

JMVH

Volume 19 Number 2

April 2011

Journal of Military and Veterans' Health



- The Korean War and Military Health
- The exsanguinating trauma patient
- Female veterans' health

The Journal of the Australian Military Medicine Association



THE FULL FORCE HEALTH RECRUITER

CMHEALTH

OPPORTUNITY | PROFESSIONALS | ADVICE



CM Health is Australia's leading Health, Medical Recruitment and Workforce Outsourcing organisation.

As the largest supplier of Civilian Health Practitioners to the Australian Department of Defence, we provide a wider range of Health Professionals than any other supplier in the recruitment industry.

Working with civilian professionals including GP's dental practitioners, nurses and allied health professionals, our experienced team have an unrivalled knowledge of the unique Health environment with Defence.

You might even say we're the "full force" in health recruiting.

"Without any exaggeration CM Health stands head and shoulders above any other company I have worked with. Factors such as individual support, remuneration, prompt and personal response to any query raised, and a willingness to accommodate personal circumstance needs as much as possible, have been the hallmark of my experience while working with them."

Michael Gamble, Physiotherapist,
HMAS Albatross, Nowra NSW

MEDICAL | NURSING | DENTAL | ALLIED HEALTH

defencehealthjobs.com.au

Table of Contents

Editorial

Inside this edition	3
President's message	3

Original Article

Health-related characteristics and dietary intakes of male veterans and non-veterans in the Multiethnic Cohort Study (United States)	4
--	---

Review Articles

The management of maxillofacial trauma during the Korean War – A coming of age of a specialty	10
The face of war: The initial management of modern battlefield ballistic facial injuries	15
Damage Control Resuscitation of the exsanguinating trauma patient: Pathophysiology and basic principles	19
The health and wellbeing of female veterans: A review of the literature	25
Endurance, courage and care: The Kokoda campaign of Captain Alan Watson and the 2/4th Field Ambulance	32

Reprints

Sometimes you hear the bullet	41
New Zealand Mobile Dental Section in Korea (I) (December 1950 – January 1953)	44
New Zealand Mobile Dental Section in Korea (II) (December 1952 – November 1954)	50

Book Review

General practice: The integrative approach	52
--	----

Australian Military Medicine Association News

Calling all MEAO veterans	54
---------------------------------	----

Instructions to Authors	55
-------------------------------	----

Copyright Policy	63
------------------------	----

Cover photo: Capt Alan Cull (NZ Dental Corp) treating a patient, Naegon, South Korea, February 1951

Journal of Military and Veterans' Health

EDITORIAL BOARD

Dr Andrew Robertson (Editor in Chief)
Associate Professor Scott Kitchener (Managing Editor)
Dr Keith Horsley
Dr Peter Leggat
Professor Malcolm Sim
Dr Bob Stacy
Dr Darryl Tong

Australian Military Medicine Association

PATRON

MAJOR GENERAL Paul Alexander
Commander Joint Health and Surgeon General
Australian Defence Force

COUNCIL

President	Dr Greg Mahoney
Vice President	Dr Nader Abou-Seif
Secretary	Dr Janet Scott
Treasurer	Dr Peter Hurly
Council Members	Mr Kerry Clifford Assoc Prof Scott Kitchener Dr Andrew Robertson Mr Geoff Robinson
Public Officer	Ms Paula Leishman

STATEMENT OF OBJECTIVES

The Australian Military Association is an independent, professional scientific organisation of health professions 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.

Inside this edition

Over sixty years ago, at 4 AM on 25 June 1950, North Korea invaded South Korea. Australian forces were committed rapidly, with the Australian Government sending HMAS Shoalhaven and HMAS Bataan to assist on 29 June, No. 77 Mustang Fighter Squadron on 30 June and 3rd Battalion, Royal Australian Regiment on 26 July 1950.

Welcome to the first of our themed issues, where we look at military health and the Korean War, with a number of review and reprinted articles. Future themed issues will look at military occupational health and safety, tropical medicine and military history. Our readers are encouraged to submit either papers in the themed areas or questions on the topic that we could explore or answer in the themed issue.

In addition to our themed papers, we have a range of papers looking at the early management of

exsanguinating and facially injured patients, health issues in female veterans and the challenges of providing military healthcare during the Kokoda campaign.

We are also just finalising our preparations for the introduction of the ScholarOne online manuscript system, which will streamline the submission and peer review process for future articles. We anticipate having this in place for the July 2011 issue.

As always, other articles on the military and veteran's health theme are most welcome, as represented by the excellent calibre and range of articles in this issue.

Captain Andy Robertson, CSC, RANR
Editor-in-Chief

President's message

Welcome to the latest edition of the Journal of Military and Veterans' Health. In March, the AMMA council met for its biannual face to face meeting at the Crown Conference Centre for what was a very full agenda and I wish to share with you a number of important outcomes.

- The membership sub-committee investigated our membership structure with a view to encouraging junior ranks to the membership. In their deliberations, they found that the Association's fees were low which left the council little room to manoeuvre. However, it did point out that many of the junior ranks could apply to be student members as a subsidised membership and that this needs to be publicised.
- As the association enters its 20th year, the council felt that it was an important to undergo a strategic review of our objectives for the future.
- On the Journal, the council is seeking further sponsorship and grants from government and commercial sources.

The organisation of the Annual Conference continues a pace with Nader Abou-Seif and the secretariat working tirelessly to provide the membership with an interesting and informative program. They are

very pleased to announce that we have secured as keynote speakers Professor James Ryan, former Joint Professor of Military Surgery at the Royal Army Medical College and Professor Patrick McGorry, Australian of the Year 2010. There also promises to be a speculator dinner to be held in the Melbourne Town Hall with entertainment to put a smile on everyone's face. Members are also reminded that the "Call for Papers" has gone out, so it is time to get those abstracts to avoid disappointment.

It is pleasing to hear from our esteemed editor, Andy Robertson, that there has been a substantial increase in the number of paper submissions to the Journal. It is hoped that, with the introduction of online submission and the peer reviewing system, the improved processes will encourage more submissions.

Finally, I would like to congratulate, on behalf of the membership, Commodore Robyn Walker CSC and Air Commodore Hugh Bartholomeusz OAM on their promotion and appointment as the Surgeons General.

Greg Mahoney
President

Health-related characteristics and dietary intakes of male veterans and non-veterans in the Multiethnic Cohort Study (United States)

Song-Yi Park, PhD¹, Kangmin Zhu, MD, PhD, MPH^{2,3}, John F. Potter, MD^{2,3}, Laurence N. Kolonel, MD, PhD¹

Abstract

Background: Nationwide surveys in the United States found that certain health-related factors, in particular cigarette smoking and obesity, were more prevalent in veterans than in non-veterans.

Purpose: The objective of this paper was to compare health-related characteristics and dietary intakes between veterans and non-veterans in the Multiethnic Cohort.

Materials and Methods: The cohort participants (aged 45-75 years), residing in Hawaii and California at baseline, completed a mailed questionnaire on diet, medical history, and lifestyle in 1993-1996. The current analyses included 20,939 men (14,975 veterans and 5,964 non-veterans) who returned a survey questionnaire on military service in 2007.

Results: Compared to non-veterans, veterans were more likely to be overweight and obese (BMI 25, 61% vs. 55%), former smokers (54% vs. 47%), heavier consumers of red and processed meat, and lighter consumers of fruits and vegetables. Within the veteran group, enlisted men were more likely to be obese, to have a history of smoking, to consume more processed meat and to consume smaller amounts of dairy products and fruits than officers.

Conclusion: The findings imply that veterans as a group are at somewhat higher risk of developing lifestyle-related chronic diseases than are non-veterans. Comparisons of actual differences in disease incidence and mortality in the Multiethnic Cohort between veterans and non-veterans will require several more years of follow-up.

Introduction

Military veterans constitute approximately 13% of the total population aged 18 or older in the United States¹. Although military populations may differ from the general population in certain disease risks due to service-related exposure to health hazards and intense and stressful environments², overall, active duty military populations are likely to be healthier than other populations because of physical screening prior to entry into military service and better access to health care³. This is reflected in data showing that mortality among military populations was 10% to 25% lower than in the general population. However, this “healthy soldier” effect may be attenuated as they age. Indeed, in a national survey in the U.S., older veterans had a slightly higher mortality rate than their non-veteran counterparts⁴.

Nationwide and statewide surveys in the U.S. found that certain health-related factors, in particular cigarette smoking and obesity, were more prevalent in veterans than in non-veterans⁵⁻⁸. However, information on the dietary intakes of veterans, another important determinant of health status, is very limited. With data from the Multiethnic Cohort Study, which was initiated to investigate diet and cancer in Hawaii and

California, we recently conducted a special survey to obtain information on the military backgrounds of male participants. The objective of this paper is to compare health-related characteristics and dietary intakes between veterans (both officers and enlisted men) in the cohort.

Materials and methods

Study Population

The Multiethnic Cohort is comprised of more than 215,000 men and women living in Hawaii and California who completed a mailed baseline questionnaire on diet, medical history and lifestyle in 1993-1996⁹. Sampling for the study was based primarily on the drivers' license files in both states and additionally on the voters' registration file in Hawaii and the Health Care Financing Administration files in California, and these yielded a highly representative group for the study⁹. The participants were mostly African Americans, native Hawaiians, Japanese Americans, Latinos and Whites, aged 45-75 years when they entered the cohort. Follow-up of the cohort includes active contact with the participants by annual newsletters and five-year follow-up questionnaires, as well as annual computer linkages of the cohort to population-based tumour registries

and death certificate files in Hawaii and California and to the U.S. National Death Index. Out-migration from the study areas is low (3.7% after 7 years of follow-up). The study was approved by the review boards of the University of Hawaii, the University of Southern California, and the Uniformed Services University of the Health Sciences.

In 2007, a one-page survey was mailed to living male participants (n=77,258) in the Multiethnic Cohort. The survey included questions on military background, such as ever serving in the U.S. Military, the service branch, length of active duty, and job category. A total of 21,472 men (28%) returned the questionnaire. Compared to non-respondents, respondents were more likely to be younger (58.1 vs. 59.1 years), to be from Hawaii rather than California (65% vs. 47%), and to be more educated (college graduate and higher, 44% vs. 26%). For the current analyses, we excluded participants who reported implausible dietary intakes on the baseline questionnaire (n=533). Therefore, 20,939 male participants were included in the analyses.

Variables

Respondents were divided into veterans and non-veterans based on the answer (yes or no) to the question, "Have you ever served in the U.S. Military?" Veterans were also subdivided into enlisted men and officers according to their main or longest-held grade.

Socio-demographic characteristics, health-related characteristics and dietary intake at baseline were compared between veterans and non-veterans and between enlisted men and officers. Body mass index (BMI, kg/m²) was calculated from self-reported height and weight on the baseline questionnaire. Smoking status, vitamin and mineral supplement use, and physical activity were also obtained. Heavy drinkers were defined as those who had consumed two drinks or more per day, based on the criteria of the U.S. National Institute of Alcohol Abuse and Alcoholism¹⁰. The baseline questionnaire included an extensive quantitative food frequency questionnaire (QFFQ) with over 180 items. The QFFQ was validated by a calibration study which showed satisfactory correlations between energy-adjusted daily nutrient intakes from the QFFQ and three 24-hour recalls¹¹. Energy, nutrient, and food group intakes were calculated from the QFFQ using the food composition table that has been developed and maintained at the Cancer Research Center of Hawaii for use in the Multiethnic Cohort Study.

Data Analysis

Descriptive statistics were used to compare selected socio-demographic characteristics between veterans and non-veterans, and between enlisted men and officers. Because the age and race/ethnicity distribution differed between veterans and non-

	Non-veterans (n=5,964)	Veterans (n=14,975)	P [†]	Veterans		P [†]
				Enlisted [‡] (n=12,195)	Officers [‡] (n=2,452)	
Age (years, mean (SD))	56.1 (8.4)	58.9 (8.3)	< 0.0001	58.8 (8.3)	59.2 (8.2)	0.0095
Race/ethnicity (%)						
African American	5.1	8.7	< 0.0001	9.3	4.9	<0.0001
Native Hawaiian	6.0	6.6		7.2	4.0	
Japanese American	32.3	38.1		40.4	27.7	
Latino	19.4	12.8		14.2	4.7	
White	32.0	31.6		26.3	57.8	
Other	5.2	2.3		2.5	0.9	
Area of residence (%)						
Hawaii	60.7	67.1	< 0.0001	64.2	82.5	<0.0001
California	39.3	33.0		35.8	17.5	
Marital status (%)						
Married	78.6	80.9	< 0.0001	80.2	84.1	0.0001
Separated or divorced	10.8	10.2		10.5	8.9	
Widowed	1.8	2.7		2.8	2.3	
Never married	8.8	6.2		6.5	4.7	
Education (%)						
≤ 12th grade	28.4	23.0	< 0.0001	26.4	4.7	<0.0001
Vocational/some college	23.3	33.7		38.0	13.0	
≥ college graduate	48.3	43.4		35.7	82.3	
Number of children (%)						
None	18.3	16.4	< 0.0001	16.7	14.9	0.041
1-2	39.1	40.2		40.3	40.5	
3-4	31.1	34.0		33.5	35.9	
≥5	11.5	9.4		9.5	8.8	

[‡]Defined as a person who has ever served in the U.S. Military.

[†]Based on t-test (means) and chi-square test (proportions).

[‡]328 participants were missing information on military grade.

Table 1. Characteristics of veteran* vs. non-veteran males in the Multiethnic Cohort, 1993-1996

	Non-veterans (n=5,964)	Veterans (n=14,975)	P [†]	Veterans		P [†]
				Enlisted (n=12,195)	Officers (n=2,452)	
BMI (kg/m ² , %)						
<18.5 (underweight)	0.9	0.7	<0.0001	0.7	0.7	<0.0001
18.5-24.9 (normal)	43.7	38.7		38.6	40.1	
25-29.9 (overweight)	41.8	45.9		45.5	47.6	
≥30 (obese)	13.6	14.7		15.2	11.6	
Smoking status (%)						
Never	40.4	31.7	<0.0001	29.7	42.9	<0.0001
Former	46.6	53.5		55.4	47.8	
Current	13.0	14.8		14.9	9.3	
Pack years for ever smokers (mean (SD))	17.2 (17.1)	19.1 (20.8)	<0.0001	19.5 (22.4)	17.7 (17.9)	<0.0001
Heavy alcohol drinking (≥2 drinks/day, %)	15.8	17.6	0.0052	17.6	17.8	0.91
Vitamin and mineral supplement use (%)	56.0	55.8	0.84	55.9	58.0	0.025
Physically active (≥30 min/day, %) [‡]	32.1	31.4	0.41	30.9	31.8	0.38

*Adjusted for age and race/ethnicity.

[†]Based on chi-square test (proportions) and t-test (means)

[‡]Strenuous sports or vigorous work

Table 2. Health-related characteristics of veteran vs. non-veteran males in the Multiethnic Cohort, 1993-1996*

veterans, comparisons for health-related characteristics and dietary intake were conducted using the general linear model procedure and least square means to control for age and race/ethnicity. Food group and nutrient intakes were adjusted for energy intake in addition to age and race/ethnicity. Other potential confounding variables, including education as a measure of socioeconomic status, were also considered. However, none of these variables had a substantial effect on the results, and thus were not included in the final models. Significant differences in proportions and means between comparison groups were determined using the chi-square and t-tests, respectively. A conservative significance level of $p < 0.0001$ was selected as an indicator of statistically significant differences to compensate for the large sample size. All analyses were performed using SAS software, version 9.1 (SAS Institute, Cary, N. Carolina).

Results

Out of 20,939 respondents, 14,975 (72%) were veterans and 5,964 (28%) were non-veterans. We performed a telephone survey of non-respondents using an ethnic-stratified random sample of 125 men. Since only 57% of them identified themselves as veterans, our study sample in the analysis is likely to over-represent veterans in the cohort. Table 1 summarizes age, race/ethnicity, marital status and education of veterans and non-veterans in the cohort. Veterans were likely to be older (mean age = 58.9 years) than were non-veterans (56.1 years) at baseline. The veteran group had higher proportions of African Americans and Japanese Americans, and fewer Latinos compared to the non-veteran group. Among veterans, the officer group included higher proportions of Whites, Hawaii residents, and college graduates than did the enlisted group.

Several health-related characteristics of the participants are compared in Table 2. Compared to non-veterans,

more veterans tended to be overweight (25 BMI < 30 kg/m², 46% vs. 42%) or to be obese (BMI ≥ 30 kg/m², 15% vs. 14%) and to have smoked at some stage (68% vs. 60%). Furthermore, veterans who had a history of smoking had a greater lifetime exposure (19.1 pack years) than did non-veterans (17.2 pack years). Veterans were also more likely to be heavy alcohol drinkers (18% vs. 16%), although the difference was only suggestive. There was no statistically significant difference in vitamin and mineral supplement use and in vigorous physical activity between the two groups. Among veterans, enlisted men were more likely to be obese (15% vs. 12%) and to have smoked at some time (70% vs. 57%) than were officers.

Comparing food group intakes, veterans consumed more red meat and processed meat, but fewer fruits and vegetables than did non-veterans (Table 3). As expected from the food group patterns, veterans had lower intakes of vitamins and dietary fibre and a higher intake of total fat as a percentage of energy than did non-veterans. Within the veteran group, enlisted men consumed more processed meat and fewer quantities of dairy products and fruit juice; they also had lower intakes of calcium and vitamins than did the officers.

Discussion

In general, in the Multiethnic Cohort, health indicators were poorer in veterans than non-veterans, and among veterans, were poorer for enlisted men than for officers. Specifically, veteran men were somewhat more likely to be overweight/obese, former smokers, heavier consumers of red and processed meat, and lighter consumers of fruits and vegetables on average compared to non-veterans. Among veterans, a higher proportion of men who were enlisted when they served in the military tended to be obese, to be smokers, and to consume more processed meat and fewer dairy products and fruits than those who were officers.

	Non-veterans (n=5,964)	Veterans (n=14,975)	P [†]	Veterans		P [†]
				Enlisted (n=12,195)	Officers (n=2,452)	
Food group (g)						
Red meat	45.5 (33.7)	48.4 (40.0)	<0.0001	47.5 (41.4)	46.3 (33.8)	0.063
Poultry	50.8 (41.2)	49.0 (48.9)	0.0014	47.2 (50.2)	49.3 (41.1)	0.0089
Processed meat	22.5 (21.2)	25.1 (25.1)	<0.0001	25.1 (26.5)	23.0 (21.7)	<0.0001
Fish and shellfish	27.9 (25.6)	27.1 (30.4)	0.039	26.6 (31.6)	27.7 (25.9)	0.033
Dairy products	207 (192)	203 (228)	0.14	200 (239)	217 (195)	<0.0001
Milk	143 (174)	143 (206)	0.80	142 (218)	154 (178)	0.0005
Vegetables	346 (190)	333 (226)	<0.0001	329 (236)	341 (193)	0.0014
Fruits	265 (235)	241 (279)	<0.0001	239 (288)	242 (235)	0.53
Fruit juice	93 (127)	89 (151)	0.021	87 (158)	100 (130)	<0.0001
Nutrient						
Energy (kcal)	2,430 (1,070)	2,388 (1,271)	0.0043	2,379 (1,323)	2,338 (1,083)	0.048
Protein (g)	85.3 (18.7)	85.0 (22.3)	0.35	83.7 (23.3)	84.9 (19.1)	0.0011
Fat (g)	77.7 (21.5)	79.4 (25.5)	<0.0001	78.5 (27.1)	77.5 (22.1)	0.019
Carbohydrate (g)	311 (62)	304 (74)	<0.0001	300 (78)	301 (64)	0.57
% Energy from protein	14.4 (2.9)	14.4 (3.5)	0.43	14.4 (3.7)	14.6 (3.0)	0.0048
% Energy from fat	29.3 (7.6)	30.0 (9.0)	<0.0001	30.1 (9.6)	29.6 (7.9)	0.0011
% Energy from carbohydrate	52.7 (9.6)	51.5 (11.3)	<0.0001	51.5 (12.1)	51.5 (9.9)	0.89
Calcium (mg)	787 (294)	772 (349)	0.0002	762 (364)	798 (298)	<0.0001
Iron (mg)	17.4 (7.5)	17.5 (8.9)	0.14	17.3 (9.4)	18.3 (7.7)	<0.0001
Vitamin A (µg RE)	1,492 (943)	1,448 (1,120)	0.0009	1,436 (1,175)	1,498 (961)	0.0010
Vitamin C (mg)	180 (117)	171 (139)	<0.0001	170 (147)	182 (120)	<0.0001
β-carotene (µg)	5,060 (4,081)	4,807 (4,845)	<0.0001	4,754 (5,037)	4,970 (4,119)	0.0072
Vitamin E (mg α-TE)	12.2 (6.3)	12.4 (7.5)	0.0020	12.3 (8.0)	12.8 (6.6)	<0.0001
Folate (µg)	385 (200)	380 (237)	0.058	375 (250)	402 (204)	<0.0001
Dietary fiber (g)	25.5 (11.1)	24.5 (13.1)	<0.0001	24.3 (13.6)	25.2 (11.1)	<0.0001

RE, retinol equivalents; α-TE, α-tocopherol equivalents.

*Adjusted for age, race/ethnicity, and energy intake. Mean (SD)

[†]Based on t-test.

Table 3. Daily food group and nutrient intakes of veteran vs. non-veteran males in the Multiethnic Cohort, 1993-1996*

Several reports from the Behavioral Risk Factor Surveillance System (BRFSS), a cross-sectional telephone survey of the civilian, noninstitutionalized adult population over the age of 18 years, has examined the prevalence of those considered overweight or obese among U.S. veterans compared with the general U.S. population. In a report based on the year 2000 BRFSS survey, the authors found that veterans tended to be overweight⁸ and male veterans particularly were somewhat more likely to be obese¹², which is consistent with the present study results. Similarly, based on the 2003 BRFSS, veterans who received care at the U.S. Department of Veterans Affairs (VA) facilities had higher rates of being overweight or obese than the general population⁵. In contrast, a report based on the 2004 BRFSS found a similar prevalence of these conditions among U.S. veterans and the general U.S. population¹³. An analysis combining the 2003 and 2004 BRFSS showed that being overweight was more frequent in veterans than in non-veterans but obesity prevalence was similar between the two groups¹⁴. Since our data were collected in the mid 1990's, they may be more comparable to the earlier BRFSS surveys. The more recent increase in the prevalence of being overweight and of obesity in the U.S. population generally and/or the VA weight control campaign¹⁵ may have obliterated differences between veterans and non-veterans. In the current study, only weight and height information was

available, and thus, body fat distribution and muscle content could not be compared between veterans and non-veterans. However, the Multiethnic Cohort Study recently collected waist and hip circumferences in a follow-up survey, which should enable us to examine central adiposity as a risk factor for disease in the future. One limitation of the BMI as a measure of adiposity is its lack of specificity, since greater muscle mass will also result in a higher BMI.

Several studies in the U.S. have reported that the prevalence of smoking is higher in veterans than in non-veterans^{5,6,12,13,16,17}, as shown also in our study. Koepsell et al.⁷ speculated that young men who are already smokers may be more likely to enter the military services, or that military life may initiate tobacco use. However, we did not have information on the starting age of smoking, and thus cannot address this issue. The U.S. Department of Defense reported that the prevalence of cigarette smoking was higher in enlisted men than in officers in the Survey of Health Related Behaviors Among Active Duty Military Personnel¹⁸ as well as in the more recent Millennium Cohort Study¹⁹, which is consistent with our finding that the proportion of smokers (at any time) was higher in enlisted men than in officers. Several factors may affect the smoking prevalence in the U.S. military, such as the lower cost of cigarettes and the stresses associated with military life

that may increase smoking prevalence, and the anti-smoking policy of the U.S. Department of Defense for health promotion in the military may decrease smoking prevalence. The suggestions of a higher proportion of heavy drinkers among veterans in this study, though not statistically significant, is also consistent with findings from a survey using nationally representative samples that reported more frequent daily or almost daily alcohol use in veterans than in non-veterans²⁰.

With regard to diet, we found that veterans consumed fewer fruits and vegetables than non-veterans. The 2003 BRFSS⁵ also reported that veterans were less likely to eat the recommended daily number of fruits and vegetables (5 servings/day). In the current study, total fat intake in both veterans (30%) and non-veterans (29%) groups was within the recommended range, 20 to 35% of total energy intake²¹. The daily calcium intake of both groups was lower than the recommended intake for U.S. adult men (1,000 mg/day for 31-70 years)²² probably because of their low consumption of milk and dairy products. Overall, our study showed fairly consistent results with previous studies on health-related behaviors of veterans and non-veterans, and provides additional information on their usual dietary intake. To our knowledge, this is the first study to compare usual nutrient intake between veterans and non-veterans, using a comprehensive validated food frequency questionnaire.

This study also had several limitations. The survey to identify military veterans in the Multiethnic Cohort was conducted in 2007, more than 10 years after cohort entry, which necessarily restricted participation to those who were alive at that time. Therefore, the population for this analysis may have been healthier than the full cohort at baseline, which was when the exposure variables were collected. Unfortunately, the overall response rate to the survey was not high (28%). When we contacted a random sample of non-respondents to the veterans' survey, we found that 57% of the sample were veterans, whereas 72% of our respondents identified themselves as veterans. This indicates some selection bias in the survey, with over-representation of veterans. Although the study population was limited to residents living in Hawaii and California, the participants comprised a reasonably representative sample of the general population as evidenced by comparisons with U.S. census data⁹. Nevertheless, the findings may not apply to the entire U.S. veteran population. In addition, all information, including weight and height, was based on self-report and was obtained only at one time, at cohort entry, and, though it seems unlikely, we cannot confirm the reliability of the data being similar for veterans and non-veterans. Although time since the end of military service might affect health-related characteristics of veterans, no information on this was available. Because veterans in this study were defined

as persons who had ever served in the U.S. military, they might be a rather heterogeneous group in terms of length of service, service branch, active duty/reserves, and so on, compared to a veterans group more strictly defined. The multiple comparisons in our analysis would have increased the probability of a type I error, though we used a conservative significance level of $p < 0.0001$. Finally, because this special survey was only completed recently, comparisons of actual disease incidence and mortality between veterans and non-veterans will require several more years of follow-up. Indeed, Zhu et al.²³ reported that cancer incidence patterns were different between the U.S. military and the general population, with incidence rates of some sites being higher and that of other sites lower in the restricted population²³. The authors speculated that these differences may be related to access to medical care and cancer screening services, in addition to lifestyle factors.

In summary, veteran men in the Multiethnic Cohort were more likely to be overweight or obese, to have smoked at some stage, they were heavier consumers of red and processed meat and lighter consumers of fruits and vegetables on average compared to non-veterans, and that these differences were more extreme for enlisted men than for officers. Veterans' health-related characteristics and dietary intakes indicate that as a group, they had a somewhat less healthy lifestyle than did non-veterans, especially among the enlisted men, and thus presumably are at higher risk of subsequently developing chronic diseases such as diabetes, hypertension, cardiovascular diseases and certain types of cancers. Further study is warranted to investigate how the less healthy lifestyle of veterans affects their disease incidence in later life.

Acknowledgement

This study was sponsored by the U.S. Military Cancer Institute via the Uniformed Services University of the Health Sciences under the auspices of the Henry M. Jackson Foundation for the Advancement of Military Medicine (DAMD 17-94-T-4184), and was also supported in part by a National Cancer Institute grant, number R37 CA54281. The information or content and conclusions do not reflect the official views of the Uniformed Services University of the Health Sciences, the Department of Defense, or of the U.S. Government.

Authors' affiliations: ¹Epidemiology Program, University of Hawaii Cancer Center, Honolulu, Hawaii, USA

²U.S. Military Cancer Institute, Walter Reed Army Medical Center, Washington, DC, USA ³Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA
Corresponding author: Song-Yi Park, Epidemiology Program, University of Hawaii Cancer Center, 1236 Lauhala Street, Honolulu, HI 96813, USA
Email: spark@crch.hawaii.edu

References

1. Richardson C, Waldrop J. Veterans: 2000, Census 2000 Brief, 2003. (<http://www.census.gov/prod/2003pubs/c2kbr-22.pdf>).
2. Romanoff MR. Assessing military veterans for posttraumatic stress disorder: a guide for primary care clinicians. *J Am Acad Nurse Pract* 2006;18:409-413.
3. McLaughlin R, Nielsen L, Waller M. An evaluation of the effect of military service on mortality: quantifying the healthy soldier effect. *Ann Epidemiol* 2008;18:928-936.
4. Liu X, Engel C, Kang H, Cowan D. The effect of veteran status on mortality among older Americans and its pathways. *Popul Res Pol Rev* 2005;24:573-592.
5. Nelson KM. The burden of obesity among a national probability sample of veterans. *J Gen Intern Med* 2006;21:915-919.
6. McKinney WP, McIntire DD, Carmody TJ, Joseph A. Comparing the smoking behavior of veterans and nonveterans. *Public Health Rep* 1997;112:212-217.
7. Koepsell T, Reiber G, Simmons KW. Behavioral risk factors and use of preventive services among veterans in Washington State. *Prev Med* 2002;35:557-562.
8. Gizlice Z. Health conditions and behaviors among North Carolina and United States military veterans compared to non-veterans, North Carolina Department of Health and Human Services, 2002. (<http://www.schs.state.nc.us/SCHS/pdf/SCHS-133.pdf>).
9. Kolonel LN, Henderson BE, Hankin JH, Nomura AM, Wilkens LR, Pike MC, Stram DO, Monroe KR, Earle ME, Nagamine FS. A multiethnic cohort in Hawaii and Los Angeles: baseline characteristics. *Am J Epidemiol* 2000;151:346-357.
10. U.S. National Institute of Alcohol Abuse and Alcoholism. What's "at-risk" or "heavy" drinking? (<http://www.rethinkingdrinking.niaaa.nih.gov/IsYourDrinkingPatternRisky/WhatsAtRiskOrHeavyDrinking.asp>)
11. Stram DO, Hankin JH, Wilkens LR, Pike MC, Monroe KR, Park S, Henderson BE, Nomura AM, Earle ME, Nagamine FS, Kolonel LN. Calibration of the dietary questionnaire for a multiethnic cohort in Hawaii and Los Angeles. *Am J Epidemiol* 2000;151:358-370.
12. Barrett DH, Boehmer TK, Boothe VL, Flanders WD, Barrett DH. Health-related quality of life of U.S. military personnel: a population-based study. *Mil Med* 2003;168:941-947.
13. Almond N, Kahwati L, Kinsinger L, Porterfield D. The prevalence of overweight and obesity among U.S. military veterans. *Mil Med* 2008;173:544-549.
14. Koepsell TD, Forsberg CW, Littman AJ. Obesity, overweight, and weight control practices in U.S. veterans. *Prev Med* 2009;48:267-271.
15. U.S. Department of Veterans Affairs. Move! Weight Management Program. (<http://www.move.va.gov/>).
16. Klevens RM, Giovino GA, Peddicord JP, Nelson DE, Mowery P, Grummer-Strawn L. The association between veteran status and cigarette-smoking behaviors. *Am J Prev Med* 1995;11:245-250.
17. Talcott GW, Poston WS, Haddock CK. Co-occurent use of cigarettes, alcohol, and caffeine in a retired military population. *Mil Med* 1998;163:133-138.
18. Bray RM, Hourani LL, Rae Olmsted KL, Witt M, M. BJ, Pemberton MR, Marsden ME, Marriott B, Scheffler S, Vandermaas-Peeler R, Weimer B, Calvin S, Bradshaw M, Close K, Hayden D. 2005 Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel. Research Triangle Park, NC: RTI International; 2006.
19. Smith B, Ryan MA, Wingard DL, Patterson TL, Slymen DJ, Macera CA. Cigarette smoking and military deployment: a prospective evaluation. *Am J Prev Med* 2008;35:539-546.
20. Tessler R, Rosenheck R, Gamache G. Declining access to alcohol and drug abuse services among veterans in the general population. *Mil Med* 2005;170:234-238.
21. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7th Edition, Washinton, DC: U.S. Government Printing Office; 2010.
22. Institute of Medicine. Dietary Reference Intakes for Calcium and Vitamin D. (<http://www.iom.edu/Reports/2010/Dietary-Reference-Intakes-for-Calcium-and-Vitamin-D.aspx>).
23. Zhu K, Devesa SS, Wu H, Zahm SH, Jatoti I, Anderson WF, Peoples GE, Maxwell LG, Granger E, Potter JF, McGlynn KA. Cancer incidence in the U.S. military population: comparison with rates from the SEER program. *Cancer Epidemiol Biomarkers Prev* 2009;18:1740-1745.

The management of maxillofacial trauma during the Korean War – A coming of age of a specialty

Lieutenant Colonel Darryl C Tong RNZAMC¹, Professor Tom H Brooking PhD¹, Professor Robert Love MDS, PhD, FRACDS¹

Abstract

Background: The Korean War remains “the forgotten war” despite being the proving ground for such innovations as helicopter casualty evacuation and the Mobile Army Surgical Hospital (MASH), both of which would see much development and action in the Vietnam War.

The Korean War was also a turning point in the recognition of dentally qualified face and jaw surgeons who were to become “oral surgeons”. A fine reputation for military surgery was thus established during the Korean War and its importance continues on today.

Conflict of interest

The authors declare no conflict of interest and have not received any material or monetary gain in the preparation of this article.

Introduction

Often dubbed “The Forgotten War”, the Korean War (1950-1953) has never gained the publicity or media attention afforded to the Vietnam War despite involving more combatants from more nationalities (as part of a United Nations operation) and the very real threat of precipitating another global war with the potential for unrestricted use of nuclear weapons.

Whereas the Vietnam War has been given more exposure due to a number of Hollywood movies and a generation of anti-war protesters often symbolised by great music, the Korean War to this day remains largely unknown even in the face of key developments from that conflict such as the first jet-to-jet aircraft combat, the use of helicopters in casualty evacuation (CASEVAC) and the introduction of what is perhaps the only legacy of the Korean War in popular culture – the Mobile Army Surgical Hospital or MASH.

It may be forgivable to think that the Korean War was an American-only affair, especially when popular television shows such as *M*A*S*H* have conditioned viewers into thinking that it was perhaps the one and only such facility that operated in Korea. Judging from the combat casualties seen through the fabled 4077th MASH, only US soldiers and Marines were involved. During the course of the Korean War, the armed forces of twenty countries were represented in the conflict, ranging from the heavy weights such as the United States, China and the USSR, to smaller countries such as the Philippines, Luxembourg and Belgium.

Interestingly, this perception was not perpetuated in the original book by Richard Hooker, (the pseudonym for Dr Richard Hornberger, MD, general surgeon, US 8055th MASH), who describes a particularly heavy period of casualty influx over a two week period during which a number of soldiers from other nations were operated upon by the surgeons of the 4077th - soldiers from China, Puerto Rico, the Netherlands, Canada and Australia being mentioned¹. Medical support units from India, Denmark, Italy, Norway and Sweden were deployed during the conflict, the common policy being the deployment of medical support but not combat troops by the respective governments. The 60th Indian Field Ambulance and Surgical Unit attached to the Commonwealth Division was a good example of this non-combatant policy and they served with distinction, gaining a reputation second to none in treating friend and foe alike. The 60th Indian Field Ambulance performed over 2300 surgical operations and 5000 dental examinations from December 1950 to February 1954, seeing in excess of 200,000 patients during their deployment. Their professionalism and non-partisan attitude earned the unit great warmth and respect from UN forces and the civilian population^{2,3}.

The Commonwealth Division was supported by three separate Field Ambulances: 25 Canadian Field Ambulance, 26 Field Ambulance (UK) and 60th Indian Field Ambulance and Surgical Unit. Each Field Ambulance had a Field Surgical Team, a Field Transfusion Team, the UK and Canadian units having

the additional elements of a Motor Ambulance Convoy⁴. The FSTs were often incorporated with the larger US Army MASH units and evacuation of Commonwealth casualties was through the US 121st Evacuation Hospital near Seoul and then on to Japan.

The Korean War saw many developments in combat trauma surgery built upon experiences from the Second World War such as transfusion medicine, rapid CASEVAC and the evolution of vascular and cardi thoracic surgery. It may be argued that the role of dental surgeons in maxillofacial trauma became more formalised as a separate specialty during this conflict – a specialty that would eventually become oral and maxillofacial surgery. This article highlights some of the key developments in maxillofacial trauma management within the context of the Korean War.

The Mobile Army Surgical Hospital (MASH)

The concept of a mobile surgical treatment facility that could keep pace with combat units during operations is not new; the need for rapid medical support for critically injured soldiers was recognised during the Napoleonic Wars with the creation by Baron Dominique Larrey, the chief surgeon of the Imperial French Army, of horse-drawn “flying” ambulances⁵⁻⁷. Resembling the British Army model of the Casualty Clearing Station, the development of similar mobile surgical facilities by the US Armed Forces during the Second World War, known as Auxiliary Surgical Groups, proved their worth during the North African and European campaigns. Later renamed Mobile Auxiliary Surgical Hospitals, these units were the precursors of the Mobile Army Surgical Hospitals deployed during the Korean War. Definitive surgery was carried out at these facilities where experiences were not only built upon from previous conflicts but further refined and developed, with input from research teams and medical experts.

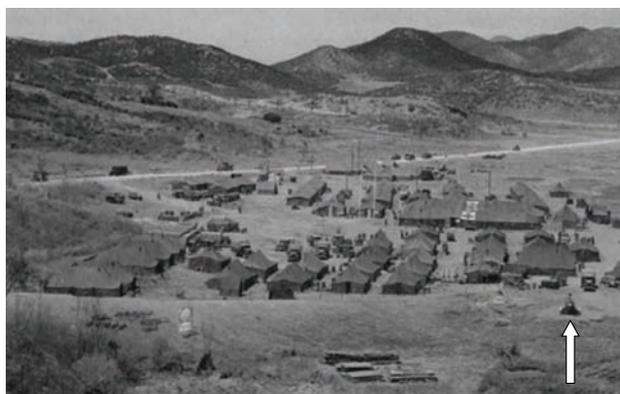


Figure 1. US 8055th MASH, Korea 1951. The fictional 4077th MASH was loosely based on this unit. Note the tented facilities and the helicopter in the foreground on the lower right (arrowed). (Public domain image courtesy of www.koreanwar-educator.org)

This represented a paradigm shift away from damage control surgery, as often the MASH was the highest echelon surgical facility available in-country and with difficult terrain, unpredictable weather and an unpredictable tactical environment, further rearward casualty evacuation to a larger facility was not always possible (Figure 1).

Each MASH operated five surgical tables in shifts and had an ambulance platoon and four helicopters attached to it for resupply, patient movements and evacuation. It had a 200-bed capacity with a surge capacity of a further 140 beds. Rearward evacuation by strategic medical evacuation (STRATEVAC) was to Japan, Europe or the continental United States of America. MASH units were originally intended to provide support at divisional level with one MASH unit per division. As more nations contributed combat troops however during the course of the war, MASH units were soon supporting a number of divisions with some units receiving more than 400 patients in a single 24-hour period^{6,7}. During the first two years of the Korean War, the MASH units lived up to their name by being truly mobile – the US 8076th MASH moved on average every three weeks during 1951⁸. In the later stages of the war however with a more static combat frontline, the MASH units rarely moved and replaced their tented facilities with hard standing structures.

The Korean War was the proving ground for the MASH concept and the success of these units in providing valuable experience and research in trauma surgery has certainly benefited the delivery of civilian trauma care. MASH units were deployed during Vietnam and the first Gulf War (OPERATIONS DESERT SHIELD and DESERT STORM). The last MASH unit (US 212th MASH) was decommissioned in 2006, providing over 60-years’ worth of lessons for both military and civilian trauma practice.

Helicopter medical evacuation

Rapid medical evacuation to a treatment facility during the Korean War was hampered by several factors, including not only the tactical situation but also the rugged terrain and poor roads which made transport by land extremely difficult and slow. Although the prolific use of helicopters in combat and other tasks was yet to occur (namely Vietnam), the use of helicopters during the Korean War initially was in the Search and Rescue (SAR) role of retrieving downed pilots. Requests however became more frequent for casualty evacuation from combat units near the frontline and soon these SAR helicopters found a new role as casualty evacuation (CASEVAC) platforms. The terminology of CASEVAC should not be confused with medical evacuation or MEDEVAC as the roles

are different – CASEVAC denotes the evacuation of a casualty by non-medical personnel using a non-standardised or non-dedicated vehicle to move the patient from the combat zone, whereas MEDEVAC involves a standardised, dedicated platform for patient evacuation often with attendant medical personnel rendering medical treatment en route⁹.

The primary helicopter used for MEDEVAC during the Korean War by US Army medical services was the Bell H13D/E, a small helicopter easily recognised by the large Plexiglas bubble canopy and open lattice-work tail assembly with a top speed of 100 mph (160 km/h) and maximum range of 300 miles (approx. 480 km) (Figure 2).



Figure 2. Iconic: aeromedical evacuation by helicopter during the Korean War. (Public domain image courtesy of www.bell47helicopterassociation.org)

This helicopter is readily identifiable as it is featured in the opening sequences to both the film and television versions of *M*A*S*H* showing a pair of Bell H13s en route to the 4077th MASH with patient litters attached to the external skids. The experience of these patients was indeed a test of fortitude, being exposed to cold temperatures, rotor downwash, transfer from one type of stretcher to another and finally a bumpy ride aboard a jeep or truck to the resuscitation tent at the MASH¹⁰. Interestingly, the overall importance of helicopters was disproportionally exaggerated in the Korean War, perhaps mainly due to their novelty at the time. Helicopters only carried approximately 4% of all hospital admissions during the Korean War, the bulk of casualties being evacuated by the overburdened motor ambulance convoys or by railway¹¹. According to US Army data on 10,000 casualties, 40% were evacuated within one hour of wounding and 70% within 3 hours¹². There is no doubt that the combination of a rapid CASEVAC system to a forward deployed surgical unit such as a MASH, saved many lives which in the previous wars would have been lost due to the time delay between patient evacuation and surgical intervention. The main impact of these innovations

would not be felt until the Vietnam War with the regular use of helicopters in a dedicated MEDEVAC capacity⁷.

Oral and maxillofacial trauma

Face and jaw surgeons (a generic descriptor) during the Korean War used techniques learnt from their Second World War counterparts, just as those surgeons had consolidated lessons from their predecessors in the First World War. The Second World War introduced antibiotics into routine surgical care, allowing the primary closure of wounds which would have been left open to prevent infection, but due to the excellent blood supply to the head, face and neck region, primary wound closure was usually not as risky compared to an open leg wound or abdomen for example. Adjunctive antibiotic therapy also allowed the routine use of intra-osseous wires in fracture management of both the mandible and midface, with open reduction of mandible fractures to visualise the bony injuries performed more frequently¹³⁻¹⁶. The mainstay of immobilising jaw fractures remained intermaxillary fixation using stainless steel wires, with external fixation being utilised for both mandible and midfacial fractures using frames. The overall incidence of head, face and neck (HFN) injuries in the Korean War was approximately 16%, comparable to that seen in the First World War among British and American casualties but much higher than the 4% incidence during the Second World War¹⁷. However, the actual patterns of facial wounds sustained by the servicemen during the Korean War were more comparable to those seen in the Second World War, which is not altogether surprising considering the weaponry causing the injuries was from the same era.

Although the fundamental surgical techniques employed by face and jaw surgeons during the Korean war were no different from those used in the latter part of the Second World War, two major surgical advances in maxillofacial war injuries arose from the Korean War, namely the routine primary closure of facial soft tissue wounds and the routine use of open reduction and internal fixation techniques made possible by the use of systemic antibiotics and earlier access to definitive surgery^{6,7,10,12}.

Whereas surgical techniques may have not changed dramatically, a subtle evolutionary step occurred during this period in terms of the specialty of face and jaw surgery. Plastic surgery remained the senior partner but dentists with surgical training for the face and jaws were now recognised as “oral surgeons” as opposed to “dental surgeons” in previous conflicts. This may have been a subtlety, but in terms of recognition and acknowledgment that a dental specialty had a primary role in the surgical management of

face and jaw trauma, the change in title had far reaching consequences¹⁸. This change in name also reflected a change in status with the creation of the American Board of Oral Surgery in 1946 being one such example of increased professional stature, incorporating education, training and professional aspects under one organisation¹⁹. In time the specialty would undergo another evolutionary name change in keeping with the scope of practice beyond the oral cavity – that of Oral and Maxillofacial Surgery. For those performing surgery in the combat zone however, quasi-political name changes are largely irrelevant and meaningless if the quality of the surgery and the professionalism of the surgeons is not maintained. Oral surgeons in the Korean War were confronted with face and jaw injuries as horrendous and devastating as those seen in previous conflicts. Two contemporary papers published in the surgical literature show some outstanding results and it is interesting to note that both soft and hard tissue repair were performed by the oral surgeon (dentally qualified) as opposed to the traditional soft tissue repair by a plastic surgeon and hard tissue repair by the dental surgeon modelled on the Gillies-Kelsey Fry model during the First World War²⁰⁻²². Oral surgeons were also more likely to be deployed to forward surgical units and were treating injuries at a much earlier stage than their counterparts in plastic surgery, who by nature of their more lengthy reconstructive procedures were more appropriately based at a general hospital facility. This is still the case today with oral and maxillofacial surgeons being deployed within the combat zone in level III facilities alongside general surgeons, orthopaedic surgeons and neurosurgeons⁹.

The fact that oral and maxillofacial surgeons may be considered as force multipliers is put into practice in Afghanistan today where the surgical scope may by necessity be expanded to basic neurosurgery, eye surgery and neck exploration, not to mention primary assistance with general or orthopaedic procedures²³. Furthermore, oral surgeons during the Korean War were often employed as secondary airway specialists working alongside nurse anaesthetists under the supervision of the anaesthesiologist (consultant anaesthetist).

This example of having to assume multiple roles when needed reflects the nature of trauma surgery in a combat zone with a combination of unique factors to contend with such as the tactical environment, limited resources both in material and personnel and multiple severe injuries presenting in the same patient. Specialist-area surgeons may not always be available for deployment, placing a greater need for pre-deployment training and “up-skilling” in other surgical areas, dictated in part by what trauma patterns are expected for that theatre of war. Compared to their civilian counterparts, military surgeons require a broader skill set and have a different mentality in order to adapt to a fluid tactical environment and potential shortfalls in materiel and equipment^{24,25}.

Summary

The Korean War saw several innovations both in military and medical areas including the use of systemic antibiotics which allowed primary closure of facial wounds and the routine management of mandibular fractures by open reduction and internal fixation. The overall numbers of HFN injuries was comparable to the First World War with similarities in trench fighting, but the actual patterns of injuries were closer to those seen during the Second World War. Furthermore, the mortality rate became lower in part due to early medical evacuation and close medical support for definitive surgery.

Oral surgery during the Korean War became a stand-alone surgical specialty showing that dentally qualified clinicians could manage complex facial injuries involving both soft and hard tissues and that from this experience, the use of oral and maxillofacial surgeons in forward deployed military surgical facilities continues today with surgeons providing technical expertise beyond the head and neck region.

*Authors' affiliations: 1. University of Otago, Dunedin, NZ
Contact author: Lieutenant Colonel Darryl C Tong
RNZAMC, Department of Oral Diagnostic and Surgical
Sciences, University of Otago, PO Box 647, Dunedin, NZ
Email: darryl.tong@otago.ac.nz*

References

1. Hooker R. M*A*S*H. New York: Pocket Books, 1971.
2. Carew A. The Korean War: the story of the fighting Commonwealth regiments. London: Pan Books, 1970.
3. Schafer E. Indian 60th Field Hospital and Surgical Unit. In Sandler S (editor) The Korean War: an encyclopedia (Military History of the United States, Volume 4). New York: Garland Publishers, 1995, 145-146.
4. Bricknell MCM. The evolution of casualty evacuation in the British Army in the 20th Century (Part 3) – 1945 to present. *J R Army Med Corps* 2003, 149: 85-95.
5. Bishop WJ. The Early History of Surgery. New York: Barnes and Noble, 1960, 144-146.
6. Woodard SC (2003). The story of the Mobile Army Surgical Hospital. *Mil Med* 168: 503-513.
7. King B, Jatoi I (2005). The Mobile Army Surgical Hospital (MASH): a military and surgical legacy. *J Natl Med Assoc* 97: 648-656.
8. Apel OF, Apel P. MASH: An Army Surgeon in Korea. Lexington: University Press of Kentucky, 1998, 35.
9. Burris DG, Dougherty PJ, Elliot DC et al. (editors): Emergency War Surgery, 3rd US edition, Washington DC: Borden Institute, 2004, Chapter 4.
10. Driscoll RS. US Army medical helicopters in the Korean War. *Mil Med*, 2001,166: 290-296.
11. Cowdrey AE. Medical service in the Korean War. In Sandler S (editor) The Korean War: an encyclopedia (Military History of the United States, Volume 4). New York: Garland Publishers, 1995, 220-224.
12. Triplett RG, Kelly JF. Historical perspective. In Kelly JF (editor) Management of war injuries to the jaws and related structures. Washington DC: US Government Printing Office, 1977, 11-14.
13. Adams WM. Internal wiring fixation of facial fractures. *Surgery*, 1942, 12: 523-540.
14. Peer LA. Plastic surgery for 1942. *Arch Otolaryngol*, 1943, 38: 171-189.
15. Kazanjian VH. Advances in maxillofacial surgery during the past half century. *J Oral Surg*, 1955, 13: 97-102.
16. Rowe NL. The history of the treatment of maxillofacial trauma. *Ann R Coll Surg Engl*, 1971, 49: 329-349.
17. Dobson JE, Newell MJ, Shepherd JP. Trends in maxillofacial injuries in war-time (1914-1986). *Brit J Oral Maxillofac Surg*, 1989, 27: 441-450.
18. Erich JB, Austin LT. Traumatic Injuries of Facial Bones. Philadelphia: WB Saunders, 1944.
19. American Association of Oral and Maxillofacial Surgeons. The building of a specialty: Oral and Maxillofacial Surgery in the United States. *J Oral Maxillofac Surg*, 1989, 47 (Supplement 2):33-36.
20. Cook TJ. The role of the oral surgeon in a general hospital in war. *J Oral Surg*, 1951, 9: 3-17.
21. Kwapis BW. Early management of maxillofacial war injuries. *J Oral Surg*, 1954, 12: 293-309.
22. Pound R. Gillies: Surgeon Extraordinary. London: Michael Joseph Ltd, 1964.
23. Keith KM. High energy facial injuries. In: Nessen SC, Lounsbury DE, Hetz SP (eds.) War Surgery in Afghanistan and Iraq. Washington DC: Borden Institute, 2008, 74-81.
24. Lieber A, Dusel W, Doll D. Must military surgeons also be field surgeons? *Med Corps Int Fourm*, 2010, 48-52.
25. Sakaforas GH, Peros G. Principles of war surgery: current concepts and future perspectives. *Am J Emerg Med*, 2008, 480-489.

The face of war: The initial management of modern battlefield ballistic facial injuries

A J Gibbons¹, A Breeze²

Abstract

There is an increased incidence of maxillofacial trauma in conflicts of the 21st century in comparison to those of the 20th century. This is attributed to the asymmetrical nature of modern war with the increased use of improvised explosive devices and improved thoraco-abdominal protection provided by current body armour.

This paper aims to briefly review the principles of the initial management of modern battlefield ballistic injuries. The opinions given in this paper are those of the authors and not necessarily those of the UK MoD.

Introduction

The head and neck region accounts for 12% of the total body surface area. Despite this, head and neck injuries are seen in over 20% of battlefield casualties in 21st century conflicts.^{1,2} In comparison, in the 20th century around 16% of battlefield injuries involved the head and neck.^{3,4} This is most likely due to a decrease in thoraco-abdominal injury due to the effectiveness of current body armour in combination with the increased incidence of improvised explosive devices. In the most recent British Oral and Maxillofacial Surgery Cadre deployment in Afghanistan in 2008/2009, over 50% of military oral and maxillofacial injuries were due to improvised explosive devices (IEDs) and the majority of gunshot wounds were from high velocity rounds.⁵

Ballistic wounds have been traditionally divided into low and high velocity injuries⁶ and blast injuries. However, the amount of energy exchanged to tissues is more important than the projectile's velocity. The energy exchanged to tissues depends on many factors including: projectile design, velocity, mass and flight, the distance to the target, the tissues hit and the protective barriers. Blast injuries are frequently multiple and in addition to injuries from projectiles, casualties often have blast, burn and blunt trauma wounds.⁷

The majority of trauma seen by surgeons in hospitals in the Western World is due to blunt trauma or low energy exchange penetrating trauma from knives and hand guns. The management of these injuries is well described and early definitive surgery with the use of plating techniques is advocated.⁸ In contrast, the high energy exchange trauma seen in Afghanistan is frequently extensive and heavily contaminated with comminuted displaced fractures and tissue avulsion.⁵ The management of these injuries, often in an austere environment, presents even greater challenges.

Emergency management

The emergency management of battlefield trauma has been refined over the past decade.⁹ All military patients are assessed for control of catastrophic bleeding prior to airway, breathing and circulation management. Polytrauma is the predominant form of battlefield injury and catastrophic blood loss is the leading cause of preventable death. Neck wounds can cause life threatening blood loss. However, the primary cause of death in head and face injuries is airway compromise.¹⁰ The airway is at particular risk in unconscious patients with facial injuries. In an emergency a cricothyroidotomy may be required if airway manoeuvres or endotracheal intubation fails. A definitive endotracheal airway or a surgical airway should always be considered for patients with severe ballistic facial injuries. During evacuation, a temporary airway may be dislodged and patients may require a definitive surgical airway for frequent operations or postoperative care. Patients with facial burns must be assessed for airway damage and a definitive airway established before swelling ensues and the airway is lost.

Clinicians should have a high index of suspicion of haemo or pneumothorax in penetrating neck wounds. Haemorrhage from the face, although relatively rare, can be managed by pressure (e.g. nasal packing), diathermy, fracture reduction and immobilisation, suturing, embolisation of the bleeding vessel or tying of the external carotid artery.

Once casualty room emergency interventions are done the patient is assessed for emergency surgery for resuscitation and initial stabilisation. The concept of damage control resuscitation and surgery applies to all severely injured oral and maxillofacial surgery patients. Damage control resuscitation aims to prevent the lethal triad of hypoxia, acidosis and coagulopathy

by permissive hypotension and haemostatic resuscitation.¹¹ The physiological insult of surgery is limited by carrying out the minimum amount of surgery in the shortest time to stabilize patients and prevent infection.^{12,13} Definitive surgery is delayed until the patient's condition has been optimized. Maxillofacial damage control surgery is restricted to tracheostomy, the arrest of haemorrhage, initial wound debridement, simple reduction and immobilisation of fractures and sight saving procedures such as lateral canthotomy.

Assessment of facial injuries

A clear diagnosis of the extent of facial injuries should be made once the patient has been resuscitated and stabilized. This involves complete clinical and radiographic examinations. However, an assessment of the occlusion may be difficult in the orally intubated patient. Plain films give basic information on the site and displacement of facial fractures and show fragments within soft tissues without artifact scatter. Computed Tomography (CT) imaging can be invaluable and is available in many established Western Conflict Hospitals (Figure 1) but not all.

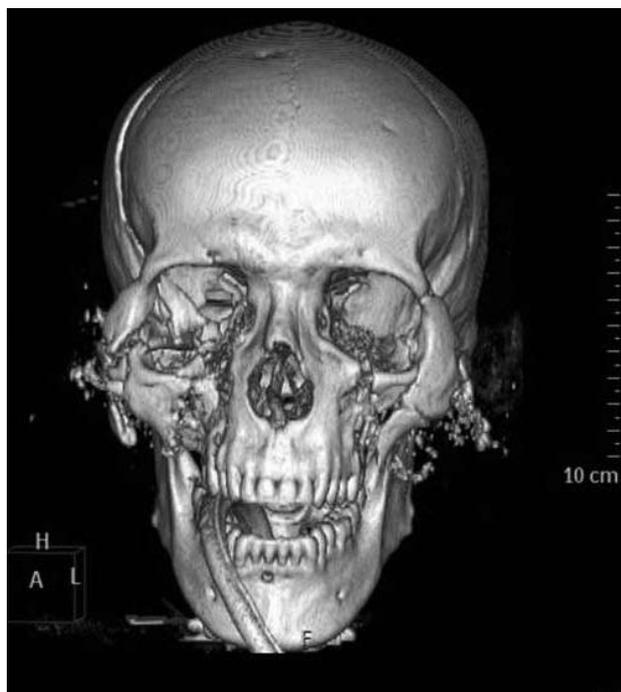


Figure 1. 3 D CT of high energy exchange damage to midface from a high velocity round.

When available, three dimensional CT images allow the clinician to perceive injuries in an easily understood format and are good at showing the extent of hard tissue, and to some extent soft tissue damage, and the displacement of fragments and shrapnel. However, unless the CT cuts are fine, minimally displaced fractures may infill and may not be identified radiographically. Vascular imaging may also be required to assess damage to major vessels.

A full evaluation of soft and hard tissue damage and soft and hard tissue loss should be made. If teeth have been avulsed then they should be accounted for. If they are displaced into the airway they may compromise the airway. If displaced into the sinuses or soft tissues they may cause infection later.

Treatment of facial injuries

The modern initial management of ballistic injuries depends on two key factors. Firstly, the surgeon must analyse the mechanism and amount of energy exchanged to the injured tissues. Secondly, treatment of facial injuries must be undertaken in the context of the overall number and severity of injuries sustained by the patient.

A high velocity round that strikes dense bone in the face will exchange much of its energy. The secondary projectiles of shattered bone and the tumbling of the round can cause further severe damage beyond its path and an avulsive exit wound. However, if the high velocity round has been fired at a distance it will impart less energy to the tissues. Hence, the effects may be similar to a low velocity round, namely, a penetrating wound with damage mostly confined to the missile tract. High energy exchange wound margins may take 5 days to declare themselves.^{14,15} These injuries, therefore, do not lend themselves to early definitive treatment. In contrast, low energy exchange wounds, if adequately cleaned, can be successfully treated early.

The priorities of battlefield surgical treatment are to save life, eyesight and limbs and then to give the best functional and aesthetic outcome for other wounds. The treatment of facial injuries must be undertaken in this context and take into account the principles of damage control surgery.

Later definitive and reconstructive surgery will be greatly influenced by the initial surgery done. Hence, thought should be given at early operations as to the likely nature of the final surgery required. Obtaining early wound closure in areas of tissue loss or the injudicious removal of potentially compromised bone or soft tissues may lead to collapse and scarring. This may make subsequent treatment more difficult. Surgical judgment is required as to the amount of soft tissue and bony debridement that is initially required to adequately clean tissues and prevent infection, and what early definitive treatment can be done to give the best final form and function.

Battlefield casualties often have multiple injuries to different body sites. These injuries are frequently severe (Figures 1 and 2).



Figure 2. Severe ocular injuries from shrapnel in a patient not wearing eye protection.

Teamwork is important to ensure optimal results. In the head and neck, neurosurgeons, oral and maxillofacial surgeons, plastic surgeons, ophthalmic surgeons and otolaryngology surgeons can exchange knowledge and surgical expertise.

Soft tissue injuries.

Ballistic facial injuries are often heavily contaminated and frequently burned. Early adequate debridement is advocated to minimize infection and subsequent tattooing and scarring.¹⁴ This may involve the use of scrubbing brushes, pulsed lavage and copious irrigation. CT scans should be fully evaluated to identify foreign bodies and these should be meticulously removed. Surgical dermabrasion with a scalpel blade can be used to remove all debris that may cause subsequent wound tattooing which is difficult to correct when established. The use of diathermy should be judicious rather than extensive. Although cleaning must be thorough, any tenuous blood supply to tissues should not be compromised by aggressive handling or periosteal stripping of bone. As facial tissues are so well vascularised, tissue should be preserved wherever possible. If in doubt about the cleanliness and viability of wounds, they should be packed open with ribbon gauze and antibacterial agents. They should then undergo serial debridement until judged able to be closed. Only wounds that have no gross contamination or deep extension should be closed primarily. Deep wounds should be explored on the operating table with facilities for surgical vascular control if required. Anastomosis of nerves and salivary ducts should be done as soon as is practical. When soft tissue facial wounds are ready to close, well designed local rotational flaps can often be used to close mild to moderate skin defects. However, the rotational flap should not compromise the blood supply to a larger soft tissue flap that may be required later if the wound breaks down. Prompt evacuation is a

key feature in the management of coalition personnel. Procedures such as soft tissue flaps and nerve repairs that are not essential aspects of damage control surgery are often undertaken within a few days, on return to the patient's home country.

Tetanus prophylaxis should be given if the patient is at risk and broad spectrum antibiotics given. Infection with unusual pathogens such as *A baumannii* has not proved a problem in facial injuries.

Facial fractures

Providing the soft tissue environment around the facial fracture is favourable, blunt and simple low energy exchange ballistic fractures can be managed by conventional open reduction and internal fixation plating techniques. However, primary reconstruction with bone plates and screws in the austere combat environment often yields poor results with subsequent soft tissue infections and plate exposures.⁷ Where the soft tissue environment is not favourable and with moderate to high energy exchange ballistic trauma, serial debridement of wounds will be required and plating techniques are generally contra-indicated. Once wounds are infection-free and the viability of tissues has declared itself, plating techniques can be used.

Conventional techniques of external pin fixation or intermaxillary fixation (IMF) can be used to reduce and hold most facial fractures in their anatomical position. IMF is useful for most mandibular and low level maxillary fractures. Pin fixation can be used for most facial fractures, often in conjunction with IMF. The adequate stabilization of facial fractures is necessary to prevent collapse and fibrosis that is so difficult to treat once established. IMF or placement of an external fixator by a closed technique does not require wide periosteal stripping at the fracture site that may compromise the bony blood supply, introduce infection and displace comminuted bone. No foreign body is introduced at the fracture site. IMF with arch bars or intermaxillary screws¹⁶ is often an effective treatment but compromises the patient's airway. Special precautions for the release of fixation are required during patient evacuation. With external fixators, the mouth can be opened during fracture healing. Hence, oral hygiene and patient nutrition are improved and trismus due to fibrosis and scarring is reduced. Any soft tissue or bony defects may continue to be debrided with the fixators or IMF in place.

Further management

The definitive management of complex ballistic facial injuries is best undertaken by multidisciplinary teams in hospitals specializing in this care. Adequate nutrition and good oral hygiene are essential. Physiotherapy and

physiological support may also be required. Definitive treatment and reconstruction may include rotational flaps, bone grafts, free flaps, distraction osteogenesis, implants or prosthesis. However, the correct early management of facial ballistic injuries is crucial in achieving the best possible surgical outcomes.

Conclusions

Battlefield ballistic injuries present a unique challenge to facial surgeons. The facial surgeon should have a low threshold for providing a surgical airway in ballistic facial injuries and be assiduous in the prevention of blood loss. An appreciation of the energy exchanged to facial tissues and the overall condition of the patient is

essential in the early treatment phase. If the viability of tissues is in doubt they should be packed open and serially debrided. IMF and external fixation techniques have found a new prominence in the treatment of ballistic facial fractures. Teamwork and good surgical planning are required to ensure optimal results.

Authors' affiliations: ¹Peterborough Hospital, Cambridgeshire, UK, ²Queen Elizabeth Hospital, Birmingham, UK.

*Corresponding author: Wing Commander A Gibbons, Consultant, Department of Oral and Maxillofacial Surgery, Ministry of Defence Hospital Unit, Peterborough Hospital, Thorpe Road, Peterborough, Cambridgeshire PE3 6DA
Email: Andrew.gibbons@pbh-tr.nhs.uk*

References

1. Xydakis MS, Fravell MD, Casler JD. Analysis of Battlefield Head and Neck Injuries in Iraq and Afghanistan. *Otol Head and Neck Surg* 2005; 133: 497- 504
2. Brennan J. Experience of first deployed otolaryngology team in Operation Iraqi Freedom: the changing face of combat injuries. *Otolaryngol Head Neck Surg* 2006; 134(1): 100- 105
3. Jackson DS, Batty CG, Ryan JM, McGregor WS. The Falklands War: Army Field Surgical Experience. *Ann R Coll Surg Eng* 1983; 65: 281-285
4. Dobson JE, Newell MJ, Shepherd JP. Trends in Maxillofacial Injuries in Wartime (1914-1986). *Br J Oral Maxillofac Surg* 1989; 27: 441-450
5. Gibbons AJ, Mackenzie N Lessons Learned in Oral and Maxillofacial Surgery from British Military Deployments in Afghanistan. *JR Army Med Corps* 2010; 156:110-113
6. Powers D B, Robertson O B. Ten Common Myths of Ballistic Injuries. *Oral Maxillofacial Surg Clin N Am*.2005; 17: 251-259
7. Gokel T. Improvised Explosive Devices and the Oral and Maxillofacial Surgeon. *Oral Maxillofacial Surg Clin N Am* 2005; 17: 281-287
8. Glapa M, Kourie JF, Doll D, Degiannis E. Early Management of Gunshot Injuries to the Face in Civilian Practice. *World J Surg* 2007;31: 2104-2110
9. Hodgetts T, Mahoney PF, Byers M, Russel MQ. ABC to < C > ABC: Redefining the military trauma paradigm. *Emerg Med J* 2006; 23; 745-746
10. Breeze J, Bryant D. Current Concepts in the Epidemiology and management of Battlefield Head, Face and Neck Trauma. 2009 *JR Army Med Corps* 155: 274-278
11. Jansen JO, Thomas R, Loudon MA, Brooks A. Damage control resuscitation of patients with major trauma. *BMJ* 2009; 338: 1436-1440
12. Blackburne LH. Combat damage control surgery. *Crit Care Med*. 2008; 36: S304-S310.
13. Bowley DM, Barker P, Boffard KD. Damage control surgery- concepts and practice. *J R Army Med Corp* 2000; 176-182
14. Reed B, Hale RG, Giddon M, Ericson M. Maximising outcomes for maxillofacial injuries from improvised explosive devices by deployed health care personnel. *ADF Health* 2008 ;9 : 1-8
15. Robertson BC, Manson PN. High-energy ballistic and avulsive injuries. A management protocol for the next millennium. *Surg Clin North Am*. 1999; 79:1489-1502.
16. Gibbons AJ, Baden J, Dhariwal DK, Monaghan AM, Hodder SC. A drill-free bone screw for intermaxillary fixation in military casualties. *J R Army Med Corps* 2003: 149: 30-32

Damage Control Resuscitation of the exsanguinating trauma patient: Pathophysiology and basic principles.

Dr Claire Frauenfelder, MBBS¹, Mr. Eamon Raith², A/Prof William M Griggs³ MBBS, MBA, PGDipAvMed, FANZCA, FCICM, FACAP, FAICD, AM, ASM

Abstract

Damage Control Resuscitation (DCR) is a systematic approach to major exsanguinating trauma incorporating strategies of permissive hypotension, haemostatic resuscitation and damage control surgery. In this article we review current literature regarding the pathophysiology of massive haemorrhage: the “lethal triad” of coagulopathy, acidosis and hypothermia, and integrates this with an introduction to the components of DCR.

Introduction

Damage Control Resuscitation (DCR) is a systematic approach to major exsanguinating trauma that modifies current initial resuscitation algorithms and early management protocols.

Incorporating three key concepts of permissive hypotension, haemostatic resuscitation and damage control surgery, it has shifted emphasis to prompt control of haemorrhage and correction of coagulopathy prior to definitive management. It is defined by Hodgetts et al as “a systemic approach to major trauma combining the <C>ABC paradigm (catastrophic bleeding, airway, breathing, circulation) with a series of clinical techniques from point of wounding to definitive treatment in order to minimise blood loss, maximise tissue oxygenation and optimise outcome”¹.

DCR has its origins in the discovery of trauma-induced coagulopathy in the Vietnam War and the use of early rapid transfusion seen in the 1982 Falklands conflict, and has evolved as a true trauma system during the conflicts in Iraq and Afghanistan^{1,2}.

This evolution in trauma care has developed from a greater understanding of the pathophysiology of exsanguinating haemorrhage. This article provides an introductory review of current knowledge and guidelines in Damage Control Resuscitation, and briefly considers its military and civilian applications.

Pathophysiology of exsanguinating haemorrhage

Massive haemorrhage has been reported to account for up to 50% of all trauma-related deaths³. In addition to blood loss alone, haemorrhage produces a cascade of three key physiological interactions encapsulated by the term the “lethal triad”. It is this combination of coagulopathy, hypothermia and acidosis that results in a global haemostatic deficit, increasing the risk of

exsanguination. Associated anaemia, hyperfibrinolysis and hypocalcaemia increase the lethality of the triad³⁻⁷.

Acute Coagulopathy of Trauma

Acute traumatic blood loss activates the normal coagulation pathway, but massive injury can defeat the normal haemostatic effect of the coagulation cascade. Continued massive exsanguination and ongoing attempts at clotting deplete the body’s stores of coagulation factors. Activation of haemostatic mechanisms in turn trigger anticoagulation mechanisms, particularly the Protein C pathway, further reducing the efficacy of the clotting cascade through inhibition of factors V and VII, reduced fibrinogen use and induced fibrinolysis⁷. Coagulopathy of trauma chiefly results from consumption of blood coagulation products, coagulation factor dilution, and abnormal anticoagulation pathway activation, culminating in a pathological fibrinolysis³⁻⁷.

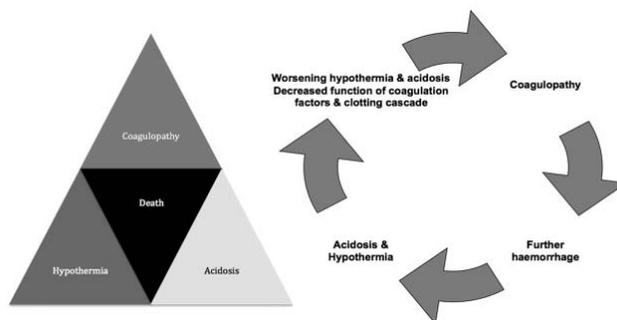


Figure 1 The Lethal Triad

This intrinsic acute traumatic coagulopathy may also be worsened by administration of large volumes of non-blood product intravenous fluids in aggressive resuscitation, diluting coagulation factors, platelets and red blood cells³⁻⁵. Use of isolated blood components such as red blood cells will further dilute remaining coagulation factors. Choice of intravenous fluid

may also contribute to coagulopathy. Studies show that administration of hydroxyethyl starch 130/0.4 exponentially depletes fibrinogen, prothrombin, and factor X and XIII while 5% hypertonic saline affects platelet function, prothrombin and thrombin times, worsening the coagulation status of the patient^{3,9}. A 1994 study of patients with uncontrolled penetrating trauma demonstrated administration of intravenous fluids can increase mortality in the presence of severe uncontrolled haemorrhage¹⁰. Recently published European guidelines for the management of bleeding following major trauma acknowledge difficulty in identifying an ideal resuscitation fluid or volume with no clear benefit from non-blood products¹¹.

Acidosis

Acidosis in the exsanguinating patient results primarily from decreased tissue perfusion and a switch from aerobic to anaerobic cellular metabolism, leading to consequent accrual of lactic acid^{1,3-7,12}. In addition, acidosis is worsened by an increasing base deficit as a direct consequence of haemorrhage and lactate production, resuscitation with calcium-binding fluids (e.g. Ringer's Lactate) or those containing supra-physiologic concentrations of chloride¹³, and the infusion of stored red blood cells that have an increased lactate concentration and elevated base deficit as a consequence of RBC ageing^{14,15}.

The increased concentration of hydrogen ions acts to disrupt the interaction of coagulation complexes FVIIa, FVIIa/Tissue Factor complex and prothrombinase complex (FXa/FVa) with negatively-charged phospholipid receptors on the surface of activated platelets^{5,11}. This inhibition has been found to reduce the activity of FVIIa by 90%, FVIIa/TF complex by 55% and the rate of prothrombinase complex-mediated activation of prothrombin by 70% at a pH of 7.0^{3,12,16}.

Acidosis further impairs haemostasis through a reduction in the affinity of Ca²⁺-binding sites on plasma proteases, an increase in fibrinogen degradation by up to 1.8 times normal rates, and a reduction in platelet numbers by up to 50%⁴.

Measurement of both serum lactate and base deficit is recommended early in the assessment of haemorrhagic shock to determine the degree of physiological disruption, and should be repeated in order to monitor the response to resuscitation¹¹.

It has also been postulated that the use of crystalloid fluid, in particular normal saline, in the resuscitation of the exsanguinating patient may worsen acidaemia through the development of a hyperchloraemic acidosis¹².

Hypothermia

Temperature control is a critical factor in the successful management of the trauma patient. Traumatic injury

also induces hypothermia by altering the patient's own thermoregulatory mechanisms, reducing shivering, and affecting normal tissue metabolism, so reducing intrinsic heat production⁸.

Preventing further external exacerbation of hypothermia is vital. Conductive and radiated losses during the "exposure" phase of trauma management and evaporative losses from wet or soiled clothing need consideration^{8,11,12}. Fluid resuscitation with cool or room temperature fluids and any surgical procedure also contribute to central cooling of the patient by introducing cold fluids to the body's core and/or exposure of peritoneal and pleural surfaces during surgery^{10,11}.

Acute traumatic coagulopathy is exacerbated by hypothermia, through inhibition of platelet receptor GPIb-IX-V and von Willebrand factor, decreased fibrinogen synthesis and an absolute reduction in physiologic fibrinolytic inhibitors e.g. alpha-2 antiplasmin at lower body temperatures^{4,8,12}.

These clinically significant effects are present even in moderate hypothermia. At 35°C all coagulation factors decrease their function, with factors XI and XII functioning at only 65% of normal. At 33°C, there is <50% of the usual clotting factor activity observed in normothermic patients, and at 33°C the activity of factors XI and XII is reduced to 17% and 32% respectively^{3,12}.

Beyond the lethal triad: Hyperfibrinolysis, Hypocalcaemia and Anaemia

Paradoxical hyperfibrinolysis in trauma results from tissue plasminogen activator release due to endothelial damage and restriction of plasminogen activator inhibitor-1 function throughout the vasculature^{3,12}. The normally beneficial effect of restricting clot propagation to the site of injury is lost as instead there is a global pathological fibrinolytic response in these severely-injured patients.

Antifibrinolytic agents have been suggested as an option in the bleeding trauma patient¹¹. Tranexamic acid and epsilon aminocaproic acid have both been recommended as adjuncts to reduce bleeding in major trauma^{11,17}. The recently published CRASH-2 multi-centre randomised controlled trial showed that "tranexamic acid safely reduced the risk of death in bleeding trauma patients in this study"¹⁴.

Circulating ionized calcium (Ca_i²⁺) concentration is known to be a critical factor in fibrin clot stabilization and the propagation of the coagulation cascade, and there is evidence that concentrations of less than 0.6-0.7mmol/L are associated with an increase in coagulation defects¹⁸.

It has been suggested that Ca_1^{2+} concentrations should be kept above 0.9mmol/L in order to avoid worsening coagulopathy and possible cardiac complications¹¹.

A decrease in the circulating volume of erythrocytes, and consequent reduction in haematocrit, has been known since the 1980s to reduce platelet efficacy. Turitto and Weiss demonstrated that platelet adhesion increases as haematocrit rises from 10 to 40% under normal linear flow conditions, but shows no further increase between 40 and 70%, and when under abnormal (i.e. traumatic) conditions, there is a linear, proportionate increase in platelet efficacy as haematocrit rises from 10 to 70%^{3,20}.

Combined with the critical contribution of ADP for platelet activation by red blood cells, it is apparent that haemostatic control requires haematocrit values beyond those required for normal oxygen transport. It is possible that in patients with uncontrolled haemorrhage despite optimum resuscitation (e.g. by avoiding excessive intravenous fluid administration), avoiding a decreasing haematocrit and haemoglobin concentration may improve haemostasis³. It is worth noting that the low levels of ADP in banked blood mean that the best option to maintain ADP stores is clearly to minimise the loss of the patient's own blood rather than rely on transfused bank blood to raise the haematocrit, a key goal for managing any exsanguinating patient.

Damage Control Resuscitation: Permissive hypotension, haemostatic resuscitation and damage control surgery

Permissive hypotension

Permissive hypotension, also known as hypotensive resuscitation, is the restriction of fluid administration until exsanguinating haemorrhage is controlled, accepting in the process a limited period of deficient end-organ perfusion. The goal is to maintain a systolic blood pressure of approximately 90mmHg (approximated clinically by a palpable radial pulse), thus ensuring a mean arterial pressure adequate to maintain continued (albeit deficient) end-organ perfusion, while controlling blood loss and allowing optimum coagulation and consolidation of haemostatic mechanisms at sites of injury^{5, 21}. Additional resuscitation endpoints include heart rate, urine output and level of consciousness. Bickell's 1994 study demonstrated an in vivo practical benefit from this approach in the hypotensive penetrating trauma patient¹⁰.

Hypotensive resuscitation has a number of limitations; it is said to be only useful in the first hour following traumatic injury and for this reason is now included in the resuscitation guidelines of a number of ambulance services²². After this time the target blood pressure

reverts to a normal level of 110mmHg²³. Similarly, patients with head injuries, blast injuries and children less than 12 years old are not suitable candidates for resuscitation using hypotensive principles due to complicating factors related to fluid shifts and variation in physiological functional reserve²³. Finally, accurately measuring blood pressure in the field can be difficult and rapidly occurring yet significant changes may be missed using an intermittent measurement method. Continuous intra-arterial blood pressure measurement has obvious benefits but both the availability of equipment to do this and the time to insert a cannula clearly limits its acute use.

Permissive hypotension should be used as a specific goal-directed therapy aimed at producing a systolic blood pressure of 90mmHg, reduction of tachycardia to less than 100bpm, a urine output of greater than 0.5mls/kg/hr, and improving conscious level, provided that doing so does not delay the transfer of the patient to theatre²³. It has been suggested that fluid should be administered in boluses of 250ml, and responses to therapy monitored using a combination of parameters including central venous pressure, mean arterial pressure, central venous pH, lactate, base deficit, haemoglobin concentration and central venous oxygen saturation >70% where this monitoring is available^{11,23}.

Fluid choice is crucial in this setting, and there remains a marked disparity in recommendations, with 0.9% sodium chloride recommended (on the basis of cost) by the National Institute of Clinical Excellence in the United Kingdom, Hartman's solution advocated by the Royal Centre for Defence Medicine at the University of Birmingham for its theoretically reduced likelihood to contribute to a hyperchloraemic metabolic acidosis in patients already predisposed to acidosis, and low-volume hypertonic saline/dextran advocated by some members of the military community²³⁻²⁵. It will inevitably fall to individual institutions to define their own guidelines until further research provides definitive evidence as to the most appropriate fluid for use in hypotensive resuscitation. International consensus recommendations can be very helpful to assist institutional guideline development¹¹.

Haemostatic Resuscitation

Haemostatic resuscitation is the early use of whole blood or combined replacement blood components as primary resuscitation fluids, and aims to prevent dilutional coagulopathy and treat the intrinsic coagulopathy, described above, through the replacement of each blood component in the same ratio as it is lost through haemorrhage^{11,23,26-28}.

Fresh whole blood is frequently unavailable for correction of massive bleeding, particularly in the civilian trauma setting due in part to cost and logistic issues but mainly to the need to undertake viral testing of donated blood. Because of this, a significant amount of research into the use of blood-component combinations has been undertaken. Trauma patients generally die as a result of truncal haemorrhage (secondary to blunt or penetrating trauma), head injury or multiple organ failure. Death rates have been used as measures of the success of various haemostatic resuscitation ratios of packed red blood cells: fresh frozen plasma: platelet concentrate. The vast majority of evidence is based on historical non-randomized controlled trials. However there have recently been a number of attempts at providing a better evidence base for the use of recombinant blood products^{11,27-30}

Recent studies²⁸⁻³¹ have shown that higher ratios of PRBC:FFP:Platelets in the order of 1:1:1 significantly increase the number of patients surviving massive haemorrhage (37% reduction in mortality in troops resuscitated with PRBC: FP in the ratio 1:1 (12 deaths due to haemorrhage from 31 total deaths) compared to those resuscitated with the traditional 1:8 ratio (19 deaths due to haemorrhage from 20 total deaths)³¹.

Other factors that need to be considered in haemostatic resuscitation include plasma fibrinogen levels and calcium concentrations, for reasons described above.

Plasma fibrinogen should be replaced if levels fall below 1.0g/L²⁹ or 1.5g/L¹¹, in settings where other conventional treatments have failed, with cryoprecipitate or fibrinogen concentrate³². Some current recommendations use formulae to administer fibrinogen concentrates without measurement as part of a massive transfusion protocol¹¹.

In situations of exsanguinating haemorrhage where conventional treatments have failed, it has been suggested that there is a role for the use of recombinant factor VIIa, at a dose of 100mcg/kg. One hundred and eight incidents of recombinant factor VIIa use in trauma, across 19 hospitals, had been reported to the Australian and New Zealand Haemostasis Registry by 2007. Of the reported cases 87% were related to blunt trauma, 10% to penetrating trauma. Massive haemorrhage was successfully controlled with rFVIIa use in 59% of cases, with subsequent analysis revealing reduced efficacy in situations of severe acidosis and hypothermia. Consequently, predictors of successful use of rFVIIa appear to be pH, temperature and injury severity score. These findings appear to be borne out by US experiences with rFVIIa in the combat setting^{33,34}.

Research is currently underway into the role of thromboelastography and thromboelastometry in the management of acute coagulopathy of trauma. These methods of assessing coagulation deficiencies are felt to be better suited to trauma management than other plasma-based investigations of coagulation (e.g. Activated partial thromboplastin time, Prothrombin time)³⁴, and with ongoing research and development into point-of-care testing, will likely lead to significant changes in the assessment of coagulation in trauma. Recently published guidelines recommend thromboelastometric monitoring in massive transfusion protocols and haemostatic resuscitation¹¹.

Damage Control Surgery

Damage control surgery aims to stop haemorrhage, minimise wound contamination and allow optimisation of physiological function. The traditional surgical goal of definitive management of anatomical defects should be delayed to later definitive operation(s). Rapid assessment and commencement of resuscitation is required in the field or emergency department and priority needs to be given to early transit to the operating theatre. Crucial to the principles discussed in this article is prevention of progression to the lethal triad. Rapid initial surgery is vital and principally involves haemostasis. This staged approach requires close co-ordination between pre-hospital teams, emergency, surgeon, anaesthetic team and intensive care unit and is the final step in the damage control resuscitation paradigm³⁶⁻³⁸.



Figure 2 Damage Control Surgery

Applying Damage Control Resuscitation in the military and civilian trauma settings

The use of damage control resuscitation principles has been developed and readily adopted in the military setting and is a key component in US, British and Australian military medical response to combat-related trauma. Given the prevalence of major trauma in the Australian population (2,386 hospitalised major trauma patients in NSW in 2006⁴⁰) there is marked scope for expansion of these principles to the civilian trauma environment.

The vital steps of controlling external haemorrhage, rapid assessment of bleeding site and early surgical control of haemorrhage should to be addressed by procedure and policy on a system-wide basis, incorporating ambulance and other emergency medical services through to definitive treating medical team(s)²³. For example, strategies to target both patient temperature and higher PRBC:FFP:Platelets

replacement ratios early are immediately applicable with common goals of treatment from the road crew, through the emergency room and further into the hospital admission¹².

There is an argument for frequent updates of the evidence in this approach to exsanguinating trauma, however further research is still required on the use of DCR for management in specific injury-groups, notably blunt trauma, head injury and the paediatric trauma population, and on the role of permissive hypotension in the management of paediatric patients⁴⁰. Hypotension in brain trauma remains contraindicated due to the evidence-base for associated poor outcomes⁴¹.

Conclusion

The Damage Control Resuscitation paradigm incorporates a better understanding of massive exsanguination, provides treatment goals based on this and suggests modification of currently accepted resuscitation algorithms to improve survival for this specific group of trauma patients.

Authors' Affiliations: 1 The Women's and Children's Hospital, North Adelaide, 2 The University of Adelaide, 3 Royal Adelaide Hospital
Corresponding author: Mr Eamon Raith,
The University of Adelaide, Frome Road, Adelaide, SA 5005
Email: eamon.raith@gmail.com

References

1. Hodgetts TJ, Mahoney PF, Kirkman E. Damage Control Resuscitation. *JR Army Med Corps* 153(4): 299-300
2. Williams JG, Riley TRD, Moody RA. Resuscitation experience in the Falkland Islands campaign. *BMJ* 1983; 286: 775-7
3. Meng ZH, Wolberg AS, Monroe DMI, Hoffman M (2003) The effect of temperature and pH on the activity of factor VIIa: implications for the efficacy of high-dose factor VIIa in hypothermic and acidotic patients. *J Trauma* 55:886-891
4. Martini WZ (2009) Coagulopathy by hypothermia and acidosis: mechanisms of thrombin generation and fibrinogen availability. *J Trauma* 67:202-209
5. Jansen JO, et al. Damage control resuscitation for patients with major trauma. *BMJ* 2009;338:1436-1440
6. Brohi. Trauma Induced Coagulopathy. *JR Army Med Corps* 155(4): 320-322.
7. Spahn DR, Rossaint R. Coagulopathy and blood component transfusion in trauma. *Br J Anaesth* 2005; 95: 130-9.
8. Tsuei BK, Kearney PA. Hypothermia in the trauma patient. *Injury* 2004; 35: 7-15.
9. Brummel-Ziedins K, Whelihan MF, Ziedins EGet al. The resuscitative fluid you choose may potentiate bleeding. *J Trauma* 2006;61: 1350-1358.
10. Bickell WH, Wall MJ Jr, Pepe PE et al. Immediate versus delayed fluid resuscitation for hypotensive patients with penetrating torso injuries. *NEJM* 1994; 331 (17): 1105-9.
11. Rossaint R, Bouillon B, Coats, TJ et al. Management of bleeding following major trauma: an updated European guideline. *Crit Care* 2010 14:R52 *Epub* 2010 Apr 6: 1-29.
12. Tieu BH, Holcomb JB, Schreiber MA. Coagulopathy: Its pathophysiology and treatment in the injured patient. *World J Surg* 2007;31: 1055-1064.
13. Waters JH, Gottlieb A, Schoenwald P, et al. Normal saline versus lactated Ringer's solution for intraoperative fluid management in patients undergoing abdominal aortic aneurysm repair: an outcome study. *Anesth Analg* 2001;93:817-822.
14. Zander R, Sümpelmann R: Säure-Basen-Status gelagerter und gewaschener Erythrozyten. *Anästhesiol Intensivmed Notfallmed Schmerzther* 2001; 36 (Suppl. 1): 25-30
15. Zander R: Fluid Management (2nd expanded ed.) *Bibliomed - Med. Verlagsgesellschaft, Melsungen (Germany)* 2009.
16. Meng ZH, Wolberg AS, Monroe DM 3rd, et al. The effect of temperature and pH on the activity of factor VIIa: implications for the efficacy of high-dose factor VIIa in hypothermic and acidotic patients. *J Trauma* 2003;55:886-891.
17. Roberts SH, Caballero CJ, Coats TJ et al. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised placebo-controlled trial. *Lancet* 2010 376(9734): 23-32.
18. Spinella PC, Holcomb JB. Resuscitation and transfusion principles for traumatic hemorrhagic shock. *Blood Reviews* 2009;23: 231-240

19. Hastbacka J, Pettila V. Prevalence and predictive value of ionized hypocalcaemia among critically ill patients. *Acta Anaesthesiol Scand* 2003;47: 1264-1269.
20. Turitto VT, Weiss HJ. Red blood cells: their dual role in thrombus formation. *Science* 1980;207: 541-543.
21. Kreimeir U, Prueckner S, Peter K. Permissive Hypotension. *Schweiz Med Wochenschr* 2000; 130:1516-24.
22. National Institute of Clinical Excellence Therapeutic Appraisal TA 074: The clinical and cost effectiveness of prehospital intravenous fluid therapy in trauma. NICE, National Health Service, 2004.
23. Wright C, Mahoney P, Hodgetts T, et al. Fluid resuscitation: A Defence Medical Services Delphi study into current practice. *JR Army Med Corps* 155(2): 99-104.
24. Garner J, Watts S, Parry C, et al. Prolonged permissive hypotensive resuscitation is associated with poor outcome in primary blast injury with controlled haemorrhage. *Ann Surg* 2010; 251: 1131-1139.
25. Kwan I, Bunn F, Roberts I. Timing and volume of fluid administration for patients with bleeding (Review). *Cochrane database of systematic reviews*. 2003, Issue 3. Art No.: CD002245. DOI: 10.1002/14651858.CD002245.
26. Spinella PC. Warm fresh whole blood transfusion for severe haemorrhage: US military and potential civilian applications. *Crit Care Med* 2008; 36[Suppl.]: S340-S345.
27. Kirkman E, Watts S, Hodgetts T, et al. A proactive approach to the coagulopathy of trauma: The rationale and guidelines for treatment. *JR Army Med Corps* 153(4): 302-306.
28. Griffee MJ, DeLoughery TG, Thorborg PA. Coagulation management in massive bleeding. *Curr Opin Anaesthesiol*. 2010; 23: 263-268.
29. Holcomb JB, Wade CE, Michalek JE, et al. Increased plasma and platelet to red blood cell ratios improves outcome in 466 massively transfused civilian trauma patients. *Ann Surg*. 2008; 248(3): 447-458.
30. Zink KA, Sambasivan CN, Holcomb JB, et al. A high ratio of plasma and platelets to packed red blood cells in the first 6 h of massive transfusion improves outcomes in a large multicenter study. *Am J Surg* 2009; 197: 565-570.
31. Borgman MA, Spinella PC, Perkins JG, et al. The ratio of blood products transfused affects mortality in patients receiving massive transfusions at a combat support hospital. *J Trauma* 2007;63:805-13
32. Shaz BH, Dente CJ, Nicholas J, et al. Increased number of coagulation products in relationship to red blood cell products transfused improves mortality in trauma patients. *Transfusion*. 2010 Feb;50(2):493-500
33. Cameron P, Phillips L, Balogh Z, et al. The use of recombinant factor VII in trauma patients: experience from the Australian and New Zealand Haemostasis Registry. *Injury* 2007; 38: 1419-1425.
34. Perkins J, Schreiber M, Wade C, et al. Early versus late recombinant factor VIIa in combat trauma patients requiring massive transfusion. *J Trauma* 2007; 62:1095-1101.
35. Johansson PI, Stissing T, Bochsén L, et al. Thromboelastography and thromboelastometry in assessing coagulopathy in trauma. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2009; 17: 45
36. Blackbourne LH. Combat damage control surgery. *Crit care med* 2008; 36[Suppl.]: S304-S310.
37. Beekley AC. Damage control resuscitation: A sensible approach to the exsanguinating surgical patient. *Crit Care Med* 2008; 36[Suppl.]: S267 - S274.
38. Jaunoo SS, Harji DP. Damage Control Surgery. *Int J Surg* 2009; 7: 110-113.
39. New South Wales Institute of Trauma and Injury Management. The NSW Trauma Registry Profile of Serious to Critical Injuries: 2006. 2007. NSW Health.
40. Dempsey EM, Hazzani F Al, Barrington KJ. Permissive hypotension in the extremely low birthweight infant with signs of good perfusion. *Arch Dis Child Fetal Neonatal Ed* 2009; 94: F241-F244.
41. Guidelines for the Management of Severe Traumatic Brain Injury, 3rd Edition. *Journal of Neurotrauma* 2007; 24[Suppl]. Brain Trauma Foundation.

The health and wellbeing of female veterans: A review of the literature

Dr Samantha Crompvoets

Abstract

This paper examines health and wellbeing issues that emerged in a systematic review of the war, peacekeeping and peacemaking experiences of female veterans. Research questions that informed the search were: firstly, what is known about the experiences of female veterans, and in particular, military nurses; and secondly, what influences the perceptions of a veteran of their health and wellbeing?

Components of wellbeing that emerged included the ability to cope, ease of access to services and support, satisfaction with parenting, the effects of sexual harassment, and symptoms of PTSD (Post Traumatic Stress Disorder). Perceptions of wellbeing were both informed and challenged by the women's individual and collective identities, for example a professional identity, military identity, being a parent and being female.

There has been little research into the sense of self and identity for women in the military today. However, what we do know suggests that identity can have an impact on a woman's health and her access to services. Tensions emerge at the nexus of nurse, warrior, mother and woman and they can have adverse effects on women's health and wellbeing, inhibiting some women from seeking appropriate support.

Female nursing veterans are a group at increased risk of many mental health conditions. The increased risks are the result of the many tensions and realities of serving on a military deployment. Not only the sensory exposure to the dead and dying, but the personal, emotional conflicts inherent in caring for the sick and wounded in a war zone.

Female veterans are a group who need health services that understand their unique needs, with well informed and appropriately trained health care providers.

Introduction

The percentage of women in the Defence forces is increasing, with women comprising 13.5% of Australia's Defence Force¹, 14.6% of the US military² and 9.1% of the British Armed Forces³.

What is known about the health and wellbeing of these women as they take up more front-line like roles, moving away from the more traditional female military roles of nurse and medics? What do their experiences tell us about their health and wellbeing?

Research has shown that the newest generation of female veterans may face growing occupational challenges⁴ and unique threats to their mental health⁵. In the Australian Defence Force (ADF), women work across a diverse range of occupations. However, women comprise a small percentage of these categories overall. Categories with the highest percentage of women are largely administration and health related (see Table 1)⁶.

This paper examines the health and wellbeing issues emerging from a systematic review of the war, peacekeeping and peacemaking experiences of female veterans. Health is commonly defined as a state of complete physical, mental and social well-being and is not merely the absence of disease or infirmity⁷.

Occupation categories with highest number of women			
	ARMY	NAVY	RAAF
	Ordnance corps n=847	Supply n=552	Clerical n=478
	Transport corps n=395	Seaman n=394	Supply n=341
	Medical corps n=325	Communications n=346	Support ops n=224
Occupation categories with highest percentage of women			
	Dental corps 65.35%	Admin 100%	Dental 90.48%
	Nursing corps 62.26%	Management exec 60.61%	Clerical 70.50%
	Psychology corps 50.81%	Health services NS 56.73%	Medical 63.08% (includes nurses)

Table 1 Occupation categories for ADF women by number and percentage

This paper is part of a larger qualitative study funded by the Australian Department of Veterans Affairs (DVA), examining the health and wellbeing of female veterans, in particular, military health personnel.

Research questions that informed the search were:

- What is known about the experiences of female veterans, and in particular military nurses?
- What impacts on veterans' perceptions of their health and wellbeing?

Papers included in this review indicate the overall lack of research into recent veterans histories^{4,5,8}, and highlight the need for more reliable data on the risks associated with various military occupations, deployment to specific locations, and stressful deployment experiences. Even occupations such as healthcare specialists may expose women to the same serious risks as front-line fighters⁹.

Of the 35 articles and reports included in this review, 21 pertained to experiences of military nurses in Vietnam. Only two related to the experiences of nurses in more recent wars.

Following an overview of the search method, this paper will discuss components of wellbeing that emerged in the research. These include:

- ability to cope
- access to services and support
- satisfaction with parenting
- the effects of sexual harassment
- symptoms of PTSD.

Perceptions of wellbeing were both informed and challenged by womens' individual and collective identities, for example a professional identity, military identity, being a parent and being female.

Tensions emerge at the nexus of nurse, warrior, mother and woman and can have adverse effects on women's health and wellbeing, inhibiting some from seeking appropriate support and healthcare.

Review approach

Systematic reviews aim to comprehensively identify all relevant studies to answer a particular question. A particular type of systematic review, a narrative review, is most suited to synthesizing primary studies and exploring heterogeneity descriptively, rather than statistically¹⁰. This is the method used in this paper.

Four databases were systematically searched: Pubmed, Psychinfo, Scopus and Web of Science. In addition

specific journals were hand searched, including, but not limited to, *ADF Health*, *Military Medicine*, *War & Society*, *Journal of Women's Health*, *Military Psychology*, and *Women & Health*. Furthermore, two Australian reports known to the author were included for analysis^a. Where possible, MeSH terms^b were used for database searches. The following series was used: ("Military Personnel" OR "Military Nursing" OR "Hospitals, Military" OR "Psychology, Military" OR "Military Psychiatry" OR "Military Medicine") AND ("Women" OR "Female" OR "Women's Health").

This resulted in a total of 718 titles. In addition the terms identity, role, health, nurse, Australia, Vietnam, and veterans were added individually to search results.

The final search resulted in 428 titles. Abstracts were searched using the exclusion criteria pre-1985, i.e. the article was not written in English, studies of specific diseases where gender was not mentioned, specific exposures, male sample only, or a very small female sample in a large quantitative study, studies into training injuries, letters to the Editor, and commentaries.

After applying these exclusion criteria and after duplicates were removed, 45 full articles were reviewed. Reference lists of these articles were also hand searched. Thirty three articles and two reports were included in the final review. These were derived from a total of 25 studies that examined aspects of military nursing and female veterans (USA n= 19, Australia n = 5, UK n= 1). These studies (actual data collection) were clustered primarily around the mid 1990s.

Health, wellbeing and veteran identity

A lot has been written about the identity of military women in Vietnam, in particular nurses. The identity of a military nurse was something that was well marketed through recruitment drives during the Vietnam War. Through appealing to patriotism, femininity and duty advertisements for recruitment promised career, educational and personal advancement¹¹. An important facet of the recruitment campaign was to emphasize that Army nurses remained feminine, assuring nurses that they did not fit the stereotypes of military women. The ideal army nurse then was outwardly feminine, sought traditional ways to serve their country by providing a psychological boost to soldiers, and they might even find a husband in the process¹¹. Dixon Vuic argues that these images upheld the very old ties between nursing and femininity, including sexual images of nursing.

a. Commonwealth Department of Veterans Affairs (1998). *A study of the health of Australia's Vietnam veteran community. Volume 2: Female Vietnam veterans survey and community comparison outcomes*, and Feldman, S, Herron, Alison, & Hanlon, Clare. (2007). *"Because women cope differently": A qualitative investigation of the experiences of female war, peacemaking and peacekeeping veterans - implications for reintegration and rehabilitation into the community*.

b. MeSH (Medical Subject Headings) is the National Library of Medicine's controlled vocabulary thesaurus. It consists of sets of terms naming descriptors in a hierarchical structure that permits searching at various levels of specificity <http://www.nlm.nih.gov/pubs/factsheets/mesh.html>

The role of the military nurse in Vietnam as surrogate mother, sister and wife was highlighted by an interviewee in Norman's study: 'You represented so much to them [the patients]. You were stability, you were home, you were American womanhood'¹².

In contrast to an identity that distanced women from masculine military culture, other research has revealed that a symbiotic relationship of carer and warrior can arise as a consequence of the strategies used by military nurses. Griffiths & Jasper¹³ argue that these strategies create a psychological comfort zone, allowing the individual to adopt the persona of warrior nurse when needed and thereby allowing them to respond in an appropriate way to the unique challenges of nursing in a conflict zone. Griffiths & Jasper go further to suggest that key rites of passage mark the transition from nurse-to-warrior, for example, as in a direct threat. The roles of nurse and warrior are contrasting, and, they argue, necessitate a compartmentalisation of identity.

Far from negotiating dual identities, problems have also been associated with the lack of an identity for a female veteran having returned to civilian life^{5,14}. Feldman et al¹⁴ emphasised the need to devise practical strategies to assist female veterans to carve out an identity within the existing veteran community. This idea has not been explored.

There has been little research exploring a sense of self and identity for women in the military today. However, what we do know suggests that such a sense of identity can have an impact on women's health and influence the access to services.

Emergent in this review of literature is that women's sense of self and belonging to the military community can have implications regarding if, how and when women seek health care, and which services or support networks they access.

The main themes that emerged in this review concerned professional and personal aspects of military nursing, and issues for these women post deployment. In particular PTSD – interventions, prevalence, diagnosis; coping; parenting satisfaction; ageing veterans; social support; access to services – structural and cultural barriers; sexual trauma/harassment, and reintegration post deployment.

Gender and Post Traumatic Stress Disorder (PTSD)

A meta-analysis of studies examining sex-specific risk of potentially traumatic events (PTEs) and post traumatic stress disorder (PTSD) found that female participants were more likely than male participants to meet criteria for PTSD, although they were less likely to experience PTEs¹⁵. With particular reference to combat, war or terrorism, of interest was that the pooled studies (96 studies) showed a significant difference according to

the method of data collection. There was a significantly greater sex difference for questionnaire studies (which showed more PTSD among female participants) than for interview studies (which showed no sex difference in PTSD). It is not known why this is the case, but suggests that males are perhaps more likely to under-report psychiatric symptoms in self-report questionnaires as compared with female participants. This could be because open expression of fear is discouraged by the traditional masculine gender role.

In contrast, research by Feczer & Bjorkland¹⁶ suggests that there is a gender bias in the diagnosis of PTSD within the US Veterans Affairs (VA) healthcare system, with male veterans receiving a much higher rate of diagnosis than women, while women who developed PTSD symptoms because of a sexual assault during their military service were far less likely to receive a PTSD diagnosis.

Other studies have also found that prevalence of PTSD is elevated among women who serve in the military^{5,16-18} and symptoms have been related to parenting dissatisfaction^{19,20} and difficulty adjusting to family life post war¹⁹.

The presence of PTSD symptoms have been found to have important implications with regard to the family life of female Vietnam veterans¹⁹. Female Vietnam veterans, most of whom were nurses, were often exposed to several different forms of trauma, including severe injuries of their patients, mutilated bodies and death, sexual harassment and victimisation⁵, and the stress of living in a war zone^{17,18,21}.

Significant negative relationships have been found between symptoms of PTSD (namely avoidance/numbing and hyperarousal) and parenting satisfaction in female Vietnam veterans who had biological children²⁰. In particular, higher levels of certain PTSD symptoms, for example sleep disturbance, have been shown to adversely affect women's satisfaction in the parenting role²⁰.

Cognitive behaviour therapy has been found to be an effective treatment for PTSD in female veterans and active duty military personnel²².

Feczer & Bjorkland¹⁶ outline a trajectory of recovery and re-engagement with life in a case study of a female Operation Iraqi Freedom (OIF) veteran. Seeking treatment, although challenging, was a source of empowerment. After some of her symptoms were relieved with medication, she was able to talk openly about her experiences in Iraq. At this stage of recovery, narrative reconstruction transforms the traumatic memory into tolerable forms. This mechanism for achieving personal coherence for veterans has been discussed elsewhere²³. In the final state of recovery there is a reconnection to a new future, or, as in this case study, to a new career. This points to the importance of talking as a means of

not only debriefing but reconnecting with a coherent sense of self.

Coping

Talking through experiences as a means to vent, reflect and make sense of deployment experiences has been found to be a beneficial mechanism of coping for women veterans^{14,16,23}. This method of coping does not necessarily fit within the male-dominated military culture^{14,15}.

For female Vietnam nursing veterans, coping was encouraged through maintaining perspective (taking one day at a time), using support systems (their peers and colleagues), inner strength (spirituality), diversional activities (sport), alcohol, drugs and humour²⁴. Guidance for nurses today can be gained through the lessons learned by Vietnam nurses²⁵. In addition to appropriate clinical and psychological training prior to deployment, Scannell-Desch found that the writing of journals, the establishment of mutual support systems and the sharing of experiences with colleagues during war deployments were all recommended as essential personal care strategies by military nurses²⁵.

Parenting satisfaction

In addition to the causal links that have been explored between PTSD and parenting, further research has shown that because the family system is a critical source of social support for many, it is important to consider the impact of the separation of veterans from and their reintegration into the family system as a consequence of deployment. This issue may be particularly relevant to veteran women, given concerns that family/relationship disruptions are more strongly associated with post-deployment mental health for female rather than male service members²⁶.

Research suggests that deployment may be particularly stressful for some military mothers who must manage their family responsibilities from afar, potentially exposing female service members to the dual stress associated with both war zone and family-related concerns¹⁴. This stress may be exacerbated for some by the ease of communication with family back home by either phone or email that is unique to contemporary wars⁵.

Ageing veterans

As they age women veterans have particular health care needs²⁷. In a study that included a male-only sample, it was noted that PTSD can manifest itself in elderly veterans because unresolved memories may resurface when these veterans experience situational stressors, such as changes in living environment (for example retirement) and the loss of spouse or other family members or friends²⁸.

Research has shown that women's retirement experiences can differ from men's with regard to attachment to work, professional identity, social contacts, family roles/obligations and community involvement^{29,30}.

Similarly, while studies have examined the effects of quality of life in older veterans, information as to gender has not been included, or females have not been included in the sample³¹. Studies have shown that health promotion and personal autonomy can positively affect quality of life in older veterans. It is unknown what the effects are for women.

Experiences of service, coping mechanisms and support structures may inform us as to how female Vietnam veterans are dealing with these issues as they age.

Social support

Job stress, job satisfaction and social support in military nursing have been linked to increased smoking behaviour³², and a lack of social support at the time of homecoming acts as a powerful mediator of trauma¹⁷.

The beneficial effects of social support on well-being have been shown in various studies. Less is known about the factors which constrain or enhance the availability of social support. Research by Cotten et al. found that in a study of women from different military eras, social support was lowest among Vietnam and post-Vietnam era women³³. This study points to the importance of examining factors that constrain and enhance supportive activities and relationships.

Participants from the study by Feldman and coworkers¹⁴ highlighted the need for female ADF members to be linked into existing community services while still serving, to facilitate their access to appropriate community health and social support after transitioning to civilian life. The development of an information gateway for female veterans to also access gender-specific services, once they were integrated back into the community, was considered vital for future cohorts.

Access to services – structural and cultural barriers

There is a stigma attached to seeking psychological and psychiatric support within the ADF¹⁴ and the broader military community¹⁵.

Issues regarding access by female veterans to health services relate to a lack of knowledge about eligibility and availability²⁷. In addition, research has found issues for specific sub-groups based on ethnic/racial minorities³⁴. Street et al¹⁵. suggest that it is possible that the perceptions of their needs by women veterans is unique, keeping them from seeking and receiving needed post-deployment healthcare services at non-veterans affairs facilities.

There seems to be a gap between women being able to access veterans affairs (VA) resources, typically designed to assist men, and non -VA facilities which do not have appropriate knowledge or skills to deal with issues for women veterans⁵. General Practitioners can play a major role in maintaining veterans health and wellbeing^{14,21}. Despite this, issues have been raised about the adequacy and effectiveness of the knowledge and resources available to GPs .

Sexual harassment and assault

In-service sexual assaults and sexual harassment have several long term health implications and are common in all female veteran cohorts, including WWII veterans²¹. Frequent psychosocial complications of sexual assault include increased suicide risk, PTSD, major depression, alcohol or drug abuse, long-term sexual dysfunction, disrupted social networks, and employment difficulties²¹.

Reintegration post deployment

The homecoming adjustment experiences of women veterans may play an important role in their post deployment wellbeing. Experiences related to readjustment to the primary caregiver role, public and personal perceptions of the 'veteran woman' identity, and access to post deployment healthcare services may be especially salient for women returning from deployment⁵.

A study of Australian war, peacekeeping and peacemaking veterans found that the nature of a female veterans military service, and the continuum of her experiences through the deployment cycle – pre deployment, deployment and post deployment – impact on the quality of her transition and reintegration into civilian life¹⁴. A female veteran's experience of the deployment cycle, transition and reintegration was therefore found to significantly determine the potential demand for health and support services. Understanding the deployment cycle may therefore be integral towards ensuring a smooth transition and reintegration into community life.

Data from the Feldman et al.¹⁴ study raised women's health concerns regarding:

- women's ability to maintain appropriate contraception in the short term
- dealing with menstruation and general hygiene issues
- the long term exposure to toxic substances
- drugs administered to all serving members on fertility and reproductive health
- accessing services outside of the ADF with professional staff who have experience of, and understanding about, their particular health circumstances.

Scannell-Desch & Doherty⁸ provide one of the first studies to examine the actual experience of female US military nurses in Iraq and Afghanistan. The themes that emerged included deploying to war (travel there, living conditions, activities to create normalcy), remembrance of war (the most chaotic scene), nurses in harm's way, kinship and bonding, personal wartime stress (including homecoming and the difficult adjustment), professional growth, and advice to deploying nurses.

The results indicated that wartime deployment was a difficult challenge, that lessons learned should be shared with nurses deploying in future years, that homecoming was more difficult than most nurses anticipated, and reintegration after coming home takes time and effort.

Feldman et al.¹⁴ found that appropriate debriefing was a crucial intervention to support personnel as they completed their deployment, their return to Australia and resumption of their roles at work and within their families and communities.

Adjustment to civilian life following Vietnam took decades for some military nurses³⁵. Social support during and after the experience in a war or conflict seems critical to nurses' wellbeing in theatre and upon return to their individual postwar environment³⁶.

Conclusions

Female veterans are a group at increased risk of many mental health conditions, with uncertain access to appropriate health care.

The increased risks are the result of the many tensions and realities of serving on a military deployment. Not only the sensory exposure to the dead and dying, but the personal, emotional conflicts inherent in caring for the sick and wounded in a war zone.

The pressures on nurses from the Vietnam era to adhere to a predetermined and readily perpetuated set of professional and personal values – holistic, morally sound nursing, feminine looks and values – meant that they were confronted with personal and professional dilemmas with which they were not necessarily equipped to deal.

How Australian female Vietnam veterans negotiate changing roles and identities as they approach or transition to retirement has important implications for developing appropriate levels of support for these women. It is thus far unknown.

A diagnosis of PTSD may have much to do with the ability of any individual to challenge cultural norms of the military and to seek help. Not to do so may have negative consequences for a sense of self and may stifle the ability to recover from the traumatic event.

Being able to debrief and comfort one another is an important coping strategy for women veterans. This is helped by being in a supportive environment that allows space for individuals to voice their anxieties and concerns, and more importantly to reassure them.

What it means to be a mother away from her family on deployment has not been fully explored and warrants further study. Help with reconciling the dual role of mother and military woman may result in prevention of possible mental health effects.

In addition, post deployment reintegration into civilian life may mean that some women are in a state of limbo, belonging neither to a military nor to a civilian culture and feeling that neither provides services that can help them with the health and wellbeing issues they may face. Female veterans are a group who need health services

that understand their unique needs, with well-informed and appropriately trained health care providers.

It has been at least a decade since data were collected on Australian female Vietnam veterans, and none exist on more recently deployed Australian military nurses. This review points to the need for further research to be undertaken into ageing veterans, exploring what support structures are in place and what needs to be developed. A substantial gap exists in our understanding of female veterans from wars more recent than Vietnam.

*Author's affiliation: The Australian National University
Contact author: Dr Samantha Cromptvoets, Rural
Clinical School, Medical School, The Australian
National University, Canberra ACT 0200
Email: samantha.cromptvoets@anu.edu.au*

References

1. Department of Defence (2009). Appendix 7 People: Defence workforce by gender and employment category. Defence Annual Report 2008-09 Volume 1. Canberra: 198.
2. Department of Defense (DoD) (2006). "Active duty servicewomen by branch of service and rank." Defense Manpower Data Center, Unpublished data Retrieved from <http://infoplease.com.ipa/A0004600.html> (17/8/10).
3. Ministry of Defence (2006). "Women in the Armed Forces: fact sheet." Retrieved from <http://www.mod.uk/defenceinternet/factsheets/womeninthearmedforces.htm> 17/8/10.
4. Smith, T. C, Jacobson, Isabel G, Smith, Besa, Hooper, Tomoko I, Ryan, Margaret A K, & For the Millennium Cohort Study, Team, (2007). "The occupational role of women in military service: validation of occupation and prevalence of exposures in the Millennium Cohort Study." *International Journal of Environmental Health Research* 17(4): 271-284.
5. Street, A. E, Vogt, Dawne, & Dutra, Lissa, (2009). "A new generation of women veterans: Stressors faced by women deployed to Iraq and Afghanistan." *Clinical Psychology Review* 29: 685-694.
6. Australian Defence Force (2011). PMKeys Reporting 14 January 2011. ADF HR Reporting and Analysis, Data provided to the author,.
7. World Health Organisation (1946). "Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19 June - 22 July 1946."
8. Scannell-Desch, E. A, & Doherty, Mary Ellen. (2010). "Experiences of U.S. military nurses in the Iraq an Afghanistan Wars, 2003-2009." *Journal of Nursing Scholarship* 1(6): 1-10
9. Reeves, R. R, Parker J D, et al. (2005). "War-related mental health problems of today's veterans: New clinical awareness." *Journal of Psychosocial Nursing & Mental Health Services* 43: 18-28.
10. Petticrew, M, & Roberts, Helen. (2006). *Systematic reviews in the social sciences: A practical guide*. Maldon, USA, Blackwell Publishing.
11. Dixon Vuic, K. (2006). "Officer. Nurse. Woman' Army nurse corps recruitment for the Vietnam War" *Nursing History Review* 14: 111-159.
12. Norman E. M. (1989). "The wartime experience of military nurses in Vietnam, 1965-1973." *Western Journal of Nursing Research* 11: 219-232
13. Griffiths, L, & Jasper, Melanie, (2007). "Warrior nurse: Duality and complementarity of role in the operational environment." *Journal of Advanced Nursing* 61(1): 92-99.
14. Feldman, S, Herron, Alison, & Hanlon, Clare. (2007). "Because women cope differently": A qualitative investigation of the experiences of female war, peacemaking and peacekeeping veterans - implications for reintegration and rehabilitation into the community. Department of Veterans Affairs. Victoria University: 1-153.

15. Tolin, D. F. & Foa, Edna B. (2006). "Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research." *Psychological Bulletin* 132(6): 959-992.
16. Feczter, D. & Bjorklund, Pamela, (2009). "Forever changed: Posttraumatic stress disorder in female military veterans, A case report" *Perspectives in Psychiatric Care* 45(4): 278-291.
17. Fontana, A, Spoonster Schwartz, Linda, & Rosenheck, Robert. (1997). "Post traumatic stress disorder among female Vietnam veterans: A causal model of etiology." *American Journal of Public Health* 87(2): 169-175.
18. Carson, M. A, Metzger, Linda J, Lasko, Natasha B, Paulus, Lynn A, Morse, Amanda E, Pitman, Roger K, & Orr, Scott P. (2007). "Physiologic reactivity to startling tones in female Vietnam nurse veterans with PTSD." *Journal of Traumatic Stress* 20(5): 657-666.
19. Gold, J. I, Taft, Casey T, Keehn, Molly G, King, Daniel W, & Samper, Rita E, (2007). "PTSD symptom severity and family adjustment among female Vietnam veterans." *Military Psychology* 19(2): 71-81.
20. Berz, J. B, Taft, Casey T, Watkins, Laura E, & Monson, Candice M. (2008). "Associations between PTSD symptoms and parenting satisfaction in a female veteran sample." *Journal of Psychological Trauma* 7(1): 37-45.
21. Murdoch, M, Bradley, Arlene, Mather, Susan H, Klein, Robert E, Turner, Carole L, & Yano, Elizabeth M, (2006). "Women and war: What physicians should know." *Journal of General Internal Medicine* 21: S5-10.
22. Schnurr, P. P, Friedman, Matthew J, Engel, Charles C, Foa, Edna B, Shea, Tracie M, Chow, Bruce K, Resick, Patricia A, Thurston, Veronica Orsillo, Susan M, Haug, Rodney Turner, Carole & Bernady, Nancy (2007). "Cognitive behavioural therapy for posttraumatic stress disorder in women: A randomised controlled trial." *Journal of the American Medical Association* 297 (8): 820-830.
23. Hemmings, L. (1996). "Vietnam memories: Australian Army nurses, the Vietnam War and oral history." *Nursing Inquiry* 3: 138-145.
24. Scannell-Desch, E. A. (1996). "The lived experience of women military nurses in Vietnam during the Vietnam war." *Journal of Nursing Scholarship* 28(2): 119-124.
25. Scannell-Desch, E. A. (2005). "Lessons learned and advice from Vietnam war nurses: a qualitative study." *Journal of Advanced Nursing* 49(6): 600-607.
26. Vogt, D, Bergeron, Amy, Salgado, Dawn, Daley, Jennifer, Ouimette, Paige, & Wolfe, Jessica, (2006). "Barriers to veterans health administration care in a nationally representative sample of women veterans." *Journal of General Internal Medicine* 21: S19-25.
27. Silverstein, N. M, & Moorhead, Jennifer L. (2001). "Responding to social service and health care needs of aging women veterans." *Journal of Women and Aging* 13(2): 39-56.
28. Snell, F. I, & Padin-Rivera, E. (1997). "Post-traumatic stress disorder and the elderly combat veteran." *Journal of Gerontological Nursing* 13(2): 13-19.
29. Simmons, B. & Betschild, Myra. (2001). "Women's retirement, work and life paths: changes, disruptions and continuities." *Journal of Women and Ageing* 13(4): 53-57.
30. Price, C. A. (2002). "Retirement for women: The impact of employment." *Journal of Women and Ageing* 14(3/4): 41-47.
31. Mowad, L. (2004). "Correlates of quality of life in older adult veterans." *Western Journal of Nursing Research* 26(3): 293-306.
32. Alexander, L L, & Beck, Kenneth, (1990). "The smoking behaviour of military nurses: the relationship to job stress, job satisfaction and social support." *Journal of Advanced Nursing* 15: 843-849.
33. Cotten, S. R, Skinner, Katherine M, & Sullivan, Lisa M. (2000). "Social support among women veterans." *Journal of Women and Ageing* 12(1/2): 39-62.
34. Huynh-Hohnbaum, A.-L. T, Damron-Rodriguez, JoAnn, Washington, Donna L, Villa, Valentine, & Harada, Nancy. (2003). "Exploring the diversity of women veterans' identity to improve the delivery of veterans' health services." *Affilia* 18(2): 165-176.
35. Stanton, M. P, Dittmar, Sharon S, Jezewski, Mary Ann, & Dickerson, Suzanne S. (1996). "Shared experiences and meanings of military nurse veterans." *Journal of Nursing Scholarship* 28(4): 343-347.
36. Stanton-Bandiero, M. P. (1998). "Shared meanings for military nurse veterans: Follow up survey for nurse veterans from WWII, Korea, Vietnam, and Operation Desert Storm." *Journal of the New York State Nurses Association* 29(3/4): 4-8.

Endurance, Courage and Care: The Kokoda Campaign of Captain Alan Watson and the 2/4th Field Ambulance

Dr Barry Reed

Abstract

Many of the modern principles of combat health support were displayed in the critical 1942 Kokoda campaign of the 2/4th Field Ambulance. The photographic collection and war diary of a member of this Field Ambulance, Captain Alan Watson, Dental Officer, AAMC, provides a unique illustrated view of the essential and difficult work of the 2/4th Field Ambulance. The 2/4th Field Ambulance functioned in a similar fashion to a current day ADF role two (enhanced) deployable hospital, providing initial wound surgery close to the battlefield whilst being mobile and capable of redeploying quickly to minimise evacuation times over the mountainous jungle terrain as the campaign progressed.

In his Kokoda campaign, Captain Alan Watson demonstrated the vital importance of deploying a dentist to provide rapid and local care for soldiers' dental pain, dental disease, and mouth and jaw battlefield wounds. Dental pain, disease and injury not only reduce soldier performance and oral function, they lower morale. The versatility of deployed dental officers was illustrated when Captain Watson was multitasked into two additional essential roles while still performing his dental duties. In the absence of an anaesthetist for the general surgeon, Captain Watson was trained in the field to administer general anaesthesia for battle casualties, and performed 173 general anaesthetics for wounded soldiers, often under hurricane lamp and ankle deep in mud. Captain Watson also served as an aerial evacuation officer, and in one day alone arranged the aerial evacuation of approximately 400 casualties.

Events of the campaign of the 2/4th Field Ambulance are described in relation to current day principles of combat health support. The valuable and timeless lesson from the Kokoda campaign of Captain Alan Watson is that immediate high quality oral care by ADF dental teams who are capable of providing battlefield wound care has always been essential for our deployed Australian soldiers.

This historical research has been supported by an Australian Army History Unit Research Grant Award.

Field Ambulances served as the deployable hospitals for the Kokoda campaign, as the nearest general hospital was at Port Moresby. The 2/4th Field Ambulance took over as the lead medical unit for the later advance phase of the Kokoda campaign from October to December 1942, serving the health needs of the two frontline infantry brigades. The other medical units deployed for the Kokoda campaign were the 14th and 2/6th Field Ambulances for the initial advance to Kokoda in July, and the fighting withdrawal phase of August to September. They then served mostly as rear units for the second advance phase behind the 2/4th Field Ambulance (after fostering in this fresh field ambulance), as their members were by then both physically and mentally exhausted^{1,2,3,4}.

The original war establishment for the 2/4th Field Ambulance was 12 officers, 225 other ranks and 57 Army Service Corps personnel. With the problem of adequate resupply for the Kokoda Campaign, it was stripped down to 12 officers and 88 other ranks. Of crucial importance,

it had a general surgeon and surgical team attached for the campaign¹. Indeed, the 2/4th Field Ambulance had a comparable casualty care role to today's role two (enhanced) deployable Army hospital (as defined by the Commanding Officer, 1st Health Support Battalion, in his lecture on role2(e) health capability in March 2009), except for the key difference that early evacuation was not initially possible and the Field Ambulance was forced to hold hundreds of seriously wounded and sick patients for up to two months before aerial evacuation was introduced^{1,3,4}.

The roles of the 2/4th Field Ambulance included triage and resuscitation; initial wound surgery for battle casualties and further surgery; nursing ward care for battle casualties and acutely sick patients; preparation for evacuation of casualties along the Kokoda track; establishment of multiple aid posts along the track for care during evacuation of the walking wounded, as well as primary health care, emergency dental care and environmental health support. Their shelters

were tents or native huts. As an example of the heavy surgical workload, the surgical team while at Myola One, operated day and night with ten major operations and up to five additional less serious cases in twelve hours. They worked up to 36 hours continuously in the operating theatre and performed up to a total of 240 operations in ten days. The surgical team tackled all branches of surgery. The surgeon at Myola One was Captain Douglas Robert Leslie, from Victoria. Later in the campaign, Captain Harold Gatenby took over as surgeon with Douglas Leslie then operating with the 2/6th Field Ambulance^{1,2,3,4}.

Captain Alan Oliver Watson was the sole Dental Officer for the 2/4th Field Ambulance. Army dentists have provided care for our soldiers very close to the front lines since Gallipoli in World War One, where a British Medical Advisory committee found that up to 54% of soldiers had acute dental problems⁵. During the eleven weeks of his Kokoda campaign, Alan Watson treated 208 dental patients including 238 tooth extractions, 74 fillings, 19 cases of “trench mouth” and several facial fractures^{1,2}. If his emergency dental care was not available, then it is possible that up to two hundred soldiers would not have been fit for duty (or at least had their performance adversely affected), in a campaign where relatively small troop numbers in battle meant every extra fit soldier and officer could make a difference.

In addition to his dental care role, Alan Watson was appointed by his Commanding Officer LTCOL Arthur Hobson as unofficial photographer for the Field Ambulance, utilising his own and LTCOL Hobson’s German Leica cameras^{1,2}. His photography which illustrates this article provided a unique perspective of the significant medical aspects of the Kokoda Campaign.

By 1942, Alan Watson was already an experienced wartime dental surgeon having served in the Syrian Campaign in 1941, after joining the Army in 1939. Alan Watson was twenty five years old in 1942, and was a graduate of Sydney University with Honours in 1938 and represented the University in tennis and boxing. Alan was six feet tall with reddish brown hair, brown eyes, fair complexion and slim build. Alan has been described as a gentle person, quietly firm, with a lifelong love of music and photography. He commenced in rural private dental practice in 1939. He married Nancy Sharp in March 1942^{1,2}.

In an early example of multitasking personnel to ensure adequate coverage of key clinical roles, LTCOL Hobson arranged for Alan Watson to receive a short concentrated course in the administration of general anaesthesia by the medical officers of the Field Ambulance at the start of the campaign. This was in case future events resulted in insufficient medical

officers available for this role. This foresight proved invaluable in improving the rapidity and magnitude of casualty care. In nine weeks, Alan Watson performed 173 general anaesthetics for wounded soldiers².

Alan Watson was also multitasked later in the campaign as plane loading officer for aerial evacuations which were pioneered in the Kokoda campaign. He personally organised the aerial evacuation of 750 battle casualties and the sick during the campaign.

While the Field Ambulance was still moving up the track towards the frontline in early October, the first operation on a soldier with a fractured femur from a gunshot wound was carried out at Uberi, at night and under a single hurricane lamp by their surgeon Douglas Leslie, with Alan Watson receiving his first practical lesson in general anaesthesia from Captain Alan Day, Medical Officer (MO). The anaesthetic agent was ether from a bottle first issued to an AIF Field Ambulance in France in 1918. The operating table was a makeshift piece of bush handicraft made of local saplings. The casualty had been carried back from the frontline over three days by “fuzzy wuzzy angels”, an indigenous carrier team¹.

As an example of the intensity of the fighting later in the campaign, 200 battle casualties were admitted in just twenty four hours from 1800 hours on 6th December, with not one empty stretcher left at the Main Dressing Station (MDS). Just 42 staff of all ranks were available for duty from the 2/4th and 2/6th Field Ambulances. Such casualty surges led to LTCOL Hobson requesting a second surgical team^{1,2}.

In regard to the types of wounds, limb wounds were the most common with one notable observation being “a really serious problem was lack of control of the femoral artery (haemorrhage) by tourniquet.” Other common wounds were chest (often being sucking chest wounds), abdominal wounds (which often required transfusion) and head wounds. It was also found that buttock wounds were misleading and often had concomitant injuries involving deeper structures. Gas gangrene comprised 4.5% of battle casualties and for these the “value of surgical excision” was emphasised by the surgeons. It was found that severe wounds were usually caused by mortars and mountain guns while the small (.22) calibre, but high velocity Japanese bullets “caused little fragmentation” in wounds^{1,2,3}.

In regard to resuscitation, it was noted that “severe degrees of shock were not uncommon” and blood transfusions included whole blood and serum. Of possible interest to current day debates, Field Ambulance members and soldiers provided a “walking blood bank”. There was no x-ray capability. A pathology service only became available very late in the campaign and this enabled malaria testing to commence^{1,2,3}.

Treatment of the sick from tropical diseases usually comprised 50% of hospital admissions or more. For example, on 8th November there were 52 battle casualties and 205 sick ward patients admitted, suffering from diseases such as malaria, dysentery, skin diseases, fatigue and exhaustion, typhus and respiratory diseases^{1,2,3}.

By late November, the Field Ambulance (comprising an MDS and a series of aid posts) was providing care for approximately 750 to 800 wounded and sick patients stretching from the frontline back to Wairopi (with the MDS at Soputa singlehandedly caring for 450 patients with sixty staff). There were still great shortages of medical stores, cooking gear and shelter even at this late stage of the campaign. At this time, four American Medical Officers from the 126th Casualty Clearing Station volunteered their services and "provided great help"¹. They also provided ether, the new Pentothal anaesthetic agent and dressings "without which we could not have carried on"¹. The first American battle casualties underwent surgery at the Field Ambulance MDS on 22nd November^{1,2,3}.

Important features in general for the Kokoda Campaign were difficulties from the terrain (jungle, mountains, mud, swiftly flowing rivers and streams), weather (both the heat and cold, and torrential rain) and tropical diseases, which made for great difficulties in adequate communications, transport, resupply and maintenance of soldier fitness. In fact, General Vasey, in relating the difficulties that his soldiers faced, described the Kokoda campaign as jungle warfare and mountain warfare combined⁷. Specific casualty care problems for the Field Ambulance from these adverse conditions included difficulties with medical evacuation, insufficient resupply of medications, dressings and food, lack of adequate shelter and hospital equipment, inadequate staffing levels for the tremendous surgical and nursing workload, staff health maintenance due to severe tropical diseases and lack of medications for preventable illnesses, and maintenance of morale and performance due to these demanding conditions. For example, important and continuing specific medical shortages included bandages and dressings, essential drugs, anaesthetic agents, tents, stretchers, sutures and sterile water. Even with aerial resupply drops by low flying aircraft for these shortages, around 50% of supplies were still lost in these drops (often into the jungle or damaged), and losses were even greater (up to 80%) until medical supplies were better packaged to survive the drops^{1,2,3}.

It is important to understand the way the Field Ambulance functioned when confronted with these combined obstacles. WO2 L. Thompson, in an article published in *SALT* in March 1943, stated the Field Ambulance "comprises the shock troops of the AAMC and must be capable of instant movement

and change. In the New Guinea campaign there was no question of leaving the field ambulance behind. It had to and did keep up with the battle troops."⁶. These rapid movements gave the Field Ambulance the vital advantage of proximity to the battlefield which greatly shortened evacuation times and consequently saved many more lives and limbs.

Alan Watson in his 1991 video commentary stated that the Field Ambulance "had to and did prove equal to any circumstances. The revolutionary conditions imposed on us gave rise to a new leap-frog movement. The unit was spread out along the track in a series of posts"¹. The advance aid posts near the battle front guided the wounded and sick back to the MDS and surgical team of the Field Ambulance for treatment and surgery. For evacuation behind the MDS, there were small aid posts with nursing orderlies at intervals back along the track to care for the walking wounded who, during the advance phase, had to trek back to Owers Corner near Port Moresby (where the transport chain began) until Kokoda and its airstrip were regained^{1,2,3}. In fact, the only wounded that could be evacuated before the airstrips were retaken were those who could walk, hobble, or use improvised crutches going from stage to stage, hobbling painfully and arriving at the aid post drenched and exhausted for a night's rest. During this later advance phase of the campaign, bearer parties were too urgently required at the front and for resupply to be spared for such a long carry back to Owers Corner. The evacuation distance along the track was not measured in miles or yards but in time, and the time varied whether in the dry or in the wet weather. Rain could easily double the time needed to go the required distance. Even for a fit soldier, the distance from Myola to Owers Corner could not be covered in less than four or five days. Indeed, a distinctive feature of the Kokoda Campaign was the self evacuation of the walking wounded along the track back to base. This could take them up to several weeks^{1,2,3}.

A unique feature of the Kokoda campaign was the crucial role of the indigenous carriers, affectionately nicknamed the 'fuzzy wuzzy angels' by the Australian soldiers. These indigenous carriers of both severely wounded soldiers and for the transport of critical supplies, were vital in sustaining the entire Kokoda campaign. Alan Watson in his video commentary described them as "native boys, both local and from New Britain, employed by the army via the Australian and New Guinea Administration Unit and we can't speak highly enough of them. Their courage, devotion, physical endurance and perseverance became legendary.....without this assistance we would have been defeated well before we achieved victory"¹. As well, all of the medical equipment of the Field Ambulance had to be of sufficient light weight to be transported by the fuzzy wuzzy angels over the track^{1,2,3}.

Aerial evacuation was forged in this phase of the Kokoda campaign by trial and error. The first aerial evacuation was carried out at Myola on 27th October with the evacuation of a casualty with an eye wound. The crash of three aircraft on landing at the difficult Myola airstrip together with the initial allocation of too few aircraft for aerial evacuations led to the abandonment of aerial evacuation (only 37 casualties were evacuated) until the Kokoda airstrip was retaken. After this, many hundreds of wounded and sick soldiers were evacuated by air. Alan Watson was first ordered by LTCOL Hobson to act as Plane Loading Officer for casualty evacuations at Kokoda airstrip from 5 to 16 November. He organised the evacuation of 350 casualties over these eleven days, with the best two days resulting in 111 and 99 casualties evacuated. Later at Popondetta airstrip, he demonstrated great ingenuity when he was ordered to evacuate casualties and the sick with the upmost speed by any means. Allied transport pilots often declined to fill their returning empty planes with casualties, while the RAAF pilots always filled their planes to capacity. He persuaded Allied pilots by bartering Japanese helmets and rifles as payment (one rifle equalled ten to twelve evacuations, one helmet equalled two evacuations). This resourcefulness resulted in the transport of 400 Australian casualties and sick on 27th November alone^{1,2,3}. This enormous number of casualty evacuations was just prior to a Japanese air raid on the Field Ambulance later that day.

At 1630 hours, on that same day, thirteen Japanese Zero fighter bombers in three waves strafed and bombed the MDS of the Field Ambulance which had a large Red Cross ground sign clearly visible. The wards and kitchen area were badly hit, and the Q store and dispensary were completely gutted by fire. Among the twenty two killed were seven staff including two Medical Officers, Majors Ian Vickery and Hew McDonald, the others being sick malaria ward patients hit by machine gun fire. Over fifty patients and ambulance personnel were wounded. The Official History "Australia in the War of 1939-1945" painted a grim picture: "It was a scene of utter devastation in a few minutes a busy hospital was transformed into a miniature battlefield"³. The Field Ambulance RSM WO1 Kim Williams (who later received a Mention in Despatches) was outstanding in arranging the clearing of the wounded, sick and dead. While returning from their aerial evacuation duties at Popondetta airstrip, Alan Watson and Captain Follent, MO, were repeatedly machine gunned whenever their jeeps appeared in the open kuni grass patches on their way back to the MDS. Despite the losses, after relocation, the Field Ambulance was again admitting casualties for care the next day^{1,2,3}.

By mid December, the 2/4th Field Ambulance members were physically and mentally exhausted or sick from malaria and the replenished 14th Field Ambulance

took over their role, assisted by key personnel of the 2/4th Field Ambulance in each department. On 16th December, LTCOL Hobson and Alan Watson walked to Gona to have the satisfaction of completing the whole trek to the coast. In late December, the entire Field Ambulance was flown to Port Moresby and embarked by sea for Cairns in mid January^{1,2,3}.

In 1943, LTCOL Arthur Hobson was awarded the OBE (Military Division) for being "personally responsible for good service rendered by his Field Ambulance ... during the advance from Nauro to Gona". Mentioned in Despatches was Captain Alan Watson "for having rendered gallant and distinguished services", as were Captain Douglas Leslie, and WO1 Kim Williams, Major Ian Vickery (posthumous) and Major Hew McDonald (posthumous). The essential role of military dentistry was recognised formally in 1943 with the establishment of the Australian Army Dental Corps^{1,2,3}.

Alan Watson suffered malaria for a further three years as well as dysentery, with his weight plummeting to under 40kg. With his life long partner Nancy he had three children. He was promoted to Major and was discharged in 1944. He commenced practice with his father at Macquarie St in Sydney. Alan was a pioneer in innovations in the dental care for cerebral palsy patients for thirty years; he established the dental operating theatre of the Spastic Centre Mosman; he was a lecturer at the Universities of Sydney and Illinois; he was awarded an honorary life membership of the Spastic Centre of NSW and he was awarded a Doctor of Dental Science in 1955. He retired in 1985 and was made a Member of the Order of Australia. He was



Captain Alan Watson providing emergency dental care. Demonstrating foresight, he selected the items most likely to be used in dental emergencies and aimed to have them last for several months. This was quite prescient as there was no replacement of dental instruments or medications such as local anaesthetic for his entire campaign. Note that General Vasey had recently ordered that epaulettes be worn again. AWM.

the author of many publications and edited the book "History of Dentistry in NSW 1788-1945". He produced his Kokoda War Diary video in 1991². Alan Watson and his surgical colleague Douglas Leslie remained life-long friends. Alan Watson, AM, BDS, DDCSc, FRACDS, FICD died in 1993. Nancy died in 2009.

Conclusion

In conclusion, with the benefit of hindsight, it appears there was a lack of appreciation by the higher command at the time of the many great obstacles in provision of effective medical care in a combined mountain and jungle tropical campaign. As one example, early in the campaign, the Field Ambulance members had to rely for their adequate malaria suppression on quinine supplies captured during the Japanese retreat¹.

These preparation shortcomings led to the need for effective improvisations, much adaptability and considerable ingenuity by the medical soldiers of the three Field Ambulances who provided life-saving solutions to the unique casualty care challenges of the Kokoda campaign. The solutions provided by these Field Ambulance soldiers and the Brigade Headquarters staff to the challenges posed by the Kokoda Campaign included:

- "Leapfrog" Field Ambulance movements to enable rapid casualty care
- Holding non-walking casualties long term in wards
- Self evacuation of the walking wounded



Captain Douglas Leslie, surgeon, applies plaster to a soldier's broken left leg. Assisting Captain Leslie is Major Henry Selle (MO) from the 2/6th Field Ambulance. To support the broken limb during the procedure, a makeshift frame of rough wooden poles has been set up at the entrance to the tent that serves as the operating theatre. AWM.

- Aerial supply drops of urgently needed essential medical supplies
- Pioneering the use of aerial casualty evacuation and the related vital role of possession of airstrips
- Field training and multitasking personnel for staff shortages in key clinical roles such as providing general anaesthesia and aerial evacuation organisation
- Improvisation of hospital equipment from local materials such as saplings for operating theatre tables, splints and even boiled water from clean mountain streams when sterile water for intravenous use became unavailable
- Location of medical liaison officers at Brigade Headquarters which enabled more efficient casualty care
- Lastly and most importantly, the vital role of the Fuzzy Wuzzy Angels in resupply and casualty evacuation cannot be over emphasised.

Without a doubt, a study of the Kokoda campaign records of Captain Alan Watson gives a great insight into the importance of always deploying an ADF dental team as part of future ADF deployments to eliminate avoidable loss of soldier performance and morale caused by oral problems. For example, in the Boer War when the Australian volunteer military units did not deploy any dentists, 25% of all evacuations from the front line were due to dental problems⁸. Recent deployments such as by the US Army in Iraq and Afghanistan have revealed new dental problems related to stress and diet that can debilitate soldiers if there is not rapid access to dental treatment⁹. Alan Watson's campaign well illustrates the importance of personal flexibility and the importance for commanders to recognise and utilise their soldiers' skills in different roles.

In conclusion, many of the modern principles of combat health support were displayed in the Kokoda campaign of the 2/4th Field Ambulance including: mobility, proximity, flexibility, responsiveness, simplicity, continuity of care, and economy of effort¹⁰. Of most importance, the timeless military medicine qualities of endurance, courage and care were magnificently exemplified by the members of the 2/4th Field Ambulance and their two companion Field Ambulances in their Kokoda campaign.

*Author's affiliation: John Hunter Hospital, University of Newcastle
Contact author: Email: drbreed@bigpond.net.au*



Myola October, 1942. Major Henry Selle (centre) a Medical Officer serving with the 2/6th Field Ambulance, assists the surgeon Captain Douglas Robert Leslie (right) in an operation to repair a wound to the left thigh in an Australian soldier. In the background (right) is the anaesthetist for the operation, Captain Alan Watson, Dental Officer. AWM.



The CO Lt Col Arthur Hobson (centre) in discussion. Their dress shows evidence of the unit's lack of preparedness for the jungle campaign ahead along the Kokoda Track, with Captain Alan Day (left) wearing puttees as used in the deserts of North Africa, Sgt Watt (right) wearing gaiters for normal dress wear and Lt Col Arthur Hobson, CO, (centre) having neither puttees nor gaiters. AWM.



Imita Ridge, Papua, October 1942. Two indigenous carriers and a member of 2/4th Field Ambulance slowly climb the so-called 'Golden Stairs' towards Ioribaiwa. Each step was battened at its edge by a rough log which was sometimes broken and often slippery with a coating of mud. In climbing the stairs, soldiers had to lift their leg over the log and put their foot down on the step behind in what was frequently a puddle of mud and water up to six inches deep. AWM.



Myola One, October 1942. Informal outdoors group portrait of members of the surgical team at the Main Dressing Station of the 2/4th Field Ambulance. Myola consisted of dry lake beds which provided the best environment of the whole campaign. Left to right: Staff Sergeant Stanley Clark, senior theatre orderly; Captain Alan Oliver Watson, Dental Officer and anaesthetist; Captain Douglas Robert Leslie, surgeon; Private W. McBean, theatre orderly; Pte Gribble, dental technician; Pte Finlay, the CO's batman. The men are standing in front of the tent that serves as the operating theatre. AWM.



Templeton's Crossing area, November 1942. A team of native stretcher-bearers, affectionately known as 'fuzzy wuzzy angels', carries a wounded Australian soldier through difficult jungle terrain along the Kokoda Trail. The fuzzy wuzzy angels were cared for by CAPT Geoffrey Vernon, the most significant Medical Officer of the Kokoda campaign, who also provided care for the 39th Battalion. It has been said that the only difference between Captain Geoffrey Vernon and Private Simpson Kirkpatrick of Gallipoli was that Vernon did not have a donkey. AWM.



Jumbora area. 16 December 1942. Two teams of native Papuan stretcher-bearers carry sick or wounded Australian soldiers along a muddy section of the road between Soputa and Gona. Plodding through the mud on the other side of the road (right) is Lieutenant Colonel Arthur Francis Hobson, CO of the 2/4th Field Ambulance. AWM.



The operating theatre at Myola One, October. The operating table is a makeshift piece of bush handicraft made from trees. A tent has been used in the improvisation of a makeshift operating theatre. During operations, a blanket was hung at each end of the theatre to enclose it. The surgical equipment was most primitive: a Primus stove of Syrian origin, assorted tins for sterilisation, 2 hurricane lamps and 2 electric torches for illumination when night fell. AWM.



Kokoda, November. USAAF Stinson Vigilant ambulance aircraft prepares to take off from the airstrip. The aircraft is evacuating two sick or wounded Australian soldiers to Port Moresby from the 2/4th Field Ambulance. The Stinson was capable of carrying two patients, one lying and one sitting. A Red Cross sign indicates the Stinson's medical function. The nose bears a tally sheet of smaller crosses which records the number of medical evacuation missions undertaken. AWM.



Myola One, Papua, October 1942. At the Main Dressing Station of the 2/4th Field Ambulance, members of the unit's surgical team work in the open as they apply plaster to the broken arm of an injured soldier. Left to right: Major Ian Vickery, a Medical Officer, who is standing with his hands in his pockets and watching the procedure; Private Downey (with back turned) who is supporting the patient's arm; the patient himself; Captain Douglas Leslie, the surgeon (in surgical gown), who is applying the plaster; Pte W. McBean (at rear), a nursing orderly, who is supporting the patient's back. Standing on the ground in front of the group are a jerry can marked with a large 'W' to signify water, a canvas bucket full of water, several rolls of dressings sitting on a box marked 'USS', and two tins of plaster of Paris. The surgical team not infrequently grabbed passers-by to provide some sort of help in such procedures. AWM.



Soputa, Papua, 27 November 1942. Staff members of 2/4th Field Ambulance gather together for identification the dead bodies of unit members and patients killed when Japanese Zero aircraft, attacking in three waves, strafed and bombed the unit's Main Dressing Station. At the same time, the Japanese aircraft attacked 7th Division Headquarters and the US Army's 126 Combat Clearing Station which were located nearby. The bodies of the dead men have been wrapped in blankets. AWM.



Private Ron Weakly of the 39th Battalion undergoing an operation for severe facial wounds. This became a famous picture and first appeared in 'Pix' and has been published many times since. It is the Soputa Two Main Dressing Station. Left to right Colonel Norris ADMS; Major Ackland, surgeon; Captain Middleton; CO Lieutenant Colonel Hobson; Captain Alan Watson, anaesthetist; and Major Munroe Alexander, DADMS. Note the carpet of mud. AWM.

Review Articles

References

1. Kokoda War Diary 1942-43. The Recollections and Photographs of Dr Alan Watson A.M. ~ Video. 1991.
2. Extracts from the war diary of Captain Alan O. Watson. 1942 – 43; and biographical notes. Mitchell Library Collection, Sydney, NSW. Reference MSS 1825
3. Australia in the War of 1939–1945. Series 5 – Medical - Volume 3 – The Island Campaigns. 1st edition, 1957. p.15 – 107.
4. Tyquin, Michael. Little by Little. A centenary History of the Royal Australian Army Medical Corps.. Australian Military History Publications. 2003. p.405 -437.
5. Butler A.G. The Australian Army Medical Services in the War of 1914 – 1918. Volume 3. Australian War Memorial Canberra. 1943. p.447 – 448.
6. Thompson L. Blitzed Ambulance. The story of an AIF Field Medical Unit. SALT magazine. March 1943. p. 24 -30.
7. Ham, Paul. Kokoda. HarperCollins. 2004. Sydney. p.378.
8. Watson, Alan (editor). A History of Dentistry in New South Wales 1788 to 1945. Australian Dental Association (New South Wales Branch). 1977. Chapter 24. Dentistry in the Armed Services. p.185.
9. Reed, B.E. Overseas Travel Post Visit Report to Brooke Army Medical Center, San Antonio Texas. March 2008. Report to the Australian Army. p.6.
10. Australian Army. Land Warfare Doctrine. LWD 1-2 Combat Health Support, 2004. p. 2-3 to 2-5.
Battlefield hospital quote p.82 Australia in the War of 1939–1945. Series 5 – Medical. Volume 3

Photo acknowledgments

Australian War Memorial, Canberra. Photographic Image Collection.

Sometimes you hear the bullet

A Leavy

Reprinted from: Aust Mil Med 1998; 7(1): 21-23

The comedy/drama MASH, which concerned the lives of American army medical staff stationed just behind the front lines in the Korean War, was one of the most successful television programs of the 1970's. During its eleven year history it presented an enormous range of issues from the essentials of friendship and loyalty to the concerns of bigotry and the irony of war. In between, MASH provided a mirror for society's changing attitudes, particularly by revolutionising the public's perception of the medical fraternity.

MASH began as a novel by Richard Hooker and was produced as a cinematic feature in 1970 by Ingo Preminger. Between 1972 and 1983, 250 half hour episodes of the series were produced for television. During that period and under the direction of a variety of writers, directors and producers the program remained a consistent performer in the top twenty television programs of countries around the world.^{1,2,3} It collected 14 Emmys, and the final two and a half hour special was the highest rated program of its type in American history.

Although MASH was set during the Korean war (1950-1953), it had its roots in the late 1960's, a revolutionary period of history incorporating the 'flower-power', hippy era, rock and roll, student demonstrations and most notably, the Vietnam War. Traditional opinions on many subjects were being challenged during this time, notably public attitudes towards war and morality. These changes were reflected in MASH which, in many ways, was a pioneer in television production history.

Shortly after the end of the Korean War American television was making its first forays into the genre of medical drama. The initial result was a docudrama entitled 'Mefie' which made a serious attempt to present medical issues to the public. It was killed by controversy in 1956.⁴ In 1961 'Dr. Kildare' and 'Ben Casey' reached the screens and each lasted five years, to be followed in 1969 by 'Marcus Welby MD', 'The Bold Ones' and 'Medical Centre'. All of these programs presented an idealised image of doctors. They were either young, alert and handsome or older, wise and definitely genteel, but as a fraternity they were, generally, infallible combatants of illness and disease, dispensers of wisdom and justice and guardians of moral order.⁴ MASH chose to present a far more realistic picture of the medical profession and was aided in this by the setting of the program,

Mobile Army Surgical Hospitals, the real MASH units, were a significant development of the Korean War. Combat experience established that the survival of trauma victims is inversely proportional to the time from injury to effective treatments. The introduction of helicopters reduced transport time which was further cut by moving fully equipped surgical hospitals to just behind the front lines.^{6,7,8} Time from injury to definitive care averaged two to four hours in the Korean War which dropped as low as 81 minutes during the Vietnam conflict.⁸ The cost of moving the hospitals forward was to increase the risk to the staffing personnel and hence the stressors imposed upon them. However, it was this pressurised setting that made it possible for the MASH writers to more fully explore the limits of human response to the variety of circumstances. Although a model of ensemble acting, the central characters in MASH were Benjamin Franklin "Hawkeye" Pierce and his companion in bedevillary "Trapper" John McIntyre (replaced in later series by B.J. Honnicutt). As protagonists their appearance and behaviour deviated markedly from that of previous television doctors. Unshaven and frequently stained with sweat and blood, they made a mockery of any dress code. Their living and working conditions were similarly in stark contrast to the accepted television standards of the time.

One of MASH's central themes was examining how the characters responded to being moved from their comfortable 'Stateside' lifestyles to be placed in the chaotic environment of a MASH unit. This was done essentially by contrasting the response of two characters, Majors Frank Burns and Margaret Hoolihan, to that typified by Hawkeye. Burns and Hoolihan maintained a strict adherence to military rules, regulations and in anything that did not concern their relationship, codes of ethical and moral behaviour. Their dependence on the bureaucracy of the military to provide the ground rules for physical and mental survival was contrasted with Hawkeye's irreverent overall behaviour but reliance on the basic goodness inherent in humanitarian values to guide his actions and ethical commitments. The battle between bureaucracy and humanitarianism was among many of the issues covered by MASH. As was its corollary which accepts that there are limits to individualism when survival is dependent upon team-work (for further discussion see Fasse⁹).

Perhaps one of the best examples of a complex theme which is always relevant to members of the medical profession, and which was dealt with most completely in MASH, was carried by Hawkeye from the movie to the final episode. It examined Hawkeye's ability to cope with the insanity of being stretched to the limits of professional ability and personal responsibility. In general Hawkeye and his fellows maintained their links with sanity, in the conventional sense, by inoculation with small doses of insanity in the form of elaborate pranks and hijinks. However, this form of defence is not without its limitations.

In the movie Hawkeye is instrumental in helping the character of Painless (the dentist) to overcome his fears of sexual impotency. Throughout the television series it is Hawkeye who must deal with questions concerning his own worth and ability, hence his potency as a healer. An example of this occurred in the 1972-1973 season in an episode entitled 'Sometimes You Hear The Bullet' written by Carl Klein-schmitt. When Hawkeye was unable to save the life of an author friend and is discovered in tears by the commanding officer, Henry Blake, he is counselled with the advice that there are two rules: 1. Patients die and 2. Doctors can not change rule number one. Unfortunately Henry's advice is valueless in the final episode of the program (Goodbye, Farewell and Amen, 1983) when Hawkeye witnesses a mother suffocate her baby in an attempt to silence it and avoid detection when an enemy patrol approaches their stranded bus. The baby's death devastates Hawkeye and he retreats through a process of denial. His eventual recovery and acceptance of reality, tragic though it can be, is a slow process guided by a psychiatrist, Dr. Sidney Freidman.

In the final episode MASH comes full circle, recapturing the sentiment of the theme song for the movie, the lyrics of which did not follow the music in the transition to the small screen (see below). Essentially, life is often difficult and death and suffering raise awkward questions. In order to survive these questions doctors need to return to the roots of their profession and become, where healing fails, philosophers. It is not enough to turn away from the questions of "Why?", some attempt at an answer must be made for the sake of the patient's, the relatives' and the doctor's own mental wellbeing.

In the end, MASH lasted three times longer than the Korean War which it depicted. In doing so it provided a valuable medium which tempered drama with comic relief and thus allowed the viewer to confront difficult and often dark issues without the risk of being engulfed by them. MASH also demonstrated the need for doctors to acknowledge not only their humanity and humility but also the vulnerability of that humanness.

SUICIDE IS PAINLESS

Through early morning fog I see
Visions of the things to be
The pains that are withheld for me
I realise and I can see

*That suicide is painless
It brings on many changes
And I can take or leave it
If I please

The game of life is hard to play
I'm gonna lose it anyway
The losing card of someday laid
So this is all I have to say

* chorus

The sword of time will pierce our skin
It doesn't hurt when it begins
But as it works its way on in
The pain grows stronger
Watch it brim

* chorus

The only way to win is cheat
And lay it down before I'm beat
And to another give my seat
For that's the only painless feat

*chorus

A brave man once requested me
To answer questions that are key
Is it to be or not to be
And I replied 'Oh, why ask me?'

* chorus

Lyrics: Mike Altman
Music: Johnny Mandela
Chappell Music

References

- 1 Tindall K, Reid D. Television's Children. Audiovisual Research Volume I. Sydney Teachers' College 1975
2. Tindall K, Reid D, Goodwin D. Television: 20th Century CYCLOPS. Audiovisual Research Volume 2 Sydney Teachers' College 1977
3. Lealand G. American TV Programs on British Screens. Broadcasting Research Unit: Working Paper 1984
4. Alley RS. Media, medicine and morality. *In* Adler R, Carter D (eds). Television as a Cultural Force. New York: Praeger Publishers 1976
5. Lewis FR. Prehospital Trauma Care. *In* Trunkey DD, Lewis FR (eds). Current Therapy of Trauma 1984-1985. Philadelphia: BC Decker Inc 1984
6. Flint LM, Flint CB. Evolution, design, and implementation of trauma systems. *In* Zuidema GD, Rutherford RB, Ballinger WF (eds). The Management of Trauma. Philadelphia: WB Saunders Company 1985; 4th Ed
7. Antopol MR. Advances in the military management of mass casualties. *In* West JG (ed). Trauma Care Systems: Clinical, Financial, and Political Considerations. New York: Praeger Publishers 1983
8. Trunkey DD. Predicting the community's needs: Local solutions to local problems. *In* West JG (ed) Trauma Care Systems: Clinical, Financial and Political Considerations. New York: Praeger Publishers 1983
9. Fass PS. Television as cultural document: Promises and problems. *In* Adler R, Carter D (eds). Television as a Cultural Force. New York: Praeger Publishers 1976

New Zealand Mobile Dental Section in Korea (I) (December 1950 - January 1953)

Dr Alan H Cull

Reprinted from *History of the South Korean Army Dental Corps*, p.386-385

In 1950, when the security Council of UNO asked member nations to provide forces for service in Korea, the New Zealand (NZ) Government announced it would recruit about one thousand men. The main component of the force was a field artillery regiment equipped with twenty-five pound guns; the 16 NZ Field Artillery Regiment. Smaller units were a transport platoon, a base headquarters unit, a signals troop, and a reinforcement training unit. A mobile dental section - dental officer, dental technician, chairside orderly, and clerk/driver - was to accompany the force. Alan Cull, resident dental surgeon at Wellington Hospital and a lieutenant in the Territorial Dental Corps volunteered and was appointed Officer Commanding, the dental section. He entered Waiouru Military Camp (North Island NZ) in September 1950, where he organised the formation of the K-force Mobile Dental Section. He also assisted the regular force dental officers in rendering the force to dentally fit.



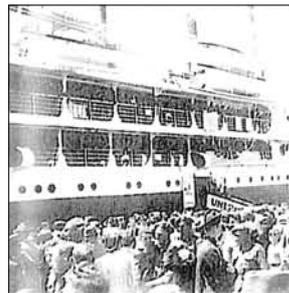
254. Dental Section, WAIOURU Military Camp 1950. Left to right M.Cottle, D.Wind, A.Craill, A.Cull



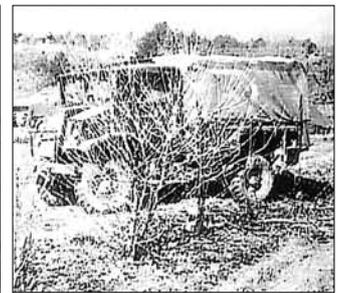
255. New Zealand Gun crew, 1951

Equipment and transport

The field dental equipment was adequate for normal conservative, exodontic, prosthetic dental work. It included a foot-pedal dental engine, folding dental chair, two large panniers for dental equipment, and a folding table and foot-operated lathe for the dental technician. There was a tent for operating in and accommodation and a fifteen hundred weight truck for transport. Dental materials were ample and later, in Korea were replenished from English, New Zealand and Australian sources.



256. "SS ORMONDE" December 10, 1950



255. New Zealand Dental Truck

To Korea

The NZ Force embarked for Korea from Wellington on the "SS Ormonde" on 10 December 1950. A cabin was provided on the ship for emergency dental treatment. After three weeks at sea, with calls at Brisbane and Manilla, the ship berthed in Pusan on 30 December, and the troops disembarked on 31 December 1950. It was bitterly cold, grey day, and on the dock-side a US Army band played, "If we knew you were coming, we would have baked a cake".



258. Pusan

Official directive from director dental services, N.Z. Dental Corps, TO/ C K-Force Mobile Dental Section

The dental section was to be attached to the 16 NZ Field Artillery Regiment and, when practicable, was to inspect and treat other units in the field and at base. Policy: a. To provide emergency treatment to NZ troops and others in the area requiring attention. b. When circumstances permitted, to maintain the dental fitness of New Zealand troops by regular dental inspections and treatment. This policy ensured that the dental section was always fully occupied, and was a policy probably unique to the NZ Dental Corps.

The clothing issued to the New Zealanders was inadequate for the sub-zero temperatures, the coldest winter in Korea for some years. (A supply of good winter clothing was supplied before the following winter). The dental section had its own particular problems: the lack of heating and the “freezing solid” of dental materials (e.g. local anaesthetic solution) and later, of operating on a floor of “corrugated-ice” paddy fields.

The dental officer vividly remembers his first night in Pusan. In his tent, he lit a kerosene heater and placed a can of water on top for shaving. But in the next morning although the heater was still burning the water was a solid block of ice. The time in Pusan was spent mainly in unloading equipment and supplies from the ship. The dental section organised a surgery in a room of a deserted schoolhouse, and was open for emergency treatment. It checked all dental equipment, and prepared its truck for the eventual move northwards in convoy with the trucks and guns of 16 NZ Field Regiment.

On 13 January 1951, the convoy moved to Miryang, about forty miles north of Pusan, on narrow winding roads, in the lowest temperatures yet experienced. Progress was slowed by thousands of refugees moving south. Although the regiment was not yet in action, it suffered its first casualties of the war when a warrant officer and his driver, turning back to search for a missing vehicle, were waylaid and shot dead by guerrillas. The regiment camped by a river which was completely frozen solid. It was quite a pleasant spot, with a grove of conifers and chestnuts, but there was the usual difficulty pitching army tents on the rock-hard ground. The dental section was soon operational, coping with emergencies: conservative and prosthetic.



259. Dental Section. Miryang, January 1951



250. At Miryang, 1951. Left to Right Sgt. M, Cottle CPL, Craill, CPT. Cull and a patient.

The regiment spent this period in calibrating their twenty-five pounder guns, and getting ready for action. On 20 January 1951, the convoy headed north, and spent a miserably cold night at Nakdong. The dental section erected with difficulty a double pup tent for its overnight stay on an iced paddy field.

After an early morning move, the regiment set up camp at Naegon-Ni late on 21 January 1951, when it became part of the 27 British Commonwealth Brigade, relieving a US Artillery Battalion. On 29 January



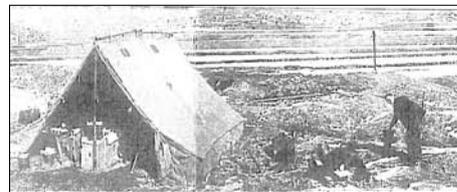
261 N.Z. Dental Section, Nakdong. January 1951 Overnight Stay



262 Packing Next Morning, Nakdong. January 1951.

1951, the regiment fired its first shell in anger. The 27 Brigade went into reserve at the end of January 1951, but the 16 NZ Field Regiment remained at the front near Hongchon, in support of US units. The dental section, operating in their tent, treated many of the US troops.

As the war was very mobile, the section soon became very proficient in packing up at short notice. After ten days, the 27 Brigade returned to operations, and the New Zealanders' time with the US units was over. They moved to Ichon, turned eastward, and headed for Yoju. Yoju was in ruins. The regiment encamped a few miles from the town. As there was a slight lull in the fighting, the dental section was thankfully able to reduce a considerable back-log of work.



263 At Yoju, February 1951



264. At Yoju, February 1951 Cpt. Cull in the tent

In the dental section, it soon became apparent that a fifteen-hundred weight truck was insufficient for travelling in the sub-zero temperatures. It was bitterly cold in the cab of the truck but for the two personnel who travelled on the back, with all the dental gear and personal equipment, it was almost unbearable. A smaller trailer, later acquired, went a little way to relieve the situation.

During the winter, the troops received a free rum issue to relieve the cold. It was at these times that the dental section became popular, as a queue would form for a tincture of oil of cloves (Eugenol) to supplement the rum.

During February 1951, at the request of Brigadier R. Park, Commander of NZ K-Force stationed in Pusan, the dental section travelled back to Pusan for a short period to examine the NZ troops based there. As it was unsafe to travel at night, especially when not in convoy, an overnight stay was made at Taejon. Here, a US unit kindly provided tented accommodation.



265. Dental truck and trailer



266. At Taejon, NZ Dental section leaving US Camp CPT Cull, SGT Cottle. Driver Williams

Next morning, the section proceeded to Pusan where a signals truck was made available for them to operate in.



267 Capt Cull and Signals Truck used in Pusan.



268. At Taejon Leaving N.Z. Transport Unit Driver Williams, SGT Cottle, CPT Cull, Driver, Lieut Allerby

The section spent ten days working in Pusan. It was a pleasant interlude after the constant travelling of the previous month or so. On its return journey, the section stayed overnight in Taejon, with a small NZ Transport unit, and took the opportunity to examine and treat the unit that night, using a room in the building they were occupying.

Because of the time lost in travelling, the dental officer decided that future tours of duty to Pusan would be by rail, on the EUSAK (EUSAK: Eight US Army in Korea) express. This was an overnight trip from Seoul to Pusan. The required dental equipment was taken from the regiment down to Seoul, where it was packed on the train, and the section had a comfortable overnight journey. This was a very satisfactory arrangement. Occasionally, this train was attacked by guerillas, but fortunately the dental section never experienced this. However, it was the duty of the occupants at each end of the carriage to be armed and ready for any overnight emergency, and on one occasion the dental officer assumed this role. Fortunately for all concerned, it was an uneventful night.

The dental section returned to the regiment during a relatively quiet period. Patrols had been mounted into enemy territory, but no contact had been made. It was on occasions like that the dental section was able to function fully, compensating for times lost during heavily active warfare and constant movement.

However, the regiment was soon in action again, and the response of the twenty four guns to a call for a regimental target was a salutary reminder that the war was still on. At night, the concussion from the gunfire would 'whoosh' through the tent and extinguish all candles. Sleep was minimal.

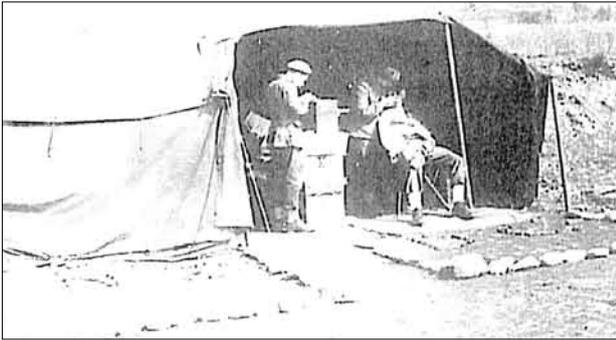


269. At Yoju, Cull, Wind, Cottle, Craill

About mid-April 1951, the 27 Brigade went to reserve just north of Kapyong, but the 16 Field Regiment remained in action to support the 6 ROK Division. This division, moving north, met little resistance, and there was a slight lull in operations. Although the dental section was always available for emergency treatments, it was during these "quieter" periods that its policy of routine dental inspections could be implemented.

But on 22 April 1951, at about 22:30 hours, the Chinese mounted a swift and massive attack, and the 6 ROK Division was pushed back. Rather than risk their guns, the regiment withdrew down the Kapyong Valley. The dental officer vividly remembers the scene that night. "In darkness, the road was congested with guns, vehicles and withdrawing troops: complete confusion and chaos."

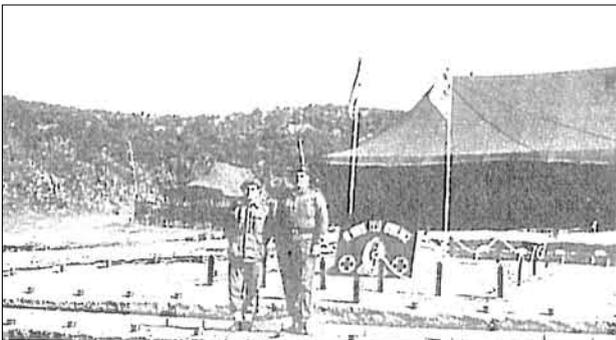
The regiment deployed to assist the 3 Royal Australian Regiment (RAR) infantry. However, there were further withdrawals to new gun positions. On 24 April 1951, the regiment continued to provide fire support for 3 RAR, which late in the afternoon completed a difficult withdrawal. The regiment then provided support for the Canadian infantry (2PPCLI), who were also part of the 27 Brigade. On 25 April 1951, the Chinese attack had been repelled, and the Battle of Kapyong was over. For their part in the battle the 16 NZ Field Regiment was awarded the Republic of Korea Presidential Citation. During these four hectic days of continual movement, the little sleep one managed was in the open air, or on the back of a truck. Fortunately, no toothaches were reported. At one place, an American unit in hasty retreat had left behind, among other items, a large tent which the dental section gratefully appropriated. After several moves, the regiment's final position was on the Imjin River.



270 Large tent acquired from US unit CPL. Craill, CPT. Cull, and a patient.



271. N.Z. Dental Section original tent used by section SGT Cottle, CPT. Cull. Note the foot-pedal lathe used by dental technician, and foot-pedal drill used by CPT Cull.



272 At 60 Indian (para) Field Ambulance. CPT Cull and CPT Sur (Dental officers)



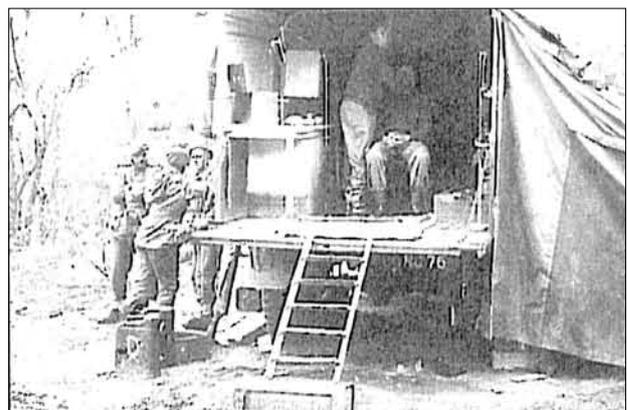
273. Capt. A. Martin, NZ Regimental medical officer CPT Cull, dental officer, preparing for a rainy season.

In July 1951, NZ Base Headquarters shifted from Pusan to Hiro Camp (near Kure) in Japan. This would now hold the Reinforcement Training Unit. A small Advanced Base Headquarters (HQ K-Force) remained in Pusan. The supplementary dental equipment that was used on the "SS ORMONDE" during the trip to Korea, was set up in a room at the base camp, and occasionally the dental section would inspect and treat the base troops.

At the end of July 1951, the 16 NZ Field Regiment (now of the 28 Brigade) became part of the newly formed 1st British Commonwealth Division comprising English, Canadian, Australian, New Zealand, and Indian units. The 60 Indian (Para) Field Ambulance was located about twenty to thirty minutes by road behind the front. This was a highly respected unit, which arrived in Korea early in the war. It included one dental officer during Captain Cull's time in Korea: Captain Rao and later Captain B. Sur.

Further back was the Norwegian 8055 MASH (NORMASH), which also had one dental officer. Helicopters, which carried two stretchers, were used for the first time for the evacuation of wounded in the Korean War. This was a revolutionary step in evacuation, and especially valuable in Korea, with its rugged and hilly terrain. About this time, the dental

section replaced its fifteen-hundred weight truck with a three-ton truck, which was modified by the LAD 16 Field Regiment for use as a dental surgery. A canvas lean-to was added for the dental technician to operate in.



274. N.Z. Dental- Section. 3-ton truck and lean-to. Capt. Cull operating.

Late in September 1951, the regiment pushed across the Imjin River to support the 1st British Commonwealth Division in "Operation Commando." The warfare was heavy and severe and the Chinese provided stubborn resistance. But a strong defense line was secured forward of the Imjin River.

The mobile phase of the war was now virtually over, and the static phase had begun

In October 1951, the NZ force in Korea was increased by about five hundred men with the arrival in the forward areas of the 10 NZ transport company. To facilitate his work, the dental officer used a Jeep to make quick inspections of the troops in their own areas. Those requiring treatment would then visit the dental section wherever it was located-usually at RHQ 16 Field Regiment, or HQ 10 Company. About this time, Sergeant D. Wind, who had been hospitalised for a period in Japan returned to New Zealand. His successor was Peter Glen, who had recently arrived in Korea.

The static phase of war meant a more comfortable existence. There were, of course, some strategic moves by the 15 Field Regiment and 10 Transport Company, but not of the urgent and immediate variety of the past. It was now possible to “dig-in” with the expectation of remaining in the one place for a reasonable length of time. Naturally, this was welcomed by the dental section, especially now that the number of troops for whose dental welfare they were responsible had increased fifty percent.

But there was still very heavy fighting and in October 1951 the 16 Field Regiment fired more shells than in any other time during its time in Korea. The enemy stubbornly resisted all advances and in November still hit back savagely, but these attacks were repulsed.

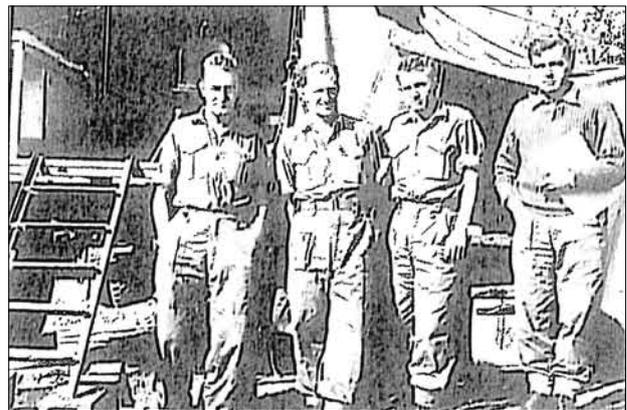
The second Christmas away from home - the first was celebrated on the ship to Pusan - was a white one, which for most New Zealanders was a novelty. As the regiment was being rested at the time it was a very joyous occasion. Most units now had suitable heaters (petro-fed), some of a “home-made” variety. Overheated flues, unsuitably insulated from the canvas, resulted in many-a-tent going up in flames. The dental truck acquired a very efficient heater which was of inestimable value for sterilising instruments, and for hot cocoa.

Because of the regular dental inspections, there were very few “toothaches” presenting in the field, although New Zealanders’ teeth in those years were notorious for dental decay. There were a few Vincent’s infections, especially with troops returning from R and R in Japan. As there was a high percentage of artificial dentures in K-Force, the dental originally Sergeant M. Cottle and later his successor, Sergeant D. Broadhurst, were kept fully occupied in making and repairing dentures.

Later, a gradual replacement scheme was initiated for New Zealanders who had served overseas for eighteen months. By July 1952, most of the original K-Force, including all of the dental section except the dental

officer, had returned to New Zealand. Captain Cull remained another six-and-a-half months.

The two new replacements in the dental section chairside orderly Les Everitt and dental technician Doug Broadhurst had relatively easy initiation to field dentistry. However, the latter appeared understandably bemused when after heavy rainfall on his first day with the section his lean-to was flooded and its contents, including artificial dentures, floated merrily away.

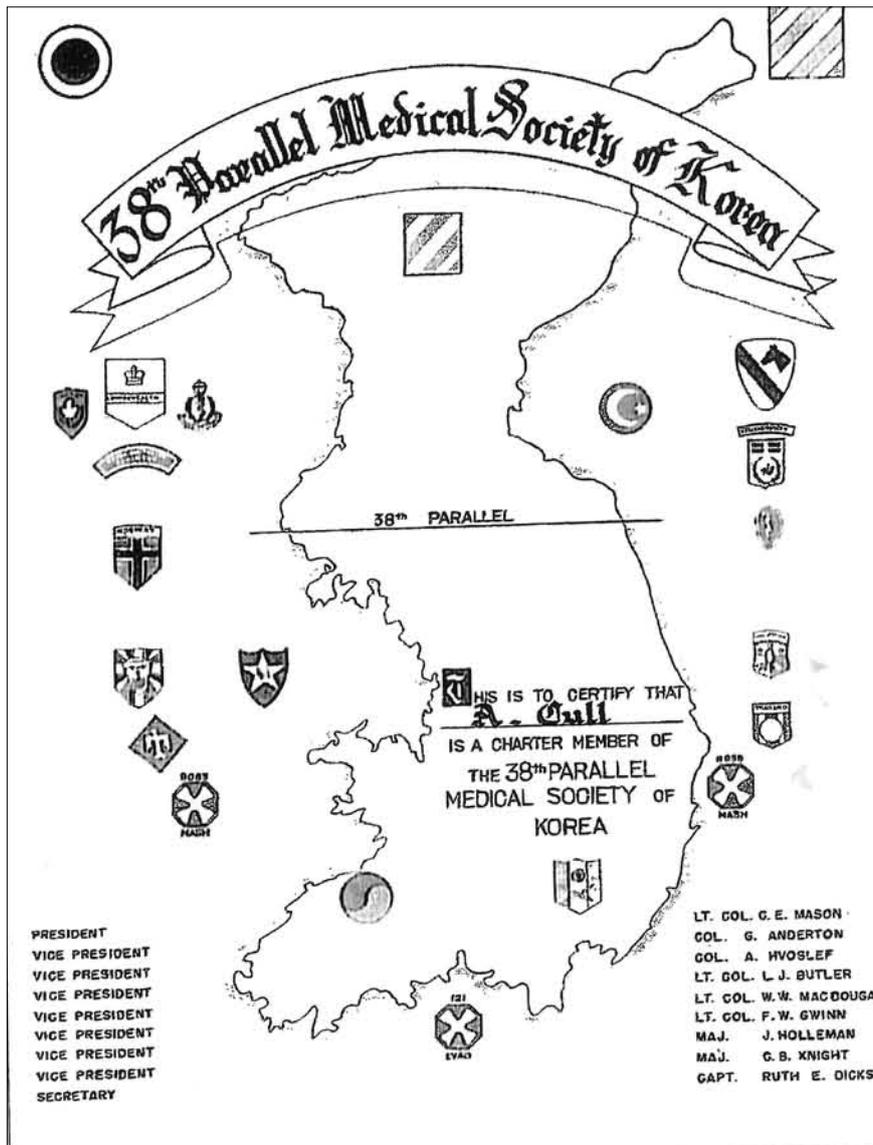


276. *New replacements, Dental Section. P Glen, L. Everitt, D. Broadhurst, CPT. A. Cull.*

The usual pattern of inspections and treatment continued 1952, with most of the time being spent at the 16 Field Regiment and the 10 Transport Company. A detailed account of these activities would be repetitive.

Contacts were made with other dental units in Korea: Indian, Norwegian, English, and Australian. On one occasion a US dental officer, Captain Johnston, who was based at an air force station, kindly hosted a number of dental officers for a day. Medical and dental officers of many UN units also attended meetings of the “38th Parallel Medical Society of Korea”. This unofficial gathering held at a MASH, discussed subjects of common interest. The New Zealand, regimental medical officers, and dental Captain Cull, attended these quite regularly.

Lieutenant Colin Wilson arrived in Korea in December 1952 and, after changeover period, he assumed command of the dental section. Captain Cull returned to New Zealand late in January 1953: and, on his return to New Zealand, was awarded the MBE for distinguished service in Korea. He entered private practice in Palmerston North, New Zealand, and continued his association with the Territorial Forces. He was promoted to Major, commanded 2 Mobile Dental Unit based in Wellington, and was posted to the retired list in 1964. He retired from practice in 1985.



276 UN dental officers at US air force station. From left of back line to right: CPT Johnston (US), Maj. Rooke (UK), CPT Cull (NZ), UK officer, Canadian officer, Canadian officer, Australian officer, (Photographer Norwegian Dental officer)

277 Charter members of the 38th Parallel Medical Society and the certificate

*In this text, as well as using my own records, I have gleaned information from other publications, including, "With 16 Field Regiment RNZA in Korea 1950-1951" by Colonel RKG Porter, OBE, and "New Zealand and the Korean War - Volume 2" by Ian Mccibbon. To these authors 'I express my thanks .

New Zealand Mobile Dental Section in Korea (II) (December 1952 - November 1954)

By Dr. Colin J. Wilson

In September 1952, Lieutenant Colin J. Wilson volunteered to replace Captain Alan H. Cull who had spent two years in Korea and was due for replacement. Lieutenant Wilson travelled to Korea via Japan in December 1952 and took command of the NZ Mobile Dental Unit in January 1953 when Captain Cull returned to New Zealand.



278 Unit when Capt. Cull Left Korea and Capt. Wilson took command. From left to right . Cpl. L. Everitt (Chairside), Driver D Hackford, Sgt. P. Glen, Capt. Cull, S/ Sgt. D. Broadhurst (dental technician), Mr. Lee (Korean translator), and Capt. Wilson.

The dental unit was located at the 10 NZ Transport Coy at the head of the Gloucester Valley, south of Imjin river. Various NZ units were examined in their areas and any treatment required was performed in the mobile clinic, on the back of a 3-ton GMC Lorry, at the 10 Coy location. The units inspected were the 10 Transport Coy, a detachment of Signallers, and the NZ Engineering LAD (LAD: Light Aid Detachment).

The NZ Mobile Dental Unit moved to Pusan and then Seoul and Treated NZ Kay force, HQ Staff and Signallers. Then to NZ Field Artillery Regiment in April 1953 following the completion of all work at NZ 10 Transport Coy. The dental unit moved to NZ Field Artillery Regiment in April 1953 and was attached to Regimental Headquarters where the unit remained till July 1953. All personnel in the Artillery Regiment were examined and treated in this time. The unit then moved to Kure in Japan where the NZ Base Camp was located and treated all personnel in that region.

The unit then returned to Korea and the 10 Transport Coy in August 1953 and treated all personnel at that location (near Tokchon). The unit then moved in October 1953 to the NZ Artillery.



279. N Z. dental jeep and Surgery in the background.

Regiment now located in their truce-time position on the northern bank of Imjin River and near the Pin Trail Bridge. A permanent surgery was built during 1954.



280. N.Z. fixed dental facility.



281. Inside of the dental facility.

Reprints

The unit remained in this position until March 1954 when the unit once again went to Kure and treated. Base Camp and NZ Kay Force HQ personnel. The unit returned to Korea and the 16 NZ Field Artillery Regiment in April 1954. All further treatments of NZ personnel were carried out from this location. Finally, the unit returned to New Zealand in November 1954.

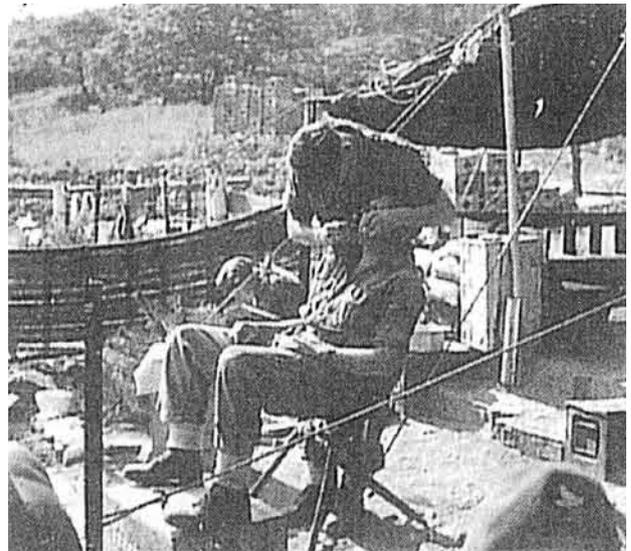
During Captain Wilson's tour of duty the following treatments were carried out:

Oral Examinations	2,818
1-surface amalgams	687
Compound amalgams	1,139
Inlays (gold)	29
Plastic (amberion)	378
Extractions	173
Scalings	127
FV/FL dentures	108
PV/PL dentures	156
Repairs	135
Vincent's infection	1

A number of Korean civilians were treated for acute dental conditions. All NZ personnel were given leave for a dental treatment when the dental unit was located in Japan.



283. CPT. Wilson and a Canadian officer before a Canadian ambulance in 1954



282. Examining N.Z. artillery personnel in their unit area. May 1955 (Upper photographs)



284. CPT. Wilson visiting a US Marine Corps dental clinic. Wilson and three US Marine Corps dental officers.

General practice: The integrative approach

Kerryn Phelps and Craig Hassed*

* 1st edn, xxxiii + 993 pp, hardcover with illustrations, ISBN13: 978-0-7295-3804-6, Sydney, Churchill Livingstone, RRP: AUD150, 2010.

General Practice: The Integrative Approach is a contemporary colossus of Australian textbooks of general practice. For GPs wanting a wide-ranging general practice reference, then the first edition of the *General Practice: The Integrative Approach* is one of the most current of the major textbooks and one which is highly relevant to general practice in Australia. It is also a textbook aware of international differences, issues and resources in general practice. Published late 2010, the first edition of *General Practice: The Integrative Approach* contains a table of Contents, list of Contributors, list of Reviewers, a Foreword by Professor Michael Kidd AM (President-Elect, World Organization of Family Doctors), a Preface, Acknowledgements, seven main Parts, 62 Chapters, an Appendix, a list of Picture Credits, and a comprehensive Index. Each chapter is referenced, but there is no glossary or list of abbreviations. The textbook is presented with in full colour throughout. Weighing in at over 3 kg, it is likely to stay close to the library shelf or office desk. None-the-less, as with many other "Student Consult" titles, purchase of the textbook gives access to the online edition, which is very useful and makes the textbook highly portable, especially for students and registrars.

General Practice: The Integrative Approach is primarily aimed at general practitioners, registrars and students working in general practice. This is a huge potential market. In 2009-2010, the Australian Government estimated that there were 26,613 general practitioners (GPs) in the country,¹ without consideration of the number of registrars and students in the field. It is important that the sub-title "*The Integrative Approach*" does not deter prospective readers, as it is simply a textbook looking at all facets of evidence-based general practice. The textbook is consistent in its presentation, which is a remarkable effort given it is a first edition. The main Parts are colour coded at the top of the page, which helps the reader find the relevant Part that they are looking for. The incorporation of extensive pictures, boxes, tables, and figures is helpful. There is a missed opportunity to put information on the major general practice emergencies on the inside front and back covers, which might be useful to consider in a following edition.

The main Parts of *General Practice: The Integrative Approach* include "Part 1 Principles of integrative medicine", "Part 2 Principles of general practice", "Part 3 Systems", "Part 4 Men's health", "Part 5 Women's health", "Part 6 Lifecycle health", and "Part 7 Social conditions". It targets important integrative aspects, such as behaviour change strategies and spirituality, as well as the common general practice conditions. It is hard to find a gap, unless specialised aspects of health are considered, such as homeless health, but it may have been an oversight not to include a named section on rural and remote practice. By far the largest section is "Systems" (509 pages), which indicates that this textbook provides an excellent grounding in the clinical issues relevant to general practice. It is a comprehensive textbook in this field. Its main shortcoming is its size and readers, especially students and registrars, may need to turn to a companion handbook, such as *John Murtagh's General Practice Companion Handbook*, reviewed previously,² or perhaps the authors of the present work can be encouraged to produce their own companion handbook.

Both authors are well known general practitioners and sometime media celebrities. Professor Kerryn Phelps, MBBS (Syd), FRACGP, FMA, will be best known for her election as the first female President of the Australian Medical Association, as well as her public commentary on many public health issues. She is currently President of the Australasian Integrative Medicine Association and Conjoint Professor, School of Public Health and Community Medicine, University of New South Wales, and Adjunct Professor at the University of Sydney Medical School. Dr Craig Hassed, MBBS, FRACGP, is Senior Clinical Lecturer and Deputy Head, Department of General Practice, Monash University, Melbourne. He also is a public health commentator and medical writer, as well as being heavily involved as a founding board member of the Australasian Integrative Medicine Association.

The production of the first edition of the *General Practice: The Integrative Approach* is a credible effort. The cost is not prohibitive considering its size, comprehensive nature and full colour quality production. Although it

has little competition in the field of integrative general practice, the textbook will compete head to head with major established works in the field, such as *John Murtagh's General Practice* fifth edition by John Murtagh also published 2010.3 None-the-less, *General Practice: The Integrative Approach* is highly likely to establish itself in the exclusive international portfolio of major reference textbooks in general practice.

Declaration of Interests

The reviewer contributed one chapter to this textbook (Chapter 45 Travel Medicine).

*Reviewer: Peter A. Leggat, MD, PhD, DrPH, FAFPHM, FACTM, FACRRM, Professor and Deputy Head, School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University, Townsville, Queensland, Australia.
Email : peter.leggat@jcu.edu.au*

References

1. Australian Department of Health and Ageing. General Practice Statistics. Available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/General+Practice+Statistics-1> (accessed 20 February 2011).
2. Murtagh J. *John Murtagh's General Practice Companion Handbook*. 4th edn. Sydney: McGraw Hill, 2007. (Reviewed *J Mil Vet Health* 2008; 17: 30-31)
3. Murtagh J. *John Murtagh's General Practice*. 5h edn. Sydney: McGraw Hill, 2010.

Calling all MEAO veterans

Informing reservists and ex-serving personnel that they will be invited to participate in the MEAO Health Study in 2011

In 2011, researchers from the Centre for Military and Veterans' Health (CMVH) at the University of Queensland will be sending invitations to ex-serving and Reservist personnel for participation in the Middle East Area of Operations (MEAO) Health Study.

Of particular concern to CMVH researchers is evidence which indicates that physical and mental health outcomes for ex-serving members are different from those of serving members. For this reason, they are utilizing all resources available to reach the ex-serving community in order to provide members the opportunity to take part in this valuable research.

As part of the Military Health Outcomes Program (MilHOP), the largest health research program ever undertaken by the ADF, the MEAO Health Study aims to capture the health, wellbeing, and deployment experiences of ADF members who deployed to the MEAO since 2001.

This year, CMVH researchers will concentrate on reaching Reservist and ex-serving members who deployed to the MEAO. Formal invitations will be sent throughout 2011.

"Given that ex-serving and Reservist ADF members can be more difficult to locate, we welcome these group members to contact us directly if they hear about the study before we are able to reach them," urges Associate Professor Susan Treloar, Head of the University of Queensland node of CMVH.

"We need their current contact details in order to send information about how to join the study. Log-in and password details for a secure online survey will also be sent, or there is the option to do a mailed paper survey."

CMVH is a university-based centre. Individual study responses and information are kept secure and confidential by authorized research staff at the University of Queensland and the University of Adelaide. The study has the endorsement of both the Chief of Defence Force and the Repatriation Commissioner. All participants can be assured that their individual privacy will be protected, and no identifiable information will be provided to the Department of Defence or the Department of Veterans' Affairs. The overall results of the study will be important to both Departments in terms of revealing any linkages between deployment exposures and experiences, and subsequent health problems amongst veterans.

For further information on the MEAO Health Study, please visit www.cmvh.org.au/milhop. Enquiries are also welcome by contacting CMVH on freecall 1800 886 567 or email to milhop@cmvh.org.au

1. Purpose and scope

The Journal of Military and Veterans' Health is a peer reviewed journal published by the Australian Military Medicine Association. The aim of the journal is to promote excellence in the discipline of military and veterans' health, to promote research and to inform and educate all those practising as health professionals or who have an ongoing interest in this area. The scope of the journal covers all aspects of health of service personnel from enlistment and service within a military organisation to post service health care as a veteran. Environmental and related aspects of employment are included in this scope so that the journal provides a unique forum for discussion and research related to a wide range of health issues arising from exposure to military environments. This scope is very broad including, for example, mental health, trauma, health training and effects of environment on health.

Editorial Office

Please address all non-electronic correspondence to:

Journal of Military and Veterans' Health
113 Harrington Street
Hobart TASMANIA 7000
AUSTRALIA

Email: editorial@jmvh.org

Tel: 613 6234 7844

Fax: 613 6234 5958

URL: <http://www.jmvh.org>

Submission of manuscripts

Electronic submission of manuscripts is mandatory.

Manuscript requirements

Manuscripts submitted to the Journal of Military and Veterans' Health must conform with the *Uniform requirements for manuscripts submitted to biomedical journals* (www.icmje.org).

2. Categories of manuscripts

The Journal of Military and Veterans' Health publishes articles related to health of military personnel and veterans within two broad areas of interest:

Research and practice related	Informative and commentary
Original Research/ Original Articles	Editorials
Short Communication	Letters to the editor
Review articles	Biographies
Reprinted Articles	History
Case Studies	Obituaries
Abstracts from the Literature	Book reviews
	Commentary
	View from the Front

Each issue may not contain all categories of articles. The word limit does not include text in the abstract, references, figures and tables. The requirements for submission categories, which are peer reviewed, are summarised below:

Category	Maximum word count	Maximum number of	
		Tables and/or figures	References
Editorials	1000	1	3
Original research	3500	6	30
Short communication	1500	3	10
Review article	5000	8	60
Case studies	1000	3	10
Letters to the editor	800	2	10
History	3000	6	20
Commentary	1500	3	10
View from the Front	2000	5	20
Obituaries	200	1	4

Instructions to Authors

Original research

This category is the primary mode in the journal for communication of findings from original research studies.

Short communications

This category is for communicating the findings from small-scale research studies however other subject material will be considered.

Review articles

Authors who wish to submit a review should first contact the editors to determine its suitability for publication in the journal. The editors encourage authors to submit systematic reviews for publication.

Reprinted articles

This section will include full length copies of articles reprinted with permission from other journals. These articles must be keynote and valuable contributions to health issues in the military and veterans' areas. Readers are invited to email details of papers that should be considered for this category. Any proposal should be accompanied by a short commentary (maximum 200 words) outlining why this historical paper was important in shaping some aspect of military or veteran health practice. The commentary will be published with the keynote article.

Case studies

This category is primarily designed to present details of interesting or unusual clinical cases and a summary is required with a limit of 100 words. The text should be presented using the following headings; background, history, examination findings, special investigations, discussion including differential diagnosis. The article should succinctly illustrate important points.

Abstracts from the literature

This category will include abstracts of seminal work published in other journals which is related to the scope of the Journal of Military and Veterans' Health. Readers are invited to email references to papers that are considered to be valuable to healthcare professionals and others in the military and veterans domains. The editors acknowledge that many of our readers may not have facilitated access to comprehensive reference libraries.

Letters to the Editor

Letters may comment on material that has recently been published in the journal or may address new topics, such as use of new equipment or instrumentation in

the field or a new technique applicable to preventive medicine. Where the subject matter is directed towards a previous publication the editors will usually send the letter first to the authors of the original paper so that their comments may be published at the same time as the letter.

Editorials

Submissions are encouraged for publication in this category and these will be subjected to the peer review process. Topics of interest must fall within the scope of the Journal of Military and Veterans' Health. Guest editorials may be invited from time to time by the editor; suggestions for topics for editorials should be directed to the editor.

Biographies

Biographical accounts of the work of individuals who have made outstanding contributions to the health and care of military personnel and veterans will be considered for publication. If you wish to submit a biographical article the editor should be consulted prior to preparation of the article. The editorial board may solicit such articles directly.

History

Articles describing notable themes related to health and care of military personnel and veterans are invited for publication. The scope is broad and could include, for example, the conduct and outcome of military operations, effect of climate, improvements in trauma care, surgical techniques and mental health. The article should focus on health care delivery and practise as the main theme and may compare changes from earlier practise to those in use today. The editorial board may invite such articles directly however if you wish to submit a manuscript the editor should be consulted in advance. The style of this category will be the same as that applied to a review article.

Obituaries

The editorial board will accept obituaries for individuals who have served as health professionals within the Australian Defence Force. These have been very successful in the British Medical Journal (BMJ) to provide information to the wider health readership. Guidance for preparing an obituary can be found on the BMJ web site, www.bmj.com (e.g. *BMJ* 1995;311:680-681 (9 September) and *BMJ* 1995;311:143-144 (15 July)). Obituaries should be submitted within one month of death and will be subject to editing if required.

Book reviews

Reviews of publications which have a direct focus on military and veterans' health for educational, informative, reference or other reasons will be invited. The author/s would be expected to be independent, have considerable experience and/or a track record and a direct involvement in the field which is addressed by the publication.

Commentary

Commentaries will be short articles which provide incisive, informative and balanced comment on current health issues. The editors may invite commentary on a research paper published in the same edition of the journal. All commentary articles will be peer reviewed and the article style will be that of an editorial.

A view from the front

This category will consider submissions from health individuals at the front line of health care and health delivery to serving personnel and veterans. These articles should be topical, recent, may contain an individual's personal view of a health delivery system and will be subject to peer review.

3. Editorial policy

Original material

The Journal of Military and Veterans' Health publishes original work describing health related research studies. Submitted manuscripts must not have been published or submitted for publication elsewhere, either in whole or in part. This applies to both paper and electronic methods of publication but not to abstracts presented to scientific meetings. Authors planning to submit review articles should first contact the Editorial Office to ensure the appropriateness of the subject material.

Disclaimer

While the Editorial Board makes every effort to ensure that no inaccurate or misleading data, opinions or statements are published in the journal, all data, results and opinions appearing in articles and advertisements are the responsibility of the contributor/s and/or the advertiser concerned. Accordingly the Editorial Board and their respective employees, officers and agents accept no liability whatsoever for the consequences of any such inaccurate or misleading data, results, opinions or statements. While every effort is made to ensure that all data are accurately presented, new methods and techniques should only be considered

in conjunction with published literature from manufacturers.

Ethics approvals

All studies that involve participation of humans, information on participants or which would otherwise be considered to require ethical approval related to the principles set forth in the Helsinki Declaration should be conducted in accordance with such principles. Studies of this nature must contain a statement indicating that approval has been granted by a properly established Human Research Ethics Committee.

All studies involving experiments with animals must contain a statement indicating that the protocol *was approved by an appropriately constituted ethics committee or institutional review board in compliance with guidelines* established by that country's government. A statement must be included that indicates that all animals received humane care in compliance with these guidelines.

Confidentiality

Confidentiality must be maintained in relation to all participants. All presented data must be de-identified. If a participant is able to be identified from illustrations, photographs, case studies or other study data then release forms or copies of permission for publication must be submitted with the manuscript.

All potentially identifying information (including patient likenesses, identification numbers, names and initials) must be removed from images, tables, graphs, charts and text before the manuscript is submitted.

If a reference is made in the text to personal communication (oral or written) as a source of information, a signed statement of permission is required from each source. The year of receipt of these statements should be provided in the text. Use of personal communication as a reference will only be accepted in special instances.

Informed consent

A statement must be included indicating that informed consent was obtained from all participants if data were obtained from or were related to human participants.

Authors Process form

Each author must complete this form and forward the original signed copy to the editorial office. A faxed or scanned image may be submitted electronically to

Instructions to Authors

maintain the editorial process however the original completed form must be received by the editorial office before publication.

Copyright assignment

Copyright for each submission is to be assigned to the Journal of Military and Veterans' Health or provision for a licensing arrangement must be completed (*Authors Process* form).

Conflict of interest and funding

Authors are responsible for recognising and disclosing financial and other conflicts of interest that may bias or could be perceived to bias their work. They should acknowledge in the manuscript all financial support for the work including any control over publication by funding bodies and other financial or personal connections to the work. Each author must complete the conflict of interest and funding section of the *Authors Process* form.

Authorship and acknowledgments

Each author must indicate their contribution to preparation of the manuscript (*Authors Process* form). The corresponding author is responsible for ensuring that all individuals who do not satisfy the criteria for authorship are noted in the acknowledgements section together with a brief description of their contribution.

Sole submission

Authors must indicate that the work is original and has not been published or submitted for publication in another journal (*Authors Process* form) as the same or similar material. This includes submission by the authors and their colleagues in the interval before this work is published. Submission by authors of similar material to advertising, news media or other forms of publication must be indicated when the Journal of Military and Veterans' Health receives your manuscript and a copy of that material should be provided with your manuscript.

Peer review

Two or more referees are assigned to review each submission (except for Book Reviews and Reprinted Articles). Acceptance of original articles is based on significance, originality, scientific quality and interest to the Journal of Military and Veterans' Health readership. If the submission is accepted for publication, editorial revisions may be made to aid clarity and understanding without altering the meaning. Authors are given the opportunity to nominate reviewers whom they believe are expert and impartial in their area of interest.

Offprints

A copy of the final paper will be provided to the corresponding author in pdf format. A copy will be available from the journal website (www.jmvh.org) for interested individuals to download. These copies are made available for single, personal use only and are not available for commercial or other use.

Rights and permissions

Written permission to reproduce any previously published tables or figures must be obtained from the copyright holder (and authors as applicable) and a copy of this permission provided with your submission. Any reproduced material must be clearly identified and its source and permission noted in the manuscript.

Clinical trial registration

We define a clinical trial as "Any project that prospectively assigns human subjects to intervention and comparison groups to study the cause-and-effect relationship between a medical intervention and a health outcome (ICMJE definition). These should be registered, including early phase uncontrolled trials (phase I) in patients or healthy volunteers (WHO Recommendation)".

The Journal of Military and Veterans' Health requires all clinical trials to be registered with a registry that is accessible to the public (at no charge); is searchable using standard, electronic (internet) means; is open to all prospective registrants at minimal or no cost; validates registered information; identifies trials with a unique number; and includes basic information related to the researchers and the trial.

If you are submitting a randomised controlled trial, add the registration number of the trial and the name of the trial registry in the acknowledgements section of your manuscript. Other trial registers that currently meet all of the International Committee of Medical Journal Editors (ICMJE) and World Health Organization (WHO) requirements can be found at <http://www.icmje.org/faq.pdf>.

Registries that meet these criteria include:

- Australian Clinical Trials Registry (www.actr.org.au/)
- US National Library of Medicine (sponsor) (www.clinicaltrials.gov)
- The International Standard Randomised Controlled Trial Number registry (www.controlled-trials.com)

Instructions to Authors

- The National (UK) Research Register (www.update-software.com/national/)
- European Clinical Trials Database (<http://eudract.emea.europa.eu/>)

Language

All manuscripts must be written in English. Spelling and phraseology should be to either standard English or standard American usage and should be consistent throughout the manuscript. Contributors with a non-English native language are encouraged to seek the help of a competent linguist who is familiar with medical terminology prior to submission. It is the author's responsibility to have the language revised before submitting the work for publication. Only minor language revisions are provided after submission.

Review process

Receipt of all submitted papers is acknowledged by email. Manuscripts are initially assessed by the editors and then sent for external review to experts in the field. The corresponding author will be notified by email when a decision is reached. To aid in the peer review process we invite authors to suggest potential reviewers, with their contact details, in the cover letter.

Reproduction of articles, figures and tables

If you would like permission to reproduce an item from material published by the Journal of Military and Veterans' Health, contact the editorial office by email editorial@jmwh.org.

Software and format

The manuscript must be supplied in Microsoft Word in .doc format (Word 2007 file format not accepted at this point in time) or in rich text format. Files prepared in other packages will only be accepted and considered provided they are compatible with Microsoft Word and that *any reformatting is minor*. Files prepared in various desktop publishing proprietary formats will not be accepted.

4. Organisation of manuscripts

Papers will differ in structure depending on category. These instructions refer to sections of manuscripts independent of category where these sections are included. For original research articles the structure should follow the order below with each section beginning on a new page. Reviews should commence with an abstract and then be organised such that the information is presented in a logical sequence with

informative headings and sub-headings related to the content.

Title page

The manuscript should be preceded by a title page which includes the following information:

- Concise title of manuscript
- Name, address, title, highest qualification, affiliation and contact details (email, postal address, telephone and fax) for each author
- Identify corresponding author
- Identify (email) address for correspondence (corresponding author)
- Short running title (maximum 50 characters including spaces)
- Word count (text of paper only – excludes abstract, references, figures and tables)

Abstract

The abstract for original articles should be structured under the following headings: Background, Purpose, Material and Methods, Results, Conclusion. The Background must be a maximum of two sentences. Maximum length of the summary should be 250 words with three to five key words or phrases included below the abstract or summary.

Conflict of Interest

All conflicts of interest must be disclosed in full in this section of the manuscript. These may include, but not be limited to, specific or "in kind" interests, incentives and relationships in respect of the manuscript (e.g. grants, funding, honoraria, stock ownerships, royalties, payment of expenses). This section applies to all authors.

Introduction

It should be assumed that the reader does not have a comprehensive knowledge in the field and you should therefore provide a concise account of the background (including relevant literature references) and reasons for this study.

Materials and methods

Descriptions of any techniques and methods must provide sufficient detail such that a reader can replicate the procedures. Methods that have been published elsewhere should not be described in detail and should be referenced to the original work

Statistics. A full description of the statistical methods used should be provided.

Results

Description of results, while concise, should permit repetition of the procedures and direct comparison with similar data by others. Data should not be repeated unnecessarily in the text, figures and tables and appropriate selection of significant figures for numerical data presentation should be applied. Significance should be expressed as values of probability. Where appropriate, results should be presented as figures rather than tables of data.

Discussion

The discussion should not simply reiterate the results presented; the authors should present their analysis and conclusions with reference to the current knowledge base related to this work. Any assumptions on which conclusions may be based should be stated and there should be some discussion of strengths and weaknesses of the research.

Acknowledgements

These should be brief and should include references to sources of support including financial, logistical and access to material not commercially available. Any individuals named must be given the opportunity to read the paper and approve their inclusion in the acknowledgements before the paper is submitted.

References

A list of references should be provided starting on a new page. Only published references or those genuinely in press should be included.

Tables (including legends to tables)

Tables are to be placed at the end of the manuscript in order of appearance in the text with one table per page. Captions to tables should be short and concise, not exceed one sentence and be on the same page as the table.

Illustrations

These are to be submitted as a separate electronic file for each image.

5. Preparation of manuscripts

Style

References. A standard English dictionary should be used (e.g. Oxford English Dictionary 2007) for spelling or hyphenation of non-medical terms and Dorland's Illustrated Medical Dictionary (WB Saunders, Philadelphia) is recommended for medical

terms. A source for general style including grammar, punctuation and capitalisation is the *Style manual for authors, editors and printers*, Sixth edition 2002 (John Wiley and Sons, Australia).

Numbers. Use numerals for all units of measure and time and for all sets of numbers (e.g. 1 m, 2 hours, 5 years, 4%, 2 of 6 observations). Spell out the numbers one through nine only for general usage (e.g. "we had two opportunities"). Spell out numbers beginning a sentence.

Abbreviations. Abbreviations should be kept to a minimum to avoid confusion with readers who may not be familiar with the subject material. Only standard abbreviations, as listed in a style manual or accepted internationally for use within a subject area, may be used without definition. Terms used frequently within a manuscript may be abbreviated however these should be spelled out at first citation with the abbreviation in parenthesis. Abbreviations in speciality areas must conform to accepted use in that area.

Layout. Headings and sub-headings should be consistent throughout the article and conform to the style used in articles previously published in the journal. No text should be underlined. Prepare the manuscript with double-spacing and allow margins of 2.5 cm.

Tables

Tables should be on separate pages at the end of the paper (following the References section) and be capable of interpretation without reference to the text. They should be numbered consecutively with Arabic numerals (e.g. Table 1). A concise, descriptive caption must be provided for each table. Units in which results are expressed should be given in brackets at the top of each column and not repeated on each line of the table. Ditto signs are not acceptable. An indication should be provided in the manuscript as a guide to indicate where the table should be inserted.

Image files

All images must be submitted as separate files. Images embedded in word processing files are not acceptable. Each image must be referred to in the text and an indication should be provided in the text as to the preferred position of the image. Lettering and lines should be of uniform density and the lines unbroken. Image size and layout should be constructed so that each can be placed within a single column or page width.

At submission all files must satisfy the following criteria for resolution, file format and file size and be

submitted in the actual size to be used. Image width should be constructed to be either one or two column width.

- Halftone images
600 dpi
- Colour images
400 dpi (saved as CMYK)
- Images containing text
600 dpi
- Black and white line art
1200 dpi
- File types
TIF, EPS (JPG and GIF are not suitable)
- Figure width (single column)
-- mm
- Figure width (double column)
-- mm
- Font size
8 point (must be readable after reduction)
- Font type
Times, Times New Roman, Helvetica, Arial
- Line width
Between 0.5 and 1.0 point

Illustrations. These should be referred to in the text as figures (e.g. Figure 1) and numbered consecutively with Arabic numerals. Photographs and illustrations will only be accepted as digital images and should be either composed or cropped before submission to ensure there is no unwanted material in the frame. Digital files judged to be unacceptable in the review process must be resubmitted by the authors.

Graphs, charts and figures. All graphs, charts and figures must be submitted in electronic format (.EPS or .TIF files) and should be prepared by a suitable software package. These should be referred to in the text as figures (e.g. Figure 1). Images of hand drawn material will generally not be accepted. Symbols which are to appear in the figure (and not in the caption) should be chosen from the following available types:

• ◦ ◻ ◼ ◾ ◿ ▲ ◆ ◇ + △

Footnotes

The following symbols should be used in the order given to reference footnotes:

* , † , ‡ , § , || , ¶ , ** , †† , ‡‡

References

The list of references should appear at the end of the manuscript. References should be numbered consecutively in the order in which they are first mentioned in the text. References in text, tables and legends should be identified by Arabic numbers and appear in the text in superscript, for example text¹ or text²⁻⁴ or text^{5,6-7}. Where punctuation (e.g. comma, period) follows a reference number then the punctuation should appear after the reference.

The format of references should follow the "Vancouver" style as described in the *Uniform requirements for manuscripts submitted to biomedical journals* (www.icmje.org/). The Journal of Military and Veterans' Health varies in two respects from these guidelines: Surnames and initials of no more than the first three authors [et al.] are cited and the first and last page numbers of a reference are cited in full. Journal names should be abbreviated as accepted in Index Medicus (<http://www.nlm.nih.gov/tsd/serials/lji.html>) and a period is not used after journal name abbreviations (e.g. J Mil Vet Health). A list providing detailed examples of references for many types of publication is available at http://www.nlm.nih.gov/bsd/uniform_requirements.html. Where appropriate, cite the type of reference (e.g. letter, editorial, abstract or supplement).

Authors should verify references against the original documents and are responsible for checking that none of the references cite retracted articles except in the context of referring to the retraction. For articles published in journals indexed in MEDLINE, the International Committee of Medical Journal Editors considers PubMed (<http://www.ncbi.nlm.nih.gov/sites/entrez/>) the authoritative source for information about retractions. Authors can identify retracted articles in MEDLINE by using the following search term, where pt in square brackets stands for publication type: Retracted publication [pt] in pubmed.

An example of the reference system is as follows:

1. Quail G. Asthma in the military. *Aust Mil Med* 2000; 9(3):129-137.

Units of measurement

The International System of Units (SI) must be used. For values less than zero enter a zero before the decimal point e.g. 0.123. The style should include a solidus e.g. mg/L.

Abbreviations

Use of abbreviations should be minimised. Spell out non-standard abbreviations at their first mention in the text followed by the abbreviation in parentheses. Avoid uncommon abbreviations and jargon.

6. Checklist

Check the following items before submitting your manuscript.

- Covering letter
- Authors Process Form completed by all authors
- Copy of permission to publish material from other sources (copyright holders)
- All individuals named in Acknowledgements have read the paper and approved their inclusion.
- Copy of all permissions to reproduce material from other sources
- All graphs, charts and figures as separate files, referred to in text of paper and position in paper identified
- All illustrations as separate files, referred to in text of paper and position in paper identified
- All tables included, referred to in text of paper and position in paper identified
- Permission obtained for use of *Personal communication* as a reference
- Copies of any part of the manuscript that may have been published previously
- Copies of any advertising or other material that includes any of the submitted material or data
- Statement on ethics approval/s included

7. Submission of manuscripts

Covering letter

Your covering letter should be submitted electronically with the manuscript as a separate file. It can contain author identifying information as it will not be shown to peer reviewers. It should include:

- Why the paper should be published in the Journal of Military and Veterans' Health
- Details of suggested reviewers

Proofs

Proofs will be sent in electronic form as a PDF to the corresponding author who should read them carefully. Major alterations to the text cannot be accepted at this stage. The proofs should be corrected and returned to the Editorial Office by fax or email (image) within 48 hours of receipt.

Software file requirements

The software files must be named so that each is uniquely identified and attributable to your submission. All files submitted should be named to include the following information in the order below:

- Corresponding author surname
- Corresponding author initials
- Title of paper (may be abbreviated)
- Supplementary identifier to indicate contents of file (e.g. for a figure, include *figure* and unique identifier which can be related to that figure).

Examples:

Quail G Asthma in the military Text of paper.doc
Quail G Asthma in the military Figure 1.eps

Electronic submission of paper

The files can be compressed using a .zip compression format. File size must not exceed 10 Mb for a given email. If there are file size concerns contact the Editorial Office.

Copyright Policy

Journal of Military and Veterans' Health (JMVH)
Author Process Form

Each author must read the authorship, licence to publish, conflict of interest and acknowledgements sections of this form and then acknowledge agreement with each section by ticking the check boxes. The corresponding author must also read and sign the statement on the acknowledgements section. Original signed copies of the form must be sent to the JMVH 113 Harrington Street, Hobart.

Your Name (Print): _____

Manuscript Title: _____

Email: _____

Telephone: _____

Fax: _____

Corresponding Author: _____

1. Authorship. Each author must acknowledge their contributions by checking the appropriate statement. An individual must be able to check all boxes in this section to qualify as an author.

I certify that:

- The manuscript presents original, accurate and valid results. I accept responsibility for all subject material and data on which the manuscript is based and for the integrity and veracity of this paper and its conclusions. I may be called upon to defend the veracity of this paper, should it ever be questioned or criticized in part or in full.
- The manuscript has not previously been published (except in abstract form), in part or in total and has not been submitted elsewhere for publications (attach a letter of explanation if part or wholly submitted elsewhere).
- The manuscript shall not be published elsewhere in any language without written consent of the journal and will not be stored electronically or otherwise in any form without consent of the journal.
- If the manuscript has more than one author, the corresponding author nominated above will communicate with the JMVH editorial office to review edited proofs and make decisions regarding the manuscript.

I certify that I have made substantial contributions to the intellectual content of the manuscript for all of the following:

- Conception and design of the study or analysis and interpretation of data.
- Drafting or critically reviewing the manuscript for intellectual content.
- Giving approval of the submitted manuscript.

2. Licence to Publish. Check the appropriate box:

I certify that JMVH has been assigned an exclusive *Licence to Publish* the manuscript in part or in total in printed and electronic form. This licence shall include all parts of the manuscript including text, tables, figures, video, audio and any other related material as:

- The copyright belongs to me.
- The copyright belongs to my employer from whom I have obtained written permission for a *Licence to Publish*.
- The copyright belongs to the funding body/bodies for this work from whom I have obtained written permission for a *Licence to Publish*.
- The copyright for the manuscript and its content belongs wholly in the public domain and no *Licence to Publish* is required.

3. Financial Disclosure and Conflict of Interest. Check one of the boxes below as applicable. The statements refer to the previous five years and the foreseeable future.

I certify that:

- I have no conflict of interest including but not limited to specific financial incentives, relationships or affiliations and have received no "in kind" considerations in relation to this manuscript OR
- I have disclosed all conflicts of interest including but not limited to specific or "in kind" interests, incentives and relationships in respect of the manuscript (e.g. grants, any control of publication by funding body, honoraria, stock ownerships, royalties, payment of expenses) and these are disclosed in full in the Conflict of Interest section of the manuscript.

Your Signature

Date

4. Acknowledgements Section. I certify that (both boxes must be checked):

- Written permission has been provided by all individuals noted in the Acknowledgements section of the manuscript.
- All individuals who have made a significant contribution to the content reported in this manuscript but who do not satisfy the criteria for authorship are noted with their specific contributions described.

Corresponding Author Signature

Date



20TH
ANNIVERSARY

MILITARY HEALTH SHAPING THE FUTURE

2011 AMMA CONFERENCE
COMMEMORATING 20 YEARS OF AMMA

21–23 OCTOBER 2011
CROWN CONFERENCE CENTRE
MELBOURNE VICTORIA



REGISTRATION & CALL FOR PAPERS
OPEN NOW.

ONLINE AT www.amma.asn.au



DISCLAIMER

The views expressed in this journal are those of the authors, and do not reflect in any way official Defence Force policy, or the views of the Surgeon General, Australian Defence Force, or any Military authority

www.jmvh.org