸

The inquiry's ten terms of reference did not refer either to malaria or the drugs used to manage the disease; however, almost inevitably, because of Major McCarthy's submission and evidence, the AAMI's trials with anti-malarial drugs became a subset within the issues the committee investigated. Mefloquine subsequently became the subject for two of the committee's 17 recommendations. These were that:

Recommendation 5

...Defence and DVA [Department of Veterans' Affairs] contact ADF members and veterans who have been administered mefloquine hydrochloride (mefloquine) during their service to advise them of the possible short-term and long-term side effects and that all ADF members and veterans who have been administered mefloquine during their service be given access to neurological assessment.

Recommendation 6

...the report for the Inspector General of the Australian Defence Force's inquiry to determine whether any failures in military justice have occurred regarding the Australia Defence Force's use of mefloquine be published immediately following the completion of the inquiry.⁴⁹

The inquiry referred to in Recommendation 6 was the ADF's own internal inquiry into the complaints about mefloquine and tafenoquine publicly aired by Major McCarthy. This had been conducted by the Inspector General of the Australian Defence Force (IGADF), an independent statutory authority separate from the military chain of command. The IGADF inquiry publicly released its findings on 4 October 2016. Contrary to the beliefs of the veterans' advocacy groups, it found that 'the drug trials were conducted ethically and lawfully, soldiers volunteered to participate,...very few people became ill as a result and there were very few adverse events' among participants.⁵⁰ Perhaps predictably, anti-mefloquine lobbyists expressed disappointment at this outcome. One retired Army officer, Colonel Ray Martin, formerly the commander of the 1st Battalion of the Royal Australian Regiment, was one said to have expressed 'outrage' over the findings. ABC Radio quoted him as saying that he and other veterans were 'kind of devastated' by the inquiry's outcome.⁵¹

Even as the Senate inquiry into veterans' health was in progress, the Senators were scrutinising the AAMI's activities in another forum. This was the Senate Estimates Committee, which provides an opportunity for the Parliament of Australia to scrutinise estimates of government expenditure as part of the annual budgetary cycle. The Senate Estimates Committee examined the issue of mefloquine use by the ADF at its hearings in Canberra on 10 February 2016. The officials representing the ADF were the Vice Chief of the Defence Force, Vice-Admiral Raymond J. Griggs,

and the Surgeon General, Air Vice Marshal Tracy Smart. The Senators questioned Griggs and Smart closely about the historical background to the use of mefloquine, the ADF's reliance on the drug for anti-malaria prophylaxis and the nature, severity and frequency of the drug's side effects. Their responses to the Senators' interrogation were, in effect, a reiteration of the information made available in the mefloquine-tafenoquine-doxycycline fact sheets referred to above.⁵²

Vice Admiral Griggs and Air Vice Marshal Smart could hardly have been surprised by Major McCarthy's response to what they had said before the Senate Estimates Committee. Using social media, he published an account of the hearings under the title 'Misleading evidence to Senate Estimates...by Senior Defence Officials [concerning] ADF use of the anti-malarial drug mefloquine'. Among others, he took issue with their description of mefloquine's more serious side-effects as being 'uncommon'. In endeavouring to refute that notion he claimed to be quoting from the manufacturer's description of the drug. Rather than being 'uncommon', he wrote, 'the safety profile of mefloquine is characterised by a predominance of neuropsychiatric adverse reactions'.⁵³

One possibility ignored by the veterans' advocacy groups and their supporters is that the psychoneurotic conditions suffered by those claiming to have been permanently damaged by mefloquine and tafenoquine were due to causes other than having ingested the drugs. No one, either in the ADF Joint Health Command and much less the International Mefloquine Veterans Alliance, seems to have publicly canvassed other pre-existing neuroses or psychoses as being the real cause of the medical conditions attributed to the two drugs. Nor did anyone suggest that mefloquine and tafenoquine had become convenient scapegoats the veterans could blame for such conditions.

The ADF has consistently denied that there is evidence that mefloquine is a causal factor in conditions such as post-traumatic stress disorder (PTSD). A diagnosis of PTSD, it has pointed out, requires particular medications to be considered and eliminated. The ADF's position is that it has focused on eliminating mefloquine toxicity as a cause of PTSD but encourages people suffering PTSD to seek help regardless of the cause of their distress.⁵⁴

Veterans' demands for compensation for having been administered mefloquine and tafenoquine are another aspect of the controversy. That in turn raises another issue — the nature and quality of the information about mefloquine and tafenoquine being

placed on websites like those of the International Mefloquine Veterans Alliance. Unlike the information about the drugs reported in the professional scientific journals, the data appearing on advocacy groups' websites does not appear to be subject to quality control. Anyone with a grievance may 'post' personal opinions in internet 'chat rooms'. No 'filtering' process regulates what gets published; and so prejudice, bias, unverifiable claims and subjective assertions characterise the comment that appears.

The 'unfiltered' information available on the internet leads to misinformation and myths about medical procedures and prophylactic drugs. These abound on internet websites. Examples of such myths include 'vaccines given to babies cause sudden infant death syndrome'; 'measles vaccines cause autism'; 'the AIDS epidemic arose from a 1950s polio vaccine trial-gone-wrong'; and 'polio vaccine is used to prevent births in minority groups'. Once promulgated, such myths become widely accepted, enshrined as an article of faith in the minds of those who wish to believe them. As with religious belief, appeals to scientific proof cannot persuade the true believers that the faith might be groundless.⁵⁵

Maintaining adopted positions

As this article was being prepared for publication in May 2017, eighteen months after the mefloquine controversy became headline news in Australia, all sides to the mefloquine-tafenoquine debate were maintaining the positions they had meanwhile adopted.

Though probably embarrassed by the scale of the controversy and the accusations of criminality thrown at them, the ADF Commanders and the ADF Joint Health Command seemed satisfied they had done everything possible to address veterans' concerns about anti-malarial medication fairly, honestly and openly.

The AAMI and its scientific staff were deeply wounded by the aspersions against their institutional and personal integrity. ADF protocols precluded their publicly answering their accusers. The news media were generally uninterested in telling the mefloquine-tafenoquine story objectively from the AAMI perspective. As this article was going to press (August 2017), very few news items appraising the AAMI's work positively had appeared in the 23 months since the controversy first erupted. From that we might conclude that 'good news' stories like the Institute's continuing achievements don't sell newspapers as well as scandals and controversies do.

As for the veterans' anti-mefloquine advocacy groups, nothing but compensation payments plus an ADF apology for sanctioning the use of mefloquine and tafenoquine seemed likely to lessen their members' hostility to the ADF generally and the AAMI in particular. And so the AAMI, the dissentient veterans' unintentional *bête noir*, seemed fated to continue receiving a 'bad press', at least in the advocacy groups' websites and social media pages.

What advocacy group members seemed unlikely ever to admit to was that mefloquine and tafenoquine might actually have saved their lives. The malarious countries in which they had served were in regions of malarial endemicity where the often fatal *falciparum* form of the disease is common. Without the AAMI-devised malaria treatment and prophylaxis regimens, multiple soldier deaths from *falciparum* malaria could well have occurred.

The last Australian soldier to die from the disease succumbed to *falciparum* malaria 50 years ago, in Vietnam in 1967. In Timor Leste 32 years later, however, five ADF soldiers actually came close to death after contracting *falciparum* malaria in the period December 1999 to May 2000. Their lives were saved by their prompt evacuation to Darwin and hospitalisation in the intensive care unit of the Royal Darwin Hospital. These cases demonstrated that lethal malarial infections are not just a theoretical risk during modern military operations but remain a threat to the lives of all ADF personnel posted to malarious regions.⁵⁶

That no other malarial fatalities within the ADF have occurred since 1967 is a signal achievement. In large part it may be attributed to the AAMI research effort and the malaria treatment and prophylaxis regimens that have been the result.

Conclusion

The foregoing sections have outlined the way in which the mefloquine-tafenoquine controversy developed. At the time of writing this article, it was still too early to write an historical account of the dispute. Perhaps another decade might need to elapse before such a history can be written. That amount of time will probably be necessary in order for the standpoints of each of the protagonists to be seen from an historical perspective.

What direction, if any, the controversy might take in future is uncertain, but what seems likely is that it might continue. That is obviously unwelcome to the AAMI and the ADF Joint Health Command, for whom it is an unwanted distraction from their roles and their responsibilities to the ADF commanders

and serving personnel; however, come what may they certainly remain professionally committed to delivering the best in health and welfare services to Australia's military personnel, and in particular to those deployed to malarious regions overseas.

The five biographical profiles set out in this concluding article in the 'Pioneers of Australian military malariology' series have aimed to demonstrate something of the value to the ADF of the AAMI research programs and of the quality of those in charge of the Institute's activities.

The achievements of the Institute are undeniable. No amount of vilification by dissident veterans blaming the AAMI for their health problems should be allowed to detract from that. Nor should it diminish an appreciation of what the Institute has accomplished in the half-century since its foundation.

Abbreviations

1MRL	1 Malaria Research Laboratory.
1MRU	1 st Malaria Research Unit.
AAMC	Australian Army Medical Corps (prefixed 'Royal' from 1948).
AAMI	Australian Army Malaria Institute.
ADF	Australian Defence Force.
AWM	Australian War Memorial.
BSc	Bachelor of Science.
CO	Commanding Officer.
DC	District of Columbia.
DGMS	Director General of [Army] Medical Services.
DNA	Deoxyribonucleic acid (the self-replicating material present in living organisms as the main constituent of chromosomes).
DVA	Department of Veterans' Affairs.
FAQ	Frequently Asked Question
HIV	Human Immunodeficiency Virus.
IGADF	Inspector General of the Australian Defence Force.
MB BS	Bachelor of Medicine and Bachelor of Surgery.
MD	Doctor of Medicine.

History

MPH-TM	Master of Public Health and Tropical Medicine.	US	United States [of America].
MSc	Master of Science.	USAID	US Agency for International Development.
MScAgr	Master of Agricultural Science.	WHO	World Health Organisation.
NPD	Neuropsychiatric diagnosis	<hr/> <i>Author's affiliations: Dr Ian Howie-Willis is a professional practising historian. His most recent book is An Unending War: The Australia Army's struggle against malaria, 1885–2015 (Big Sky Publications, Newport [New South Wales], 2016). The previous four parts of his series of articles on 'The pioneers of Australian military malariology' appeared in earlier editions of JMVH. In November 2016 the series was granted the 'JMVH Editor's Award'. The author's two current major research projects are a biography of the malariologist Brigadier Sir Neil Hamilton Fairley and a history of the Australian Army's experience of sexually transmitted diseases.</i>	
PhD	Doctor of Philosophy.		
PSTD	Post-traumatic stress disorder		
RAAMC	Royal Australian Army Medical Corps.		
RSL	Returned and Services League of Australia.		
SARS	Severe Acute Respiratory Syndrome.		
TGA	Therapeutic Goods Administration.		
UN	United Nations.		

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- 2 *World Malaria Report 2016*, *op. cit.*
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- 8 Apart from the principal author, Karl H.W. Rieckmann, the contributors to the series were (in alphabetical order of surname): John G. Aaskov, Alyson M. Auliff, Qin Cheng, Robert D. Cooper, Michael D. Edstein, Stephen P. Frances, Ivor E. Harris, Scott J. Kitchener, Barbara M. Kotecka, Kenneth G. Lilley, Peter Nasveld, G. Dennis Shanks and Anthony W. Sweeney,
- 9 Australian Army Malaria Institute, *The Australian Army Malaria Institute: Celebrating its 50th Anniversary in 2016*, Australian Army Malaria Institute & Department of Defence, Australian Government, no place of publication cited (but Enoggera, Queensland, and Canberra), 2016.
- 10 Until after the end of World War II, Australia controlled Papua and New Guinea as separately administered territories. In 1946 they were administratively combined as the 'Territory of Papua and New Guinea'. That name was retained until the granting of self-government in 1973, when the present name Papua New Guinea was adopted. This name has continued since the nation achieved independence in 1975. For convenience, this article will most often use the present name.
- 11 The biographical and professional information in this section is derived from the author's interviews with Dr Sweeney and personnel records held by Australian Army Malaria Institute.
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- 13 Australian Army Malaria Institute, *The Australian Army Malaria Institute: Celebrating its 50th Anniversary in 2016*, Australian Army Malaria Institute & Department of Defence, Australian Government, no place of publication cited (but Enoggera, Queensland, and Canberra), 2016.
- 14 The biographical and professional information in this section is derived from personnel records held by Australian Army Malaria Institute.
- 15 The biographical and professional information in this section is derived from the author's interview with Dr Cooper and personnel records held by Australian Army Malaria Institute.
- 16 The biographical and professional information in this section is derived from the author's interviews and correspondence with Professor Rieckmann.
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TAILORED MEDICAL AND HEALTH SERVICES FOR DEFENCE AT HOME AND ABROAD



Command versus technical authority: lessons from the 2nd General Health Battalion

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Introduction

Historically, military medical units were commanded by senior doctors. All of the renowned hospitals that form the heritage of the ADF had medical commanders: for example, Colonel Thomas Henry Fiaschi of the 3rd Australian General Hospital at Lemnos; Lieutenant Colonel Wilfred Giblin of the 1st Casualty Clearing Station at Gallipoli; Lieutenant Colonel Henry McLorinan of the 2/1st Casualty Clearing Station in the Middle East during the Second World War; and Major W.B ('Digger') James, Officer Commanding of the 8th Field Ambulance in South Vietnam.

Even though these doctors were no doubt reliant on non-clinical staff officer support, there was an expectation that seniority in technical (usually surgical) skill equated with authority and that the public, soldiers and the Defence Force expected final responsibility for the running of a hospital should rest with the most authoritative deployed clinician. This situation closely mirrored that in Australian civilian hospitals, where 'administrators' were responsible for only business process and logistic functions well into the 1980s.

From the 1980s in Australia and elsewhere, driven by a need for efficiency and the professionalisation of business management, civilian hospitals became increasingly reliant on non-clinical managers to develop hospital operating systems running along business lines. As senior doctors became progressively isolated within their clinical units, a new medical specialty of 'medical administration' emerged that bridged the business and clinical functions of the hospital.

Today, every major Australian hospital has (using these or similar titles) both a Chief Executive Officer, usually with a background in public sector administration, and a Chief Medical Officer, a doctor, usually with the specialty Fellowship of the Royal Australasian College of Medical Administrators. The Chief Executive Officer is responsible for delivering

a targeted scope and quantity of healthcare, staffing and the logistic and business functions of the hospital, while the Chief Medical Officer is responsible for the quality and safety of healthcare, the maintenance of professional standards, the coordination of medical specialties with the nursing and allied health professions, and compliance with legal and ethical community expectations.

Neither the Chief Executive Officer nor the Chief Medical Officer is subordinate to the other; rather, both have such clearly-defined functions that the relationship is (ideally) symbiotic. However, as the Chief Medical Officer is essentially responsible for standards and the Chief Executive Officer for productivity and efficiency, competing demands can occasionally cause tension. Ideally, this is a collaborative tension, with the fundamental shared goal of delivering the best health outcomes for the community.

Healthcare in the ADF is in a process of transition towards a command/administrative and clinical leadership structure that mirrors civilian hospitals. The Surgeon-General of the ADF for many years has been the ultimate technical authority responsible for guaranteeing to the Australian community the highest standard of clinical practice; essentially the equivalent of a Chief Medical Officer. With the appointment of the Commander Joint Health Command in 2008, the ADF created the equivalent of a Chief Executive Officer. However, unlike in civilian healthcare, since the inception of Joint Health Command these two positions have been held by the same person.

Lower levels of clinical and command authority follow no clear pattern. Each of the single Services has both a Director General (1-star) and Director (O-6) of its health functions but neither of these positions is solely command/administrative or clinical. Army Senior Medical Officers at most of the manoeuvre brigades no longer exist, having been replaced by Senior Health Officers who may or may not have a nursing or allied health background. Senior RAAF

medical officers occupy largely administrative and occupational health rather than clinical roles.

In contrast, other areas of the ADF have clearly recognised the need for clinical authority. For example, Navy's Fleet Medical Officer is responsible for clinical advice to health elements at sea. The Senior Medical Officer (J07) at Joint Operations Command has technical authority—but no command authority—over all deployed clinicians. Joint Health Command has several senior (O-6) officers with responsibility for clinical policy, such as the Directors of Military Medicine and Mental Health. However, command of health assets technically controlled by these positions is devolved to individual unit commanding officers or operational and formation commanders. Not surprisingly, this can lead to uncertainty when solving problems or designing plans that have both technical and operational considerations.

In Army, the clearest distinction between command/administrative and clinical authority is in the positions of Commanding Officer and Director of Clinical Services at the 2nd General Health Battalion. The 2nd General Health Battalion was last commanded by a medical officer in 2009. The 1st Health Support Battalion, when it operated as a Role 2E hospital prior to the Combat Health Restructure, last had a medical officer as commanding officer in 2005.

The change to General Service Officer command of Army's Role 2E hospitals was, in part, driven by the lack of suitably-qualified medical officers and, in part, by the emergence of very well-qualified General Service Officer candidates for the position. The requirement to deliver, day-to-day in a busy hospital, both clinical and command/administrative leadership functions no doubt acted as a catalyst to the adoption of the civilian model.

The rationale for the appointment of a Director of Clinical Services was to provide technical leadership and governance. As a respected subject-matter expert, the Director of Clinical Services could exercise authority over clinicians held individually responsible not only to the military chain of command but to the Australian community through external regulation by the Australian Health Practitioners Authority and the specialist medical colleges.

This article outlines the responsibilities of the Commanding Officer and Director of Clinical Services at the 2nd General Health Battalion and highlights how the tension inherent between the two roles, when properly understood, works to enhance the clinical capability of the organisation. It also highlights the potential broader application of such a relationship

between command and technical functions in the other Services, and in other ADF technical fields.

Responsibilities of the Commanding Officer and Director of Clinical Services

Command and technical responsibilities within the Role 2E capability differ markedly between the training and operational environments. Although the 2nd General Health Battalion has a 'live dependency' on major exercises, in reality few (if any) very seriously ill patients are treated during these brief periods, leaving the majority of the year to providing primary care (general practice) in garrison health centre augmentation or on field exercises, or conducting individual training, equipment maintenance, and administration. In contrast, even on low-intensity operations, the focus of the deployed hospital is the provision of clinical care up to the level of complex surgery, with the implicit requirement to meet or exceed Australian civilian hospital standards.

In garrison (including support to major field exercises)

The Commanding Officer generates a unit capable of deploying on operations in accordance with the Chief of Army's Preparedness Directive, and provides personnel and subunits in support of domestic exercises and programs such as the Army Aboriginal Community Assistance Project. The Commanding Officer is responsible for all the non-clinical functions of the hospital, including security, personnel, logistics, and planning for exercises and operations. This requires personnel leadership, discipline and administration, oversight of the Technical Regulatory Framework for equipment, financial governance, input to health doctrine and training, and liaison with higher headquarters.

The Director of Clinical Services is the unit representative of the chain of technical control that leads through 17th Combat Service Support Brigade to the Surgeon-General of the ADF. In garrison, the four main responsibilities of the Director of Clinical Services are maintenance and enhancement of the clinical workforce, including training, technical performance management, and selection and mentoring of clinical teams; advice on equipment resources; development of clinical policy; and oversight of the (usually limited) 'real life' clinical work of unit staff supporting exercises.

The major tool used by the Director of Clinical Services to harness the multidisciplinary expertise of the hospital is the Clinical Governance Committee. This includes representatives from all hospital

departments, and might be better understood as a 'clinical leadership committee', as it is the primary means by which the clinical functions of the unit are directed. The committee structure is effective as there are frequently issues that can be solved within the technical resources of the unit that might not be visible to individual departments.

The 2nd General Health Battalion's establishment rank for the Director of Clinical Services is Colonel, in order to exercise authority over clinicians of the hospital who usually hold ranks between Captain and Colonel, whereas the rank of the commanding officer of a battalion-sized unit is Lieutenant Colonel. This rank disparity has no bearing on the command authority of the Commanding Officer. Until now, the Director of Clinical Services has been a Reservist as for many years there have been no Regular Army hospital specialists; however, this is likely to change with the introduction of the full-time Medical Specialist Program.

On operations

The current ADF operational construct deploys subunits, units and formations that are constituted specific to particular requirements. In recent decades, task-organised health units have occasionally been the primary focus of such deployments (such as Operation TAMAR, the 1994-95 response to the Rwandan genocide), more often a principal component of the multifaceted response to humanitarian emergencies (such as Operation SUMATRA ASSIST, the response to the 2004 Indian Ocean tsunami) and most often a small part of the force protection element for a peace enforcement operation (Operation STABILISE, East Timor, 1999-2000) or training task in warlike conditions (Operation OKRA, Iraq, 2015-present).

The health elements of Operation TAMAR and the first UN hospital in Dili were commanded by doctors. However, by the middle of the decade 2001-2010, the command of such units had passed to non-clinicians. The experience of officers embedded in the Dutch Role 2E hospital in Tarin Kot in 2007-10 and the NATO Role 3 hospital at Kandahar Airfield, 2012-14, suggested that a deployed doctor with overall responsibility for the clinical work of the hospital would be a valuable addition to the ADF's hospital deployed command team.

The first time the ADF deployed a Director of Clinical Services on operations in one of its own hospitals was on Operation OKRA in Iraq in 2015. The 37-strong (including 6 doctors) Australian and New Zealand staff of the ANZAC Role 2E Hospital

Taji was commanded by a Major, with a Lieutenant Colonel as the Director of Clinical Services. Drawing on the 2nd General Health Battalion's doctrine in the garrison environment and limited experience on major exercises, as well as building on experiences while embedded in deployed coalition hospitals, a delineation of responsibilities rapidly emerged.

The Officer Commanding performed essentially the same functions as listed above for the Commanding Officer of the 2nd General Health Battalion in garrison, with overall responsibility for achieving the mission of the hospital within the medical rules-of-engagement and imposed resource limitations. Major tasks included personnel command, leadership and management; controlling the logistic functions of the hospital, such as resupply of pharmaceuticals and other stores; generating and maintaining hospital facilities (including designing the layout of the hospital) and major equipment systems (for example, surgical instrument sterilisers and anaesthesia machine); and setting the daily schedule and priorities of effort.

Unlike the Officer Commanding, the role of the Director of Clinical Services in a functioning hospital with 'real' (as opposed to exercise) patients was quite different to that in garrison. There was essentially no requirement for credentialing or selection of staff for particular postings, as all this had been decided prior to deployment. Rather, the Director of Clinical Services had to use the capability of the hospital to the greatest clinical effect. This frequently required interpreting the medical rules-of-engagement as they pertained to the treatment of individual patients.

A common question was what constituted 'emergency' healthcare, for which all patients presenting to the hospital were eligible, and what was 'routine', for which many coalition soldiers and contractors were ineligible. Whether fluid resuscitation for infectious gastroenteritis or surgery for acute appendicitis are treatments for 'life-threatening emergencies' were decisions that could only be made with clinical knowledge of the risk of alternatives.

The Director of Clinical Services took ultimate responsibility for triage in and out of the facility (understanding the risks of all options), and for all treatment decisions, most notably those relating to potential conflict between the medical rules-of-engagement, resource limitations and medical ethics. Tasks supporting these responsibilities included setting expectations of the clinicians, including establishing a process for resolving disagreements on clinical issues; developing clinical policies that encouraged uniformity of practice within agreed

clinical practice guidelines; handling healthcare complaints and investigating critical incidents; and leading a process for identifying and mitigating clinical risk, with particular focus on infection control.

The Director of Clinical Services had to create an understanding among clinicians that waiting for decision by consensus could lead to being overwhelmed, and that occasionally the Director of Clinical Services' authority would need to be respected regardless of individual dissenting opinions. The scopes of practice of individual clinicians had to be defined, taking into account both individual skills and the risk of evacuating patients from the facility.

In the deployed environment more so than in garrison, there is an inherent tension between the roles of the Officer Commanding/Commanding Officer and the Director of Clinical Services. The latter must aim to provide the best clinical service to individual patients; the former sets the limits on what can be achieved with the resources available, the tactical situation and the higher commander's intent. Except in the unusual situation of unlimited resources, the Director of Clinical Services should be highlighting areas in which the hospital could improve its clinical performance through the acquisition of equipment, the reallocation of personnel or the redesign of procedures. The Officer Commanding/Commanding Officer must fight for this prioritised list of requests but must ultimately declare when no more can be done. The Director of Clinical Services then uses the resources made available to the best advantage—accepting that this will sometimes require compromise of usual civilian standards of practice. Clinical responsibility for such pragmatic decisions rests with the Director of Clinical Services. Therefore, the Director of Clinical Services' role is 'aspirational', in so doing fulfilling the Australian public's and external regulator's (that is, the Australian Health Practitioners Authority's) expectations of healthcare practitioners, while the Officer Commanding's/Commanding Officer's is 'pragmatic'.

The Director of Clinical Services is subordinate to the Officer Commanding/Commanding Officer in all but one domain. To the greatest degree possible, the Director of Clinical Services is responsible for the hospital's adherence to the external regulations that apply to all Australian healthcare practitioners. This transcends the authority of the Officer Commanding/Commanding Officer and the responsibility of the Director of Clinical Services as an Army officer, being instead a responsibility to the Australian nation, which expects the same standards of the doctors in

its Defence Force as it does of all Australian doctors. ADF doctrine recognises this by stating that 'medical personnel ... cannot be ... compelled to carry out any act incompatible with their humanitarian mission or medical ethics' (Commonwealth of Australia, 2006).

The practical application of this responsibility is that the Director of Clinical Services must advise the Officer Commanding/Commanding Officer on things that should or should not occur (taking into account the command prerogative to accept a greater than usually tolerable risk in order to achieve a mission) and things that must or must not occur, which are beyond the authority of the Officer Commanding/Commanding Officer and indeed Defence.

Examples of things that should or should not occur include not allowing staff to work beyond their scope of practice; not transferring patients to hospitals with inadequate resources to treat them; not attempting resuscitation of unsalvageable patients; and ensuring that only medical officers perform duties that are legally the sole responsibility of doctors, including prescribing medications, ordering and interpreting diagnostic tests, and performing surgery or administering general anaesthesia.

Examples of things that must or must not occur, regardless of operational commands, include not permitting euthanasia; not treating patients without their consent (unless in the emergency treatment of an unconscious patient when consent cannot be sought and would reasonably be expected to be given); and reporting instances of practitioner impairment or unethical behaviour to the Australian Health Practitioner Regulatory Agency, even if this risks compromising the clinical capability of the hospital.

Higher responsibility to an authority outside the ADF is perhaps a confronting notion to many within Defence. However, this is essentially an extension of the non-combatant status afforded medical personnel since armed forces first incorporated physicians and surgeons. ADF doctrine states that the role of the Royal Australian Army Medical Corps is 'to contribute to the Army's operational capability through the conservation of manpower by promoting health and well-being, through the prevention of disease and injury, and through the care, treatment and evacuation of sick and wounded' (Commonwealth of Australia, 2016a). The RAN and RAAF are less prosaic but have similar intent. These roles are potentially in conflict with the duty of Defence clinicians, as 'every ADF doctor is a non-combatant and remains obliged to treat all patients (including enemy combatants) equally and with

primary regard to welfare rather than operational capability' (Neuhaus et al., 2001). This accords with the Medical Board of Australia's code of conduct, which requires that doctors must 'make the care of patients their first concern' (Medical Board of Australia, 2014a). The inherent tension between the roles of the organisation and the clinicians who serve in it are similar to the tension between the Director of Clinical Services and the Officer Commanding/Commanding Officer.

Knowledge/experience required of the Director of Clinical Services

Both Australian and UK experience suggests that the Director of Clinical Services must have a broad understanding of military healthcare structures and processes, at least some understanding of the operational environment, and be skilled at negotiating with staff officers and commanders (Mahoney et al., 2011).

Specific knowledge and experience includes a technical understanding of modern combat casualty care (including the principles of damage control surgery and when to apply them; blast/ballistic wound patterns and their treatment; and the imperative to move casualties rapidly through the continuum of care); an understanding of resource limitations in the deployed environment, and how these might be overcome; an understanding of at least the basics of every hospital specialty, so as to be able to provide governance of clinical decisions and a 'second opinion' when needed; and experience in triage and managing the resources of the hospital during times of near or beyond capability workload, as occurs during mass casualties.

Key relationships

ADF doctrine identifies the Surgeon-General of the ADF as the technical authority for all health matters (Whelan, 2012). From the perspective of the 2nd General Health Battalion, this authority is delegated through Director Army Health, the Command Health Officer of Forces Command, the Senior Health Officer of 17th Combat Services Support Brigade, to the Commanding Officer of 2nd General Health Battalion. While the Surgeon-General has always been a medical practitioner, many of the other positions in this chain are now occupied by non-clinicians without the knowledge to judge clinical decisions against anything other than written policy.

As written policy cannot take account of all possible individual circumstances, an informal technical reporting chain has developed in garrison: from the

Director of Clinical Services of 2nd General Health Battalion to the Director Clinical Governance 17th Combat Services Support Brigade to the Surgeon-General. On operations, clinical necessity has formalised this technical reporting chain, which is through the deployed Senior Medical Officer to Joint Operations Command's Senior Medical Officer and thence to the Surgeon-General.

Nurses and medics form the bulk of the clinicians of the hospital. The Director of Clinical Services relies heavily on the leadership and technical expertise of the Senior Nursing Officer and the Senior Medic to generate nursing- and medic-specific policies and procedures, and governance of these respective workforces. Similarly, the Senior Allied Health Officer takes responsibility for pathology, radiology and physiotherapy. The Director of Clinical Services relies on the leadership and technical expertise of the Deputy Director of Clinical Services, a senior nursing posting, to enact day-to-day functions of credentialing, clinical governance and training across the span of clinical craft groups.

On major domestic exercises in the absence of the Director, the Deputy Director of Clinical Services is required to fill the Director's role and, as such, has encountered similar tensions described when working with command. An often misunderstood position is that of the Senior Medical Officer, a term with different meanings in different organisations. While the Senior Medical Officer in a headquarters is its lead clinical authority, within the 2nd General Health Battalion the Senior Medical Officer is subordinate to the Director of Clinical Services and is usually a general practitioner with responsibility for the clinical supervision, professional development and workforce coordination of the non-specialist medical officers of the unit.

Examples of actions taken by the Director of Clinical Services on deployment

Examples of responsibilities undertaken by ADF and coalition Directors of Clinical Services on recent deployments include:

- Triage during mass casualty incidents;
- Declaring patients to have unsurvivable wounds, given the constraints of care able to be delivered in the medium term, with consequent immediate palliation;
- Deciding to transfer local national patients immediately after operative surgery to local civilian facilities, rather than allowing the surgeon involved to provide post-operative care;

- Deciding not to transfer local nationals to civilian hospitals unable to provide an adequate standard of care, even when this conflicted with a commander's intent;
- Recommending to the Officer Commanding/Commanding Officer that clinicians be removed from the operational environment due to inadequate technical skills or dysfunctional work within a multinational team context; and
- Supervising junior doctors (general duties medical officers) providing resuscitation and ward care beyond their level of training (Mahoney et al., 2011).

Illustrative vignette

In East Timor during Operation CITADEL, a Health Supplementation Team comprising a Role 2E (Light) was deployed in a forward operating base near a moderately-sized town with a derelict and poorly-staffed civilian hospital. A small boy suffered a fractured femur in an accident, and was brought to the ADF facility where there was an orthopaedic surgeon. However, the medical rules-of-engagement prevented even emergency treatment of local civilians. The non-medical Officer Commanding of the Health Supplementation Team would not allow the boy to be treated.

The medical and nursing officers present were unwilling to transfer him to the local hospital (where the chance of death or permanent disability from this usually readily treatable fracture was high), as this conflicted with their professional duty of care. Confrontation transformed into 'collaborative tension' as a mid-ground was achieved, in which hospital staff accompanied the boy to the local hospital, applied traction, and were permitted to visit every day to ensure his care was optimal. In so doing, the capability of the local hospital and positive engagement with the local community were enhanced.

International comparisons

The ADF role of the Director of Clinical Services on deployment developed in the light of the highly-successful model that evolved in the UK's Role 3 hospital at Camp Bastion in Afghanistan (Mahoney et al., 2011). Prior to 2009, this hospital had a Clinical Director, who was simply the senior deployed medical officer. The work required was secondary to that person's primary clinical specialty, and limited

to being the clinicians' advocate to the command chain.

However, recognising the need for empowered clinical authority in a rapidly-evolving environment, unfamiliar even to the many permanent-force clinicians deploying, after 2009 the position was retitled Deployed Medical Director, with responsibilities for oversight of patient management, improvement of hospital procedures, and advice to the Commanding Officer on equipment and personnel issues. The Deployed Medical Director had no role in direct patient care and could be drawn from any specialty.

US military doctrine, as applied in Central Command's Role 3 hospitals in Iraq and Afghanistan, essentially split the Director of Clinical Services' role between 2-3 people. The Chief of Trauma was responsible for triage into and out of the hospital, clinical policies, and oversight of individual patient management decisions. The Senior Medical Officer and Senior Nursing Officer were responsible for credentialing, oversight of individual practitioners, and ongoing training.

The requirement for a Chief of Trauma arose partly because, unlike in Australia, trauma/acute care surgery is a discrete subspecialty in the US in which few US surgeons are trained. In some rotations, the Chief of Trauma (a trauma surgeon) was required to oversee the work of surgeons unaccustomed to trauma. This arrangement worked very well for trauma patients but, as the intensity of combat operations diminished and proportionately more non-trauma patients were admitted, there were at times instances of dysfunctional interference in other medical specialty decisions. Unlike the ADF's Director of Clinical Services (and the UK's Deployed Medical Director), the Chief of Trauma was not characterised as a consultative position providing oversight but rather as the sole 'captain of the ship' who took (or decided not to take) advice from subspecialists.

Wider implications: health

This article contends that the separation of clinical and command functions within a Role 2E hospital, both in garrison and on operations, provides the optimal structure for collaborative deliberation, professional oversight, and decisive action when required. Unlike the UK example, limitation of personnel in an Australian Role 2E hospital requires the Director of Clinical Services to have a direct patient-care role within their specialty. This structure may be applicable to the newly-established

Maritime Role 2E hospitals aboard the Canberra-class Landing Helicopter Docks, and perhaps also in the evolving concept of the RAAF Fly-Away Surgical Team.

It is further contended that at the level of higher headquarters, separation of the functions of Senior Health Officer (responsible for generation of equipment and personnel capability) and Senior Medical Officer (responsible for clinical policy, governance of the clinical workforce, advice on acquisitions and interaction with civilian regulatory authorities—and perhaps better termed a Director of Clinical Services) would be a logical extension of this concept.

To develop collaborative tension between the technical authority and command chain, these roles should not be filled by a single person. Commander Joint Health is essentially responsible for the facilities and personnel required for garrison healthcare, while the Surgeon-General is responsible to the Australian community for the standard of healthcare provided in both these facilities and on deployment. A collaborative tension between those who hold these positions would seem to be beneficial.

Conclusion

The term Director of Clinical Services is creeping into doctrine without the position having a formal description outside the internal standard operating procedures of the 2nd General Health Battalion (Commonwealth of Australia, 2014b, 2016b). This article has outlined the role and the complexity of its relationship with command in order to fill this gap.

The model that has matured at the 2nd General Health Battalion over the last six years, and which has now been implemented on operations, is relevant to other health units. It potentially is also relevant to non-health units heavily reliant on officers with externally-regulated technical expertise working in an ADF environment in which command priorities may conflict with the ideals of civilian best practice.

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and Surgery at the University of Queensland and the current Director of Clinical Services at the 2nd General Health Battalion.

Lieutenant Colonel Clark Flint joined the British Army in 1983 and graduated from the Royal Military Academy Sandhurst in 1989. He transferred to the ADF in 2006. He was the Commanding Officer of the 2nd General Health Battalion from 2013-15. He deployed on Operation GRANBY (1st Gulf War), with UN Peacekeeping Force (Cyprus) in 1995, in the Balkans in 1997 and 1999, on Operation TELIC (2nd Gulf War), Operation QUICK STEP (Fiji) in 2006 and Operation SLIPPER in 2009. He completed a Masters degree in Strategy and Management at the University of NSW in 2010.

Major Sean Kennaway graduated from the Royal Military College Duntroon in 1993 and has since spent 20 years as a General Service Officer in the Royal Australian Army Medical Corps. He has held the full range of appointments in training, operations, command and staff roles. He has deployed on six operations including Operation TAMAR (Rwanda), Operation CITADEL (East Timor), Operation NIUE ASSIST (Niue), Operation RESOLUTE (PNG and Nauru), Operation SLIPPER (Middle East Area of Operations) and Operation OKRA (Iraq) in 2015, where he was the first Officer Commanding of the Role 2E hospital. He holds a Bachelor of Applied Science and is a graduate of the ADF School of Languages in both Bahasa Indonesian and Tetum.

Lieutenant Colonel Nicholas Duff was commissioned in 1994 as a direct entry officer and, until 2016, was the Deputy Director of Clinical Services at the 2nd General Health Battalion. He is currently the manager of the Enoggera Health Centre. He has seen operational service in Bougainville in 1999, East Timor on four occasions between 2000-03 and Indonesia in 2005, as well as defence aid to the civil community tasking. As a Nursing Officer, he has specialised in intensive care and emergency nursing, and subsequently achieved a Masters in Health System Management from Griffith University.

Colonel Brad McCall was commissioned into the Army Reserve in 1992. A Public Health Physician, he has served in preventive medicine roles, as Senior Medical Officer in deployed headquarters and, from 2010 to 2014, was the first Director of Clinical Services at the 2nd General Health Battalion. He is the past Director of the Centre for Military and Veterans Health at the University of Queensland and Director of the Metro South Public Health Unit in Brisbane.

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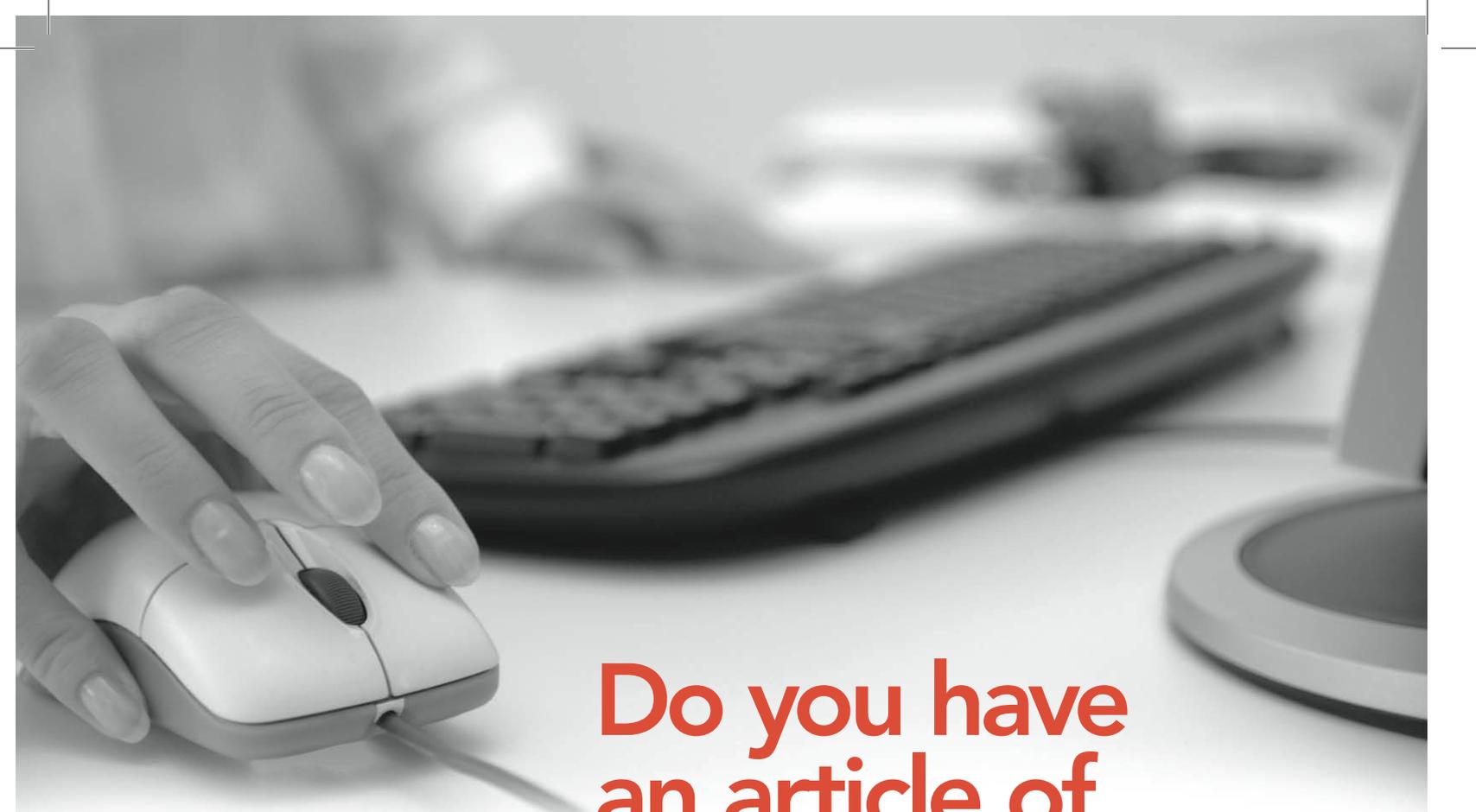
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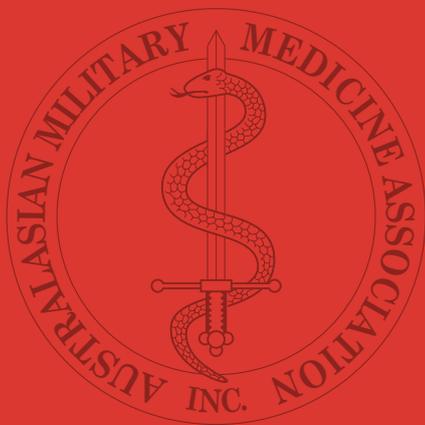


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