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Australian Military Medicine Association

Statement of Objectives

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

- promoting the study of military medicine
- bringing together those with an interest in military medicine
- disseminating knowledge of military medicine
- publishing and distributing a journal in military medicine
- promoting research in military medicine

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

The Association is totally independent of the Australian Defence Force.

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Editorial

Half a League..

"Half a league, half a league,
Half a league onward,
All in the valley of Death,
Rode the six hundred."

Thus spoke Alfred Lord Tennyson in his poem "The Charge of the Light Brigade". This charge, during the Crimean War, was probably one of the most ill considered events in military history. The Crimean War, however, was the one of the turning points of military medicine. From this foundation, we've seen the development of military medicine as a fundamental aspect of military planning and capability. The Australian Military Medicine Association was established to build on these foundations and to ensure that the study of military medicine continues to develop.

One of my aims, when taking over as the editor of this journal, was to tap in on the wealth of knowledge and information which I believe is in the Australian military medical community. To that end, as I forewarned in the last journal, I intend to increase the size of the journal with a variety of articles from all aspects of military medicine. This issue, at over 60 pages, is the largest issue that the AMMA has printed. I'm intending that future issues will be of a similar or greater size and encourage all our readers to consider submitting an article, letter to the editor, abstract, conference report or a book report. I am grateful for all those who have already taken up this challenge.

In this issue, we see a number of themes. The first of these is a preventive health theme. Keeping our defence forces healthy, whether in the fields of injury prevention or infectious disease prophylaxis, is a critical aspect of our work. Three excellent papers look at injury prevention, Ross River virus disease and the Plague. The second theme focuses on military medical practice. These interesting and diverse papers address emergency medicine in the military, the diagnosis of hypothermia and the costs of military pharmaceuticals. The final theme is a historical one. A challenging personal account of life in a German prisoner of war camp, and a fascinating article on Australia's naval involvement in the Boxer rebellion, tackle this theme.

From the last journal, the readers got an idea of my background. In this journal, I will provide some details of the assistant editor, SQNLDR Karen Gisler. Karen joined the RAAF as a medical undergraduate in 1988. She graduated in 1990 from the University of Queensland and, after residency in Brisbane, commenced full-time service in 1993. She has served in Townsville, Amberley and Canberra. Karen completed her MPH&TM in April 1997 before deploying to Iraq for 6 months in September 1997 as the SMO for UNSCOM. She is currently the SO2 Prevention within the Directorate of Preventive Health within in the Defence Health Service Branch.

We look forward to your continuing contributions and encourage you all to contact either Karen or myself if you have any comments.

Andy Robertson

Coming Next Issue:

- Survived the Mission, still coming to terms with the consequences
- The psychological effects of a Naval deployment
- Hypothermia (2): Management
- Landmines
- The Boxer Rebellion: The New South Wales and Victorian Naval contingents
- Medical oxygen in the area of operations
- Teleradiology

President's Message

The more things change, the more things stay the same. It's an old phrase, but I believe it continues to hold true in many ways.

We have left the 1990's behind us and changed all the digits in our calendar for the last time until fifty more generations have passed. (I'm a believer in the new millenium starting in 2001 – no, I'm not a spoilsport or a pedant, but it does give us all an excuse to celebrate twice). While we waited for the clock and calendar to change, some would have thought about what havoc the 'Millenium Bug' would cause. Well we're still here and able to live life without relying on baked beans and wood fires.

Where is all this leading? There has been a group of people who had spent the last few years with the responsibility of preventing and dealing with any disasters resulting from effects of the 'Millenium Bug'. They were in the unfortunate position of losing out whatever happened. If systems had failed, they wouldn't have done their job properly; if everything went well, then they were making something out of nothing and had wasted everybody else's time and money over a non-existent threat.

Does that sound familiar? Preparation and planning for situations that may not occur are the bread and butter of health logistics. A rapid, appropriate and efficient response is the minimum standard expected. In the scenarios presented to us, failure to respond is unacceptable, but if not called upon our services are 'too expensive and not really necessary'. This has always been the case and will probably always remain so – call it human nature or what you will.

The recent few months in Timor have again demonstrated this unchanging attitude. Of interest, too, is the nature of casualties seen. In an earlier message, I commented on the traditional image of military medicine being largely of battlefield casualties and trauma of man-made origin. At that time the contrast between this and incidence of disease as being a greater threat to the man in the field was discussed. Once again, the Timor experience has seen non-traumatic illness as a major issue that has faced those deployed. We continue to face similar situations and attitudes to our predecessors.

Let us take the lessons of the past with us into the future and face the 2000's with the confidence that comes with preparedness.

Nader Abou-Seif

Original Articles

Developing Injury Prevention Strategies for the Australian Defence Force[1]

PG Warfe, DD Jones, SK Prigg.[2]

Abstract

Casualties caused by injuries have a major impact on the readiness of the Australian Defence Force (ADF). The Department of Defence has developed a system for reporting occupationally related illnesses and injuries. Data from the DEFCARE database and a wide range of other data have been analysed to determine the leading causes of injury and illness as well as the associated costs. During financial year 97/98 over 32,000 working days were lost due to injuries. In addition, over $100 million was spent on workers compensation costs. The five activities associated with the highest number of working days lost were all related to physical training and sports. Modifications to the physical training program at 1 Recruit Training Battalion were associated with dramatic reductions in the injury presentation rate and the number of male medical discharges. Further development of this type of approach should help the ADF to minimise preventable injuries in the future.

Introduction

Casualties caused by injuries have a major impact on the readiness of the Australian Defence Force (ADF). Therefore, the ADF is seeking to capture data, which will assist in determining priorities for injury prevention, designing specific interventions, and measuring progress based on implemented interventions.

Methods

The Australian Defence Force (ADF) is conducting a major study to quantify the current health status of the Force as quantitatively as possible. This project, the ADF Health Status Report, began with the compilation and analysis of a wide-range of data. The desired outcomes from this process include setting health support priorities; developing illness and injury prevention strategies; and beginning the process of monitoring progress toward desired health outcomes.

The Department of Defence has developed a system for reporting occupationally related accidents and incidents. The following data from workplace injuries, illnesses and incident reports are recorded in the DEFCARE database: the nature, location, agency and mechanism of injury; the activity engaged in when the injury occurred; and other information on factors which may have contributed to injuries. One of the most useful features of the DEFCARE database is the capture of working days lost (WDL) associated with each reported casualty in terms of days in hospital, days off all duties, and days of light duty. This provides an important measure of the impact of various injuries and illnesses on personnel availability. Financial Year (FY) 97/98 was the first year for which data was compiled in the DEFCARE database.

Data on workers compensation claims in the ADF was obtained from the Military Compensation and Rehabilitation Service (MCRS), which administers workers compensation in the ADF. Although efforts are currently under way to integrate workers compensation into the DEFCARE system, this was not achieved as of FY97/98. However, some data was available on the condition for which compensation was claimed in terms of the part of the body affected.

Because ADF personnel must maintain a high standard of fitness, each Service has the right to retire members on the grounds of invalidity, that is, a physical or mental incapacity to due their duties. There are three classifications of invalidity retirements: Class A (60% or greater incapacity), Class B (30% to 59% incapacity), and Class C (less than 30% incapacity). Data on invalidity retirements was obtained from the Defence Force Retirement

[1] Warfe PG, Jones DD, Prigg SK. Developing injury prevention strategies for the Australian Defence Force. *Aust Mil Med* 2000; 9(1), 3-8.

[2] COL Peter Warfe was the former Director of Clinical Policy, Defence Health Service Branch, Australian Defence Force.

and Death Benefits (DFRDB) Scheme and the Military Superannuation and Benefits Scheme (MSBS). Both the DFRDB and MSBS maintain statistics on the cause of invalidity in terms of the body system affected.

Each of the Services in the ADF collects data on hospital admissions, including the reason for admission using International Classification of Diseases Edition 9 (ICD-9) coding. This allows for a determination of the number of admissions associated with injuries and musculoskeletal diseases and disorders. Each of the military Services also maintains records of deaths due to all causes. Based on this data it is possible to ascertain the number of deaths resulting from accidents and injuries.

In addition to the aforementioned sources of data, the ADF Health Status report included a review of previously collected data and studies on injuries in the ADF. Significant in this regard was a major report on injuries in the Australian Army from 1987-1991 by Rudzki.[1] All the sources of data mentioned above were analysed in an attempt to develop a comprehensive picture of patterns of injuries and illnesses in the ADF. Where possible, an attempt was also made to establish causal relationships in order to guide casualty prevention strategies.

Results

In FY97/98 there were 5038 casualties among full-time military personnel reported to the DEFCARE database, which represents a rate of 91 per 1000 per year (9.1% of the Force). The resulting WDL was 32,644 (148 work years), including 1216 days in hospital, 6287 sick days, and 25,141 light duty days. In FY97/98 1067 casualties among part-time military personnel were reported to DEFCARE resulting in an additional 2680 WDL. When calculated in terms of full-time equivalents the casualty rate among part-time forces was 28.5%.

The activity groups associated with workplace injuries and illnesses among full-time personnel are presented in Figure 1. Work-related activities accounted for almost one-third of all casualties reported. Sports activities were also associated with approximately one-third of casualties. Physical training was the third leading activity group in terms of the number of casualties produced. Military training and motor vehicle accidents played a smaller, but still important role.

The individual activities associated with the highest number of casualties included the following: physical training (18.2%), walking (non-sport and fitness) [6.7%], rugby union/league (5.0%), equipment maintenance (4.6%), touch football (4.1%), soccer (3.9%), stores handling (3.9%), driving (3.8%), fighting (3.4%), ship maintenance (2.8%), running/jogging (2.6%), cleaning (2.5%), Australian Rules football (2.4%), and basketball/netball (2.3%).

However, in terms of priority for prevention the individual activities associated with the highest WDL are of greatest concern. Figure 2 presents a summary of activities associated with the highest percentage of WDL. The five leading activities associated with WDL are physical training (PT) and four sports activities, including touch football, soccer, rugby union/league, and running/jogging. Several other sports activities were associated with the highest proportion of WDL. Military training activities, such as marching and parachuting, were also important contributors to WDL. Walking and stores handling were work-related activities associated with relatively high WDL.

Sprains and strains of joints and adjacent muscles was by far the leading injury nature associated with lost working days and accounted for almost 30% of all casualties and 31% of WDL. Disorders of muscle, tendons and other soft tissues and fractures were also major contributors to WDL with each accounting for approximately 18% of days lost. Dislocations and dorsopathies each accounted for approximately 5% of WDL. The types of injury associated with the highest WDL are not surprising given the activities associated with the highest WDL.

Figure 3 presents a summary of the location of injuries and illnesses in full-time military personnel reported to DEFCARE in FY97/98. Again it is not surprising that lower limbs were affected in one-third of casualties given the types of activities associated with the highest rates of casualties. Lower limb injuries are associated with over 50% of WDL. Upper limbs were affected in 22% of casualties reported and accounted for 20% of WDL. The third highest body location to be impacted was the trunk, which accounted for over 15% of casualties and WDL. All other body locations were much less likely to be affected.

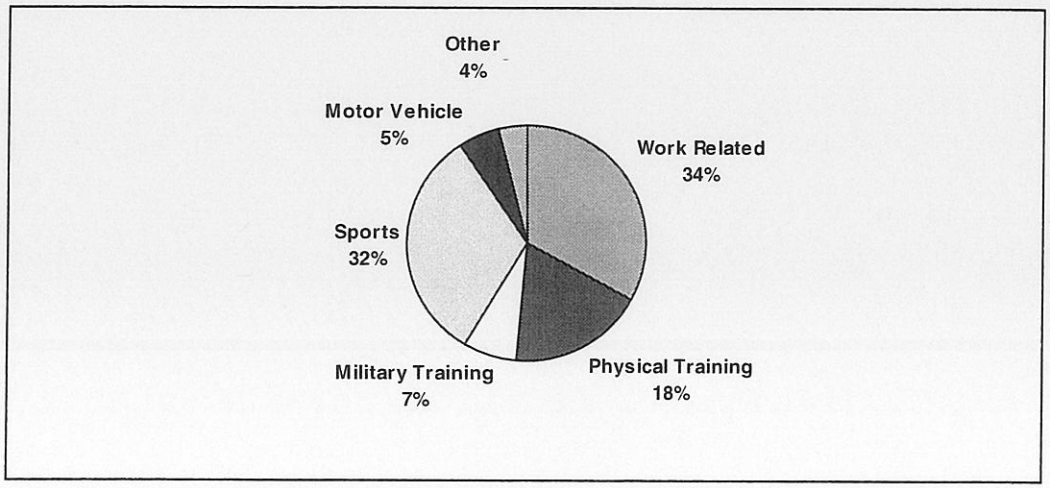

Figure 1. Workplace Related Casualties by Activity Grouping

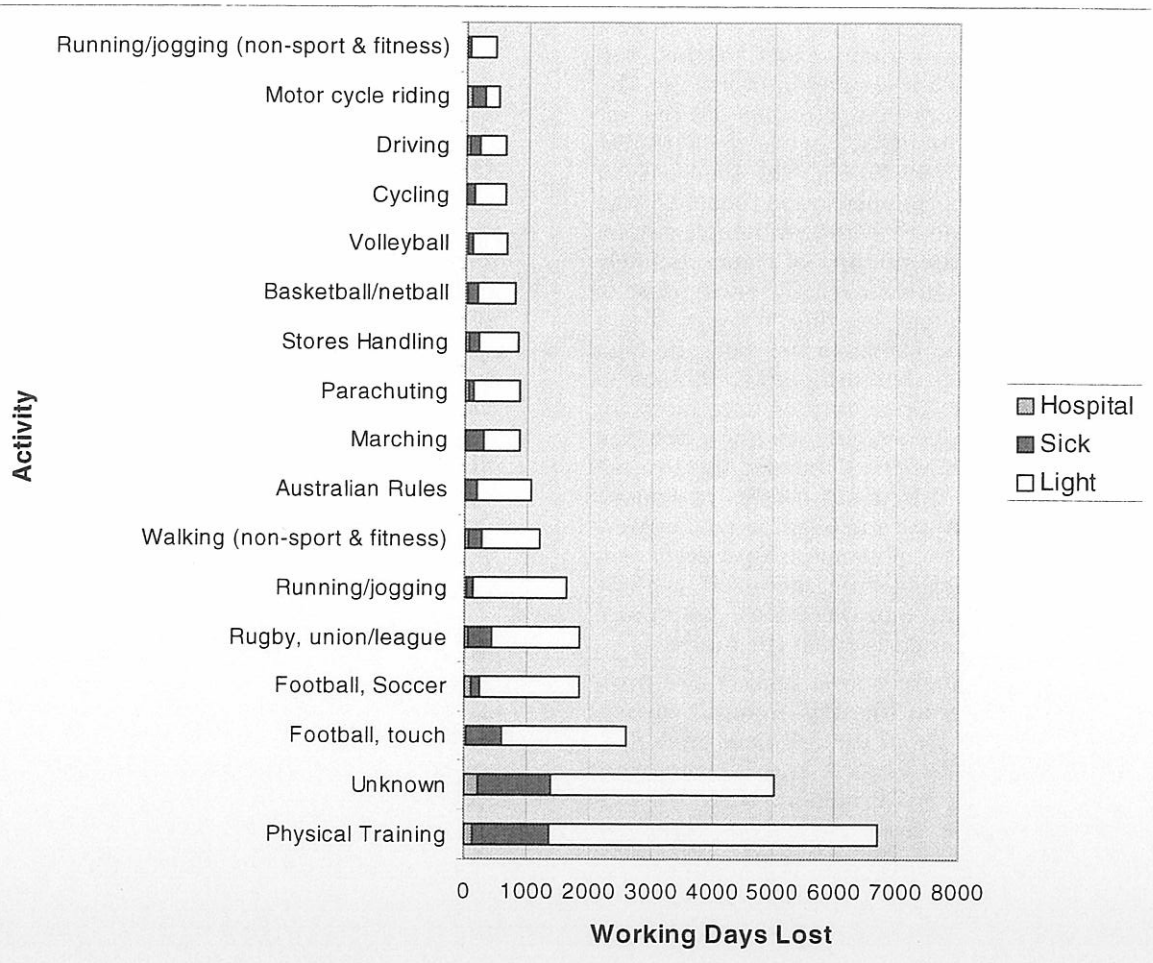

Figure 2. Individual Activities Associated with the Highest Number of Working Days Lost

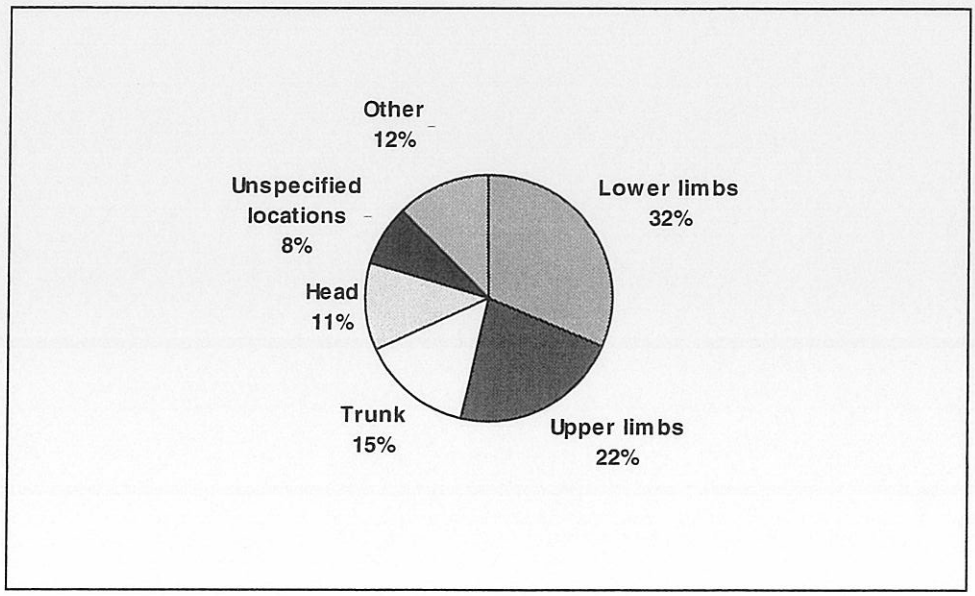

Figure 3. Injury Location Group Summary for ADF Workplace Injuries and Illnesses

Workers compensation costs in the ADF have seen significant escalation over time. The number of workers compensation claims received almost doubled between FY90/91 (3208) and FY97/98 (6285). The total cost of military worker's compensation benefits was $101.23 million in FY97/98. Although part of the increase in the number of claims is likely associated with greater client awareness of benefits and the long lag time between injury and submission of claims in the ADF, the high cost of work-related injuries and illnesses in the ADF is clear. Knee injuries accounted for 19.4% of compensation claims between FY92/93 and FY96/97. Other leg injuries accounted for an additional 18.7% of claims. Back and arm injuries accounted for an average of 15 and 13% of claims, respectively over the five-year period. Integration of workers compensation data into DEFCARE should provide for useful comparisons in the future.

In FY97/98 there were a total of 574 invalidity retirements in the ADF from all causes. This represents 1% of the full-time force. The annual liability for Class A and B retirements in FY97/98 was $67.6 million. While Class A retirements have held relatively steady over the past five years, Class B retirements have steadily increased over the past four years. Class C retirements, which are by far the most numerous, fluctuated considerably with a range of 158 to 264 per year. Diseases and disorders of the musculoskeletal system accounted for 62% of Class A and B retirements and 63% of Class C retirements in FY97/98 under MSBS. A total of 37% of all invalidity retirements were associated with diseases and disorders of joints and 16.5% were associated with spinal injuries.

Based on a review of hospital admission data over the last several years, the average number of admissions related to injuries and poisonings or musculoskeletal diseases and disorders was over 2000 per year. Australia's Health 1998[2] indicated that the average cost per admission for musculoskeletal diseases and disorders and injuries, poisonings, and toxic effect of drugs was $3369 and $2307, respectively. Thus, the cost of hospitalisation of ADF personnel for such injuries and illnesses is estimated to be millions of dollars. The Australian National Audit Office (ANAO) has estimated that the total cost of injuries in the ADF is between $210 and $840 million. [3] Furthermore, on average, 22 ADF personnel die as a result of accidents and injuries every year with motor vehicle accidents taking the greatest toll on life.

Given the major costs associated with workplace injuries and illnesses in the ADF, the need for focused injury prevention efforts are clear. Based on a thorough analysis of available information it became clear that a substantial numbers of injuries and illnesses (particularly musculoskeletal diseases and disorders) are preventable. PT and sports injuries should receive the highest priority for prevention efforts. Military training activities such as marching and parachuting should also receive attention along with work-related activities associated with high numbers of casualties (eg. walking, maintenance, and stores handling).

The rest of this paper will focus on the ADF's initial efforts in seeking to address the problems of PT and sports injuries.

Table 4 provides a profile of the nature, location, and mechanism of injury for each of the leading causes of WDL and indicates the proportion of casualties associated with each.

Activity	Nature of Injury	Bodily Location	Injury Mechanism
Physical Training	Sprains & strains (49%) Disorders of muscles, tendons and soft tissues (12%) Fractures (10%)	Lower limbs (48%) Upper limbs (20%) Trunk (18%)	Body stressing (34%) Falls, trips, & slips (29%) Hit by moving objects (15%)
Touch Football	Sprains & strains (44%) Disorders of muscles, tendons and soft tissues (17%) Fractures (11%)	Lower limbs (56%) Upper limbs (26%) Trunk (10%)	Falls, slips & trips (34%) Body stressing (22%) Hit by moving objects (15%) Hitting objects (14%)
RugbyUnion/League	Sprains & strains (35%) Fractures (16%) Disorders of muscles, tendons and soft tissues (14%) Dislocation (8%)	Upper limbs (31%) Lower limbs (31%) Head (14%) Trunk (14%) Neck (7%)	Hit by moving objects (66%) Falls, slips & trips (11%) Hitting objects (10%) Body stressing (8%)
Soccer	Sprains & strains (48%) Fractures (20%) Disorders of muscles, tendons & soft tissues (11%)	Lower limbs (69%) Upper limbs (13%) Trunk (7%)	Hit by moving objects (47%) Falls, slips, & trips (19%) Hitting objects (15%) Body stressing (13%)
Running/jogging	Sprains & strains (52%) Disorders of muscle, tendons and soft tissues (17%) Fractures (8%)	Lower limbs (78%) Upper limbs (7%) Trunk (7%)	Falls, slips & trips (40%) Body stressing (32%)

Table 4. Profile of the Activities Associated with the Highest WDL

While this information is useful it is also important that the risk factors for injury be well understood. A summary of risk factors for military training injuries prepared by Gillespie et al (4) for the British Army is provided in Table 5 below. The levels of evidence were originated by the U.S. Agency for Health Care Policy. A grade of B requires availability of well-conducted clinical studies but no randomised trials on the topic of recommendation. A grade of C requires evidence from expert committee reports and/or clinical experience of respected authorities and indicates the absence of directly applicable studies of good quality. Level IIa corresponds to evidence obtained from at least one well-designed controlled study without randomisation. Level IIb corresponds to evidence obtained from at least one other type of well-designed quasi-experimental study. Level III corresponds to evidence obtained from well-designed correlation studies, non-experimental descriptive studies, and case-control studies. It is vitally important that the ADF use an evidence-based approach in seeking to minimise injuries in the ADF.

Citing a report on sports injuries in Australia by the Centre for Health Promotion and Research, Rudzki noted that based on questionnaires completed by coaches, administrators and medical staff, a mean estimate of 30-50% of sports injuries were regarded as realistically preventable.[1] Rudzki also cited an Australian Sports Medicine Federation study indicating the major causes of sports injury are human error (54%), terrain (31%), and equipment (15%).[1] Rudzki concluded that the main areas of manipulation are education and modifying the environment with coaches and trainers being the people deemed most important in preventing sports injuries. The ADF must learn from training and conditioning programs of professional and top amateur sports programs how to minimise preventable injuries. In essence the ADF must learn to train smarter to minimise risk. This will require greater education of commanders and all personnel regarding the benefits, risks and prevention strategies for minimising injury.

Risk Factor	Level of Evidence
Age over 24 years	Grade B level Iib
Low or average physical activity prior to training	Grade B level Iib
Female gender	Grade B level III
Smoking >10 /day	Grade B level Iib
Hyperpronation of foot	Grade C level IV
Total amount of marching/running (military training)	Grade B level Iib
Running frequency > 3 days/week for 30 mins	Grade B level Iia
Running duration >30 mins for 3 days per week	Grade B level Iia

Table 5. Risk Factors for Training Injury

Where primary prevention efforts fail, the ADF must have the means to aggressively manage injuries to ensure they are completely healed and do not become chronic problems that can eventually lead to medical discharge. Physiotherapy is extremely important as a means of secondary prevention. However, when other means fail, the ADF must have strong rehabilitation programs in place.

A case study at 1 Recruit Training Battalion (1 RTB) by Rudzki and Cunningham provides an idea of the potential impacts that smarter training can have.[5] Medical staff at 1 RTB was able to convince commanders at the Army establishment for initial recruit training that changes in physical training could result in fewer injuries while still providing rigorous training and physically fit recruits. Changes in the PT program included the following: cessation of road runs, introduction of 400-800m interval training, reduction in test run distance from 5km to 2.4km, standardisation of road marches, and introduction of deep water training. These changes address several of the risk factors in Table 5. The results of the uncontrolled observational study included a 46.6% reduction in the total injury presentation rate for medical treatment. In addition the annual rate of medical discharges among males decreased by 40.8% resulting in an estimated savings of over $1.2 million.

Conclusions

Injuries and illnesses have a major impact on the ADF both in terms of decreased personnel availability and monetary costs. Physical training and sports injuries should receive the highest priority for prevention efforts. Based on a survey of relevant literature and the case study at 1 Recruit Training Battalion, it appears that substantial numbers of injuries and illnesses can be prevented through smarter training. Resources invested in prevention efforts are likely to be extremely cost effective as well as increasing Defence readiness.

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Ross River Virus Disease - A Focus On The Problem[1]

B. Hayden[2]

Abstract

This is review of Ross River Virus (RRV) disease and its impact on military forces. In particular, the review will look at the impact of RRV on the Army elements of the Australian Defence Force.

Introduction

In 1997, Hueston et al. reported cases of RRV disease in military exercises conducted in Queensland, a region where many deploying units undertake annual exercises for the purpose of military training.[1]

Due to the disease's relevance for this particular population, and prevalence in the region, the increasing incidence of RRV disease in Defence Force personnel over the past few years deserves further investigation. One explanation for this increase in reports may actually be the improved surveillance and testing techniques.

Although the numbers of reported cases of RRV disease in this population is not large, the morbidity from this non life-threatening infection is significant and is of serious social and economic concern. The impact of such debilitation on both the service member and the ADF has not yet been investigated. No studies have investigated the costs of this health problem, although various Australian commentators have proposed that the costs are high.

The literature stresses the importance of individual preventive measures against infection. There is strong rationale for the implementation of a preventive health program for all ADF personnel. Such a health program would be both beneficial in improving the awareness of service members to RRV disease and reducing further ADF cases in the Queensland region.

History

Gambel et al. have indicated that, throughout history, arthropod-borne disease has had devastating effects on military operations.[2] Even when disease was not transmissible, 'nuisance bites' alone have caused a variety of physiological reactions, psychological stress and secondary infections, affecting both individual and unit performance.

By their very nature, operations are undertaken in field conditions, such as jungle environments, which expose non-immune soldiers to significant non-battle health risks. Although insect bites may be considered just minor nuisances, and go relatively unnoticed, some bites could result in serious infections requiring medical evaluation, treatment and possibly even evacuation. This ultimately limits warfighting capability.[3]

Disease

Endemic to Australia, RRV disease was first isolated in the early 1960's in Queensland.[4] RRV disease (also referred to as Epidemic Polyarthritis) is mosquito-borne arbovirus whose major hosts are thought to be macropods such as wallabies and kangaroos. Many species of mosquito are thought to transmit the disease, particularly pools of the Aedes species, such as Ae vigilax, Ae funereus and Ae procax.[5]

With an incubation period of 3-11 days, this self-limiting disease presents with polyarthritis and/or polyarthralgia (similar to rheumatoid effects), lasting from a few days to a few months. The disease primarily affects the small joints of the extremities, particularly wrists and ankles, and symptoms gradually improve without destructive changes. There may also be a maculopapular rash (usually non-pruritic) affecting the trunk and limbs, which usually resolves within 7-10 days and is followed by a fine desquamation. Fever is commonly absent.[6] Both Mackenzie et al. and Russell state that there have been reported cases, with remissions and exacerbation's of decreasing intensity, of symptoms lasting for more than a year.[5,7] There is no evidence of transmission from person to person, with recovery followed by lasting immunity.

Major outbreaks (epidemics) of RRV disease have occurred across Australia, chiefly in New South Wales (1996 and 1997); Western Australia (1991-1992 and 1995-1996); Queen-

[1] Hayden B. Ross River virus disease - A focus on the problem. *Aust Mil Med* 2000; 9(1), 9-15.

[2] CAPT Bronwyn Hayden is currently undertaking postgraduate study in Intensive Care Nursing and is posted to 1 Commando Regiment.

sland (1996); and Victoria and South Australia (1993 and 1997). Increased reporting tends to occur mainly during the January-May period, when mosquito activity is greatest.[8] Sporadic cases of RRV disease have also been reported in other coastal regions of Australia, Papua New Guinea and the Pacific Islands. [4,5]

The Australian National Notifiable Diseases Surveillance System (NNDSS) maintains surveillance of more than 40 communicable diseases or disease groups, including RRV disease. Disease notifications are initially made to individual State and Territory health authorities who then supply the data for further analysis to the NNDSS.[9] Various criticisms, however, have been made of this system. These include a lack of uniformity between State and Territory reporting systems, with some using laboratory reporting solely and others relying on clinical diagnosis; underreporting of cases, with the patients' not presenting with subsequent infections as they realize there is no specific treatment or cure; lack of uniformity between laboratories in their diagnostic techniques, and variations in interpretation of results and reporting criteria.[9] Whilst various factors may contribute to inaccurate reporting of cases, a new series of national clinical and serological definitions, with guidelines for testing and reporting, have been proposed recently which may address this problem.[5]

Russell concludes his paper by indicating that "for reasons associated with mosquito and human ecology, the risks of RRV disease is increasing for many communities ... with the virus likely to continue as a public health problem" for the foreseeable future.[7]

Prevention

As there are no treatment measures, the issue of prevention of RRV disease falls to educating individuals in personal preventive measures and community orientated mosquito-reducing capabilities. The Australian Defence Force Publication (ADFP) 717 (Health Series Preventive Medicine Manual) outlines a three-step system to protect against arthropod-related disease. Referred to as Personal Protective Measures (PPM's), the three-tier system recommends the use of insect repellent containing DEET (N,N-diethyl-m-toluamide), the wearing of appropriate field clothing, and the Permethrin (a contact toxicant for insects) impregnation of field clothing.

ADFP 717 strongly advocates that, due to the mobility and dispersion of 'modern fighting armed forces', there is a need for each individual service member to take responsibility for protecting themselves against a health threat.[10] It is also recognized that the use of established military PPM's by each individual requires reinforcement training and stringent supervision by leaders in the ADF in order to work.

Literature Review

As personal measures are one of the cornerstones of maintaining the health of ADF personnel against arthropod-related diseases, it is important to assess the effectiveness of the recommended measures. A review of the literature reveals a distinct paucity of studies of RRV disease and the Australian Defence Force, although there are various anecdotal and unpublished reports.

A study by Hueston et al. describes the presence of RRV disease in a large combined Australian/United States of America military exercise at Shoalwater Bay Training Area in south-eastern Queensland during March 1997.[1] It was recognized that there was a significant threat to the health of US troops, due to a lack of previous exposure to RRV disease by these forces, and personnel were trained in military protective measures against mosquito biting prior to deployment to the high-risk area. Unfortunately, this study does not outline the education and health promotion program used for US service members. In addition, there was no indication as to whether Australian troops received the same or a similar education prior to deployment.

Surveillance revealed 19 suspected clinical cases, with 6 diagnosed serologically by the Deployed Public Health Laboratory (DPHL).[1] The DPHL had been deployed into the field for the purpose of preventative medicine as well as disease and vector surveillance. Cases were diagnosed using IgM enzyme linked immunosorbent assay (ELISA) techniques. A large-scale post-deployment serosurvey was also undertaken to establish whether undiagnosed RRV disease infections occurred during the exercise. Of the six diagnosed cases of RRV disease, five were American and one Australian. Anecdotal evidence noted that despite predeployment health promotion, some US personnel were still observed to, as an example, dig trenches with no upper body field shirt covering.

In 1998, Gambel et al. performed a survey on the knowledge, attitudes and practices regarding personal protective measures of soldiers in the United States Army.[2] The rationale for the survey was to focus interventions toward improving service members' ability to use PPM's appropriately, and effectively, and as an aid to developing other repellent products. Utilising a cross-sectional approach, the sur-

vey included US military personnel, either active duty or reserve, attending one of 13 Army courses at 7 installations in continental US. Participation was voluntary and informed consent obtained from each participant. Students were from a cross-section of the Army with a range of experience from 4-15 years of service for enlisted soldiers and 6-18 years of service for officers.[2]

Participation in the study focused on four general categories of students, based on military occupational specialties (MOS),[2] with the categories including:

- soldiers trained for direct combat (military sciences);
- soldiers considered a priori to be most knowledgeable regarding arthropod-borne diseases and PPM's (health sciences);
- soldiers involved in distributing supplies or maintaining soldiers in the field (logistics); and
- 'other' soldiers, included the remaining eight general MOS categories and survey participants who did not identify their specific MOS.

Measurement of knowledge, attitudes, beliefs and practices of PPM's was via a written questionnaire (n=1007) or group interview of 4-6 students (n=65). Perception of the effectiveness and availability of US military repellent products and the degree of command emphasis on PPM's were also assessed.

Group interviews provided an interactive approach with the opportunity for deeper probing and clarification of comments on specific topics, investigation of common themes and patterns, and exploration of areas beyond the scope of the questionnaire. For example, this included the social contexts in which information on PPM's is provided, the degree of command emphasis on PPM's in the field, and suggestions for improving use of PPM's.

Of the 1,007 service members who completed the survey questionnaire, 63% were enlisted soldiers and 37% were officers. The majority (88%) was active duty Army, with smaller representations of Army National Guard, Army Reserve, and other services.

The survey found that there was a lack of knowledge about the different types of DEET containing repellents and the use of Permethrin, with less than one third of all respondents answering correctly. The highest average scores were by soldiers in the military sciences followed by soldiers in the health sciences. These findings are supported by a questionnaire survey undertaken by Gambel et al. who examined the US soldier's knowledge of the military's system of PPM's and use of PPM's in general while on deployment in three military operations: Operation Vigilant Warrior in Kuwait (1994); Operation Uphold Democracy in Haiti (1995); and Operation Joint Endeavour in Bosnia (1996).[11] The most common MOS represented in the surveys were from the military sciences or direct combat troops. Approximately 40% of respondents correctly identified the 33% extended-duration DEET containing repellent in a tube as the US military's topical insect repellent, while approximately the same proportion accurately identified Permethrin as the agent used to treat the field uniform.[11]

With regard to attitudes and beliefs, approximately one quarter of survey participants were undecided which product (commercial versus military issue) was more effective, while almost three quarters of participants indicated that they felt that they did not have enough or any information regarding the US military doctrine of PPM's. A similar proportion stated that they believed that, in general, the use of a repellent is necessary and its application is less of a nuisance than suffering insect bites.[2]

The majority of respondents reported use of a combination of both commercial and military issue repellents, with the highest proportion of combination use evident in the military sciences. Survey findings indicated that nearly three times as many respondents used commercial repellents alone as compared to military repellents alone. The reasons for this were not outlined, although it was indicated that less than one quarter of respondents were able to accurately discern the major differences (duration, plasticising effect, greasiness and smell) between two types of military issue topical repellent, one containing 75% DEET and the other containing the more current 35% extended-duration DEET. Of note, the study states that "almost 70% of those in the military sciences, the MOS category expected to have the most field experience, reported never having been ordered to use PPM's".[2]

A summary of results for group interviews indicated that, apart from predeployment health threat briefings, only one service member recalled unit training on PPM's. Information on the importance of use in the field appeared to move horizontally through mostly informal channels. Decisions of which repellent to use appeared to be commonly made from both a combination of advice from others in the unit (peers) and personal experience. Most respondents were surprised to learn that military issue extended duration repellent containing 35% DEET is actually identical to a known commercial product except for tubing

colour. Respondents were also only vaguely aware of the currently existing method of treating field clothing with Permethrin. Most interviewees also indicated that they had heard or witnessed other service members using 'dangerous methods' such as wearing flea collars and drinking dilute turpentine in an attempt to prevent insect bites. Most believed, that if PPM's are so important, they should be handled like any other military task by training to standard and testing for competence.[2]

Other points consistently mentioned during group interviews included:[2]

- prevention of nuisance bites rather than prevention of disease was the primary motivator for utilising insect repellent;
- focus tended to be more on the effectiveness of a product to prevent insect bites, rather than on concerns regarding product toxicity or side-effects; and
- the responsibility for enforcing the use of PPM's in the field was unclear, with neither enlisted soldiers nor officers believing that enforcement of measures was their responsibility.

The authors' discussion focused on a few key points. Whilst not being as a valid sample of the US Army overall, the authors believed that this group with at least recent experience in the field would more likely display a greater degree of knowledge of the military preventive measures regimes than the average soldier.[2] Although the MOS of military sciences displayed a greater degree of knowledge than others (including health sciences), results obtained generally indicated that knowledge deficits consistently existed across all ranks and military MOS's surveyed. [2]

Study Results

To address the issue, two small focus groups (n=11) were arranged with the members of a combat-orientated Army Reserve unit. Verbal consent was obtained from participants prior to running the focus groups.

The focus groups addressed pre-established risk factors believed to contribute to the incidence of RRV disease in Army personnel. These factor were lack of education, poor knowledge base and lack of compliance with PPM's. The risk factors were presented to participants with the aim to canvas a range of opinions on RRV disease and PPM's in this particular unit. The demographic details of the group are in Table 1.

Characteristic	Focus Group
Sex	Male 11, Female 0
Rank	Private 10, LCPL 1
Age	22-32
Years of Army Service	1-11
Army Employment Service	Raider 10, Combat First Aider 1
Civilian Education	HSC 6, TAFE 3, University Degree 2
Service in Previous Army Units	Health services 1, Military Services 3, Training 1

Table 1: Focus group demographic details

The participants of the focus groups identified a health problem as being any injury, illness or threat to health. As a broad category, the field was identified as an area where the threat to health may increase, with the suggestion that the farther away from support the individual is, the greater the perceived risk. As mobility is an essential component for achieving operational objectives, operations can place the soldier some distance from the usual established health support services for various periods.

The most prevalent health risks identified by participants of the focus groups during the field phase included infection, injuries/accidents, unforeseen circumstances, and hygiene and self-maintenance problems inclusive of insect bites, ticks, snakes and leeches. It was generally agreed that if a health problem existed, the effectiveness of the team would decrease with a domino effect occurring, thus placing stress on other members of the team and consequently increasing their risks. The group also strongly advocated, however, that the 'buddy system' should occur, where looking out for 'one's mate' should aid in preventing the health problem occurring or becoming worse.

Themes identified by the participants thought to contribute to the health risk of RRV disease on an individual level included :

- lack of education regarding PPM's;
- perception and attitude of the individual;

- individual compliance with preventive measures;
- being poorly equipped for an exercise, inappropriate equipment, lack of 'common sense' and poor planning and preparation predeployment; and
- lack of knowledge regarding arthropod-related diseases.

Interestingly, these risk factors generally correlated with the proposed risk factors. Consequently, a random selection of contributing risk factors was presented to the participants for further exploration. Those identified as relevant by the participants were consequently categorised into predisposing, enabling and reinforcing factors where applicable.

Identified risk factors and contributing risk factors included :

Lack of Education - Formal training avenues possibly not achieving their full potential, thus allowing for a revision of the strengths and weaknesses of the current system regarding arthropod-related diseases and PPM's.

Enabling

- Missed opportunities to provide knowledge and training during formal military courses, possibly related to tight schedules and timing of formal courses, thus at times necessitating the 'missing' of a health lecture over something regarded of greater importance.
- Education (and other) initiatives. A possible lack of focus and interest on RRV disease hence leading to the question of how do we maintain interest in promoting this health problem? In addition, how can the effectiveness of educational opportunities during formal training courses and in-house unit training be enhanced?
- Lack of practice and testing procedures. As PPM's are not currently testable procedures for practice purposes, no standard for comparison exists.
- Recommendations could be suggested to improve this possible weakness in the chain of ensuring effective use of PPM's.
- Who is responsible for ensuring ongoing training/education in individual units?

The focus group strongly advocated that individuals should be educated according to risk level, with an emphasis on the risk for the individual. Education should also be 'situation specific' and relevant to current climate and geographic deployment location. The general indication was that medics are viewed as the ones to be seen as being responsible for ongoing training and providing updates of studies on PPM's.

Poor Knowledge Base - Of arthropod-related diseases such as RRV disease and use of PPM's in prevention.

Predisposing

- "It won't happen to me" attitude. Possibly related to poor understanding of perceived versus actual health threat to the individual.

Enabling

- Poor knowledge of mosquito-borne diseases in general.
- Poor knowledge/awareness of measures for prevention against mosquito-borne diseases in general.
- Poor knowledge of recommended military regime of PPM's against infection at the individual service member level.

The focus groups identified a need for a standardised knowledge base. The group believed they only require a basic knowledge of RRV disease, with more focus being placed on the how's and why's of PPM's. The principles outlined behind the how's and why's included: how the regime works in terms of preventing/reducing the health risk, with studies on the demonstrated effectiveness of the individual components; why it is important to comply with the PPM's, and why they are effective.

Lack of Compliance - With PPM's against infection by RRV disease.

Predisposing

- Perceived health threat by the individual, for example, "I can die from that, but can only get sick from that".

Enabling

- knowledge deficits of available military resources;
- issue of military repellent;
- use of Permethrin impregnation for field clothing predeployment to a high-risk geographic location; and
- studies on products outlined in the military regime of individual PPM's.
- responsibility for ensuring compliance.

Reinforcing

- Habits, myths and anecdotes by both peers and role models.
- Lack of continuing reinforcement, role model compliance, and so forth.
- Responsibility for ensuring compliance.
- Previous exposure/ past experiences.

The focus groups identified a need for an uniform awareness and compliance level with regular education and opportunities for assessment/testing and practice prior to deployment. There was strong consensus that the individual was responsible for compliance with preventive measures and thus ensuring their own health.

There was a suggestion by a few participants that they believed that a different mentality may exist between reserves versus regular soldiers and within individual unit in the Army. This therefore poses an interesting question for any pilot study as to whether to separate the two populations or perform an overall cross-section of the target group.

Risk markers (factors having impact on the health problem but not necessarily directly contributing to the identified problem) were also identified in recognition that, while focus in this needs assessment report remains on the individual and PPM's, it is only one aspect of a wider scale health problem.

Identified Risk Markers included:

- Climate - humidity/temperature; season; rainfall; global warming issues.
- Geographic location - region of Australia; inland/coastal areas; incidence of RRV disease (endemic areas and epidemic outbreaks); surveillance systems; epidemiological reporting systems.
- Military field operations - mission; sources of infection (vectors and hosts); time spent in location (length of exposure to health risk); terrain.
- Availability of resources - current funding allocation; knowledge of current studies on repellents and Permethrin used in the military system; logistics support; knowledge base of logistic support staff.
- Identification issues with symptoms of RRV disease.
- Mixed interpretation of testing procedures and reporting criteria (Notification System) through the chain of command.

Conclusion

The results of these focus groups indicate that further investigation of this health problem, through a pilot study, may provide some interesting data on the current status quo of the Army system. A preliminary survey such as this may prove beneficial in assessing the strengths and weaknesses of the current system, while allowing for relevant and appropriate strategies for interventions in accordance with available resource allocation. Pre-existing resources and programs could be identified, with utilisation of existing skills, knowledge and expertise in the area. Involvement of the health side of the ADF would be an essential prerequisite, along with securing funding for any health program initiatives.

Above all, the awareness that health education and awareness/promotion is an important first step in promoting 'healthy' behaviour and therefore improving overall health. By increasing the awareness of military personal protection measures for prevention of arthropod-related diseases, the individual service member may accept the responsibility for maintaining and protecting their own health. By the very nature of field phases of military exercises and deployment to high-risk geographic locations, the significant risk to all non-immune ADF personnel is worthy of efforts to improve the knowledge, attitudes, beliefs and practices of service members' to PPM's.

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Emergency Medicine in the Military - A New Untapped Speciality[1]

M. Little[2]

Abstract

Emergency Medicine is a new specialty in Australia. This specialty presents the Australian military with a specialist with training and skills ideal for a variety of roles, in both in peacetime and at war. This article discusses some of the benefits.

Introduction

The Australasian College of Emergency Medicine (ACEM) was established in 1986 and the specialty of emergency medicine was recognized in 1993. Currently, there are 300 Fellows of the College. With 700 trainees, emergency medicine is the fastest growing specialty in Australia. In the military, however, it remains an untapped resource, although times may be changing, albeit slowly. In the United States (US), emergency physicians have been involved with the US military for at least 15 years, with many emergency physician's serving routinely and operationally in the military. The aim of this article is to discuss the potential role of the emergency physician in the Australian military, particularly the Army, the service with which I have had the greatest experience.

Discussion

Emergency medicine is the field of medical practice based on the knowledge and skills required for the diagnosis and management of the acute and urgent aspects of illness and injury affecting patients of all age groups. This covers a full spectrum of episodic and undifferentiated physical and behavioral disorders. It further encompasses an understanding of the development of prehospital and inhospital emergency medical services, and the skills necessary for this development (as outlined by International Federation of Emergency Medicine in 1991). The emergency physician's work daily in an environment of continual flux, where patient presentations ebb and flow during the day. They are involved in the triaging of a patient (the ACEM has introduced the National Triage Scale for all Australian Emergency Departments), as well as the management of seriously unwell or injured patients.

In the Field Hospitals, BASB medical platoons or the Mobile Field Surgical Teams (MFST), military personnel are likely to encounter trauma either due to battle or non-battle causes (e.g. motor vehicle accidents). Currently the senior surgeon initially triages patients before overseeing their assessment and resuscitation. In civilian practice, emergency physicians are heavily involved in the initial assessment and management of severe trauma. Many Australian emergency departments have trauma teams lead by emergency physicians, who coordinate various medical, nursing and allied health care professionals in the care of the trauma patient. As a consequence of their normal duties, emergency physicians have to work in a team on a daily basis, an essential requirement of a military medical unit, and be able to interact with a variety of specialists from a range of specialties.

I believe that the emergency physician in a military environment should continue their role, practiced on a daily basis, by being involved in the initial triage and assessment of the trauma patient. This would enable the surgeon to be unhindered in the theatre and would allow surgical review of resuscitated patients in order to triage the patients for surgery. This has worked well in the US military, with the literature reporting successful medical operations with emergency physicians involved in triage and resuscitation in both the 1989 invasion of Panama[1] and the 1991 Gulf War.[2] During Operation Habitat, I spent time with the UK Royal Marine Surgical Support Team (not unlike the MFST) in Iraq.[3] The triage officer was the Infectious Diseases consultant (they did not have any emergency physicians), which enabled the surgeons to freely move about the resuscitation area and to take urgent cases to theatre. This system was established by the surgeons and worked extremely

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well. The other main advantages of utilising the emergency physician is that the remaining cases in the resuscitation area can managed whilst the surgeon and anaesthetist are in theatre, the surgeon can be warned of new urgent or deteriorating cases, and new cases can be triaged and resuscitated as they arrive.

Trauma is a small part of the emergency physician's day, as it is for a military medical unit on exercise or operations. A significant part of the workload is the non-battle casualties who present with medical or minor surgical/orthopaedic problems. Even in combat there exists a significant amount of non-trauma injuries. In the 1983 Grenada invasion, 11.8% of patients received on a casualty receiving ship were non trauma cases.[4] On the hospital ship, HMS UGANDA, during the Falklands war, 12% of casualties received were suffering from environmental or hypothermia injuries.[5] For the British Surgical Support Team in Iraq, 55.2% of patients seen were non surgical cases.[3] This team, however, was deployed on a humanitarian operation. In the future, it is more likely that an Australian military medical force will have to deal with such a crisis, and should be able to deal with civilians who have had their medical system destroyed and are faced with medical problems such as pneumonia, malaria, dehydration, and malnutrition. The majority of the day will be spent sorting out the ill from the not so ill. Triaging, diagnosing, performing investigations and initiating management, on all ages of patients from babies to the elderly, will be critical. Emergency physicians have a great range of skills in these areas, as well as their ability to resuscitate the seriously ill.

In civilian practice, the emergency physician is often involved in disaster planning and is regularly involved in mass casualty exercises. The emergency physician can, therefore, be a valuable resource for a military medical unit if deployed to a civilian disaster, either in Australia or overseas. Even in a combat environment with mass casualties, the emergency physician will be in a situation which is not unlike the daily situation in an Emergency Department where the resources are stretched due to either a crowded emergency department or 3-4 patients that arrive at the department from a major motor vehicle accident. From experience with civilian bombings,[7] the closest many emergency physicians may come to the situation on the battlefield, the literature repeatedly stresses that there are many casualties who have minor injuries, which may not require surgery. These cases, in a military scenario, could be easily managed by an emergency physician, whilst the surgeon is dealing with the more urgent cases in theatre.

The Vietnam War demonstrated the value of rapid evacuation by air and, since that time, aeromedical evacuation (AME) has been an important part of the military medical plan. In civilian practice, emergency physicians staff a large number of retrieval organisations. On any day in Australia, emergency physicians, often working closely with anaesthetic or intensive care colleagues, perform retrievals by either fixed or rotary wing aircraft. In Cairns, 260 retrievals per year are performed, predominantly by emergency physicians and usually by helicopter. Therefore, emergency physicians have developed a lot of skill and experience in the AME of seriously injured and ill patients as well as developing the skills required in planning and coordination of retrieval from remote areas.

Conclusion

The emergency physician is a new breed of specialist who offers the military a great deal of flexibility and support in either disaster or combat situations. The emergency physician has the skills to be involved in the initial triage, assessment and stabilisation of seriously injured patients; the day to day running of a resuscitation area/treatment section; and the aeromedical evacuation of casualties. The literature tells us that, in the US military, the emergency physician has successfully performed these roles in military operations. The time has come for the Australian military to utilise this new speciality.

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Review Articles

The Price Of Prevention:

Drugs, Vaccines and Medications Used to Prevent Disease in the Australian Defence Force[1]

N Burton, JP Pearn[2]

Abstract

The Australian Defence Force comprises the healthiest and fittest groups of individuals in Australian society. Pre-selection at recruitment is a major factor that pre-determines this status; but on this basis are built major preventive health and safety policies and programs that promote positive health – both during peacetime and during operational deployments overseas. Health materiel generally, and pharmaceutical items specifically, form a significant link in the preventive medicine chain of Australian servicemen and women. Five groups of pharmaceutical agents in particular, contribute to the maintenance of this positive health. These include vaccines, drugs for malaria prophylaxis, sun protection screens, the oral contraceptive pill and nicotine dermal patches to aid individuals to reduce or cease cigarette smoking. Prior to the Peace Enforcement role in East Timor (Operations Stabilise and Warden) the annual ADF budget for pharmaceutical items was $11.42 million (financial year 1998-1999), of which $4.6 million (40.5%) was spent on vaccines. This ratio far exceeds that of preventive drug costs of any other section of society, and highlights the Defence Health Service's role in maintaining the uniformed workforce in optimal health. The use of vaccines, in the military context, has a history in Australia dating from 1804, when the Nation's second Surgeon General, Thomas Jamison RN, published his "General Observations on the Smallpox" in the Sydney Gazette. Today, the use of hepatitis A and B vaccines, as a major preventive intervention, has implications not only for the preservation of manpower but also for the potential use of uniformed service personnel as safe volunteer blood donors during overseas operations in times of emergency. The Defence Health Service Branch also plays a significant role in drug research using volunteer servicemen and women in the Australian Defence Force; and has taken also a proactive, altruistic role sponsoring the re-registration (ARTG Registration No. AUST R63856) of Primaquine, for the use of all Australians (both civilian and military), returning to Australia from malarious areas. This latter has involved the ADF in a direct funding commitment of $30,000 in the 1997-1998 financial year; but a practical audit of such expenditure reveals a most beneficial return on this investment, not only in terms of financial saving from (otherwise) loss of person-power, but also in terms of the prevention of human suffering in both The Australian Defence Force and in the more widespread Australian society.

Introduction

The Australian Defence Force comprises the healthiest and fittest groups of individuals in Australian society. Pre-selection at recruitment is a major factor that pre-determines this desirable state. On this basis of selected fit individuals, free from disease, are built significant preventive health programs. These involve sophisticated safety policies that reduce disease and injury; and preventive health policies that promote positive health.

Such form essential core doctrines for the Australian Defence Force (ADF) during both peacetime and during operational deployments overseas.

Health materiel generally, and pharmaceutical items specifically, form a most significant link in the preventive health chain which ensures

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optimal health for Australian servicemen and women[1]. In this paper we explore the price of such prevention, specifically from the viewpoint of the use of pharmaceutical items to maintain positive health. We include also an audit of the most recent peacetime use of vaccines, drugs for malaria prophylaxis, sun protection screens, the oral contraceptive pill and nicotine dermal patches. These latter aid individuals to reduce or cease cigarette smoking.

This audit shows that the preventive-to-treatment ratio of the cost of drugs for the Australian Defence Force far exceeds that of any other section of society; and highlights, in expenditure terms, the major commitment of the Defence Health Service in maintaining its uniformed workforce in optimal health.

Therapeutic Class	Total (Units Issued)	Usage %	Total $	Expenditure %
Preventive Medicine	331,900	17.6	5,049,300	44.2
Skin	233,400	12.4	873,600	7.7
Infections, Infestations	223,500	11.9	896,900	7.9
Analgesia	199,900	10.6	138,600	1.2
Surgical Preparations	164,600	8.7	747,600	6.5
E.N.T. Preparations	146,300	7.8	461,100	4.0
Respiratory System	122,200	6.5	406,900	3.6
Electrolytes, Vitamins, Minerals	96,500	5.1	144,700	1.3
Musculo-skeletal System	67,500	3.6	222,800	2.0
Eye Preparations	63,900	3.4	134,200	1.2
CNS Preparations	59,000	3.1	318,100	2.8
Alimentary	48,800	2.6	535,100	4.7
Allergic Disorders	45,400	2.4	280,000	2.5
Cardiovascular	28,700	1.5	498,900	4.4
Contraceptive Agents	18,600	1.0	181,900	1.6

Table 1: Ranked order of the "top 15" therapeutic classes of pharmaceutical items, by usage and cost. Annual issue data, the Australian Defence Force

Drug Use and Costs

Currently, the Australian Defence Force comprises some 52,500 uniformed full-time servicemen and women. Drug use reflects the sequelae of training in both the wet tropical north and throughout much of the dry, hot inland of Australia; and the inescapable complications of physical fitness training and sport which are afforded a high priority for the maintenance of stamina and personal readiness for operational service.

The total pharmaceutical costs, by the physiological system or class of drug, are shown in Table 1. The top ten pharmaceutical items used by the Australian Defence Force, by volume usage, are shown in Table 2, and by cost in Table 3.

Item	Indication	Annual Usage	Price Per Unit $	Annual Expenditure $
Sunburn preventive stick – lip balm	Sunscreen	93924	0.65	61,051
Doxycycline 100mg SR caps 7s "Doryx"	Antibiotic/anti-malarial	91284	1.20	109,541
Paracetamol tablets 500mg 24s	Analgesic	71611	0.38	27,212
Sunburn preventive cream 50g tube	Sunscreen	54091	1.39	75,186
Codeine phosphate with paracetamol 20s "Panadeine"	Analgesic	50523	0.69	34,861
Cetylpyridinium chloride lozenges "Cepacol"	Antiseptic lozenge	41521	2.00	83,042
Hepatitis A and B vaccine "Twinrix"	Vaccine	37227	34.85	1,297,361
Sunburn preventive lotion 125 ml	Sunscreen	33673	2.39	80,478
Sodium chloride injection 0.9% 10ml amp	Diluent and irrigation	31345	0.20	6,269
Pseudoephedrine HCl 60mg 30s "Sudafed"	Decongestant	30254	1.00	30,381

Table 2: *The ranked "top ten" pharmaceutical items used in the Australian Defence Force, by volume usage; with costs and annual expenditure for the financial year 1998-1999. Cumulative bulk point-of-issue data.*

Prevention

The total expenditure on pharmaceutical items by the Australian Defence Force in the financial year of 1998-99 was 11.4 million dollars. An analysis of source data has shown that 46.7% of this expenditure is on pharmaceutical items specifically used to prevent disease. The rank order of such "preventive" pharmaceutical items is shown in Table 4. The biggest single budget item comprises the expenditure on vaccines, which total 4.63 million dollars, or 87% of the total "preventive" pharmaceutical agent cost. This comprises 40.5 % of the total annual pharmaceutical expenditure.

Specific "Preventive" Pharmaceuticals

The military pioneered the use of vaccines in Australia. In 1804, the Nation's second Surgeon General, Captain Thomas Jamison RN, published an advocacy letter entitled "General Observations of the Smallpox" in the Sydney Gazette of that year[2]. Today, vaccine-preventable disease does not occur amongst Australian uniformed servicemen and women, in contrast with such preventable illness that still occurs in the civilian population. Vaccine preventable disease has been reported in the last two years in uniformed servicemen from other armies, notably that of poliomyelitis in the Albanian army in 1998[3]; and hepatitis B still occurs in serving members of the armed forces of some African nations. Today, the use of hepatitis A and B vaccines is a major preventive intervention; and has implications not only for the preservation of manpower but also for the potential use of uniformed service personnel as volunteer blood donors during overseas operations in time of life saving emergency.

Item	Indication	Annual Usage	Price Per Unit $	Annual Expenditure $
Japanese Encephalitis vaccine "JEV"	Vaccine	15000	130.00	1,950,000
Hepatitis A and B vaccine "Twinrix"	Vaccine	37227	34.85	1,297,361
Typhoid vaccine "Typhim vi"	Vaccine	13877	30.49	423,110
Hepatitis A vaccine "Havrix 1440"	Vaccine	7735	41.00	317,135
Omeprazole capsules "Losec"	Proton pump inhibitor	3813	64.35	245,367
Loratadine tablet 10s "Claratyne"	Antihistamine	22152	7.77	172,121
Sodium Chloride eye irrigation	Irrigation	29074	4.04	117,459
Doxycycline HCl 100mg SR 7s "Doryx"	Antibiotic/anti-malarial	91284	1.20	109,541
Meningococcal polysaccharide vaccine "Mencevax"	Vaccine	4021	25.00	100,525
Propofol injection "Diprivan"	Anaesthetic	1415	65.52	92,711

Table 3: The ranked "top ten" pharmaceutical items used in the Australian Defence Force, by cost; with annual usage and unit cost. Data from the financial year 1998-1999. Cumulation bulk point-of-issue data.

Any audit of preventive pharmaceutical use has, of necessity, its "expenditure" on the current "left side of the ledger". The right hand side, that of health maintenance, may not see its accrual for years or decades in the future. Such is particularly relevant in the use of sunscreens and in the promotion of smoking cessation campaigns using nicotine patches and gum.

Currently, the greatest return on preventive pharmaceutical expenditure is undoubtedly in the area of malaria prophylaxis. Noting that even with optimal diagnosis and treatment of acute cases of malaria, a convalescent soldier cannot return to work for 4 to 5 weeks after diagnosis, and that sub-optimal use of antimalarial pharmaceutical agents leads to significant "break through" cases, an annual expenditure of $100,000 for doxycycline prophylaxis is one of the most cost-efficient expenditures currently employed on operational deployments in malarious areas. Such has applied particularly to UN operations in Western Sahara, Angola, Somalia, Rwanda and Cambodia in the past; and to current operations in Bougainville and East Timor.

Drug Research – Preventive Pharmacology

The Australian Defence Force has participated in a number of collaborative drug trials in the last decade – espousing the policy that research spin-off has the potential to benefit preparedness for warfighting and its training. Such potential research is reviewed by the Australian Defence Medical Ethics Committee (ADMEC); and if approved monitored for best practice ethical standards, for the incidence and type of side effects and ultimately for efficacy[4].

"PREVENTIVE" PHARMACEUTICAL COSTS –	AUSTRALIAN DOLLARS
Vaccines (excluding Japanese B Encephalitis Vaccine]	2 677 000
Vaccine (Japanese B Encephalitis Vaccine)	1 950 000
Sunscreens	256 500
Contraceptives (oral and injectable)	182 000
Nicotine Preparations (smoking cessation)	165 500
Doxycycline (as antimalarial)	100 000
TOTAL "Preventive" Costs (46.7%)	5 331 000

Table 4: Ranked annual expenditure on pharmaceutical items, as a percentage (46.7 percent) of all pharmaceutical expenditure, the Australian Defence Force, financial year 1998-1999.

Examples of current clinical research projects involving Australian volunteer servicemen and women include (a) investigations to determine the optimal route of administration of Japanese B encephalitis vaccine; and to determine its optimal antigenic load; (b) collaborative studies to quantify the risks of side effects following BCG immunisation; (c) rates and the effects of preventive strategies to reduce skin cancer in troops stationed in northern Australia; and (d) research trials of new insect and arachnid skin repellents, using Army ento-

mologists as volunteer subjects in the wet tropics of Australia.

Preventive pharmaceutical research is also being undertaken as part of collaborative international studies, using both research leaders and volunteer subjects, with some of Australia's neighbours who share cognate terms of reference in keeping our armed forces fit. Examples include (a) drug trials of the new antimalarial drug, tafenaquine (formerly etaquine and also known as WR238605), using Melanesian uniformed volunteers in Manus Province of Papua New Guinea; and (b) a double-blind drug trial of the same antimalarial drug using both Thai and Australian volunteer service personnel.

The Defence Health Service Branch has also taken a proactive, altruistic role sponsoring the re-registration (ARTG Registration No. AUST R63856) of primaquine, for the use of all Australians (both civilian and military), returning to Australia from malarious areas. This latter has involved the ADF in a direct funding commitment of $30,000 in the 1997-1998 financial year; but a practical audit of such expenditure reveals a most beneficial return on this investment, not only in terms of financial saving from (otherwise) loss of person-power, but also in terms of the prevention of human suffering in both the Australian Defence Force and in the more widespread Australian society.

Conclusion

It can be seen that "preventive pharmacy" occupies a central theme in the doctrine and practice of the Defence Health Service Branch. Insofar as vaccine-preventable diseases have not occurred in the ADF since full immunisation-protection has been introduced; and that clinical malaria does not occur on operations even in chloroquine-resistant areas, it can be seen that the preventive drug programs are supremely effective.

The data presented in this paper allow a health auditor to determine the specific drug cost of such positive health outcomes. It can be seen that the total per capita annual drug cost of such optimal health is $102. It would be difficult to imagine a greater return for the expenditure of any Defence dollar.

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The Plague - Its Relevance To Travel Medicine[1]

A. Lewis[2]

Ring a ring a roses,
Pocket full of posies,
Tishoo, tishoo
All fall down.[1]

Introduction

The plague, recognised by most from its description as the Black Death, is alive and well today. It is an enzootic disease of peridomestic and wild rodents caused by the bacillus *Yersinia pestis*. It is spread by the bite of the oriental rat flea *Xenopsylla cheopsis*. When the rodent population is reduced through death brought about by epizootic proportions of the disease, the flea finds other hosts. If there is contact between human and rodent populations, such as existed early this millennium, and that occurs due to population movements as a result of disaster or wars, then outbreaks of the plague in humans can occur.

The plague is subject to quarantine and reporting by International agreement through the World Health Organisation (WHO). Its relevance to Travel Medicine is in its history of global spread over the centuries and the effect of disasters, wars and possibility of development of antibiotic resistance on its possible resurgence.

History of the Plague

Plague has been with us throughout recorded history. It is a disease associated with movement of human populations and trade.

Biblical Times

It is mentioned in the Book of Samuel in the Old Testament of the Bible.[1]

Justinian Epidemic (AD 543)

This epidemic, starting at the time when Justinian I was Emperor of Rome, lasted some two centuries. It is believed to have spread from India or Central Africa by rats on board seagoing vessels, initially into Egypt and thence into the coastal areas surrounding the Mediterranean, into Western Europe and possibly as far as the British Isles. The death toll is thought to have been as high as 10 million people throughout Europe. At the same time that Europe was being devastated by the plague, ships trading between India and China were also carrying the disease.[1]

The Dark Ages

The result of the massive reduction in the population of Europe caused by the Justinian Epidemic was the breakdown of administration and civilisation in what became known as the Dark Ages. Little is known about the plague during this time. What literature is available makes scant mention of the existence of plague and one wonders whether it had ceased to be a problem.[1]

The Twelfth Century

During the Twelfth Century, increased communication between Asia and Europe occurred because of the overland caravan and the conquering Mongol armies of Genghis Kahn. This situation, along with the use of the Silk Road between China and Syria, increased the contact of the burrowing rodents of the Steppe with human and animal carriers of the plague from areas of India, China and the Himalayan foothills. This movement of human carriers into areas previously clear of the plague set the stage for the Black Death.[1,3,4]

The Black Death (AD 1347)

From 1348 to 1350, the plague devastated much of Europe. It was called the *mors ater*, which translated means terrible or black death. It was believed to have originated in Caffa in the Crimea around 1347. Caffa was under siege by a Mongol prince. Plague broke out amongst the besiegers.

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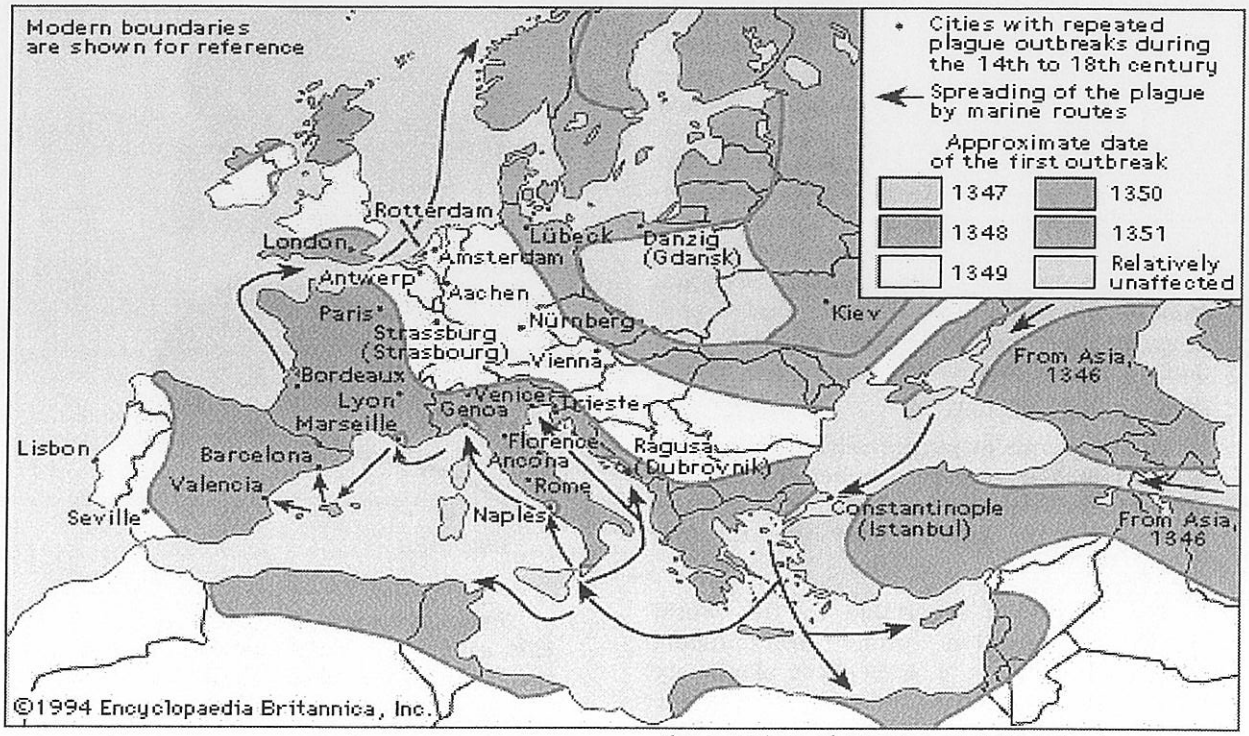


Historical reports claim that the besiegers catapulted the bodies of plague victims over the walls of the besieged city. This is an early example of the use of biological warfare. It is suggested that some of the inhabitants of Caffa, fleeing the siege by Genoese ships, carried the plague with them to ports such as Venice, Messina and Genoa. From there it spread across Europe. It is estimated that throughout Europe approximately 25 million people died as a result of the Black Death.

Oberammergau and the Passion Play

The impact of the plague was so dramatic on many areas of Europe that even today its influence can be seen in some social traditions. One of the most interesting examples I have found is that of the story of the Passion Play enacted every ten years in the little town of Oberammergau in the Bavarian Alps since 1643. It is reputed to have been started after the people of the town vowed that if they were spared from an epidemic of the plague, they would celebrate with a Passion Play.[6]

The Great Plague of London (AD 1665)

The Great Plague killed an estimated 70,000 out of a total population of around 460,000 people in London. Changes had occurred in building materials utilised since the Black Death. More houses were built out of stone rather than wood and tiles were used in place of thatch. This and the use of quarantine meant that this epidemic, by comparison with earlier episodes, was relatively short lived. The Great Fire of London in 1666 further reduced the number of wooden and thatch structures. The reconstruction that followed reinforced the trend towards living conditions that reduced the impact of rodents on the human population.[6]

China (AD 1894)

In 1894, outbreaks in Hong Kong and Canton left some 80,000 to 100,000 dead from the plague. A further 10 million deaths worldwide were attributed to the plague over the next twenty years after its spread from the southern Chinese ports.

Twentieth Century

Small outbreaks of the plague have occurred throughout this century. Between 1900 and 1906, Western Australia had 80 cases. Cases of the plague continue to occur in areas of Asia, Africa, North and South America, with the most recent being an outbreak in Namibia.

"Plague continues to be enzootic in wild rodent populations over large areas of the Americas, Africa and Asia, with occasional outbreaks among commensal rodents in villages and small towns. Wild rodent plague poses a real, though limited, risk to humans. When infection spreads to rats in urban or populated areas, humans are at markedly increased risk of exposure. In the past several decades, however, urban outbreaks have been rare and limited in size. Wild rodent plague exists in the western third of the United States, in widely scattered areas of South America, in north-central, eastern, and southern Africa, Madagascar, Iranian Kurdistan, along the frontier between Yemen and

Saudi Arabia, Central and Southeast Asia (China, India, Indonesia, Kazakhstan, Mongolia, Myanmar [Burma], Vietnam), and portions of the Russian Federation. In recent years, human plague has been reported from the African region from Angola, Botswana, Democratic Republic of Congo (Zaire), Kenya, Libya, Madagascar, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zambia and Zimbabwe; in Asia from China, India, Kazakhstan, Laos, Mongolia, Myanmar (Burma), and Vietnam; and in the Americas from Bolivia, Brazil, Ecuador, Peru and the United States. Risk to travelers in any of these areas is small."[7]

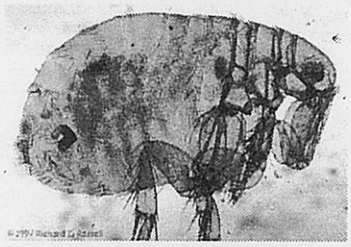
The incidence of plague worldwide continues to rise. The average number of cases reported to the WHO in the 1980s was 861 cases per year. By the 1990s it had risen to 2025 per year.[9]

The plague is reportable to the World Health Organisation under International agreement. Isolation of cases of the plague are responsible for reducing its spread despite the speed of travel.

"For international travelers, international regulations require that prior to their departure on an international voyage from an area where there is an epidemic of pulmonary plague, those suspected of significant exposure shall be placed in isolation for 6 days after last exposure. On arrival of an infested or suspected infested ship, or an infested aircraft, travelers may be disinsected and kept under surveillance for a period of not more than 6 days from the date of arrival. Immunization against plague cannot be required as a condition of admission to a territory."[8]

The Disease

The plague is a disease of rodents. It is transmitted from rodent to rodent, other mammals and man by the bite of the oriental rat flea, *Xenopsylla cheopsis*. For humans to become part of the transmission cycle of the disease, certain factors need to exist. The rodent population must be infected with the bacillus *Yersinia pestis*. At some point, the disease reduces the rodent population and the flea seeks new hosts. There needs to be sufficient contact between rodents and humans allowing for humans to become the alternate hosts for the flea.



Xenopsylla cheopsis

Black Rat

"Initial signs and symptoms may be nonspecific with fever, chills, malaise, myalgia, nausea, prostration, sore throat and headache. Commonly a lymphadenitis develops in those lymph nodes receiving drainage from the site of the flea bite, where there may be an initial lesion. This is bubonic plague, and it occurs more often in lymph nodes in the inguinal area (90%) and less commonly in those in the axillary and cervical areas. The involved nodes become swollen, inflamed and tender and may suppurate. Fever is usually present. All forms, including instances in which lymphadenopathy is not apparent, may progress to septicemic plague with bloodstream dissemination to diverse parts of the body, including the meninges. Endotoxic shock and disseminated intravascular coagulation (DIC) may occur without localizing signs of infection. Secondary involvement of the lungs results in pneumonia; mediastinitis or pleural effusion may develop. Secondary pneumonic plague is of special significance, since respiratory droplets may serve as the source of person-to-person transfer resulting in primary pneumonic or pharyngeal plague; this can result in localized outbreaks or in devastating epidemics."[8]

The Vaccine

The plague vaccine available in New Zealand is produced by CSL, Australia. It is an inactivated vaccine made using agar-grown, heat killed organisms of *Y. Pestis* in saline containing 0.5% w/v phenol as an antiseptic.

Plague vaccine is not required as a condition of entry into any territory. Use of the vaccine is believed to confer some protection on the individual, increasing the chances of recovery from the bubonic form of the plague. Its protection to the pneumonic form of the plague or aerosol exposure is presumed to be ineffective.

The vaccine is given subcutaneously. It is given as two doses between one and four weeks apart in those over 12 years and three doses for children under 12 years. Dosage is age related (as outlined in package insert). Booster doses are given every six months for those persons living in areas where plague is prevalent.

The dosage regime for the plague vaccine licensed for use in the US differs from that used in NZ. The primary series consists of an initial dose followed by two smaller doses at 1-3 months later and then 5-6 months after the second dose. Three booster doses then follow at 6 month intervals after the third dose of the primary series.

Treatment

The plague is readily treatable with antibiotics. Persons suspected having the plague should be placed in strict isolation.

"Streptomycin is the drug of choice, gentamycin can be used when streptomycin is not readily available; tetracyclines and chloramphenicol are alternative choices. All are highly effective if used early (within 8-24 hours after onset of pneumonic plague)."[8]

Streptomycin is given at 30mg/kg/day (IM) in two divided doses for ten days, however, it can be difficult to obtain in some parts of the world. Intravenous doxycycline 200mg initially, followed by 100mg every 12 hours for 10-14 days is also effective.[10]

Contacts should be given a course of antibiotic, either oral tetracycline or co-trimaxazole.[9] For contact with patients with pneumonic plague, doxycycline is the drug of choice, given 100mg orally twice a day for seven days or for the duration of risk of exposure.[10]

Sources of Information

Travel medicine specialists need to be aware of the worldwide incidence of plague and of any current outbreaks of the disease. There are many sources of this information. The World Health Organisation provides information about areas of plague in its publication, *International Travel and Health: Vaccination Requirements and Health Advice*. This book is published yearly and should be part of the library of a travel medicine clinic. It is available electronically at:

http://www.who.org/ith/english/index.htm.

WHO has a site on the Internet, http://www.who.int/wer/, which contains the World Epidemiological Record (WER). This can also subscribed to via email. PROMED, another Internet source of up to date information, is available as an email digest. It can be accessed at:

http://www.healthnet.org/programs/promed.html.

Relevance to the Modern Traveller

Plague risk to travellers today is small. There are still areas of risk and these must be pointed out to the intending traveller. Those that will be staying in areas of plague foci for periods in excess of thirty days, such as missionary and aid workers, members of the military and those who are adventurous travellers are most at risk.

The traveller's itinerary must be ascertained as this will throw some light on the advice to be given. For instance, a traveller to Namibia, going for a year as an aid worker and staying in accommodation of unknown standard in rural areas close to the latest known outbreak of the plague is at risk. On the other hand, a visitor to South Africa, who has friends living in the capital of Namibia, and intends to go see his friends for a couple of days is unlikely to be at risk.

"Immunization of visitors to epidemic localities and of laboratory and field workers handling plague bacilli or infected animals is justifiable but should not be relied upon as the sole preventive measure."[8]

Plague vaccine is available, but its use is limited. It is essentially only useful in preventing bubonic plague.[8] It is not considered effective against the pneumonic form. Where travellers are considered to be at risk, consideration should be given to the use of short term antibiotic chemoprophylaxis using doxycycline or tetracycline during periods of risk[7]. It is important that those at risk are educated about the disease and how it is spread, the strategies that can be employed to reduce risk of exposure and what to do if the plague is contracted.

It should be stressed that the first line of defence is the use of good preventive medicine practices. This includes choice of living arrangements, care with rubbish disposal, awareness of presence of rodents in the area and use of personal protective measures. Care must be taken if reduction of any rodent population is contemplated that the first action is the use of insecticides to reduce any fleas in the area. Killing of the rodents without care for fleas may result in the fleas looking for new hosts, one of the causes of plague spread.

Secondly, use of insect repellents on exposed skin and use of permethrin for impregnation of clothing and bednets may reduce the risk of contact with fleas. This is good advice

for any traveller to areas of insect borne disease.

Perhaps some comment on the possibility of spread via household pets in areas of risk should also be mentioned. For instance, it is known that cats can develop pharyngeal plague and that this can be passed to humans causing pneumonic plague.

"Seventeen cases of primary plague pneumonia were acquired from pet cats with plague pneumonia in the interval 1977-1994."[8]

The Returning Traveller

It is important to be aware of the plague as a possible infection among travellers despite the small risk.

"Medical personnel should be aware of areas where the disease is endemic and early entertain the diagnosis of plague; unfortunately, plague is often misdiagnosed, especially in travelers who develop illness after returning from an endemic area."[8]

Conclusion

Historically the plague is a disease of contact between humans and populations of infected rodents and their fleas. It has been spread as a result of travel, either by carriage of the disease on infected persons or movement of rodents or fleas in the baggage and transport of humans.

It still occurs in areas around the world, but the epidemic proportions of the Black Death are now part of history. Its control is due largely to International Regulations, isolation of cases of the plague and the bacteria's susceptibility to the use of antibiotics.

This does not, however, mean we should be complacent. Factors exist today for an epidemic of huge proportions to occur should only a few factors change. Firstly, the number of wars around the globe threatens its control in many areas. Secondly, the speed of travel and the potential for movement of infected people and rodents and their fleas. And finally, the ability of bacteria to become resistant to antibiotics. A change in any one of these factors could be all the trigger the plague needs to once again become "the Black Death"

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Cold Induced Thermoregulatory Failure: 1: Physiology and Clinical Features[1]

B H Short[2]

Abstract

This is the first part of a two part review, which looks at the effects of cold on the body. In this article, the physiology of thermo-regulation, the mechanisms of heat loss and the clinical features of thermo-regulatory failure are addressed. The second article, to be published in the next issue, will review the management of accidental hypothermia.

Introduction.

The manifestations of cold induced thermo-regulatory failure are of great military significance. Over centuries, commanders have encountered the horrendous mortality and morbidity accompanying the general cold injury syndrome (hypothermia) and the local cold injuries of chilblains, immersion (Trench) foot and frostbite. The devastation exacted by these disorders on Napoleon's army in Russia and in the Peninsula War of 1808-1814, on the armies of both sides during the Crimean and the American Civil Wars, on almost all armies during the World Wars (on land and at sea) and more recently, during the Korean War and the 1982 South Atlantic War, have been widely documented. The effects of hypothermia may befall armies operating in deserts, in mountains, in jungles, and in fact in any climate and during any season of the year.

Thermoregulation.

The normal range of human core body temperature is 36.4o C to 37.5oC (97.5oF to 99.5oF). Hypothermia is defined as a lowering of the central core temperature below 35oC (1) whilst hyperthermic dysfunction, typified by the Heat Stroke syndrome, is associated with core temperatures exceeding 40oC.

The steady core temperature is maintained by the balance of heat loss and heat production. The set value of the body temperature is maintained by nuclei in the preoptic anterior hypothalamus. This thermoregulatory centre conserves heat by producing cutaneous vasoconstriction and stimulating muscular activity in the form of shivering. Low temperature activation of thermostats in the thermal centre as well as cutaneous cold receptors induces a series of compensatory changes. Such changes are marked by progressive metabolic depression in each organ system. Substantial individual variability in these cold-induced physiological sequelae is common. (2).

The body's predominant source of heat production results from metabolic activity within the heart and liver and are thus important contributors to the homeothermic core. Ninety percent of the body's heat loss is via the skin and a very important portal is the unprotected, especially bald-headed, scalp. The remainder of the loss is via the respiratory tract. The skin and superficial tissues comprise the body's so-called poikilothermic shell. Cold induced thermoregulatory failure occurs when peak heat production is insufficient to counter the rate of heat loss due to falling ambient temperature leading to progressive multi-organ dysfunction.

Mechanisms of Body Heat Loss.

Heat Loss occurs via the following processes:

Convection.

The movement of air (or water) aids the transfer of heat from the body to the colder surrounds. The drop in skin temperature by the increasing wind velocity relates to the dissipation of the layer of warm air around the skin, known as the wind-chill factor. Convective cooling is much greater in water than in air. Wind and wet cause a marked increase in the rate of heat loss, and a body loses less heat at –10oC in still air than at +10oC when exposed to a 33 kph (20mph) wind (3). Convection is the major cause of heat loss from the body at high altitude.

Radiation.

In this process, direct contact with air is not necessary for the heat loss since the heat en-

[1] Short B. Cold Induced Thermoregulatory Failure: 1: Physiology and Diagnosis. *Aust Mil Med* 2000; 9(1), 29-33.

2 Air Commodore Bruce Short, FRACP, FCCP, FACP, is the Assistant Surgeon General ADF (Air Force) and the Consultant in General Medicine to the Surgeon General.

ergy is transmitted to the environment in the form of electromagnetic waves. Thermal radiation accounts for up to 60% of the metabolic heat loss at sea level and is independent of air movement.

Conduction.

Conductive body heat loss occurs by direct contact with agencies at a lower temperature. In this respect, air conducts heat inefficiently such that a layer of still air acts as a good heat insulator. On the other hand, water conducts heat some 240 times greater than air with the effect that wet clothing or immersion rapidly induces reductions in core temperature.

Evaporation.

The so-called latent heat of evaporation is the transfer of energy required to change liquid to a vapour: body heat loss by the evaporation of sweat. At altitude, cold air with low humidity accentuates this heat loss. At sea level, 40% of body heat loss occurs via evaporation with insensible water loss and sweating from the skin together with respiratory fluid losses. Wet clothing exposed to wind accelerates evaporative body heat losses.

Classifications of Hypothermia.

The existing classifications are contentious. The temperature of less than 35oC proposed by the RCP Committee Report (1966) to indicate hypothermia was selected to allow for the maximum diurnal variation of core temperature. Lloyd highlights the artificiality of the classification based on core readings which might suggest that 35.5oC is not hypothermia and therefore safe while 34.5oC is hypothermia and the patient is in danger. Neither readings, however, take into account the total body heat. (4) Accidental (unintentional) hypothermia is classified as mild (body core temperature 32.2 to 35oC), moderate (28 to <32.2oC) and severe (<28oC) (2).

Hypothermia may also be classified according to the duration of exposure: (5).

Acute hypothermia results from the excessive and sudden cold stress that overrides cold resistance despite heat production being at or near maximum. Hypothermia occurs before exhaustion develops. This type most commonly occurs following cold water immersion.

Subacute hypothermia results from physical exhaustion and depletion of body's food stores, which cause a failure in metabolic heat production. Mountaineers and trekkers commonly sustain this form of hypothermic insult due to cold, wind and rain.

Chronic hypothermia is the result of prolonged exposure to a mild degree of cold stress and while the thermoregulatory response is not overwhelmed it is insufficient to counteract the cold. This type is commonly seen in the urban dwelling elderly.

A fourth variety has been proposed namely, **submersion hypothermia**. The common factor is total submersion in ice cold water. The younger the victim the greater the chance of survival. Cases are reported of successful resuscitation without brain damage after emersion for up to 60 minutes. (3).

Causes of Hypothermia.

The leading causes of accidental hypothermia in urban medical centres in the US are exposure to alcoholism, drug addiction or mental illness and accidents involving immersion in cold water (6). Hypothermia due to accidental cold exposure is encountered most commonly among neonates and the elderly, in those immobilised by trauma or exhaustion, and in intoxicated and unconscious personnel. Depending on the population analysed, alcohol is associated with 80% cases of accidental hypothermia (7). The predisposing factors for cold induced thermoregulatory failure are in Table 1.

Decreased Heat Production:	Insufficient Fuel:	Hypoglycaemia Malnutrition Extreme Physical Exertion.
	Physical Exertion:	Inactivity Impaired Shivering Young and the Elderly
	Endocrine Failures:	Hypoadrenalism Hypopituitarism Hypothyroidism
Increased Heat Loss:	Environmental	Immersion Non-immersion
	Iatrogenic	Cold Infusions Surgical Exposure Emergency Deliveries
	Skin Disorders	Psoriasis Exfoliative Dermatoses Burns
	Vasodilatation	Alcohol and Drugs Toxin induced
Impaired Thermoregulation	Central Nervous System Failure	Toxins Cerebrovascular Accident Metabolic Disorders Drugs Trauma Degenerative disorders (Multiple Sclerosis; Parkinsons)
	Peripheral Nervous System Failure	Acute Spinal Cord Transection Diabetes Neuropathies
Miscellaneous:		Uraemia Shock Infection Pancreatitis Multisystem Trauma Carcinomatosis.

Table 1: Predisposing Factors for Cold Induced Thermoregulatory Failure.
(After: Danzl DF, Pzos RS. Accidental hypothermia N Engl J Med 1994; 331: 1757)

Clinical Features of Hypothermia.

A history of cold exposure provides a straightforward diagnosis of hypothermia; however, historical facts do not always suggest hypothermic dysfunction. In addition, commonly there is a substantial individual variability in the clinical manifestations of the physiological changes. Cold-recording electronic thermometers with flexible probes are available to measure rectal, oesophageal and bladder temperatures. Core temperature is best recorded rectally utilising thermometers capable of measuring as low as 25oC. Reliance on infrared tympanic thermography for the accurate assessment of hypothermia presently requires further trial substantiation.

In all body systems, hypothermia induces a progressive depression of metabolism. It typically has an insidious onset and maybe ushered in by non-specific symptoms consisting of chills, dyspnoea, nausea or dizziness.

Central Nervous System Features.

Mild hypothermia produces gradual impaired judgement, memory disorder, speech impairment and apathy. Beware the mountain walker who commences to repeatedly and unaccountably stumble, fails to follow the trail, starts to lag behind or who develops inappropriate or incoherent speech. He may be hypothermic or developing high altitude cerebral oedema or a combination of both. Increased pre-shivering muscle tone is followed by shivering-induced thermogenesis.

Moderate hypothermia leads to a diminution in shivering and the gradual replacement by motor rigidity. Alterations in consciousness now appear with episodic hallucinations and the paradoxical removal of thermal protective clothing.

Severe hypothermia is typified by the absence of spontaneous movement, stupor and coma with reductions in cerebral blood flow

due to the loss of cerebrovascular autoregulation. The severely hypothermic individual must therefore always be re-warmed before the pronouncement of brain dead.

Cardiovascular Features.

Mild hypothermia induces vasoconstriction and an increase in cardiac output, arterial pressure and pulse rate. Tachycardia is soon followed by bradycardia and cycle prolongation with a consequent lengthening of all ECG intervals.

Temperatures between 32oC and 28oC are associated with further pulse slowing and a decrease in both arterial pressure and cardiac output. Atrio-ventricular arrhythmias become evident. ECG recording may show non-specific changes in the J-wave known as the Osborn wave. This positive deflection at the J point, the junction of QRS and ST segments, is in the same direction as the QRS complex and is seen in about one third of cases with core temperatures below 33oC. (8,9). The height of the Osborn wave is roughly proportional to the degree of hypothermia, however, it does not carry prognostic implications (10). This deflection is not pathognomonic for hypothermia and may be seen in sepsis and some CNS lesions (11).

Severe hypothermia produces further depression in rate, pressure and output with a decrease in ventricular arrhythmic threshold and concluding in asystolic arrest. Re-entrant dysrhythmias are now frequent and are of major clinical significance during re-warming efforts.

Respiratory Changes

Mild hypothermia produces early tachypnoea followed rapidly by reductions in respiratory minute volume in association with the declining oxygen consumption. Cold-air induced bronchorrhoea and bronchospasm may now be seen.

Progressive hypoventilation in association with the falling metabolic production of CO2 is associated with loss of protective airway reflexes. The blunted cough reflex is associated with hypostatic atelectasis.

Severe hypothermia leads to apnoea in association with the marked diminution in oxygen consumption. Pulmonary congestion and frank oedema may also appear.

Renal Changes

Mild hypothermic changes result in a cold-induced diuresis, which may result from the peripheral vasoconstriction as well as from a blunting of the tubular effects of ADH.

Progressive hypothermia results in a decreased renal blood flow secondary to the fall in cardiac output. Extreme oliguria supervenes and this may be exacerbated in those with acute tubular necrosis secondary to rhabdomyolisis associated with hypothermic- coexistent compartment syndromes. Hypothermia typically masks the changes in the ECG caused by the accompanying hyperkalaemia.

Haematological Changes.

Coagulopathies often develop in the hypothermic setting despite normal clotting factor levels (12). Cold directly inhibits the coagulation cascade. At –33oC there is a 50% reduction in clotting function. Concurrently there is a diminution in platelet activity due to both a reduction in thromboxane B2 production by platelets (a thermal-dependent process) as well as a cold-induced thrombocytopenia secondary to both marrow depression and hepatosplenic sequestration. (13). The assessment of the coagulopathy by measuring the prothrombin time and partial prothromboplastin time, which at 37oC may be entirely normal, fails to correctly identify the bleeding disorder.

Metabolic Changes.

Similar to hypocapnoea and alkalosis, hypothermia shifts the oxyhaemoglobin-dissociation curve to the left resulting in a decrease in oxygen release from haemoglobin into the tissues at a lower partial pressure of oxygen. This reduced oxygen release to tissues is exacerbated by hypothermia-induced vasoconstriction, ventilation-perfusion mismatch, and the increasing blood viscosity associated with the dehydration and fluid sequestration attending lengthy cold exposure. The haematocrit increases 2% for each 1°C temperature drop. (2)

Mild hypothermia induces catecholamine release with an increase in glycogenolysis with resultant transient hyperglycaemia. However, with persisting cold exposure there is glycogen depletion and therefore hypoglycaemia. Hypoglycaemia per se may also be the cause of the accidental hypothermic insult. The finding of hyperglycaemia in the hypothermic patient suggests diabetic ketoacidosis or pancreatitis.

The initial mild hypothermic shivering enhances metabolism in association with an increase in catecholamines, adrenal steroids and thyroxine. A continuing fall in temperature results in up to 80% reduction in basal metabolism and ultimately the adoption of the poikilothermic state.

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History

Australia and the Boxer Rebellion 1900 -The South Australian Contingent (1)[1]

N. Westphalen[2]

Introduction

August 2000 is the centenary of Australia's involvement in the Boxer Rebellion. This was only the second and last time that the colonial naval forces saw overseas service, the first being the deployment to New Zealand by the Victorian screw sloop *Victoria* in 1860-1. The Boxer Rebellion was the larger deployment of the two, with over 600 men from NSW, Victoria and South Australia.

Although largely forgotten, the Boxer deployment was an important step in the formation of the Royal Australian Navy in 1911. It was used by the South Australian contingent commander (and founder of the RAN) Captain William Creswell, to convince British imperial and naval authorities that Australians could train, maintain and sustain an efficient navy of their own.

Each contingent had its own medical personnel and the aim of this two-part article is to tell their story. The first covers the SA contingent and their ship HMCS *Protector*, while the second covers the NSW and Victorian contingents.

Background

Until the 1840's the Western powers only traded with China on a seasonal basis via 'factories' in Canton. Although at first Chinese goods were paid for in bullion, corrupt officials later allowed the Europeans to sell opium. After Chinese attempts to reassert control instigated the 1842 Opium War, the ensuing British victory lead to large indemnities, permission to trade from other ports beside Canton, the right to year round residency and the establishment of Hong Kong.

Further conflict became inevitable as British merchants extended their demands, especially after the 1860 China War resulted in a charter for all missionaries. Chinese peasants were hostile to missionaries and their converts because of their demands for land to build churches and housing. They also believed the 'foreign devils' buried Chinese babies in the foundations of important buildings. Furthermore, although there were only three short railways in China by 1900, many more were being built. The peasants believed railway engines to be fire-breathing dragons and the work of devils. The railway builder's neglect of feng shui (not to mention ancestral graves and other sacred sites) did little to help matters.

Secret societies have always been part of Chinese daily life. The name I He Tuan ("Righteous Harmony Group"), was corrupted by Westerners to I He Chuan ("Righteous Harmony Fists")- hence 'Boxers'. Their aim was to kill all foreigners in China. Although lacking a specific leader, the Boxers shared the inculcation of invulnerability to foreign weapons, the battle cry 'Sha! Sha!" ("Kill! Kill!"), the use of red shirts as a type of uniform, and the use of complicated, prolonged and highly unpleasant tortures.

The Boxer rebellion began in late 1898, after the Germans plundered the provinces south and east of Peking, with attacks on Chinese Christians, including arson, torture and murder. These intensified in early 1900 and by 28 May the beleaguered legations at Peking sought military assistance from the international naval forces at Taku. Further reinforcements were beaten back, initiating a siege of the legations, which lasted two months. Further reinforcements were sought overseas, but most of the fighting was over by the time the Australians arrived.

Australian Responses

In Australia all eyes was on the Boer War and the impending Federation of the six colonies. These received a request for assistance from British Secretary of State Joseph Chamberlain on 28 June.

[1] Westphalen N. Australia and the Boxer Rebellion 1900 -The South Australian contingent (1). *Aust Mil Med* 2000; 9(1), 34-41

[2] CMDR Neil Westphalen, a keen Naval Medical historian, is the SO1 MED at HQAST.

The Royal Navy in Australia.

The Royal Navy gunboats HMS *Mohawk* (with Staff Surgeon John Moore) and *Lizard* (Surgeon[1] Sydney Croneen) with the third class cruiser HMS *Wallaroo* (Surgeon Frank Bradshaw) departed Sydney on 2 July. As part of the Auxiliary Squadron, *Wallaroo* required colonial approval to release her in accordance with the 1888 Naval Agreement.[2]

All three ships were manned by RN bluejackets with their own sickbay staff. Moore had qualified in Ireland in 1884, Croneen in London in 1895, and Bradshaw in Ireland in 1889.[2] Midshipman A.L. Fletcher left his impressions of the RN medical branch at the time:

'The surgeons were about 75 per cent ex-Trinity College, Dublin, 20 per cent Scottish universities and the odd 5 per cent English. Perfect dears but very thirsty when young. Their medicine may have been crude but they knew a lot about malaria and VD. My chief memories of the sick bay were No 9 pills, almost atomic in action, for internal disorders, santonin for worms - very prevalent in the East - and vats of zinc ointment for everything else.'[3]

Colonial Responses.

The colonial response was characterised by attempts to outdo each other. On 29 June the Victorians offered their gunboat *Albert*, but later decided to send 200 sailors for service ashore. The following day Queensland offered either of their two gunboats *Gayundah* or *Paluma*, using RN personnel. This was rejected as both ships were considered too old and slow, however South Australia's offer of the gunboat *Protector* on 2 July was provisionally accepted three days later. Besides agreeing to *Wallaroo*'s release, the New South Wales government suggested its Naval Brigade be used as crews for other Auxiliary Squadron ships. The British instead accepted a contingent of 250 sailors for service ashore with the Victorians.

[1] The rank of Staff Surgeon became Surgeon Lieutenant-Commander, and the rank of Surgeon became Surgeon Lieutenant in 1920.

[2] In addition to the RN ships of the Australia Squadron, the 1888 Naval Agreement gave the colonies partial control of five small cruisers and two gunboats manned and operated by the RN, in exchange for a small colonial subsidy. Besides acting as a reserve the Auxiliary Squadron was intended to train Australians for naval service but this never happened. Although this arrangement was never satisfactory for either party it lasted until the Royal Australian Navy was established in 1911. See Nichols, Bob, *Statesmen and Sailors: Australian Naval Defence 1870-1920*, Standard Publishing House, Balmain, 1995.

The South Australian Contingent

Her Majesty's Colonial Ship (HMCS) *Protector.*

In July 1882 the South Australian parliament had allocated funds for a gunboat. Construction began at Newcastle-on-Tyne in November 1882, with the ship commissioning as HMCS *Protector* in June 1884. Costing £65,000, her specifications were:

188' long, 30' beam, 12'6" draft

960 tons displacement

Two engines totalling 1640 horsepower giving 14.5 knots.

In modern terms these dimensions are less than half the length and a quarter the displacement of a RAN guided missile frigate. *Protector* was however very heavily armed for her size, with:

One 12 ton eight inch gun forward firing a 180 pound shell,

Five 4 ton six inch guns (two on each beam, one aft) firing an 80 pound shell,

Four 3-pounder guns, and

Five machine guns.

Protector also had a 1" armour belt four feet wide on the waterline, as well as a one inch thick steel conning tower, a shield one inch thick for the eight inch gun, and shields two inches thick for the six inch guns.

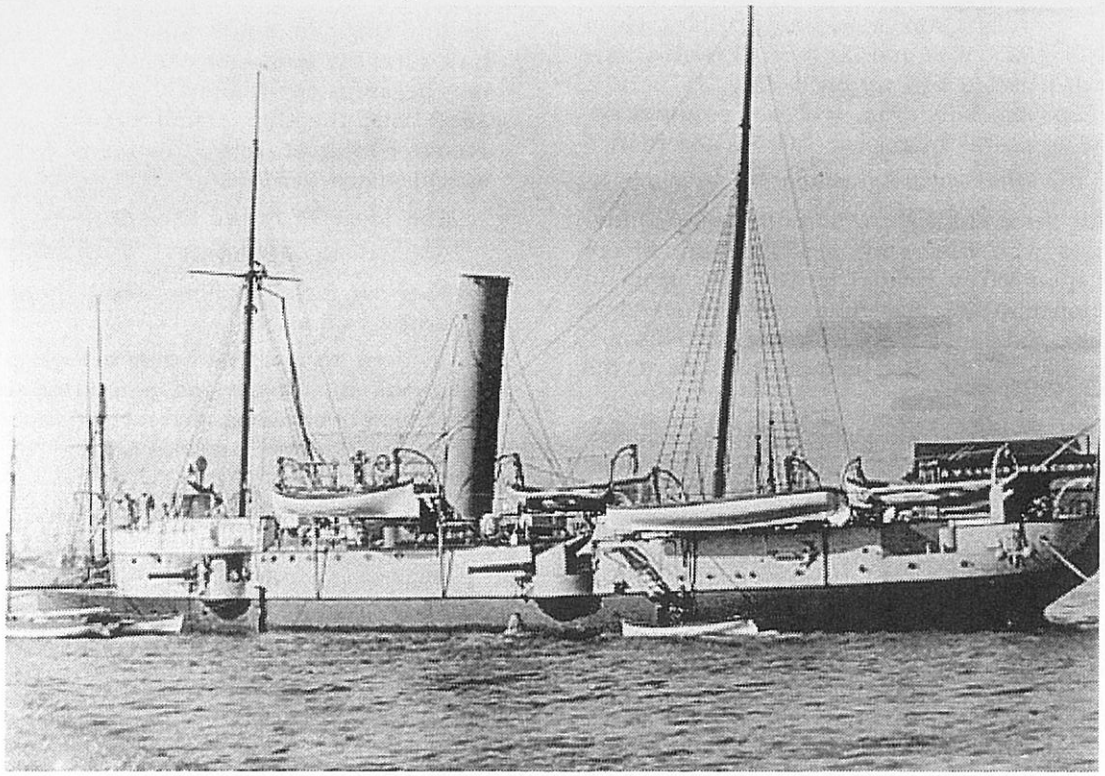
She sailed for Adelaide in June 1884 under Captain J.C.P. Walcot, RN, who remained Commandant of the South Australian Naval Forces (SANF) until 1893. She arrived on 30 September 1884 after calling at Gibraltar, Malta, Suez, Colombo and Albany. One member with fever was landed at Colombo and another died before reaching Albany, despite the efforts of a Dr William Reid. Reid had signed on as Surgeon[3] for the voyage only,[4] in contrast to the rest of the crew who signed articles for the voyage out and for three years thereafter.[5]

Lieutenant William Creswell joined *Protector* in October 1885 as First Lieutenant, after his predecessor was medically discharged for rheumatism and partial leg paralysis. Born in 1852, Creswell entered the RN in 1865, but had been working as a jackaroo following his own medical discharge in 1879.[6] Years later he wrote:

"... at Tientsin, Captain Jellicoe ... said he wondered how they could have designed such a ship of such small tonnage to carry such an armament.

[3] The Register, Adelaide, 1 October 1884. Cited in South Australian State Archive Research Note 906 'A Warship for SA'.

That a ship, 15 years after her first commission, should elicit such praise from the very highest naval opinion of the day is proof indeed that she was an exceptional and very remarkable vessel.



HMCS PROTECTOR, c1900
(B18116, with permission Mortlock Library of SA)

"Some idea of the *Protector*'s power and great stride in advance made by her design and armament may be gathered from the fact that at that time we could, excepting in heavy weather, out-steam and always (by some two or three thousand yards) outrange the great flagship on the station, the *Nelson*, an armoured cruiser, many times the *Protector*'s weight of metal and about six times her size!

It was a constant wonder to me in my early South Australian days that there was so little appreciation of the *Protector*'s real value and the complete defence she provided against the only danger to which we should be exposed in war."[7]

Over the next 15 years *Protector* undertook various duties. In December 1885 she suffered a breech explosion during the Royal Salute for South Australia's Proclamation Day. Able Seaman Phineas Davies was killed and another sailor was injured. Things went further awry when Davies was buried as a Catholic but turned out to be Jewish.

Admiral Tryon, Commander-in-Chief of the Australia Station, inspected *Protector* the following year and stated privately that she "was not only better kept than any ship on the Station, but was so much better kept that there was no ground for comparison."[8,9]

Besides her wartime role, *Protector* was used for lifeboat training and rescue, after the *Star of Greece* was wrecked at Port Willunga with great loss of life in 1888. In 1890 she assisted *Cathcart* off Cape Jervis, rescued occupants of the Semaphore baths after the jetty was destroyed in a storm, and manned the *Governor Musgrave* to rescue survivors from the *You Yangs*, after the latter was wrecked on Kangaroo Island.[4]

The 1890 Depression hit the colonies hard and 1893 it was suggested that *Protector* be sold. Instead she was reduced to reserve with only 21 officers and men. Creswell took over from Walcot as SANF Commandant and made the best of a bad financial situation until he took over the Queensland Navy in April 1900.

China Deployment Preparations

All three contingents were dogged by the mismatch between RN and colonial pay rates (1s 9d per day for RN able seamen compared with 7s for South Australians). Although *Protector* was accepted on 5 July, it was not until 31 July that the British authorities agreed to a

£1000 per month subsidy.[1] She also needed 100 men, of which 90 had to come from the reserve. Recruiting went well once they were paid South Australian rates. They then signed the following oath on the enlistment form:

"We agree to serve Her majesty the Queen on board HMCS PROTECTOR, or other War Vessel as May be directed, or on shore, in any part of the world, and for any period not exceeding one year, at the rate of pay against our names, and also agree whilst serving to be subject to the articles of war and queen's Regulations for the time being in force in the Royal Navy."[10]

Captain Chapman James Clare had only recently taken over from Creswell as SANF Commandant. On 5 July 1900 he had written to the Chief Secretary regarding clothing allowances, but a medical officer was not included on the initial list. Five days later Clare added:

"A doctor may also require an allowance for uniform when appointed. Will the Hon the Chief Secretary please approve this slight alteration if required."[10]

An account with Shierlaw and Co 'for Dr Morris' has survived as follows:

Altering mess dress to regulation, new lace etc	£2-10-0
Frock suit, regulation, naval surgeon	£10-0-0
Cap and badge, naval surgeon	£1-1-0
Sword	£7-0-0
Sword belt	£1-10-0
Total	£22-1-0

Received £14-13-0 on account 11 October 1900[10]

Apart from belatedly getting his uniform allowance, it is interesting to speculate whether the prospect of a medical officer handling any sharp implement larger than a scalpel would have worried *Protector's* gunnery officer any more than it does his professional descendants.

Staff Surgeon Bedlington Howel Morris

Dr Morris was not officially appointed into the SANF until 9 August.[11] Not surprisingly, his name is last on the enlistment form. He was paid 21 shillings per day for 169 days service (6 August 1900 to 13 January 1901), receiving £169 1s 0d after deductions. By comparison Creswell was paid 22 shillings and sixpence per day with the other officers paid substantially less.[12]

It is interesting that Morris was appointed over 17 medical officers in the South Australian Military Forces, four of whom were in South Africa.[2] As Creswell used *Protector* to further his aim of an Australian navy, it is likely he was keen to remain independent of any army support. He seemed satisfied with

Staff Surgeon B.H. Morris, 1901
(B6401, with permission Mortlock Library of SA)

Morris, as he later wrote:

"...Surgeon Morris, to whom the success of the expedition owed much, quite the ideal man for the work under such temporary conditions, and earned the confidence and regard of all on board."[7]

Morris certainly did not need the job, having already made his mark in South Australia. Born at Anglesea in North Wales on 22 April 1868, he was educated at Beaumaris and St Thomas's College and graduated MBBS from Durham University in 1893 with first class honours. He was the Armstrong Scholar for medicine, the Goyder Scholar for surgery and had won first prize for surgery. Following residency at Durham County Hospital and the Denbighshire and Flintshire Infirmary and Dispensary, he was the transport medical officer for the Netherlands-India Service to Java and Malaya. Later he was surgeon to the Blue Funnel Company on its eastern routes.[13] It seems likely that he became familiar with maritime and tropical medicine during this time. He was appointed to the Adelaide Hospital (now the Royal Adelaide Hospital) as Resident Assistant Surgeon in 13 November 1896[14] and received his South Australian registration (no 557) on 7 January 1897.[15]

He was then embroiled in the Adelaide Hospital Row, which influenced South Australian medical politics into the 1970's. The 'Row'

began with a trivial dispute over a nursing appointment but by July 1895 had become a violent 'class war' between the establishment-dominated hospital board and the government, lead by Federation Father Charles Cameron Kingston. The latter had horsewhipped a personal enemy in the middle of Adelaide and was once arrested in Victoria Square on his way to a duel with a loaded pistol. After the hospital board was sacked the members resigned all their other posts, including their teaching positions at the University of Adelaide. For some years thereafter this forced Adelaide students to complete their studies interstate or overseas. Meanwhile the Adelaide Hospital kept going under Drs Ramsay Smith and Leith Napier, who were denounced as medical 'scabs'.[15]

Even in his early career, Morris seems to have been an astute political operator, supporting Smith and Napier yet avoiding their vilification. Just prior to his appointment to the SANF, he had been appointed Government Medical Officer and Prisons Surgeon, Chief Medical Officer to the Destitute Poor Department and Chief Medical Officer to the State Children's Department.[16]

Other Preparations.

The next concern was *Protector*'s legal status, as she could legally operate as a warship only within South Australian territorial waters. This was resolved by commissioning the ship into the RN unit at Hong Kong and putting Captain Creswell (ex-RN) back in command with Clare as First Lieutenant.

Concerns regarding the ship herself were coal, water (with no condensers or evaporators her endurance was limited to 10 days at 10 knots) and her ammunition which was not standardised with the RN. Meanwhile Shierlaws completed the crew kit up, each man receiving a cholera belt (a padded belt worn over the kidneys to prevent cholera, which remained in RN use until World War II).[1] Morris arrived in time to generate a bill for £7 13s 2d for medical stores from Fauldings before the ship left Adelaide on 6 August.[10]

The Deployment

The first defaulters parade on 7 August had Able Seaman 2nd Class Russel Grant charged with leave breaking and being drunk. He claimed to have missed the boat while seeing a doctor and that the latter prescribed an excessive dose of brandy. This was not accepted and Grant received 10 days punishment and stoppage of grog.[17]

Protector arrived at Sydney on 10 August and departed for Brisbane two days later, during which Morris expended another £74 17s 1d on medical stores from Elliot Brothers.[10] In addition one sailor cut his foot on an illicit run ashore.[17] Creswell rejoined his old ship on 14 August and sailed next day for Townsville and Thursday Island, where one sailor became ill from heat stress but recovered.[17] She crossed the Line on 30 August, where the crew had the usual frivolities:

"Neptune with his wife & suite were there to receive each one. A guard was also formed with the police. Each one then had to go through the Ordinances. As your name was called out you would pass through the guard line on either side, & the "Doctor" was the first to inspect you, who would therefore prescribe for you accordingly, and a person who was known to be dilatory in regards to his cleanliness during the trip was given a thorough good overhaul by the doctor's orders. One or two this class suffered the full penalty, & really they looked quite fresh & nice for three weeks after. The doctor and his assistant would also give you a pill, which was not at all palatable, consisting chiefly of flour, mustard soap, tobacco, pepper, mixed with paint oil. It was no use to protest against it because the easier you went the better you got off & while taking the pill in your mouth would be stuffed up with soft soap by an attendant standing behind you..."[17]

Although it was likely (and one would certainly hope) that Neptune's doctor and Morris were not in fact the same person, medical officers still participate in today's somewhat attenuated line crossing ceremonies - albeit mostly on the receiving end.

Protector arrived for coal at Ilo-Ilo on Panay Island in the Philippines on 3 September and sailed two days later. After a horrendous voyage at the height of the typhoon season *Protector* reached Hong Kong on 9 September. During the trip north, while the engineers endured temperatures of 124° F below deck, Creswell drilled his crew hard, including action stations, gunnery drills, fire stations, collision drills, and abandon ship. 'Our Correspondent' for the *Herald* (not identified) wrote:

"...the port watch were given an hour's lecture on 'First Aid' by Doctor Morris, who is interesting, instructive and amusing at the same time. Imaginary limbs were bound up, arteries and veins stopped from bleeding, until some advanced pupils began to handle bandages and tourniquets as if they wished for a real subject on whom to show their efficiency."[1]

At least the intent, if at times perhaps not the skill, of naval first aid training has remained unchanged during the last 100 years.

On arrival on Hong Kong, Creswell smugly reported no illness, defects or need for coaling assistance, receiving a 'very well done' from the Port Admiral. On being invited to obtain stores, Creswell's crew enthusiastically availed themselves of the opportunity to overcome several longstanding deficiencies.[1]

Protector and her officers including Morris were commissioned into the RN on 11 September and sailed on 19 September, arriving the next day at Woosung and Shanghai. She finally arrived at the British naval base at Wei-Hai-Wei on 30 September, where Admiral Seymour (C-in-C China Station) interviewed Creswell. Years later the latter wrote:

'Sir Edward Seymour plied me with questions, asked and noted many details and particulars of the ship.

"And how many sick do you have?'

"None sir, the fact is there's nowhere to put them."

I told him of our gruelling trip to Hong Kong. "Well if you have no sick, I'm hanged if I see why anybody else should have any sick."

I learned later that a battleship anxious for a run to Japan had submitted a big sick list in support of her request."[1]

Creswell's comments suggests Morris did his part in ensuring *Protector* made a good impression during this visit, which proved crucial to the establishment of the RAN.

Protector's only real chance of action came on arriving at Taku on 1 October, where she was to participate in attacks on the forts at Shan-hai-kwan and Ching-huang-tao. Unfortunately the first had already been captured and on parading the port watch of seamen to attack the second Creswell found the Russians had got in first. Instead, A boat party including Able Seaman George Jeffery spent a few days dragging for and removing mines laid at the approaches to Ching-huang-tao and surveying a site for a pier to land military stores.[18] It is interesting to contrast these efforts with those of CDT Three in Kuwait 91 years later.

With no chance of action, *Protector* spent the rest of her time in China from 2 October to 6 November carrying dispatches, stores and personnel between Taku, Chan Huang Twa, Shan-hai-kwan and Wei-Hai-Wei. Captain Jellicoe (later commander of the British Grand Fleet at Jutland in 1916) wrote to Creswell complimenting *Protector* that she was "never sick or sorry, and always ready for a job of work."[2,8]

On 2 November *Protector* was released to return home and she left Wei-Hai-Wei five days later. She arrived at Hong Kong on 15 November where her stores were returned/replenished and she underwent docking. Her crew participated at a church service at HMS *Tamar* on 18 November and she decommissioned as a RN unit the same day. She sailed on 24 November via Manila, Ambon and Thursday Island, arriving at Brisbane on 14 December. She was cleaned by *Gayundah*'s crew and left for Sydney where she arrived on 18 December. *Protector* remained for celebrations marking the establishment of Commonwealth of Australia on 1 January 1901, sailing next day to arrive at Adelaide on 6 January (flying the new Australian national flag for the first time) where she paid off two days later, having travelled 16,000 miles.

The Adelaide *Register* included the following interview with Captain Clare on her return:

What has been the general impression concerning the men?

Throughout I may say the opinion expressed has been complementary. It is interesting to know that ours was the most healthy ship on the station. While nearly every man-of-war had 15 to 20 percent sick, our sick-list was practically nil, with the exception of a few cases of influenza. With regard to the ship, she was certainly the most heavily armed vessel for her size on the China Station. Both Admiral Seymour (C-in-C China Station) and Admiral Pearson (C-in-C Australia Station), who inspected me in Sydney, said she was an efficient ship.

You were disappointed in not going into action?

Yes, we were. The whole ship's company would have embraced the opportunity had it arisen, but there was not the slightest prospect of it. It has, however, been a great experience. The *Protector* and her crew could take her place anywhere in the British navy, and it is to the credit of South Australia that she alone of the Australian States was in the position to send a boat like *Protector* upon active service. You may say that the relations between the officers have been of the most cor-

[1] 'Our First Australian Warship - Story of the Protector - Interesting Reminiscences by Admiral Sir William Creswell.' *The Register*, Adelaide, 26 June 1924 p 10. Quoted in Nichols, Bob. *Bluejackets and Boxers: Australia's Naval Expedition to the Boxer Uprising.* Allen and Unwin, Sydney, 1986.

[2] Quoted in Jones, Colin. *Australian Colonial Navies.* Australian War Memorial, Canberra, 1986. p 127.

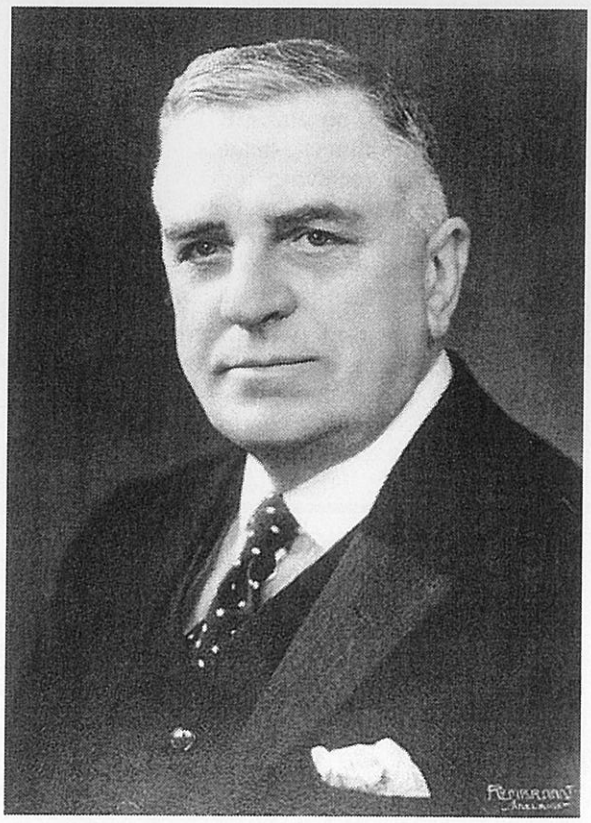
dial nature. No disputes of any sort have arisen.'[3]

Aftermath

Protector was transferred to the Commonwealth Naval Forces in March 1901 and to the RAN in 1911. During World War I she was used for minesweeping patrols off Port Phillip Bay. She was sold in 1924 and from 1931 was used as a cargo lighter until she was purchased by the Navy in July 1943 for the US Army. She left Sydney under tow on 6 September for New Guinea, but on 30 December the tow broke and she sustained heavy damage when she was hit by an Army tug. She was taken to Gladstone in a sinking condition and was sold for use as a breakwater on Heron Island.[19] *Protector's* relics include her steering wheel (now in the Maritime Headquarters foyer) and one of her six inch guns at Semaphore in Adelaide.

Bedlington Morris married Ada Jessica Shearer at St Luke's Church, Whitmore Square in Adelaide on 11 August 1902[20] and they had one child Cledwyn Howel Morris on 24 Nov 1903.[21] In 1914 he became the South Australian Inspector General of Hospitals, by which he became Chairman of the Adelaide Hospital Board, the Nurses Registration Board, the Dental Association Board and the Mental Defectives Board. He was also a member of the Medical Board of South Australia, the Faculty of Medicine at Adelaide University and the Medical-Psychological Association of Great Britain and Ireland. Morris also established the Mareeba Babies Hospital and the Bedford Park Sanatorium.[16]

He maintained his naval links and was promoted to Fleet Surgeon[4] in the Royal Australian Naval Brigade (later renamed the RAN Reserve) on 2 July 1910.[22] Having failed to get away again during World War I, he retired from the RANR on 1 February 1924. He died on 10 July 1936 and was cremated the following day at West Terrace Cemetery. In December 1936 the Northfield Consumptive Hospital was renamed the Morris Hospital (now the Hampstead Rehabilitation Unit of the Royal Adelaide Hospital).[23]



Dr B.H. Morris as SA Inspector General of Hospitals (GRG 78/96/8, SA State Archive)

Conclusion

As they entered the new century, the Australian naval forces consisted of small numbers of reservists manning small and obsolete ships (when they had them). *Protector*'s China deployment showed what Australian seamen were capable of, given the opportunity. It was up to Creswell to ensure that that opportunity was not wasted. Feedback while in China and subsequent events suggests that he had considerable success.

Besides adding credence to Creswell's aim of an Australian Navy, it seems striking how many things have remained unchanged over the last 100 years. Creswell's work-up of his crew bears strong similarities with OLOC preparations for the DAMASK deployments. AB Jeffery's mine clearing efforts appears to parallel CDT Three's work in Kuwait. Certainly most DAMASK veterans will readily identify with Creswell's crew being worked up for action, but instead performing tedious but essential operational tasks, in a foreign environment far from home.

In this *Protector's* medical department, personified by Staff Surgeon Morris, did its part in preventing illness while preparing to treat casualties. Although no medical journal ap-

3 The Register, Adelaide, 7 January 1901 p 6. Quoted in Nichols, Bob. Bluejackets and Boxers: Australia's Naval Expedition to the Boxer Uprising. Allen and Unwin, Sydney, 1986.

4 The rank of Fleet Surgeon became Surgeon Commander in 1920.

pears to have survived, his favourably reported first aid training and relative lack of illness on board suggests his efforts were highly successful. It seems noteworthy that 100 years ago the requirement for medical support, by a practitioner experienced in maritime environmental issues, was recognised and accepted. The fact that it came late in deployment planning, resulting in a rush to get ready for sea before the ship sailed, remains a consistent theme. One would hope that this aspect of naval operations will improve during the next 100 years!

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Experiences of a Prisoner of War: World War 2 In Germany[1]

E. Stephenson[2]

On 16 December 1943, I was sitting at the Navigator's seat in a very noisy Lancaster bomber over Berlin when something occurred that changed the pattern of my life. We had just dropped 13,000 pounds of bombs... a 4,000 pound "cookie" plus incendiaries and we were stooging along at 163 mph (280 km/hr)taking infra-red photographs for the first time in WW2, when we were attacked from below by a German night fighter which hit the port wing and fuselage, setting the wing on fire and wrecking my instrument panel.

Several hundred gallons of petrol burning less than 20 feet from you is an occasion for rapid action in the way of evacuation of the area, which five of us did before the plane blew up or crashed. We did this through the forward escape hatch and used parachutes.

The difference was astounding.

Out into the cold night air (it was about 2020 hours) count 5, pull the rip cord, a jagging thrust In the thighs and back and... utter silence. The ground came closer and I could see snow around but I was probably dazed by a blow I had received in the aircraft when a cannon shell hit my instrument panel and glass and metal went everywhere. Anyway, I didn't see the church steeple that snagged my parachute and I hit a wall, causing a fracture of the right epicondyle and a Potts fracture of the right ankle.

I came to in a German doctor's surgery being stitched up with our pilot and bombardier present too. Then we were taken to part of a German maternity hospital under guard in Berlin. My leg and arm were plastered and 2 days later we were taken by train to Frankfurt-am-Rhein to Dulag Luft, a holding camp, where we were put in solitary confinement

The Germans did not heat our cells and a damp plaster on one arm and one leg in the middle of a German winter doesn't induce much sleep.

Next day we were interrogated. Before each operation we'd been reminded at briefing that, if captured, we would give only rank and name. My interrogator spoke perfect English and began (when he saw my plasters) "Oh! Bad luck! Well how are things at Spilsby"...my home base. A bit disconcerting for a start and he asked a lot of questions but I feigned loss of memory, pointing to the cuts on my head.

After interrogation, we were put back into our cells for a day and another interrogation and after that taken to the transit camp proper. After the guard closed the gate and wrapped a large chain round the post and padlocked it, he uttered in English (probably all he knew) that deathless prose we were to hear so many times "For you, the war is over!"

After Christmas, we were moved to Zagan, Upper Sil-esia (in the former Polish territory) by cattle-truck (8 horses, 40 men) to Belaria compound of Stalag Luft 3. This was 5 to 6 kilometers away from the main camp which also had a North, South, Centre, East and West compound plus a jail, a hospital and a German 'vorlager'. We were very fortunate at Belaria and indeed at Stalag Luft 3 generally. This was a POW camp for Allied Officers who were flying personnel. It had been planned by Goering himself as a "super" camp because he was a WWI flyer himself.

Belaria at that stage had 8 huts for accommodation, each with an ablution area with washbasins, 3 or 4 showers, usually cold, and a urinal. Half of one hut was given over to a sick-quarters or 'Lazaret'. Belaria also had a ration store with a kitchen attached and an "abort"...an 8-holer in 2 rows of seats.

The Lazaret had a long room (about 40 ft by 15 ft) with a bench down one side, cupboards underneath and a washing sink. It had an examining couch and stools for patients to sit on while being treated. It had an old microscope and a hand driven centrifuge.

The rest of the Lazaret contained a room, which was a dormitory for 10 -12 men in double bunks; a cooking area with a stove fired by wood or brown coal briquettes; plus an Elsan type toilet and wash basin. There was a small room to house an infrared lamp and a UVL lamp. There were also two cupboards, one for linen and the other for food storage and medical supplies.

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I was the camp doctor's first patient at the Lazaret. He was looking for patients as we entered the camp at Belaria. An Irish lad named McIlroy was another patient. He came from Dublin and when we asked why he was in the RAF he replied with a wicked grin "Well, we can't have these Germans knocking the British about, else who would we fight after the War". He had an old compound fracture of be thigh, which took a hell of a long time to heal and was obviously very painful, but he did not complain once and always had a grin. Another patient was Tommy Hughes who had a badly cut head, with shaven hair and masses of bandages; Ginger Rutherford, a Geordie with a lot of cuts and bruises, and a young spitfire pilot, Stan Griffith, with a huge black-eye and frostbite alter loosing a boot. We all spent 7-10 days there but McIlroy and I were there longer.

Apart from the camp doctor, CAPT Monteuuis RAMC, who was captured at St Valery in 1940, there was an Australian medical student who had been a Hampden pilot, Geoff Cornish. He had been a POW for nearly 3 years and spoke German. There were 4 WO NCOs who between them did the cooking, cleaning, linen washing and attended the fires etc. They were magnificent and one, Peter Brewer, was also a masseur, which was invaluable. These all formed the staff of the Lazaret with German approval.

My arm was taken out of plaster at the end of January 1944 and I spent 1/2 hour 3 times a day "climbing up the wall" to overcome the bruising and avoid ankylosis. The leg had had a walking plaster put on and a heel made of wood with a piece of rubber tyre covering it. This plaster was removed in mid February and I will always be GRATEFUL TO PETE Brewer for his efforts with my rehabilitation.

I spent the next 2 months in the camp general with the other POWs who had arrived at Belaria at the same time. Then the camp doctor asked me to join him and help in the Lazaret as the camp was growing rapidly in numbers.

German Camp Staff and Routine

The German staff were members of the Luftwaffe. Initially in charge was Hauptman Wemer until the number of POW's grew and the Oberst (Colonel) arrived. He had been invalided from the Stalingrad front but I did not discover his name. Wemer then became Adjutant and had a Leutnant as Abwehr (Defence) Officer and he was in charge of Felwebel Glemnitz and seceral "ferrets". These were either Unteroffiziers or Gefreiters (Corporal or Soldiers) who wore blue dungarees with a belt and a small Mauser pistol. They were also `armed' with screwdrivers with a very long blade for poking and probing, looking for any contraband. In the camp, POWs were 'on parade' twice daily for roll call and the ferrets used to inspect the huts while we were parading.

Since it is the duty of POWs (especially officers) to escape when possible, much camp activity was geared to acquiring maps, making "ausweiss" (passes), civil clothing from uniforms, photographs and of course tunneling. This activity was under the control of 'X' wing Commander Bob Tuck, who organised a system that kept tabs on all ferret movements. If it looked like one was getting too curious about activities related to escaping some body (usually a German speaker) would be detailed to engage him in conversation and so head him off.

Originally Belaria was full of POW from Commonwealth Air Forces but extra huts were built to house US Army Air Corps officers as more and more were shot down. This was when numbers in the camp shot up and Dr. Monteuuis, who was known as 'Twee', asked me to join the Lazaret staff to help out, about April 1944.

Dr. Monteuuis was a very unusual man. His father was French and his mother Spanish. He had very black hair and a black moustache which came down over his mouth and which he frequently chewed, when he was not smoking. He was pigeon-toed and constantly gave the Germans the idea he was a bit mad, walking round the compound pretending he had a dog on a lead. This was completely a pose.

He was fiercely dedicated to his patients, within the very severe limitations of camp life, and used to try and teach his helpers bits of anatomy and physiology during the evenings after work. It was extraordinary how 'busy' we were, just fixing up the POWs with their ailments, with which they reported very readily; after all, there was little else to do. His great philosophy was "patients get better in spite of our efforts and not always because of it" and "Nature had been at this game (of practicing medicine) for a long time and is very good at it."

It is appropriate here to consider differences between the prison camp conditions for Allied POWs held by the enemy. I must emphasize that conditions in the German camps I was associated with were worlds apart from those in Japanese camps. The latter had a total of 132,134 allied prisoners of whom 35,756 died i.e. 27%. Of these, 22,376 were Australians of whom 7,777 died. The Germans and Italians had almost twice as many, 235,473 with a death rate of 4% (242 Australians).

From comparisons I have from a doctor who was in an Italian camp and from 2 or 3 prisoners who were in both at some time, the German conditions were better.

Belaria had apparently been a cadet training area for the Wehrmacht before it was turned into a prisoner of war camp. To do this, the Germans had separated off some huts to form their admin centre or vorlager and then surrounded the remaining huts with a double row of barbed wire, about 4 metres high, with a gap of a metre between the rows. At ground level, between the rows, coils of barbed wire were laid. Within the perimeter, a wooden rail was placed about half a metre from the ground and 3 metres from the wire to mark the limits of movement for prisoners. On one side of the camp was another compound that housed Russian POWs. On another was a playing field area, also surrounded by barbed wire. The third side was eventually used to build extra huts as the camp was expanded to accommodate extra prisoners. In the time from January 1944 to January a year later, the camp increased from the original 50-60 to over 1100 men.

The German word for POWs is "kriegsgefangenen" which inevitably became shortened to "kriegie". When we arrived, we were the first kriegies apart from 20 or so who had been 'purged' from the North Compound. These were old lags who had escaped once or twice and the Germans sensed something was afoot at North Compound in the way of an escape and removed those they considered ringleaders, including WGCDR Bob Tuck and Geoff Cornish. In fact, Operation 200 (the Great Escape) occurred about 6 weeks later.

The Senior British Officer (SBO) was a Group Captain who abjured us to wash or shower daily (cold water but we could get an occasional hot water dunk in a wooden tub) and shave at least every other day. Shirts and under clothes were to be washed weekly if possible. Hot water was made available twice daily from the camp kitchen in jugs. Soap was either the German 'ersatz' variety or non-existent except in some Red Cross parcels

The value of these requirements became obvious after one had been a prisoner for a while. It is a shock to the system, to say the least, to be "transported within hours, from a comfortable Officers Mess to a situation where comfort disappeared, food was restricted and you had no freedom except to walk round and round the same piece of dirt every day". To let go and not bother (and a few did) would have been disastrous for morale.

We were fortunate at Belaria to have a few men who had been prisoners for some time to give us advice on life style change. Furthermore, services sprang up quickly which enabled those who were determined and interested in keeping their lives going. Classes in German, French and even Russian started. Other topics were used to give instruction and a library was started with books sent over the years to POWs. A theatrical group developed and a band consisting of a pianist, a trumpeter, a drummer, and two guitarists, and, of course, activities related to escaping.

Occupations

Occupations in a Prison Camp in Germany	
Skilled	**Unskilled**[1]
Doctor	Map making
Dentist	Forging
Interpreter	Tailoring
Cook	Photography
Carpenter	Librarian
Musician	Acting
Mining Engineer	Brewing
	Ferret watching
	Electrician
	Scenery painting
	Tin bashing
	Tunneling
	Soil dispersing

Parts of the camp in between huts were used as 'allotments' to grow a few vegetables but the soil was very poor, although potatoes and tomatoes would grow. I can't remember where the seeds came from for this venture.

All these gave some purpose to life. The Germans allowed us to go on to the playing field when it suited them (It was denied for some time after the Great Escape). Soccer was popular and so was cricket. Union was played but the ground was very stony and injuries were common. In the winter, we hacked the frozen ground and made a small circular mound, 3-4 inches high and about 25 metres across on the playing field and flooded this with water to make an ice rink and play ice hockey, courtesy of skates sent by the Red Cross. Consequently, morale was fairly high and food was reasonable at least initially although this degenerated. Even so, a small proportion of POWs did not take part and "turned their faces to the wall". Most of these

are self-explanatory and are referred to in the text. One hut was converted into a theatre, having been an assembly hall.

[1] The unskilled faction includes jobs which prisoners had, in general, not performed before.

Red Cross Rations		
Canadian 1 tin Spam (12oz) 1 tin Corned Beef (12oz) 1 tin Salmon (8oz) 1 tin Sardines (8oz) 1 tin Klim 1 pkt Coffee or Tea (4oz) 1 pkt Cheese 1 tin Biscuits (8oz) 1 Milk Chocolate (5oz) 1 pkt Salt & Pepper (1oz) 1 tin Butter (16oz) 1 pkt Sugar (8oz) 1 tin Jam/Marmalade (8oz) 1 bar Soap (2oz)	**British** 1 tin Luncheon Meat or Sausages (16oz) 1 tin Steak & Kidney or Curry & Rice (1 pound) 1 tin Salmon (8oz) 1 tin Herrings/Pilchards (8oz) 1 tin Biscuits (7oz)1 bar Chocolate (4oz) 1 tin Bacon (8oz) 1 pkt Boiled Sweets (4oz) 1 tin Cheese (2oz) 1 bar Soap (2oz) 1 tin Margarine/Butter (8oz) Sugar (4oz) Dried Fruit (8oz) Tea (2oz)	1 tin Nestles Milk 1 tin Jam (8oz) or Syrup (4oz) 1 tin Rolled Oats/meal (5oz) 1 tin Vegetables (mixed/carrots) 1 tin Meat/Fish pasta (2oz) Salt, Mustard, Pepper or Marmite cubes Occasionally: tin Cocoa/Extra Biscuits (¼ pound) 1 tin Egg Powder (2oz) 1 tin Apple/Marmalade Puddings 1 tin Custard/Yorkshire Pudding Powder 1 tin Creamed Rice
New Zealand 1 tin Corned Mutton (16oz) 1 tin Beef (16oz) 1 tin Condensed Milk 1 tin Cafe-au-Lait 2 tins Tea (2oz each) & Sugar 1 tin Honey (6oz) 1 tin Butter (16oz) 1 tin Chocolate (4oz) 1 tin Jam (8oz) 1 tin Meat & Vegetables (16oz) 1 tin Cheese (8oz) 1 pkt Sultanas (8oz)	**American** 1 tin Spam/More (12oz) 1 tin Pork Luncheon Meat (12oz) 1 tin Corned Beef (12oz) 1 tin Salmon/Tunny (8oz) 1 tin Sardines/Brisling (6oz) 1 tin Coffee (3oz) 1 tin Powdered Milk-Klim 1 pkt Sugar (8oz) 1 tin Jam/Orange Juice or Peanut Butter (6oz) 2 bars Choc "D" ration (4oz) 1pkt Biscuits (7oz) or Cereal (8oz) 1 tin margarine (16oz) 1pkt Prunes (16oz) 60-100 Cigarettes 2 bars Soap (2oz each) 1 pkt Cheese (8oz) 1 pkt Pepper/Salt (1oz) 1 tin Rosemill Pate (6oz)	**Australian Bulk** This came 3 or 4 times per week while I was at Belaria. It was mostly dried fruit like sultanas, raisins, apple, pear, currants and sugar and was shared out on a weight basis for each man by the 'catering officer', a man detailed by the Senior British Officer (SBO) to do the job of controlling the issue of Red Cross Parcels. The Aussies bulk raisins used to get crusty on the outside of the fruit (long time travelling) and yeasty and this was very useful to make alcoholic brew which had quite a kick to it.

This was done by having the one carpenter in our midst making seats from Red Cross boxes in which the parcels were brought to the camp. Activity in this sea involved musicians, actors, painters, electricians and tailors (to make costumes) These gentlemen were also invaluable in altering uniforms to make them like civvy clothes for escape purposes. Most of the others mentioned were involved in the escape area. Tin bashers were those who used tins obtained from Red Cross parcels to make trays and dishes for cooking purposes. But the same expertise was turned to making long pipes when tunneling was going on. Using an old kit bag, a rough pump could he made and connected to the pipes so produced to provide at air circulation underground for the tunnelers. This was a feature of the tunnel which let out 78 POWs in the North Camp in 1944.

Food

This consisted of a daily German ration (q.v.) handed out on a room by room basis. Hot water and a barley porridge was prepared in the kitchen where the Red Cross food parcels were stored and issued weekly under German supervision. These parcels were either British, Canadian, American, or New Zealand, plus an occasional Australian, or Argentine bulk issue. When we arrived, the ration was 1 parcel between 2 men per week and in the heyday became 1 per man per week, but this did not last for long and reduced until when we left Belaria in January 1945 ahead of the Russian advance from the East. It dropped to about 1 between 6. After we arrived at Luckenwalde, south of Berlin in Jan 1945, there were no parcels at all. As the bombing of Germany increased, the rail communications were increasingly weakened. Since the Red Cross parcels came from Geneva, we realised supplies would drop off so we tried to store food.

German Rations	
At Balaria: Jan 44 to Jan 45 (Weekly per man approx)	**At Luckenwalde: Feb-May 1945 (Daily per man approx)**
165 gm Margarine (6 oz) 165 gm Honey or Jam 60 gm Cheese 1800 gm bread (Dauerbrot) (1 loaf = 4 pounds) 1500 gm Potatoes 160-170 gm Sugar Vegetables (Swedes, Khol, Rabi, Cabbage, Peas in season) 100 gm (4oz) Bratlings Pulver or Semolina 50 gm Sausage (Blut wurst or bacon) 100-160 gm Meat (mince or beef or pork) per 2 weeks Barley 250gm per week usually cooked in the ration store and dished out on a daily basis.	½ cup Mint tea twice daily 2/3 litre Soup (Pea, Cabbage, Meat or Barley) 300 gm Dauerbrot 25 gm Margarine 750 gm Potatoes 25gm Sugar Salt c 15 gm meat (in stew) 30-40 gm per week sausage 50 gm per week Cheese or honey

We could not store much because the Germans used to puncture all the tins at each end and the food would go bad if left too long. However, the tins of meat by Fray Bentos from Argentina were sealed with tin solder. This could be melted off by heating the empty tins and put over the puncture holes made by the Germans and so reseal the tins. Luckily for us, the puncturing took place just before the parcels were issued so the tins were only punctured for a few minutes before we got them and we sealed them quickly. There was of course no cold storage area (other than the camp kitchen) and the temperature at Belaria varied from a maximum in the summer of 40 degrees down to about -10 C in winter.

In addition to the above, we in the Lazaret at Belaria got patient comfort parcels occasionally for food distribution to the patients and on a smaller scale. They were of British, US and Danish origin.

Illness & Injuries

As would be expected, common things were common. Cuts, bruises and sprains were everyday problems. Skin diseases were frequent as cuts tended to become septic but there were numerous cases of impetigo (probably a Strep B.). Sycosis barbi hit several and I recall 2 cases of erysipelas. URTIs were frequent, from rhinitis to tonsillitis to bronchitis; only one or two asthma attacks. And of course "D&V"; the squitters, colleywobbles, Montezuma's revenge.

Clothing

As would be expected, our clothes consisted of the items we were wearing when we were shot down and these would obviously not last forever. However, army pattern clothing became available, ration controlled, possibly obtained through Red Cross sources but undoubtedly some was material captured by the Germans in various places. We were able to have British army boots, shirts and wool underclothing and later some American greatcoats and gloves were available and kit. In addition, individual Red Cross parcels provided things like scarves, gloves, woolen hats and underclothing. There was no regularity about this and we had to make them last.

Medicaments & Treatment

Supplies came through the courtesy of the Germans and Red Cross via Geneva. Cotton bandages of various widths were available, and we used to wash the soiled ones to use again. Elastoplast was scarce but gauze dressings we available to be used dry or with petroleum jelly or icthyol or even acriflavine we made up from tablets dissolved in water. Plaster of Paris was in powder form and used with cotton bandages to make splints and plasters. Metal splints like lattice were sometimes to be had and used again and again, either padded with cotton wool or bandages.

We could not rely on regularity of supply of any of these unless the Luftwaffe agreed to help us out. Generally they were quite helpful. The German doctor was Stabs. Arzt Hildebrand who was a rare specimen having a sense of humor. He would visit every 2 or 3 weeks and in emergencies if he could. Fortunately these occasions were rare. He would arrange for X-rays by having POWs sent under escort to the main camp hospital. Geoff Cornish and I have pooled our recollections and at Belaria plus North Compound, over an approximately 2-year period (up to 2000 men), the emergencies were:

3 cases of appendicitis requiring surgery

1 case of Hodgkin's Disease

3 psychiatric cases

3 POWs who were shot.

One of the psychiatric cases was under guard on the way to hospital and wandered off disorientated and was shot. It was not serious luckily, but the Luftwaffe was genuinely upset and arranged that any future cases would have a German speaking POW to accompany them. Later a case of deep melancholia was

LIST OF MEDICAL SUPPLIES (I am relying on memory)	
Bandages	Ung. Hydrarg et Ammon
Elastoplast	Whitfield's Ointment
POP powder	Zinc Oxide Cream (1 tin!)
Syringes (inc. A minim one)	Ichthyol
Ampoules of Sterile Water & sodium chloride	Gentian Violet 1%
Bottles (medicine)	Iodine
Kaoline Powder	Acriflavine Tablets
Tinct opii (scarce)	Menthol Crystals
Aspirins	Tinct Benz Co.
APC (Codeine)	Mist Ipecac.
Prontosil Powder (M&B 693 -Sulphapyridine)	Mist. Pot. Cit
Prontosil Tablets	Calamine Lotion
Evipan sodium (Anaesthetic)	Petroleum Jelly
Ethyl Chloride Spray	Tabs. Sulphaguanidine
Liquor Hammamelis	Lin Meth. Sal.
	Some vitamin tablets
	Possibly Xylocaine

sent to a hospital east of Belaria with Cornish as part of the escort. Returning from the hospital, Geoff offered the guard some cigarettes if they would take him to a hotel for a beer... which they did!

The other shootings were:

A POW got drunk on "kriegie hooch" (made from raisins from Australian bulk issue; soaked in water; the raisins had a crust of sugar and yeast and this fermented). He ran out of his hut at night and collided with a Hundfuhrer, a guard with an Alsatian dog. In the ensuing melee the POW w back to his hut but was shot in the stomach and was taken to hospital. He survived.

In the third case, a kriegie was walking round the camp some time after 'The Great Escape' and touched the rail inside the fence of barbed wire. The trigger-happy guard fired at him and hit him in the hand causing a fracture of 3 metacarpals. This case was partly managed in the Lazaret and Hildebrand took him for X-rays to watch progress.

Two other cases at Belaria which were unusual were:

A needle stick injury to one of the hospital helpers, which became septic in spite of sulphonamides and osteitis set in requiring amputation of the terminal phalanx. The other was the case of a New Zealander, in his mid 20s, who developed phimosis which required circumcision. This was performed by Monteuuis with Cornish giving Evipan. The result was a magnificent piece of surgery involving some 20 sutures. The patient was warned about not having an erection for fear of disastrous surgical consequences. He became so anxious that he organised a "Fire Drill" team consisting of the patient in the bed next to him having a large cardboard fan while on the other side was a patient with a huge chunk of cotton wool and a basin of cold water. On the command "Fire" one man fanned furiously, the other doused with cold sponges and the patient rang a hand bell energetically which was a signal for any member of the staff hearing the alarm to grab the ethyl chloride spray, rush to the ward and extinguish the impending blaze!

Cases in Lazaret: Inpatients & Outpatients

As previously stated common things were common:

Bruises and Sprains These received Liquor Hammamelis, a bandage and when appropriate, heat and massage.

Cuts & Wounds These were usually the result of carelessness or abrasions from falling. Treated with 1% acriflavine, they usually did well. The area the camp was in was a dusty farming area, and this could be a nuisance with larger wounds like burns. Sometimes we used Vaseline with a dressing.

Rhinitis was treated with inhalations of menthol..

Sore Throats and Tonsillitis received hot salt-water gargles. 2-hrly Bronchitis, received inhalations and mist Ipecac. The more severe and those who were pyrexial would be admitted to the Lazaret. If it was necessary to add Prontosil, their fluids were pushed with mist. Pot. Cit. If we had it, to reduce the risk of crystalluria, or kidney damage.

Urinary Infections received mist. Pot. Cit. and rest in bed and fluids ++

Headaches and minor aches got APC tablets.

Styes hot spoon bathing... a spoon with cotton wool held by cotton or a piece of small bandage dipped into hot water and held near the eye.

Diarrhoea often with vomiting was treated with a. Fluids only for 12-24 hours; if still present; b. Kaolin mixture sometimes with Tinct Opii.. If this worked, the question of how long to continue with medicine (being conscious of conserving resources) arose. Monteuuis would ask, "Can you fart with confidence?" If "yes" generally stop medicine.

More severe cases (frequent bowel motions not seen to be responding to medicine & diet, perhaps pyrexial) were admitted and Twee would perform the 'fork test'... a stool specimen was obtained and if faeces passed through fork prongs, bed and sulphaguanidine was the treatment. Otherwise mobilise slowly with food from the invalid comfort parcels.

Skin Lesions. Tinea cruris & pedis was quite common and usually responded to Whitfield's ointment.

Urticaria ... calamine lotion

Impetigo was quite common and usually responded to Gentian Violet Solution.

Erysipelas...2 or 3 cases occurred and responded to hot dry packs and Prontosil.

The Long March

In the latter part of January 1944, the whole camp at Belaria was given 6 hours to move to an unknown destination. The Russians were then at Breslau (Wroclaw) some 35 km away and snow was 1/2 metre thick on the ground and still falling. The hospital staff were promised a horse and cart to carry medical supplies and our own belongings. In the event there was no horse so we pulled it ourselves. The rest of the POWs took the tables from their rooms, up-turned them, knocked off the legs, nailed them to the table top to make runners and tied a cord to the sledge so produced. Where the nails came from is a mystery but I bet the huts would not stand up in a storm when we left!

We left as a column of about 1000 men and the medical team brought up the rear. We were the doctor, plus 4 medical students (1 an American B17 pilot) and 3 or 4 helpers. At the time we left there were some 80 kriegies with colds, flu or diarrhoea or who were not well enough to march under the conditions. Because he spoke German, Geoff Cornish and one med. student were left in charge of them.

Our cart contained as much medical supplies as possible, plus invalid comfort parcels and our own food and personal items. It was at the end of the column so that any sick marchers could drop out of the column and be picked up as we passed. Our supply of aspirins and APC went down very rapidly.

Guards marched on each side of the column at about 20-25 metre intervals. The SBO walked up and down the column to keep an eye on things and the Oberst (Camp Commandant at Belaria) drove his car with the adjutant periodically up and down the column. We marched about 20km the first day, starting at about 4 am and passing the main Stalag Luft 3 camp (which seemed empty) on the way.

We were housed for the night in the barns of a farm run by Poles who gave the medical team a room to use for sick parade, which took about an hour. We were allowed to sleep in the room and they fed us thick soup. Next morning, we held an early sick parade (0700 hours) mainly of aching legs, blisters and frostbite. We only had one slice of bread for breakfast and had to march 15 km that day but we were able to hitch our cart to a horse drawn wagon going our way. We arrived at Gross Selten at 1530 at a large farm run by Germans and they allowed the medics to use an out house which had a boiler room where we were able to sleep. We shared this outhouse with a Stabs Arzt (doctor) of a German SS panzer division & his staff. They gave us food which they cooked and we talked with them as best we could in bits of English, French and German but the only common language was "dog Latin"! Still, they also had some Schnapps! War is hell!

We stayed there a second day and, being very tired, enjoyed this. The Germans organised 2 sick carts for the next stage of our journey which was to Birkenstadt some 14 km further and we arrived again at about 1600 with the light fading at a farm worked by a Russian family, who gave us (the medical team) their own sleeping quarters for a sickroom and a bed room. Since the temperature outside was -10 deg C we appreciated this as well as the borsch they fed us that night and the hot coffee and bread we had next morning. We stayed there a second day and had a very heavy sick parade that day. Blisters and 'flu' were rife and the SBO managed to persuade the German commandant to take a few of the sicker POWs to the local army hospital at Muskau. The temperature rose and the snow melted off the road for our next move. Now the kriegies had to carry everything but we found moving our carts easier, especially as the weary guards liked to put their heavy packs on our carts and we made them help with pulling of course. All this time the 400 or so US Army Air Corps who had shared Belaria with us had been our companions but now the Germans separated us and moved them off in a different direction. We gave them 3 cheers as they pulled out and they went off singing songs like Dixie and McNamara's Band. The Germans just could not understand it; after all they had tried for months to sow dissension subtly. The Oberst just shrugged his shoulders, got into his car and drove off.

The guards shepherded by Feldwebel Glemnitz trudged on and many of them were worse than we. We traveled about 15 km that day and later in the morning, the SBO as part of his routine came back to the tail and of the column. The Oberst turned up again (with Hauptman Wemer) and he was furious. Wemer, who was not noted for his humor, was chuckling. The Germans had done a headcount as we left that morning and now the Oberst found he had "lost" 10 POWs but 16 guards had gone 'wek'

We had started off later that day and it was almost dark when we arrived at our destination but we were allocated a farm outhouse

again, fortunately with lights. Sick parade included many with 'rheumatism' for which we only had aspirin and lin. meth sal. But it seemed to work. Blisters were common. We slept in 3 feet of hay that night and German bread and cheese was issued. Next day we walked 7km to Spremberg railway junction, by now out of pre-war Poland and in Germany. We were assembled in 2 large sheds where we found kriegies from East Camp. We were given barley soup and a bread ration. A train arrived with the inevitable cattle trucks and we were taken to Luckenwalde, south-east of Berlin. There, Twee and I took a few really sick men to what turned out to be a British Revier or medical post manned by Irishmen while the rest of the medical team went to Luckenwalde camp.

The whole trip from Belaria had taken 8 days and we had marched over 80km and the rest by rail.

Luckenwalde

We arrived here mid February and the next 3 months to the end of the European conflict were the most uncomfortable and frustrating. Our numbers had been swollen by the addition of POWs from East Camp at Spremberg. We had also been joined there by a New Zealand doctor from East Camp and 2 medical students, one English and one Rhodesian. This was a help as we hardly ever saw any German medical staff and got virtually no supplies from them. We were housed in tall buildings without any subdivision into rooms but with an ablutions and toilet area at one end. Beds were in 3 tier bunks and the medical staff manipulated these in one corner of the building so as to make a square with one half of one side missing to allow access. One side was 8 two-tier beds earmarked as hospital beds for patients. All personal effects, food store and medical supplies had to be contained in this area, though storage became less of a problem as food ran out and so did medical supplies.

The Luftwaffe from Belaria were replaced by Wehrmacht members in this camp, which was virtually international. As well as the Air Forces contingent were US GI's, plus Dutch, Belgian and Polish civilians, all separated by barbed wire on an international basis.

We received no Red Cross parcels in spite of repeated assurances from the Germans that we would. Since the German ration was very meager we were supposed to be receiving the same ration a German garrison troops; this was partly depressing, since it meant hunger, but partly encouraging as it was due to lack of transport by rail and road owing to bombing and indicated clearly that the Germans' ability to resist much longer was severely diminished. News about the progress of the war was erratic, though a radio was held in the camp that was able to receive the BBC but it had to be constantly dismantled and moved to avoid the Germans finding it. Nevertheless, by the end of March, morale was low and lack of food was a major factor.

In a sense, this was an advantage from a medical point of view. As our medical resources ran out there was less that we could do, other than reassurance to support those with upper respiratory tract infections and diarrhoea etc, but the kriegies were pre-occupied with blotting out their hunger and other ailments lost some of their impact, I suspect.

Later, in April, a German Panzer division was making a final stand in the area and moved around the camp as it retreated from the Russians. The commander sent word that any prisoners found within their lines would be shot on sight. This discouraged any escapes. He also sent a team to supervise surrender of any weapons in the hands of prisoners. These were dumped in a deep water-filled pit just outside our section of the camp and a surprising number turned up. One night, a JU 88 flew low over the camp firing at the advancing Russians and since it was 1 am this caused quite a panic.

In mid-April, the Germans suddenly told us to pack up and marched us to the rail yard. Before we got there, while we were in a deep cutting luckily, we were halted. A force of USAAC Martin Marauder bombers bombed the rail yards, out of the blue ending any prospective trip. We were marched back to camp, but not before some very resourceful POWs had managed to get to a damaged rail engine and removed its battery and carried it back to camp with them. This was very useful as a source of power for the radio and improved reception so that we had regular news bulletins. This had a major effect in improving our morale and a thoroughly depressing one for the Germans. They dared not interfere at this stage as their radio did not give anything like the real picture of the war and the smart ones could see it was nearly over because they listened to our news readers who passed news about camp.

Then early one morning in May, we woke to find there was not a German guard anywhere. About 3 or 4 hours later, a huge Russian tank rolled into the camp. The kriegies cheered them hilariously, climbing up the wire fences to wave. The Russians simply drove the tanks along some of the fences, flattening them. For about an hour after that, the medical staff were as busy as anything dealing with cuts and abrasions from injured POWs.

Homecoming

Now our troubles really started. The Russians did not have any food. But they instituted a Town Major who gave us written authority to commandeer food supplies; we had 2 Russian speakers among our lot who were loaned small trucks with drivers to go and collect vegetables and eggs from surrounding farms. But to get to the farms they had to cross bridges over canals guarded by Russians who had been told not to let anybody over bridges on pain of death. Since they couldn't read, they refused passage to our fearless food gatherers. Eventually this was overcome and we were able to have some nourishment while the Russians compiled a huge inventory of prisoners, which they insisted on having before we were moved on. One of my friends was talking to a GI during this period and the GI said they were lousy. "Funny", said Gordon, "I've never seen a louse". Whereon the Yank searched through his shirt and found one! Finally, the Russians loaded us on trucks drove us down autobahns, slipping off road through burning forest to avoid destroyed bridges, the drivers stopping to slake their thirst by sucking petrol up from the tanks till we got to the American sector. The Yanks gave us showers, deloused us with DDT powder sprays, fed us with pork chops, potatoes, peas, angel cake, pineapple and cream sauce all on one plate and gave us a bed. Next day they flew us to Brussels where the Canadians gave us a shower, DDTd us again, gave us food and a bed (after we had 'done' Brussels) and handed us over to the Royal Air Force the next day. They put us in Lancasters and flew us to England.

Back to square one.

The Stephenson Decalogue
1. WAR IS HELL
2. IT IS IMPORTANT TO BE ON THE WINNING SIDE.
3. IT IS EVEN MORE IMPORTANT TO BE ON THE MEDICAL TEAM.
4. DISCIPLINE NOT ONLY KEEPS UP MORALE; IT COMMANDS A MEASURE OF RESPECT AND WARDS OFF THE DANGER OF BRUTALITY BY THE ENEMY.
5. A SENSE OF HUMOUR IS VITAL.
6. HUNGER DESTROYS MORALE QUICKER THAN ANYTHING.
7. ADAPTABILITY IS SINE QUA NON.
8. THERE ARE NO FAT PEOPLE IN PRISON CAMP.
9. HOMOSEXUALITY IS NOT ESSENTIAL.
10. 10.NOR ARE ANTIBIOTICS.

Abstracts from the Literature

Submitted by Andy Robertson

Morgan-Jones D, Hodgetts TJ. A unified emergency care system from first aid to definitive care. J R Army Med Corps 1999 Oct;145(3):132-5.

The Unified Emergency Care System (UECS) provides an integrated system of medical support from point of injury to the time a casualty is handed over to specialist care within hospital. It enables personnel at all skill levels to deliver life-saving support to casualties with a broad range of acute injuries and illness. The UECS facilitates standardized training with each level building upon the previous, yet it retains an inherent flexibility to adapt to specific operational and service requirements.

Comment: *LTCOL Morgan-Jones has refined many of the mass-casualty trauma systems to produce a unified system, which has a great deal of applicability to military trauma management. This article should be read by all the military health trainers.*

Scerri GV, Vassallo DJ. Initial plastic surgery experience with the first telemedicine links for the British Forces. Br J Plast Surg 1999 Jun;52(4):294-8.

In January 1998, the first telemedicine link for the British Defence Medical Services was established between the British military hospital in Sipovo, Bosnia and the Royal Hospital Haslar, the main triservice hospital in the UK. Further links were established later in the year. These simple links use a high-resolution digital camera, the Olympus C1400L and the C1400XL, to capture still images. These are then transmitted without loss of definition as electronic mail attachments to obtain specialist opinions in plastic surgery as well as in radiology, dermatology, orthopaedics, urology, ophthalmology, general medicine, maxillofacial surgery and pathology. Its use is illustrated by representative case reports from the first 11 referrals from Sipovo and elsewhere to the Plastic Surgery Department at Haslar. This system is suitable for use within both a military and a civilian context, anywhere in the world. It can readily be adapted for use by general practitioners and hospital doctors to facilitate referrals to plastic surgery departments.

Comment: *As we saw in the RIMPAC trials and here in Kosovo, this modality continues to offer utility. Reducing costs of technology and the use of the internet may make this a more affordable option.*

Popper SE, Yourkavitch MS, Schwarz BW, Wolfe MW, McDaniels M, Hankins ST, Curtis TE. Improving readiness and fitness of the active military force through occupational medicine tenets. J Occup Environ Med 1999 Dec;41(12):1065-71.

The United States Military deploys its forces with minimal lead time. These forces must be medically qualified and physically fit for any locale and mission scenario. Historically, up to half of the force identified for deployment at any given time were not medically qualified. Matching individuals to specific occupations using validated medical and physical performance standards is an occupational medicine tenet that increases the effectiveness and efficiency of the workforce. To establish a cost-effective, valid medical program ensuring a fit and ready force, the military must: (1) develop validated physical fitness/ occupational standards; (2) consolidate one fitness standard for males/females on the basis of workload requirements; (3) eliminate differing age standards; (4) provide statistically relevant medical screening, testing for health maintenance, and fitness for duty; and (5) mandate one joint medical standard for all military services.

Comment: *We all struggle with this challenge.*

Anderson ER Jr, Fowler J, Swan KG, Liman JP, Lajewski WM. Don't know, don't care. III. Mil Med 1999 Nov;164(11):758-63.

The knowledge of and interest in Department of Defense programs to help medical students with their educational expenses in exchange for military service as a physician was studied at three medical schools representing the eastern (University of Medicine and Dentistry of New Jersey/New Jersey Medical School [UMDNJ/NJMS]), midwestern (University of Missouri at Kansas City), and western (University of Utah) United States. Despite staggering indebtedness (40% of the class of 1998 at the University of Medicine and Dentistry of New

Jersey were in debt in excess of $100,000 at graduation), surprisingly few students were aware of programs such as the Health Professions Scholarship Program, the Health Professionals Loan Repayment Program, and the Specialized Training Assistance Program. Even fewer were interested when made aware of such financial assistance. Hostility to military service as a physician was common. "Patriotism" was seemingly anathema. Dwindling recruitment and retention of medical corps officers in the reserve components of our nation's armed forces is of grave concern to national security and flies in the face of medical students', hence young physicians', indebtedness for their education. Clearly Department of Defence programs must become more imaginative, certainly more financially appealing.

Comment: *And I thought we had problems with recruitment and retention. More money is only part of the solution.*

Price BA. The influence of military surgeons in the development of vascular surgery. J R Army Med Corps 1999 Oct;145(3):148-52.

Surgical attention to major blood vessels has been necessary for as long as man has been involved in armed combat. A brief resume of the history of vascular surgery is outlined with special reference to the contribution made by the military surgeon in battle. The role of modern specialist techniques in vascular injuries in present day operations will be briefly discussed.

Comment: *An interesting historical review.*

Book Reviews[1]

Plague Wars: A true story of biological warfare.[2]

By T. Mangold and J. Goldberg.

"Biological warfare has already begun. In the former Soviet Union the military has perfected smallpox, anthrax and plague as biological warheads on intercontinental missiles can reach London, New York and Los Angeles. There is no evidence the Russia has destroyed the technology. In South Africa and Zimbabwe, biological weapons have already been used to kill innocent civilians. In Iraq, a covert offensive biological warfare program capable of delivering anthrax through 'drones of death' threatens neighbouring countries and will soon threaten the whole region. Biological terrorism - the use of deadly bacteria and exotic viruses to destroy, maim, infect or incapacitate the enemy - is now widely acknowledged to be inevitable. " Or so the cover claims .....

Tom Mangold and Jeff Goldberg have certainly produced one of the best books on the subject of biological warfare that has been written in the past few years. Whilst other books, like Ken Alibek's 'Biohazard', have addressed the Russian biological weapons program in depth, this is the first book which has provided a comprehensive review of not only the Russian program but also the Iraqi program, the North Korean program, the South African program and, to a lesser degree, biological terrorism. Indeed, the authors have built on Alibek's book and provided an update on both the Russian program and the Trilateral Process, which was established to close it down.

Written in a typically journalistic style, the book is comprehensible and easy to read. Unlike much of the current writing in newspapers and the popular literature on the use of biological weapons, and despite the claims on the cover, this enthralling, balanced and comprehensive review neither belittles or sensationalises its subject. For all those with an interest in either military medical history or biological defence, this is an essential text to have in your library.

The Surgeon of Crowthorne: A tale of murder, madness and the Oxford English dictionary.[3]

Simon Winchester

For a total change of pace, Simon Winchester's 'The Surgeon of Crowthorne' is an beguiling and erudite true story. The story centres around two distinguished-looking Victorians, both learned and serious, yet from very different worlds: Dr James Murray, a towering figure of British scholarship and editor of the great Oxford English Dictionary; and Dr W. C. Minor, a charismatic millionaire American Civil War surgeon and homicidal lunatic, who, confined to Broadmoor asylum, pursued his passion for words and became one of the OED's most valued contributors. Winchester has poignantly captured both Minor's schizophrenia and the unlikely friendship between these two men in this classic rendering of a forgotten segment of history.

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[1] By Andy Robertson

[2] Mangold T, Goldberg J. Plague Wars: A true story of biological warfare. London: Macmillan Publishers Limited; 1999. (ISBN 0 333 71614 0)

[3] Winchester S. The Surgeon of Crowthorne: A tale of murder, madness and the Oxford English dictionary. New York: Penguin books; 1998.

Call for Papers

9th Annual Conference
20-22 October 2000
Hobart Tasmania

The 2000 Australian Military Medicine Conference Committee is calling for the submission of abstracts on Military Health related topics. Topics may include, but not be limited to:-

- Aeromedical Evacuation
- Aviation Medicine
- Battlefield Surgery
- Clinical Practice
- Disaster Health
- Field Hygiene
- Military Medical History
- Military Nursing
- Occupational Health & Safety
- Operational Health Support
- Tropical Medicine
- Underwater Medicine
- Medical Logistics
- Medico-Legal Aspects
- Military Dentistry
- Medical Fitness
- Medical Equipment
- Human Factors

Criteria:

Abstracts should be limited to 250 words and can be posted, emailed or faxed to Leishman & Associates, contact numbers are listed below. Your abstract should include:-

Title of the paper,
Name of author(s), and presenter(s),
Contact details: daytime telephone, mobile, fax, email and postal address.

The annual "Weary Dunlop" award will be made to the best original paper presented at the Conference.

Membership to the Australian Military Medicine Association is not a pre-requisite for either presenting or attending the 2000 Conference.

Presentation time: 25 minutes. Five minutes per presentation will be allowed for question & answers and this will be held at the conclusion of each session.

As an alternative to presenting a full paper, you may be interested in presenting at a "Poster Session", which will take the form of a more informal session. Participants will be required to prepare a display which will be mounted on a display panel in the Ballroom (the main plenary room). Approximately 1.5 metres wide. Each presenter will have 30 minutes to do this, and then delegates will review each of the sessions and informal discussion will follow.

Poster sessions may be suitable for people who have not completed research, or are seeking information from other interested parties.

Closing date for submission of abstracts and Poster Session is Friday 30 June 2000.
Please forward your abstract to:

Leishman & Associates
PO Box 1042
ROSNY TAS 7018
Tel: 03 6234 7844 Fax: 03 6234 5958
Email: paulaleishman@trump.net.au

2000 Conference Committee
Dr (SQNLDR) Nader Abou-seif
President – AMMA Council
Leishman & Associates
Paula Leishman & Joyce McGregor
Conference Managers / AMMA Secretariat

Closing date Friday 30 June 2000

AMMA Update

News and information for members of the Australian Military Medicine Association

Journal

Journals for 2000 will be published as follows:

Issue	Copy Deadline
Apr 2000	29 February
Aug 2000	30 June
Dec 2000	31 October

All queries regarding the Journal should be directed to:
CMDR Andy Robertson
Tel: 02 6266-3416 / 0416 106 966
Fax: 02 6266-3933 or email on agrobert@excite.com

Successes

The following AMMA members have achieved success through honours, awards, promotions, publications, etc.

Members will note that these items are not complete. The Editor needs sources of information from the three Services and from our civilian members as well, so that this section of your journal can truly reflect the cross-section of our membership.

Updates can be faxed to CMDR Andy Robertson or SQNLDR Karen Gisler on 02 6266 3933 or emailed to: agrobert@excite.com or kgisler@cyberone.com.au

Changing of the Guard

The new Director General Defence Health Service is BRIG Wayne Ramsey.

Defence Force Promotions

The following AMMA members have been selected for promotion in the Defence Forces:

- LTCOL Rob Miller to COL

Defence Force Movements

- GPCAPT Peel has posted to HQAST
- LTCOL Dave Sweeney is posted to JO7 HQ Norcom.
- LTCOL Darrell Duncan is posted to SMO HQ 1 BDE.
- CMDR Neil Westphalen has posted to HQAST as the SO1
- SQNLDR Mark Foreman is posted to OIC of 304 ABW (Edinburgh) with acting WGCDR rank.
- SQNLDR Ian Hosegood is posted to SI at AVMED.
- CAPT Sean Bond is posted to CAMU.
- SQNLDR Mike Seah is posted to the UK to undertake the Dip. AVMED.
- MAJ Craig Schramm is posted to the Army Aviation Centre at Oakey.
- MAJ Ros Blakley has returned from civil schooling to OC HQ MED COY at 2 Field Hospital.
- CAPT James Moten has been posted to 3 BASB.
- MAJ Poprawski is posted to OC HQ FST 2 field Hospital.
- CAPT Windley is posted to 2 Field Hospital
- CAPT Ayling is posted to 1 Field Hospital.
- CAPT Casey is also posted to 1 Field Hospital.
- FLTLT Greg Wilson to Darwin with Acting Rank for SQNLDR
- FLTLT Ralph also has been granted acting rank and posted to SMO 3 Hospital.

2000 AMMA Conference

The 9th AMMA Scientific Conference will be held in Hobart from the 20th to the 22nd of October 2000.

Call for Papers information is on page 53 of this journal.

AMMA Website

View AMMA's website at: http://amma.trump.net.au/

Your constructive comments to help improve the site are welcomed. There are lots of useful links and if you have any to add, let us know.

The website now contains a list of Australian Military Medicine articles 1998-1999, available at $6 each. This list is currently being extended.

AMMA Awards

Details of the AMMA Awards for 2000 are included in this journal. Members are reminded that applications for the AMMA Awards must be received by 30 June 2000. Further details can be obtained from the Secretariat on 03 6234 7844

For those wishing to do a research project within defence, the project must be approved by ADMEC (The Australian Defence Medical Ethics Committee). Information kits for new researchers are available from the ADMEC Executive Secretary, LTCOL Vicki Ross.
Tel: 02 62663818
Fax: 02 62664982 or email on Victoria.Ross@cbr.defence.gov.au

Library

Books from the library are available for loan of up to 12 weeks. A list is available on the website. The Association's Library is currently on the move. Any member who wishes to browse through the Library is asked to call the Librarian, Russ Schedlich on

Tel: 02 9359 2507 Mobile: 0402 028 127
Fax: 02 9359 2503 Email: Schedlich@aol.com

AMMA Contacts

For all general AMMA inquiries contact the Secretariat: Paula Leishman on

Tel: 03 6234 7844 Mobile: 0412 875-390
Fax: 03 6234 5958
Email: paulaleishman@trump.net.au

Conference and Meeting Calendar

Date	Conference	Venue	Contact No.
15-19 Apr 2000	Australasian Society for Infectious Disease Annual Scientific Meeting	Leura, NSW	02 9418 9396
27-28 Apr 2000	International Travel Health Symposium	Washington DC USA	www-hsd.worldbank.org/symposium
30 Apr - 02 May 2000	National Disaster Medical System Conference	Las Vegas NV USA	www.oep.dhhs.gov
2-5 May 2000	RACP Conference	Adelaide, SA	www.racp.edu.au/asm 03 9819-3700
3-5 May 2000	Basic Aspects of Vaccines	Bethesda MD USA	symposium@na.amedd.army.mil
6-10 May 2000	ANZCA Meeting	Melbourne, VIC	03 9859 6899
6-14 May 2000	SPUMS Meeting	Fiji	03 9885 8863 / 1 800 338 239
7-12 May 2000	RACS Meeting	Melbourne, VIC	03 9690 6744
15 May - 2 Jun 2000	Health Emergencies in Large Populations	Montreal, Canada	1 514 3767034
7-9 Jun 2000	ACHSE 2000 Congress	Sydney, NSW	02 6622 1954
7-9 Jun 2000	Health Service Executives	Sydney, NSW	02 9805 0431
16-17 Jun 2000	Emerging Pathogens Conference	Denver CO USA	www.neha.org
16-23 Jun 2000	Management for Clinicians	Western Sydney, NSW	Lesleyb@icpmr.wsahs.nsw.gov.au
25-30 Jun 2000	RACOG Meeting	Cairns, QLD	07 041 1155
16-19 Jul 2000	Emerging Infectious Disease	Atlanta GA USA	ICEID@asmusa.org
27-30 Jul 2000	RANZCP Meeting	Adelaide,SA	08 8239 2911
15-19 Aug 2000	Australasian Faculty of Rehabilitation Meeting	Melbourne, VIC	02 9439 6744
17-20 Aug 2000	AMSANZ 2000	Broome, WA	03 9899 1686 / 0418 890 641
23-25 Aug 2000	RACMA Meeting	Brisbane, QLD	07 3858 5414
6-8 Sep 2000	ANZ Burn Association 2000	Perth, WA	08 9322 6906
20-22 Oct 2000	9th AMMA Conference	Hobart, TAS	03 6234 7844
30 Oct - 08 Nov 2000	Clinical Toxicology Short Course	Adelaide, SA	08 8204 6049
20 Nov - 01 Dec 2000	RAN Underwater Medicine Course	Sydney, NSW	02 9960 0333
3-4 Mar 2001	Trauma 2001	Sydney, NSW	02 9956 8333
20-23 Sep 2001	AMSANZ 2001	Canberra, ACT	03 9899 1686 / 0418 890 641
21-23 Sep 2001	AMMA 2001	Canberra, ACT	03 6234 7844

CONTRIBUTIONS

For the August issue should be sent to:

The Editor
Australian Military Medicine
16 Gaylard Place
GORDON ACT 2906

Deadline is 30 June 2000

Instructions for Authors:

Articles submitted for publication in *AMM* should conform to the following guidelines:

- two hard copies should be submitted, typed double-spaced on A4 paper (single-side)
- if possible, an electronic copy on an IBM formatted 3.5 inch floppy disc in a standard word processing programme should be submitted
- the text in both hard and electronic copies should be unformatted
- references in the text should be numbered consecutively as they are cited and annotation of the references should accord with the style given in *Index Medicus*. Where there are seven or more authors, list only the first three then *et al.* For example:
  Szilagyi M, Dawson RM. Phosgene - A research review. *Aust Mil Med* 1995; 4(2):16-19
- figures and tables should be submitted separately with an indication in the text as to where they should be located
- the originals of all photographs, ECGs, EEGs etc should be submitted to allow high quality reproduction

Articles submitted may be subject to peer review. Articles which have been published elsewhere will only be considered if they are of importance to the field of military medicine, and publication will only proceed with the prior approval of the original publisher.

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TABLE OF CONTENTS