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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.

President's Message

Nader Abou-Seif

An old Chinese curse reads: 'May you live in interesting times.' The Australian military medicine community is certainly doing that at present. The recent Defence Reform Program (DRP) has provided another challenge in reorganisation for those in the ADF medical community. The line between efficient leanness and difficulty in mobilising adequate resources is a fine one which must be drawn carefully. Those involved in this challenge have a difficult task and we wish them well in their efforts. The one thing of which we are certain is that the expectations of the provision of high level medical care will remain whether in an operational or peacetime role. Also, the traditional commitment to excellence by all those in the ADF Health Services will remain their strength.

As we approach next month's AMMA Conference (29-31 August in Melbourne), we look forward to seeing this commitment to excellence on display in the papers to be presented. As in previous years, the program is a varied one which deals with a broad range of subjects ranging from historical to current operational to future aspects. This year, too, we have a large occupational health and safety focus which will provide an overview of what is

being done, and what can be done to enhance the conditions of those for whom we care.

I would encourage you all to consider a trip to Melbourne this August to attend what promises to be an outstanding meeting. The conference will also provide an opportunity to both catch up on old friendships and make new ones among those in the military medicine community.

You will all soon be receiving a questionnaire asking your opinion on a number of issues about the Association and how to improve it so that it may better serve your needs. I strongly encourage you to fill in the questionnaire and return it to the AMMA Secretariat so that we can evaluate the information and try to make AMMA an Association which truly meets the need of its members. As President, and on behalf of the Council, I hope to make AMMA as 'user-friendly' an Association as possible and your input is essential to help us achieve this goal.

Once more, I encourage your attendance at this year's National Conference and look forward to seeing as many of you as possible during the last three days of August.

Editorial

How purple will be the white coat?

Russ Schedlich

The forces of change impacting on the Australian Defence Force, and in particular the Defence Health Service, are making themselves felt. These changes are significant, and will produce a significant change in the way health care is delivered to the Services.

In one of the early editions of *Australian Military Medicine*, Tony Austin wrote an article entitled 'Would that the white coat were purple'.¹ In this article, Austin argued for a much more integrated Health Service, along the Canadian Defence Force model, with personnel being appointed to positions across Service lines based on their abilities, and with a minimisation of single Service rivalries allowing greater cooperation for the benefit of the whole Defence Force. The proposals for health made by the De-

fence Reform Program have embraced this concept wholeheartedly.

There are many in Defence who subscribe to the view that health is health is health, whether you are in Navy, Army or Air Force. There are others who are not so convinced, and argue that there are important single Service differences that demand some autonomy and uniqueness of the single Service health elements.

In considering this issue, it is vital to recognise the difference between *public* health and the provision of *individual* health care. The Defence Force is involved in both, but the characteristics of each are completely different.

In the provision of individual health care, there are few obvious differences between the

Services. The clinical principles in the treatment of a fractured femur are going to be much the same whether it occurs in a sailor on a ship, the soldier in the field or an aviator who has speared in an F-18. There are likely to be some marginal differences in the details of management because of the availability of differing health care facilities in an operational setting, but by and large a doctor from any Service will be reasonably able to manage any of these situations.

It is in the provision of public health, and the management of a health service, where there are, of necessity, marked differences. This is most starkly apparent in some of the very specialised areas, such as undersea medicine and aviation medicine, where differences are demanded by the physiological impact of the unique and harsh environment.

In the operational environments, the differences are quite significant. Certainly, the individual injuries or illnesses are the same, but when looked at from a population perspective there are differences in the numbers of casualties, the generation rate for combat casualties, and the proportions of different types of casualties. The environmental hazards are different, the operational methods and constraints are different, the availability of health care facilities is different, and so on. The management of casualties arising from a mortar landing in a trench in the field is a world away from the management of casualties from an antiship cruise missile in a frigate at sea.

But even 'ashore' (forgive my obvious bent), there are differences.

For example, Defence is working towards a common system of medical restriction classification. A noble goal, but one fraught with difficulties, since there will need to be a sub-classification system to make the distinctions that are relevant to the way each Service operationally deploys - for Navy, whether a person can go to sea, for Army whether they can 'go bush' and for Air Force whether they can deploy to a bare Base or to fly. The criteria for each of these will always be different - someone who is fit to go bush cannot be assumed to be fit to go to sea, and vice versa.

Even with a common classification system, Joint operations are still likely to demand the use of three separate classes for each component of the operation - because sailors will tend to serve at sea, soldiers in the field, etc. Certainly, there will be a small number of cases where soldiers serve at sea, sailors in the field - but the proportions will be very small, and in any case . . .

A further advantage of a common medical classification system is seen to be that any medical officer, from any Service, will be able to

give the 'right' medical classification for anyone. This will most likely be true for all those personnel who exhibit no pathology at all, but in those with some abnormality, is it really likely that a Navy MO will be able to make the right judgement on a soldier's fitness for the field? does that Navy MO really know what the conditions are like? what the workloads are like? what medical facilities are available? He might if he has spent most of his military medical career in the Army (but then isn't he in the wrong uniform?).

Of course, the medical classification system is a tool for determining operational fitness. But what of the strictly non-operational health services? Aren't they all the same?

When it is considered that the aim of these is to return people to duty, and to operational fitness, it follows that there must be a very clear understanding by health personnel of the individual Service requirements. It is also essential that they have an intimate understanding of the Service environment, since how can they make accurate judgements on fitness if they do not?

So can the purple coat work? What is it that health professionals must practise during their careers? Is it health, or is it health in a Service environment? If the former, with only scant regard for the Services, then an integrated solution would be appropriate. Health Services personnel can get on and become experts in health, giving the Service requirement a low priority.

On the other hand, if the aim is to be a customer focused Health Service, health professionals must surely become experts in the Service environment. In the absence of a course on each Service's environment, ethos, management practices and so on, the only way of developing this expertise is exposure - continuous and long term exposure. By that I mean, service in the Service, and as a part of the Service.

As we move to more integration, the great danger is that we will lose sight of the fact that we have two prime customers - our patients (individual health care) and our Services (management of a health service and their personnel within it).

There is no doubt that we must move to more efficient and effective utilisation of our infrastructure. This will inevitably make sharing of common services and facilities more widespread. The challenge is ensuring that we do not blur the lines so much that we cease to provide an effective service to our two customers. If we lose sight of the individual customer, we will incur their opprobrium and possibly see them in Court. If we lose sight of the Service customer, we will lose their support and be destroyed.

Reference:

1. Austin A. Would that the white coat were purple. *Aust Mil Med* 1993; 2(2):24-26

Original Article

A study of morbidity in the Australian Defence Force. The 6 RAAF Hospital Morbidity Study 1993-94^{1,2}

Neath AT,³ Quail G⁴

Abstract

Introduction

This study was designed to document the morbidity of a population of Australian military service men and women.

Methods

The study was conducted in the outpatient departments of No 6 RAAF Hospital, at Laverton, Point Cook, and Defence Force Health Centre, Melbourne. The patients studied were male and female members of the Royal Australian Air Force (66%), Army (25%), and Navy (9%), who were almost all working in office occupations.

The doctors coded the problems managed at all consultations during 1993-94, using a sub-set of ICD-9 (CM), based on the International Classification of Health Problems in Primary Care.

Results

Information was recorded from 19,981 consultations. At 1808 consultations, two problems were managed and at 202 consultations, three problems, giving a total of 21,993 problems. There was a high incidence of respiratory disease, medical examinations and musculoskeletal disorders, and a low incidence of blood, reproductive and congenital/perinatal disorders.

Discussion

The study has shown that a wide range of disease is present in the Services, providing a good breadth of experience for Defence Force doctors. A number of recommendations are made regarding the process of coding morbidity.

Key Words

Morbidity, Health Surveys, Defence Forces, Military Medicine, General Practice, Disease Classification Systems, Primary Care.

¹ This is an authorised reprint of an article published in the journal of the Australian Military Medicine Association. Neath AT, Quail G. A study of morbidity in the Australian Defence Force. The 6 RAAF Hospital Morbidity Study 1993-94. *Aust Mil Med* 1997; 6(2):3-9

² The study reported in this Paper was completed with the assistance of an AMMA Research Grant

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Introduction

In 1983, the Australian National Health and Medical Research Council recommended increased collection of health care information on which policy decisions could be based and development planned. In 1985 the Australian and New Zealand Society for Epidemiology and Research in Community Health identified information on morbidity as a key requirement for planning of improved health care and continuing education for medical practitioners.

The Defence Forces are well placed to carry out clinical research related to morbidity. They have a well documented population with base line data recorded at the time of recruitment. It should therefore be possible to assess incidence and prevalence of disease and injury and identify occupational risk factors. The effectiveness of preventative medical strategies in conditions such as obesity, hyperlipidaemia and hearing loss could also be studied.

The implications of this data collection for future planning are considerable. This could include analysis of time lost through accident and illness, the effectiveness of recruit medical examinations in screening out significant problems and the effect of conditions such as asthma on the member's fitness for deployment. Without recording morbidity accurately for a lengthy period, any conclusions drawn from data collection are at best only an impression.

Studies of morbidity among the military forces of the world have been carried out over the years, but most have looked at isolated incidents. Examples include an outbreak of diarrhoea in Dutch servicemen in Zaire,¹ and streptococcal disease among US Army trainees.² Another study recorded morbidity and medical supply usage during a deployment of 1 159 troops to Thailand for 6 weeks, to aid planning for future exercises.³

Injuries and illnesses, occurring in a group of 649 completing their basic training over a period of six weeks, demonstrated that cigarette smoking and lack of physical fitness were related to increased morbidity.⁴ Studies of morbidity during the Gulf War included a comparison of the incidence in each sex of seven general conditions such as acute gastrointestinal disorders.⁵

There is however little published data on the overall health of serving members and few longitudinal surveys. Three recent studies aim to address this question.

Fitzpatrick documented 5 793 consultations over a one year period in an aviation brigade of 1 220 persons, comparing medical attendances by aircrew and supporting staff.⁶ Zwart analysed the records from 15 275 medical consultations with aviators recorded over several years at 18 United States Air Force bases.⁷ The British Army Morbidity Surveillance study (J95), launched in 1996, is a universal comprehensive sickness monitoring system. It aims to collect data on the reasons for sickness and in-

jury attendances, working days lost, referrals and admissions to military or other facilities (personal communication - Lt Col S A St J Miller, Royal Defence Medical College, London).

Our study was conceived after an audit was carried out in 1990 of 100 randomly selected medical records of patients presenting to the Outpatients Department of 6 RAAF Hospital.⁸ This revealed a wide range of complaints and stimulated a large scale study of all patients presenting to the Department.

The aim of this on-going study is to ascertain morbidity patterns and help identify key health problems in serving members. This paper presents the results of our study. A separate paper will compare our findings with Australian general practice.

Methods

Setting and Patients

The project was undertaken by the doctors working at 6 RAAF Hospital in 1993-94. The hospital has an inpatient unit of 35 beds and an outpatient unit which functions as a general practice for the service personnel on the Laverton Base. The hospital also has outpatient branches at Defence Force Health Centre, Melbourne and RAAF Base Point Cook.

During the study, medical care was provided for 3 350 staff, of which 66% were Air Force, 25% were Army and the balance Navy members. Males accounted for about 76% of the personnel. The members who formed the study population worked mainly in office-based occupations, in contrast to personnel at operational bases, where there are more industrial occupations.

Unlike the defence forces of the United Kingdom and the United States of America, family members in Australia are not treated by service medical practitioners, so our patients are aged 18-55 years.

Data Collection

After each consultation, the doctor selected a diagnostic code for each problem managed. A maximum of three codes were then written on the appointment sheet, and later added to a computer database.

The coding system was a subset of the International Classification of Diseases - Clinical Modification (ICD-9-CM),⁹ which is used for all medical coding in the Defence Forces.

Because it would be used by doctors unfamiliar with the complexities of coding, a brief list of codes was considered desirable. The subset chosen was based on the International Classification of Health Problems in Primary Care (2nd Edition).¹⁰

A number of ICD-9-CM codes were added to cover sporting injuries and medical examinations in more detail, as these diagnoses are common in the services.

The list used contains 376 codes and was printed on a laminated double-sided A4 sheet, with a copy for each doctor. Training sessions were conducted to encourage uniformity of coding. The authors were available to discuss any coding queries.

Results

Number of Problems Managed

There were 21 993 problems managed at 19 981 consultations. At 1 808 consultations, two problems were recorded, and at 202 consultations, three problems. There was a wide range of problems with 347 different problems selected from a list of 376.

The data was analysed by sex and by the age groups 18-24, 25-44, and 45-55. The distribution of the problems among these groups is

shown in Figure 1. Although 76% of the study population is male, they represented only 67% of the problems.

Problem Groups

The distribution of the problems managed across the ICD-9 (CM) chapters is shown in Figure 2.

A list of the commoner problems managed is shown in Table 1. These were selected because the percentage of each was equal to or greater than 0.5% of all problems managed in the whole study. The numbers shown under each sex-age group represent the percentage of the problem in that particular group.

Note that the term "Med/Surg Procedure without diagnosis" includes wound dressings and cosmetic surgery.

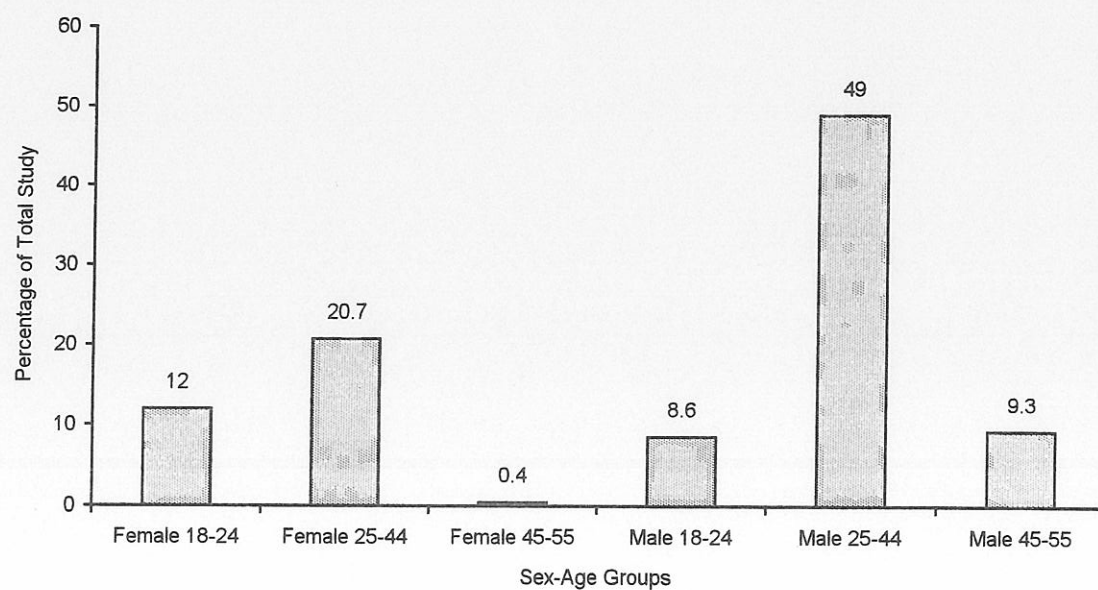


Figure 1. Problems Managed - Percentage in each Sex-Age Group

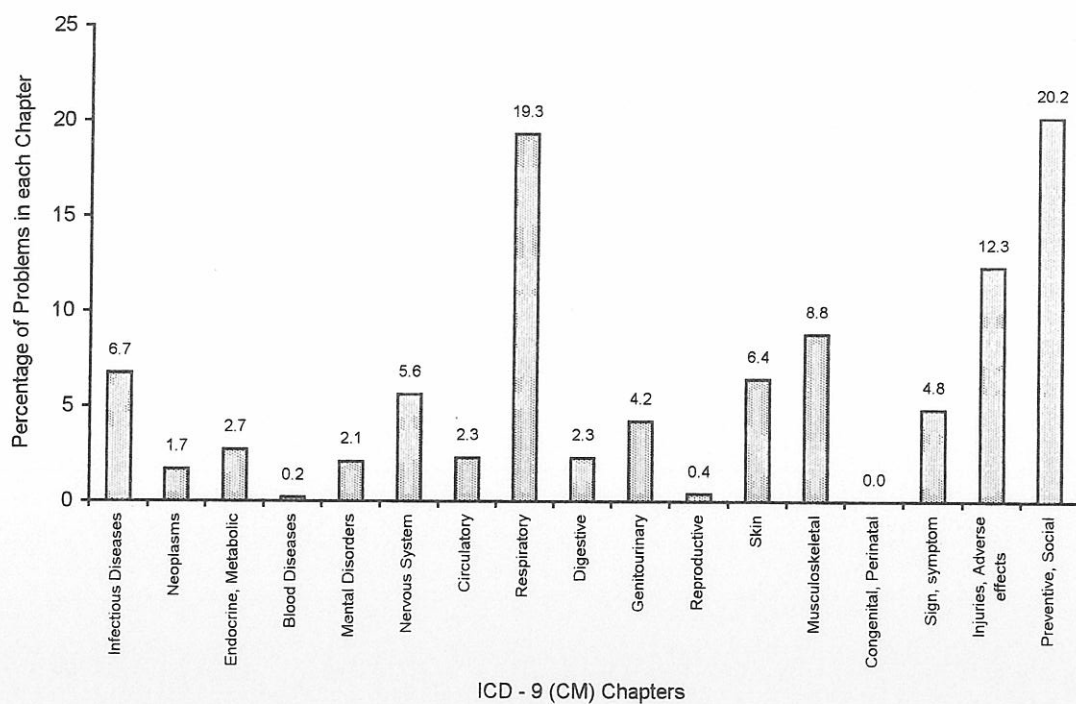


Figure 2. Problems Managed - Percentage in each ICD-9(CM) Chapter

ICD-9(CM) Chapter	Problems Managed	Female Age Groups (percent)			Male Age Groups (percent)		
	(where incidence for "All Groups" >= 0.5%)	18-24 n=2636	25-44 n=4557	45-55 n=83	18-24 n=1888	25-44 n=10777	45-55 n=2052
Infectious Diseases							
	Presumed Infectious Intestinal Disease	3.3	4.1	0.0	4.1	2.5	1.4
	Warts, All Sites, including genital	1.6	0.6	0.0	1.1	0.9	0.9
	Dermatophytosis & Dermatomycosis	0.6	0.2	0.0	1.5	1.1	0.9
	Viral Infection NEC	0.6	0.6	0.0	1.2	0.9	0.3
Neoplasms							
	Benign Neoplasm Skin, incl Naevi	0.9	0.9	0.0	0.7	0.8	0.9
Endocrine, Metabolic							
	Overweight (BMI > 26.9)	0.8	1.3	6.0	0.8	1.7	2.1
	Lipid Metabolism Disorders	0.0	0.1	0.0	0.2	0.7	3.5
Mental Disorders							
	Depressive Disorder	0.0	1.6	0.0	0.1	0.4	0.7
Nervous System							
	Refractive Errors	1.2	0.9	1.2	0.8	1.5	2.5
	Migraine	0.6	0.6	0.0	0.6	0.4	0.8
	Conjunctivitis & Ophthalmia	0.6	0.5	0.0	0.5	0.7	0.6
	Other Eye Diseases	0.3	0.4	0.0	0.5	0.6	0.5
Circulatory Disorders							
	Hypertension, Uncomplicated	0.2	0.3	7.2	0.2	1.4	7.1
Respiratory							
	Acute Upper Respir Tract Infection	8.1	8.7	12.0	10.2	10.4	7.1
	Hay Fever	2.3	2.4	2.4	2.3	2.6	2.3
	Bronchitis & Bronchiolitis, Acute	1.3	1.1	4.8	2.4	2.0	1.6
	Sinusitis, Acute & Chronic	1.4	1.5	2.4	1.5	1.8	2.1
	Asthma	1.6	1.1	0.0	1.7	1.2	2.0
	Laryngitis & Tracheitis, Acute	1.1	0.9	0.0	0.6	0.9	0.7
	Acute Tonsillitis & Quinsy	0.9	0.6	0.0	1.1	0.8	0.5
Genitourinary							
	Vaginitis, Vulvitis NEC	2.5	1.9	1.2	0.0	0.0	0.0
Skin							
	Other Skin Disease NEC	0.9	0.6	1.2	1.3	1.0	0.8
	Eczema & Allergic Dermatitis	1.1	0.9	3.6	0.8	0.9	0.7
	Keratosis (Solar, Seborrh, Senile)	0.2	0.2	0.0	0.2	0.8	1.4
	Boil & Cellulitis Incl Finger & Toe	0.6	0.5	0.0	0.7	0.8	0.6
	Other Infections Skin/Subcutaneous	0.4	0.2	1.2	0.6	0.6	0.6
Musculoskeletal							
	Back Pain W/O Radiating Symptoms	1.0	1.3	3.6	1.4	1.8	2.1
	Back Pain With Radiating Symptoms	0.5	0.7	0.0	0.4	1.3	1.4
	Pain Or Stiffness In Joint	0.4	0.5	0.0	1.0	1.1	0.9
	Chronic Internal Knee Derangement	0.5	0.3	0.0	2.2	0.6	0.4
	Shoulder Syndromes	0.1	0.2	0.0	0.1	0.7	1.2
	Cervical Spine Syndromes	0.5	0.4	1.2	0.3	0.5	0.8
Sign, Symptom, Ill-defined							
	Headache	1.3	0.9	0.0	0.5	0.7	0.2
	Abdominal Pain	1.4	0.7	0.0	0.5	0.6	0.4
Injuries, Adverse Effects							
	Sprain/Strain All Sites	6.4	5.7	3.6	10.8	8.5	3.6
	Fracture, Any Site	0.9	0.5	1.2	2.3	1.1	0.5
	Bruise, Contusion, Crushing	0.9	0.6	1.2	2.3	1.0	0.3
	Lacerations	0.5	0.3	0.0	1.2	0.8	0.5
Preventive, Social							
	Medical Examination	4.9	6.2	2.4	10.0	8.0	6.2
	Advice & Health Instruction	2.4	2.8	1.2	2.8	2.7	3.2
	Prophylactic Immunisation	0.8	1.7	1.2	1.6	3.3	2.1
	Med/Surg Procedure W/O Diagnosis	0.6	1.0	1.2	0.7	2.8	3.0
	Oral Contraceptives	6.2	4.5	1.2	0.0	0.0	0.0
	Pap Smear	4.0	4.2	4.8	0.0	0.0	0.0
	Diagnosing Pregnancy	1.5	1.6	0.0	0.0	0.0	0.0

Notes: NEC = not elsewhere classified W/O = without

Blood, Digestive, Perinatal and Reproductive Chapters are not shown in this Table because of low numbers

Table 1. Common Problems Managed

Discussion

Problems Managed

The most common group of problems managed was Preventive & Social, which comprised mainly medical examinations. In the Services, these are carried out on recruitment, re-engagement, change of employment trade, application for a licence to drive heavy vehicles, and discharge from the service. Also, all RAAF members have a periodic medical 5-yearly, while Army members have one 3-yearly until age 35 and thereafter annually, and Navy members 3-yearly.

Examinations range in complexity from checking blood pressure, height and weight, vision and hearing through to the RAAF Periodic Medical which includes a full physical examination, ECG, spirometry and a serum lipids/liver function/glucose/urate screen.

The second most common group was Respiratory. These conditions may have a higher consultation rate in the Services than in the community because members must see a doctor to obtain a prescription for common medications used for symptomatic relief of respiratory infections. This requirement is partly to ensure rapid recovery of the patient through supervision of treatment, and also to control costs, because medications are free.

The third and fourth most common group of problems were Musculoskeletal and Injuries & Adverse Effects. The prevalence of these conditions reflects the requirement by the Services for high levels of physical fitness. This results in a high frequency of sporting injuries, particularly ankle, knee and spinal strains.

Sex-Age Groups

Analysis of the data by sex-age groups reveals a similar pattern of problems managed with some notable exceptions.

In young males, the commonest problems managed were sprains and strains. Upper respiratory tract infection (URTI) was almost as common, and was the commonest problem in all other groups. Other infectious diseases, particularly gastrointestinal, tinea, warts and other viral infections figure prominently in this group.

The 25-44 year male group formed the largest subset and produced almost 50% of all problems managed. Major complaints were respiratory infections and physical injury.

In older males, whilst respiratory infections are still the commonest acute problem, chronic conditions are more frequent than in younger members. Hypertension ranks with URTI as the major cause for attendance. Eye refractive errors were three times more common than in the youngest group. Lipid disorders and obesity were also prominent. In contrast, visits due to physical injury, viral and gastrointestinal infections were much less frequent than in the younger groups.

Young females, like young males, attended mainly with URTI, physical injury and gastro-intestinal infection. Visits for contraception and vulvovaginitis were more common than in the older group.

As in the case of males, the 25-44 year old females attended more frequently than the older and younger groups combined. The three commonest problems were similar to the younger members, whilst hayfever, troublesome in all groups, was also a common reason for presenting. Attendances were similar to the younger group except for headache and abdominal pain, which were less common.

Older women presented only 83 problems in total. Whilst no significant conclusion can be drawn from this group, attendances mostly related to respiratory infections and conditions associated with ageing - hypertension, overweight and back pain. In addition, skin diseases were a cause of frequent consultation. Cervical spine syndromes - perhaps related to poor posture - were also more commonly seen, whilst sporting injuries were less frequent.

Summary

In summary, it is interesting to note the changes across age groups for certain conditions. In males, there was a noticeable decrease in frequency with age for infectious disease, chronic internal knee derangement and injuries. There was an increase with age for excessive weight, lipid disorders, hypertension, refractive errors, keratoses, back pain and cervical spine syndromes.

In females, excessive weight, hypertension, sinusitis and back pain increased with age, whereas vaginitis, sprains/strains and oral contraceptive usage declined. Changes in prevalence for other conditions were not as marked.

When all groups of both sexes are combined, we note that the largest group of problems were acute respiratory infections. Sprains and strains, medical examinations, advice and health instruction and immunisations were the next most common, reflecting the emphasis on preventive medicine by the services.

The study has shown that a wide range of disease is present in the Services, providing a good breadth of experience for doctors working in the Defence Forces. It has permitted a comparison with morbidity in similar age and sex grouped individuals in the community, which will be reported separately. Further, it will enable us to identify at-risk groups, permit critical evaluation of our treatment and hopefully will ultimately lead to improved health status in Defence Force personnel.

Classification Systems

The authors noted a number of problems with classification systems. For example, some conditions such as headache, skin naevi, respiratory infection, and viral illness can be classified under a number of different codes, de-

pending on the preference of the doctor choosing the diagnosis. It is a problem which can be reduced by careful attention to classification systems, and education of the doctors in coding nuances.

Classification is best done by the doctor seeing the patient, so it is important that the system be as simple as possible, to reduce time spent coding. It would also be preferable for the doctor to code the problems directly into a computer in the consulting room. This may be best achieved by adding diagnosis coding to computer prescription systems which are likely to be used by doctors because of the excellent drug interaction and advice systems available today.

Another problem was the high number of patients with no sex and/or birth date recorded. The missing data was later added by the authors. This source of error could be reduced

greatly if a CD-ROM was provided each month with a full list of Defence Force members, including their sex and date of birth.

Acknowledgments:

The doctors involved were: Wing Commander Russell Searle, Squadron Leaders Ian Hosegood, David Newman and Louise Owen, Flight Lieutenants Justin Jenkins and Kath Reynolds, Drs Kal Fried, Vicki Grove, Martin Hodgson, Adrian Neath, Geoff Quail, and Judy Smith. Mention should also be made of the clerical staff at the three locations, who entered the data.

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Review Article

Artificial intelligence and expert systems - their application to military medicine¹

A.G. Robertson²

In the early 1950's, the British mathematician Alan Turing argued that for a computer to be described as intelligent it must be able to deceive a human into believing that the computer was human.¹ Whilst we have yet to reach this stage, considerable advances have been made in the development of artificial intelligence and expert systems. Artificial Intelligence has been defined as 'the creation of computer programs that do things that require intelligence'.² Expert Systems, a subset of Artificial Intelligence, utilise computerised reasoning based on specific expert knowledge.³ This use of computerised reasoning or rules, combined with an expert knowledge base, differentiates these systems from decision support systems.² In this paper, the application of expert systems to medicine in general, and the Defence medical arena in particular, will be reviewed.

Expert systems designed for medical purposes have been an integral part of the historical development of Artificial Intelligence expert systems. One of the earliest expert programs developed, using List Processing (LISP), was a psychotherapist program named DOCTOR.¹ As research continued, particularly at Stanford University and the Massachusetts Institute of Technology (MIT), further rule based systems were developed. At Stanford, an expert system called MYCIN was developed to diagnosis blood and brain infections and to recommend appropriate therapy, a system which proved to be as nearly as accurate as human physicians.¹ The inference engine from MYCIN, dubbed Essential MYCIN (EMYCIN), was used to develop many new expert systems. CADUCEUS (INTERNIST), an expert system developed at the University of Pittsburgh to encompass the diagnostic knowledge of over 700 diseases, was an even more challenging project.¹ The roots of most of today's medical expert systems are derived from MYCIN, CASNET (glaucoma diagnostic system) and INTERNIST.³

The expert system consists of a number of components. These include the knowledge base, which contains the expert information and

'rules of thumb' required to make decisions; the inference engine which problem solves; the knowledge acquisition subsystem, which allows the system to be updated and its rules to be amended; the explanation subsystem, which explains the rationale behind the decision, and the communication interface with the user.^{1,3} A graphical representation of the system is in Figure 1. In medicine, expert systems are generally limited to systems designed for clinical decision making. These are generally either rule based systems (IF...THEN), which have developed from original MYCIN and the EMYCIN inference engine,⁴ or, more recently, artificial neural networks.⁵ The rule-based systems have been used to develop other expert diagnostic and therapeutic systems like ONCOCIN (Cancer protocols) and PUFF (Pulmonary function); teaching tools like GUIDON and NEO-MYCIN,³ and Quality Assurance systems like the ATTENDING expert critiquing system.⁶ Artificial neural networks are having increasing application in the diagnosis of disease conditions from radiological images to pathological slide images.⁵

Medical expert systems have the capability to provide improved access to a wider range of expert knowledge, increase consistency in the use of specific medical knowledge, and aid in problem solving and strategic planning.⁷ Expert systems have, as yet, received only minimal utilisation within Defence medical services, either in Australia or overseas. Perry describes the potential for these systems within the United States (US) Air Force but stresses the need for coordination across the US Department of Defence.⁸ There is, however, much scope for the use of expert systems, both medically and militarily, and their application will be explored further. To assist in a systematic review, expert systems can be classified broadly into functional areas. These include medical diagnostics and therapeutics, computerised medical records, quality assurance and training.

¹ This is an authorised reprint of an article published in the journal of the Australian Military Medicine Association. Robertson AG. Artificial intelligence and expert systems - Their application to military medicine. *Aust Mil Med* 1997; 6(2)10-14

² Commander Andy Robertson is the Senior Medical Officer, HMAS Stirling.

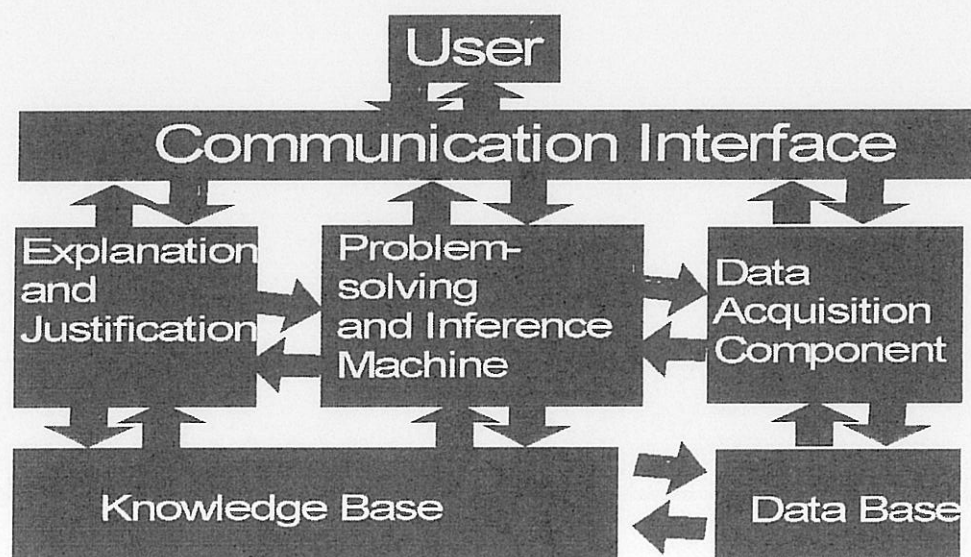


Figure 1: Components of an expert system³

Medical Diagnostics/ Therapeutics

Many of the early expert systems, like MYCIN and CADUCEUS, were developed for medical diagnostic or therapeutic purposes. Most of these systems are rule-based expert systems.¹ Work, however, has progressed on artificial neural networks (ANNs). ANNs systems are more adaptive and less constrained by fixed rules.⁵ The development of digital imagery systems, in areas such as computerised tomography, magnetic resonance imaging (MRI) and ultrasonography, has allowed the creation of digital images which can easily be manipulated by computers for consideration by ANNs based expert systems. Such expert systems have proved to be useful in image classification and have been applied with limited success to diagnostic pattern recognition in MRI, nuclear medicine and chest radiographic images.⁵ Madsen also describes how a neural network expert system is able to recognise glaucomatous visual field changes.⁹

Rule-based expert systems continue to have major applications in medical diagnostics and therapeutics. Figure 1 has outlined the various components of these systems. By developing these components, newer expert systems are becoming more comprehensive, reliable and accurate. Knowledge base and database development are an important aspect of these systems. Problems in this area include the narrow focus, poor data quality, overabundant detail and inaccessible format of many databases.¹⁰ Recent database development has included the utilisation of already established databases. At the Rennes University in France, the knowledge base of an expert system is incorporating the Human Immunodeficiency Virus (HIV) databases held at the University Hospital to provide a HIV diagnostic expert system.¹¹ Many such large clinical databases are available. Ruffin noted that these databases are being developed

by many large hospitals and health care companies. As such, they will be a goldmine of information for future expert systems.¹² Military Hospitals, like the Tripler Army Medical Centre in the United States, are also methodically developing databases of information on surgical and other procedures which could be used in future knowledge bases.¹³ The Australian Defence Force has large databases of medical information on its personnel which could be developed for these purposes. NASA has also investigated developing the knowledge base of the expert system. Whilst there is now ready access to electronic biomedical libraries, the medical knowledge needs to be engineered to be utilised in expert systems. The secondary databases, which incorporate knowledge abstracts, can operate to flag decisions inconsistent with established clinical treatment guidelines. NASA is presently trialing such a system in general practice.¹⁴ Research on improving the links between the knowledge base and database components are also being undertaken. These systems integrate diverse medical information systems, containing data and knowledge, into an expert system which allows the information to be accessed through a common interface.¹⁵

Another bottleneck in expert system's development is the knowledge acquisition subsystem. Current knowledge bases are largely manually built, a slow and tedious process.¹⁶ They are also susceptible to becoming obsolete if not periodically updated.¹⁷ The use of automated knowledge acquisition systems allows domain experts to acquire specific knowledge, transform medical information into structured knowledge and then utilise that knowledge, all without requiring a knowledge engineer.¹⁸ One example is this process is the hypertext knowledge engineering system. (Disorder Toolbox) developed for the Medical Emergency Decision Assistance System (MEDAS). This enables physicians, without a computer science background,

to add, manage and validate knowledge in the MEDAS without the need to recompile it. The use of such tools will open the doors to further opportunities in this area.¹⁸ Hasnah, however, warns that such systems need to be applied carefully to ensure that the new knowledge input is accurate and appropriate, that new heuristic rules applied don't impact inappropriately on other knowledge areas, and that the storage of increasing amounts of information is catered for.¹⁷

Research is also looking at the communication interface and the problem solving systems. This has led to the development of decision analysis support systems.¹⁹ Often embedded prompts, these interactive systems provide the cues to ensure the physician's planned diagnostic or disease management plan are both appropriate and in line with current clinical templates. Ideally, the clinical templates are table driven to allow for rapid updating of the procedures and rules for diagnosis and treatment.¹⁹ Examples of these diagnostic and therapeutic decision support systems include QMR (Quick Medical Reference), developed at the University of Pittsburgh, and ILIAD, developed at the University of Utah. Ruffin, however, notes that these expert systems take considerable time for data entry, are expensive to update, and have difficulties dealing with multiple problems in one patient.²⁰ Whilst the diagnostic and treatment protocols continue to improve, further research is needed on the communication interface and the unrealistic time frames for data entry. Otherwise, such systems will not make the jump from academic curiosity to useful tool in a busy medical practice. More integrated systems, like PsychAccess, which develop assessments of impairment, outcome focused treatment plans and patient objectives, as well as diagnosis, are more likely to make this transition.²¹

Diagnostic and therapeutic expert systems, whilst having great potential, have major disadvantages which must be addressed before such systems enter common usage. Some of these problems, like data entry and storage concerns, have already been alluded to in previous paragraphs. Sumner and Shultz note that these expert systems should recognise their own limits of expertise, be able to detail their logic for decisions and have the tools to target diagnostic dilemmas with specific questions.²² Interfacing with the computer also remains inadequate, an area which may be improved by voice recognition and virtual reality technology.¹⁶ The continued emphasis of expert systems on very small highly specialised medical areas, like MYCIN for microbial infections and CASNET for glaucoma, further abrogates their general use in medical practices. Larger and more comprehensive systems, like the ILIAD system, are required.^{9,16} In addition, the inference engines of such programs lack the intuitive thought of human experts and compilers often underesti-

mate the amount of non-expert information required to simulate this process.¹⁶

Computerised Medical Records

The failure of the current paper-based medical record systems is well documented. Problems with legibility, inconsistency between health practices and information retrieval, limit their current and future usefulness.^{23,24} Expert systems, incorporated into intelligent computerised medical records, have the potential to produce significant advances in this area. Detmer notes that the vision for computerised patient records (CPR) incorporates greater flexibility in the retrieval of patient data elements which distil the physician's clinical diagnostic and therapeutic thought processes and assess their effectiveness, a distillation which has application in future expert systems.²⁴ Epidemiological benefits aside, record linkage across databases provides improved prognostic knowledge to clinicians and assists in medical decision making.²³ Indeed, the data from a standardised global electronic health record would allow the pooling of data for research and the improvement of the quality and reliability of expert systems.¹⁰ On a more mundane note, CPRs can remind physicians of routine and follow up visits, allow graphing of physiological variables over time, and provide advice to doctors on drug interactions, allergic problems and physiological contra-indications.²⁵ Proactive clinical templates, embedded as interactive prompts, also enable the doctor to work through expert systems to verify diagnosis, treatment protocols and health maintenance requirements.¹⁹

Quality Assurance

Expert systems also have increasing application in the areas of quality assurance and risk management within health care systems. Continuous quality improvement requires the development of practice guidelines and the collaboration of groups of specialists to improve clinical care. Without the common knowledge of normal clinical practice, provided by linked databases and expert systems, the effective application of guidelines is patchy at best.²⁶ Gleiner predicts that Health Maintenance Organisations in the US will be soon linking their electronic medical records to clinical databases to produce a 'best practice' model for a specific condition.²⁷ Such systems, promising high quality medicine, will be useful as marketing tools. The National Committee for Quality Assurance in the US is developing the Health Employer Data and Information Set (HEDIS) to measure standardised health outcomes. The analysis of these outcomes will provide further information on quality of care, patient access and patient satisfaction.²⁸

On the health management side, rule-based and neural network expert systems are being utilised for claims adjudication (including fraud detection), utilisation reviews and identification of aberrant billing practices.²⁹ Frankel,

Chernow and Rosenberg note that their utilisation review system was able to identify inappropriate utilisation of medical services and aberrant billing practices, profile physician practices and provide quality assurance feedback on gaps in clinical care.³⁰

Training

Medical training is an area that will be increasingly impacted by the application of expert systems. Increasingly, interactive medical computer systems are being used in medical schools to train students in diagnosis and therapeutics while some medical schools, like the University of Michigan, are teaching students Applied Medical Informatics.³¹ The advantages of computer interactive learning include immediate student specific feedback, tailored instructional programs, objective testing of progress and an entertaining format.³² Expert systems, like GUIDON, use a set of teaching strategy rules to develop new interactive applications. Computer assisted instruction, so developed, can form the basis of a comprehensive system for lifelong education.³²

Post-graduate medical training can also benefit from the use of expert systems. Virtual reality systems, which generate environmental representations that allow sensory interaction, can be used to simulate the body for the purposes of anatomical study and minimally invasive, particularly laparoscopic, surgery.³³ Practice critiquing systems have also been developed. These include ATTENDING and HT-ATTENDING which critique anaesthetic management and hypertensive management respectively.⁶

Application to Military Medicine

The military medical community, particularly in Australia, has yet to embrace and apply the advances being made in medical expert systems. At HMAS STIRLING, the only medical computer support system is KERMIT, a Navy specific health record and medical administration

support system. Whilst the system has some primitive recall programs, the system has no expert capabilities. The MIMS prescription system is in the process of being introduced. This has some embedded prompts which will interactively question possible adverse reactions, drug interactions and allergies. On the horizon is the Health Systems Redevelopment Project (HSRP). This eight year project, which is finally undergoing pilot system trials in Canberra, aims to introduce interactive computer-based medical records across the Australian Defence Force (ADF). Within this computer network framework, there will be scope for diagnostic and therapeutic expert systems, computer assisted training, epidemiological research and quality assurance programs. As the ADF is a controlled health maintenance organisation, the 'future picture of quality medicine' with integrated registration, problem-oriented medical records, clinical templates, disease management cues and internal messaging, as espoused by Lowenstein and Greenberg,¹⁹ is becoming increasingly likely with HSRP. There are, however, many challenges still to be met. The diverse nature of medical knowledge, the lack of objective gold standards, subjective variations in medical practice, preconceived ideals of what a doctor is, and poor physician acceptance, will all contribute to the successful (or otherwise) use of artificial intelligence in medicine.³⁴

Conclusion

Medical practice has utilised expert systems since the early days of artificial intelligence research. In this paper, the role of such systems in diagnosis, therapy, quality assurance, medical records and training have been reviewed. The benefits of such systems in producing more productive and effective medical workplaces have yet to be fully realised. The future, however, of such medical expert systems remains promising for both civilian and military practice. To quote Marshall Ruffin,³⁵ one of their greatest advocates, 'the future is here'.

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Abstracts from the Literature

Submitted by Douglas J. Fahlbusch¹

Macintyre P. Treating acute pain: The Royal Adelaide approach. *Medical Review (Journal of AMA[SA])* 1997; Feb:10-1

Comment: Major improvements in the delivery of analgesia, especially post-operative, are detailed. The Royal Adelaide Hospital Acute Pain Service has treated over 13,000 patients since 1989. Most patients receive Patient Controlled Analgesia (PCA), but epidural analgesia is used increasingly (currently 25%).

Reasons for the inadequacy of older opioid regimes are a) the variability between patients of minimum effective analgesic concentration (MEAC), b) the wide differences in intra- and inter-patient peak blood concentrations, and c) the wide differences in times to peak concentration following injection of opioid.

Age better predicts opioid requirement than does weight. (100-age) mg approximates the average 24 hour requirement, however an 8-10 fold dose variation occurs. Sedation is a more reliable and earlier sign of over-administration of opioids than is respiratory depression. Periodic hypoxia may occur even with correct dosage, hence all patients receive supplemental oxygen.

Side effects are similar with morphine and pethidine, although pruritus is more common with the former; however nor-pethidine toxicity dictates the use of morphine in the first instance.

Hocking G, de Mello WF. Battlefield analgesia - A basic approach. *J R Army Med Corps* 1996; 142:101-2

Comment: The authors suggest a pain management protocol for use in the field where medical expertise or assistance is limited or not immediately available. Current civilian practice is used as a basis, and some of the points in the above article (Macintyre) are repeated. Use of a 10 mg morphine autoject is assumed, and justified by the fitness of servicemen (ASA classification 1 or 2), logistics issues, predicted analgesic requirements (based on age) and (unreported) trials by the authors. An 'analgesic algorithm' is commenced after cardiorespiratory stability is obtained by ABCD (ie after primary/secondary survey as appropriate, according to EMST or ATLS protocols). If pain is present, 10 mg of morphine is delivered.

Hourly observations are made, with two hourly administration of 10 mg boluses of mor-

phine if the patient is stable and in pain. Respiratory rate (>8 /min), pulse rate and sedation score (SS Alert or responding to Voice) are monitored to titrate doses. This is of course in addition to the usual monitoring of the battlefield casualty for requirement for early medical assistance or evacuation. The simplicity of the algorithm is attractive to the likely user (casualty) or administrator (buddy)

Murray R. Guidelines for fluid replacement during exercise. *Aust J Nutr Diet* 1996; 53(4 Suppl):S17-S21

Comment: Optimal physical performance requires minimisation of dehydration. Even low levels of dehydration (<2%) impair cardiovascular function and thermoregulatory response. Consuming fluid in direct proportion to sweat loss maintains these important physiological functions and significantly improves exercise performance, even for exercise of only one hour. Athletes (and, one would presume, military personnel) are prone to 'involuntary dehydration' because fluid replacement during exercise is generally only 50% of that required. Losses of two litres per hour or more can occur during exercise in warm, humid environments.

Fluid replacement at frequent intervals (15 minutes) is better than larger boluses less frequently (1 hour). The paper also discusses the latest recommendations made by the American College of Sports Medicine on 'Exercise and Fluid Replacement'.

Carbohydrate ingestion provides an additive benefit in improving exercise performance, independent from preventing dehydration. The recommended carbohydrate replacement is 30-60 grams per hour. Sports drinks usually contain 60-70 grams carbohydrate per litre (6-7% carbohydrate). Higher concentrations (eg soft drink, fruit juices) will impair water absorption and exceed the body's capacity for utilisation of exogenous carbohydrate, and can slow gastric emptying.

Sodium replacement of 0.5-0.7 grams per litre is recommended. The sodium content of sweat varies enormously, up to one gram per litre. The sodium content of sports drinks is not given, although it does improve palatability and ingestion rates.

¹ Lieutenant Douglas J. Fahlbusch is a Medical Officer currently serving with the Royal Australian Navy in South Australia. He has particular interests in Anaesthesia and Hyperbaric Medicine.

BenGal S, Lowe J et al. The role of the knee brace in the prevention of anterior knee pain. *Am J Sports Med* 1997; 25(1):118-22

Comment: This is reputedly the first prospective study looking at knee braces as prophylaxis for the anterior knee pain syndrome (AKPS). AKPS is a common phenomenon in physically stressed active young persons. It is associated with repetitive knee bending under load, and the pain can be triggered by prolonged sitting or stair climbing. Predisposing factors appear multifactorial and standard treatment modalities (rest, NSAID's, physiotherapy, knee bracing) have variable success. The incidence in military recruits can be up to 30%.

The study group numbered 80 fit asymptomatic 18-25 year old people initially, although 60 completed the study (43 male, 17 female): 27 wore knee braces with a silicone patellar support ring with exercise, 33 did not wear a brace at all. An 8 week, 6 hours per day, training programme ensued with middle and long distance running, obstacle courses, navigational runs and resistive exercises. 54% of male non-brace users suffered AKPS, while only 19% of male brace users suffered AKPS. Results were not considered significant among the female trainees due to the small sample size. Perhaps braces should be issued routinely for use during recruit training!

Tetzlaff K, Neubauer B, Reuter M, Warninghoff V. Pulmonary barotrauma of a diver using an oxygen rebreathing diving apparatus. *Aviat Space Environ Med* 1967; (12):1198-200

Comment: A 22 year old fit German Navy combat swimmer performed a training dive with a

closed oxygen rebreathing apparatus (LAR V, Draegerwerk AG) in the Baltic Sea to a maximum depth of 7 metres following normal procedure. Breath-holding was denied, but coughing occurred during the dive.

Several hours after surfacing, retrosternal discomfort, fullness in the throat and slight hoarseness were felt. He presented the following day. Examination was normal, in particular no subcutaneous emphysema. Plain radiography revealed a radiolucent streak along the left mediastinal border in the region of the pulmonary artery, not present on routine chest x-ray 6 months previously. Subsequent plain x-ray and CT on day 4 were normal, however spiral volumetric CT revealed a small subpleural emphysematous bulla next to the left ventricle. It was still present on follow-up 5 and 15 months later, suggesting that it was a pre-existent lesion.

Pulmonary barotrauma (PBT) of ascent is the most common complication of compressed air diving. Relatively small transmural pressures of 10 kPa can burst lung tissue. There are very few cases reported by other gases.

The emphysematous gas in this case was calculated to be 71% oxygen (following a three breath washout pre-dive). Given that oxygen is cleared by metabolism as well as diffusion, the authors suggest that the relatively high residual nitrogen load accounts for the delayed clearance of the emphysematous gas. A six breath washout is recommended (oxygen rises to 85%). Three minutes of pre-breathing is required to reduce the nitrogen fraction to 4%.

Spiral CT scanning of any PBT is recommended to detect pre-existent lesions which may predispose to a recurrence. The incidence of bullae is probably higher than realised because they are often not revealed by plain x-ray, however routine CT is not recommended.

Submitted by James Ross

Griffiths GD, Lindsay CD, Allenby AC, Bailey SC, Scawin JW, Rice P, Upshall DG. Protection against inhalation toxicity of ricin and abrin by immunisation. *Human and Experimental Toxicology* 1995; 14:155-64

1. Abrin and ricin are highly toxic plant proteins which are very similar in structure and function and inhibit protein synthesis in eukaryotes.

2. Rats have been immunised against either toxin using formaldehyde-toxoids by three subcutaneous injections at intervals of 3 weeks. For abrin, serum titres in 14 out of 15 rats were raised to between 1 : 12 800 and 1 : 51 200 after two injections, 6 weeks from the start of the experiment. Titres of between 1 : 256 and 1 : 1024

were also measured in lung washes after challenge with active abrin toxin.

3. The three major antibody classes, IgG, IgA only were detected in lung washes. The proportion of IgA to IgG was higher in the lung fluid than in sera. Rats immunised by abrin toxoid were protected against 5 LC₅₀'s of abrin by inhalation but others exposed to ricin were not.

4. For ricin, serum titres ranged from 1 : 800 to 1 : 25 600 after two injections and after a third injection the titre range was the same but population samples were weighted towards the higher titres. All rats immunised with ricin toxoid survived the challenge of 5 LC₅₀'s of ricin toxin by inhalation over the observation period of 28 days post-challenge.

5. Representative immunised rates (abrin toxoid) were taken at various times post-

exposure, humanely killed and tissues were examined for pathological changes. It was concluded that an apparently severe lung lesion occurred at a later time than in non-immunised, toxin challenged rats. This damage was not lethal over the experimental observation periods.

6. Immunisation by the sub-cutaneous route therefore protects against lethality from challenge by inhalation of ricin or abrin toxins but does not prevent significant lung damage.

Griffiths GD, Rice P, Allenby AC, Bailey SC, Upshall DG. The inhalation toxicology of the castor bean toxin, ricin, and protection by vaccination. *J Defence Science* 1996; 1(2):227-35

Ricin is an extremely toxic protein extracted from the seeds of the castor oil plant. It was implicated in the assassination of the Bulgarian journalist Georgi Markov, and it is seen as a potential chemical warfare hazard. This paper describes the toxicity of ricin when administered by inhalation of aerosol. The toxicity of ricin from two sources has been compared. Both types were extremely toxic by inhalation - fatalities occurred at doses of less than 10 micrograms per kilogram body weight. Histopathological study showed that damage was entirely restricted to the lung. Death resulted 1-3 days after exposure, from severe intra-alveolar oedema (fluid in the lung) and consequent hypoxia (lack of oxygen) in the majority of cases. There was a latent period of about 18-24 hours before overt signs of poisoning, but studies using cells in culture showed that cells were committed to lethal biochemical lesions within 1 hour of addition of toxin to the growth medium. For this reason, a pretreatment would be the best way for protection of personnel against ricin poisoning. CBDE has developed a ricin vaccine. Immunisation of rats with the ricin vaccine offered very effective protection against the lethal effects by inhalation.

Comment: These two papers detail some very encouraging work from the researchers at Porton Down on ricin and abrin, two plant toxins. Problems persist with lung lesions in immunised animals but research on the use of micro-encapsulation and oral routes may alleviate these problems.

Al Mulla KMA, Pugh RNH, Hossain MM, Behrens RH. Travel-related AIDS awareness among young Gulf Arab men. *J Travel Med* 1996; 4:224-6

Background: The Federal Ministry of Health of the United Arab Emirates (UAE) has a vigorous AIDS control programme to reduce the incidence among its citizens and ensure a low frequency of spread by the sexual route. This is in keeping with cultural factors perceived to have withstood the potential for sexual spread in the Arabian Gulf area. However, there is an ac-

knowledge concern for the risk to young male citizens while travelling abroad to popular destinations such as India, Thailand, and the Philippines.

Methods: The authors attempted to determine the knowledge and attitude about AIDS among Emirati males (aged 18-25 years) by confidential, self-administered questionnaire (modification of a tested approach in the UK). A total sample of 298 subjects participated (94% response), comprising 47 medical students (16%), 197 non-medical students (65%), and 57 school graduates (19%). Of all participants, 253 (85%) were unmarried.

Results: Salient discriminatory findings were that medical students significantly differed from the other two groups in stating that AIDS could not be identified in a person by appearance ($p=.003$) and that the use of condoms were protective while travelling abroad ($p<.001$). The latter issue also reflected a significant difference between married and unmarried.

Conclusion: This study demonstrated a prevailing uncertainty about AIDS knowledge and a possible fear of AIDS, both of which tend to increase acceptance of special education programmes.

Comment: This is one of the first papers I have seen addressing Arab attitudes towards HIV infection and AIDS. Given the continuing role of military forces in the region, this is a useful paper for developing understanding of the perceived problems in the area.

Pohling-Brown P. Non-lethal weapons - Who pays if they kill? *Jane's Defence Contracts* 1996; (11):4-5

Comment: This interesting article provides both a good summary of the different types of non-lethal weapons whilst raising the spectre of a litigious public if allegedly 'non-lethal' weapons actually kill. Whilst this is principally a concern under the American legal system, such concerns should be factored in if Australia is to explore this area.

Levy CL, Sharp TW. Medical challenges for deploying forces. *Marine Corps Gazette* 1997; 81(2):54-61

Tomorrow's commanders may well be challenged by environmental conditions and diseases that pose a greater threat than the enemy to their forces.

Comment: Whilst this is a well-beaten drum, the medical principles behind it bear repeating. Up until World War II, there were more casualties to disease than to battle injury. Levy and Sharp have provided a good review of the dangers of diarrhoeal disease, malaria, arboviral disease (including Japanese encephalitis), and environmental hazards. They also provide a series of operational recommendations for the preparation of troops, preventative medicine during the deployment, and appropriate care

post-deployment. The article is illustrated with good examples of what happens when these measures are not followed, including the outbreak of malaria amongst Marines post Somalia, diarrhoea outbreaks in the Gulf War and high rates of injury in Haiti.

Michaelson A, et al. Compliance with universal precautions among physicians. *J Occup Environ Med* 1997; 39(2):130-7

This study characterised and assessed self-reported levels of compliance with universal precautions (UP) among hospital based physicians, and determined significant factors associated with both compliance and non-compliance. The physicians (n=232) were a subgroup of a larger study population of hospital-based health care workers recruited from three geographically distinct locations (n=1746), and were surveyed using a detailed confidential questionnaire that assessed personal, work-related and organisational factors. Compliance with UP was measured through 11 items that examined how often physicians followed specific recommended work practices. Compliance was found to vary among the 11 items: they were high for certain activities (eg glove use 94%, disposal of sharps 92%) and low for others (eg wearing protective clothing 55%, not recapping needles 56%). Compliance with all items was low (31 to 38%). Stepwise logistic regression revealed that non compliant physicians were likely to be aged 37 or older, to report high work stress and to perceive a conflict of interest between providing patient care and protecting themselves. Compliant physicians were more likely to be knowledgeable and to have been trained in UP, to perceive protective measures as being effective, and to perceive an organisational commitment to safety.

Comment: *If this is the compliance in a controlled environment, with peer pressure, a OH&S program to reinforce it, with the potential for disciplinary action against those not complying, what is it like in General Practice . . . what about in the field, under battle conditions. The likelihood of significant compliance is very low.*

Lebeda FJ. Deterrence of biological and chemical warfare: A review of policy options. *Mil Med* 1997; 162(3):156-61

The deployment of biological and chemical weapons by aggressive states is not a hypothetical scenario but a life-threatening contingency. Although Iraq was deterred from using its biological and chemical weapons during Operation Desert Storm, what forms of deterrence must be considered in preventing the use of these weapons of mass destruction in the future? Traditional deterrents against their use have ranged from the threat of military response to the ratification of diplomatic treaties and agreements. An overall strategy to deter the use of these weapons includes an additional, less frequently

discussed approach - force protection - which encompasses defensive biomedical countermeasures (eg antibiotics, drugs, vaccines, diagnostic tests) and non medical protective devices (eg masks, specialised clothing/shelters, detectors). A combined, integrated approach to deterrence is reviewed in this article with regard to current policies and the roles played by Department of Defence research and development programs for biological and chemical defence.

Comment: *If getting bang for your buck is concerned, I wouldn't be putting much into current force protection measures. Far better to prevent the weapons being deployed at all, than hoping the measures in place would protect. The protective clothing and masks are of little protective value in a heavily contaminated area; they are hot and heavy, reduce communication and have bad psychological effects. Vaccines are of varied help - they can of course be used in a non-war time scenario to help overall health status, but consider the anthrax vaccine, given that currently anthrax is viewed as the biological weapon most suited to being weaponised. To be properly vaccinated requires 6 injections over 18 months, followed by annual boosters. There are significant numbers of local reactions, to loose time from work and convince the sufferer not to return for more. And the cost - initial vaccinations of the US military is estimated to be US\$120 million. Think of what else that money could be spent on. The money could, for instance be going into research for better force protection.*

Doran CM, Sanson-Fisher RW. A cost-benefit analysis of the average smoker: a government perspective. *Aust NZ J Pub Health* 1996; 20(6):607-11

The aim of this paper was to compare the benefit and costs of cigarette smoking from the government's perspective during a one-year period. This was undertaken by estimating, among other things, the publicly financed health care expenditure attributable to smoking and comparing it with tobacco taxes paid by smokers. This comparison of benefits and costs may provide a yardstick from which to measure the relative worth (in financial terms) an average smoker is to the government, an assessment that may be important when assessing health care priorities and any level of commitment to reducing smoking rates. It is estimated that in 1989-90 an average smoker cost the government \$203.57, while benefits received totalled an average of \$620.56 in the same year. If the government were serious about addressing cigarette smoking as a primary health objective its efforts would portray this. The results of this analysis suggest that the objective of raising revenue from smoking is more of a priority than reducing smoking rates.

Comment: *An interesting attempt to quantify smoking costs and benefits to government, but flawed in many ways. The government rep-*

resents the society as a whole, and the overall costs incurred by a society should be reflected in the ledger. As the authors state, 'the human costs of cigarette smoking....associated with tobacco related illness far outweigh any benefits gained from smoking.' The difficulty in assessing costs means that costs are greatly underestimated, not even taking into account pain and suffering; enforcement of non-smoking policies and legislation; passive smoking litigation; smoking research and education; smoking related traffic accidents; welfare costs; ambulance costs; opportunity costs of tobacco consumption and production are not taken into account. Passive smoking costs are probably underestimated. The total costs are much lower than in several other investigations. The benefits are easy to define, but costs are often ephemeral. There is evidence to suggest that maximising revenue from cigarette taxes has not been reached yet, and further increases in taxes could be imposed without reducing tobacco tax income. Eventually that point will be reached where revenue will reduce as smoking prevalence decreases. I don't know the machinations of high office, but while revenue is important, I doubt whether good cost-benefit analysis is in the hands of bureaucrats to enable them to make informed decisions on this issue. And the argument suggesting that government is more interested in taxes than health relies on reliable data being in the hands of decision makers. It is more likely that the special interest lobby remains formidable and an incremental approach is the one preferred by most governments.

Graner JL. S.K. Livingston and the Maggot Therapy of wounds. *Mil Med* 1997; 162(4):296-300.

Stanton K. Livingston was this country's [read United States] foremost authority on the maggot therapy of war wounds in the years following World War I. His contributions to the literature, including his methodology for raising flies and applying their maggots, are discussed. Prior to the antibiotic era, maggot therapy was the most effective means of promoting wound healing, and Livingston's research, albeit poorly reported by modern standards, was responsible for preserving the lives and limbs of hundreds of veterans.

Comment: *Highly recommended.*

Moon RE, Sheffield PJ. Guidelines for the treatment of decompression illness. *Aviat Space Environ Med* 1997; 68(3):235-43

This is an abbreviated version of a 426 page monograph produced as a result of a combined Aerospace Medicine Association/ Undersea and Hyperbaric Medical Society Meeting. It describes pathophysiology, diagnostic techniques, initial treatment (prior to recompression) and definitive treatment. The recompression guidelines differ for altitude and diving related DCI.

This is the best succinct discussion on the subject that I expect could be found. Some unanswered questions posed are:

- factors resulting in incomplete resolution of symptoms after initial hyperbaric treatment
- need for a uniform database for epidemiological data
- whether oxygen at ambient pressure ever provides sufficient treatment of diving related DCI
- relationship between treatment delay and ultimate outcome
- relationship between intravascular bubbles and tissue damage
- mechanisms of tissue damage
- role of adjunctive pharmacotherapy
- development of an animal model of DCI in which long term functional outcome can be assessed
- neuropsychiatric tests that can be administered in a recompression chamber

Braithwaite M.G. The British Army Air Corps in-flight spatial disorientation demonstration sortie. *Aviat Space Environ Med* 1997; 68(4):342-5

Following didactic instruction, most aircrew are able to experience some of the disorientating illusions and limitations of the orientational senses in a variety of ground-based devices. In order to reinforce instruction in spatial disorientation (SD) within the environment in which they operate, British Army Air Corps helicopter pilots also receive an airborne demonstration of the limitations of their orientation senses. Since 1982, a specific SD sortie has been programmed towards the end of the basic rotary-wing phase of flight training approximately 6 weeks after the aeromedical training module, and before students commence rotary-wing instrument flight training. Refresher sorties are flown every 4 years. The conduct of the SD sortie is described in detail. Analysis of helicopter accidents demonstrates that this training is operationally effective by contributing towards the reduction of SD-related mishaps. It is cost-effective and the addition of this type of in-flight demonstration to the aeromedical training syllabus is regarded as being of great value to British Army helicopter aircrew. Similar instruction could be readily adopted by other services.

Comment: *Malcolm Braithwaite has become something of a guru of Spatial Disorientation, especially practical attempts to increase awareness and reduce its impact. This assessment of a relatively inexpensive but effective training technique could well be considered carefully in Australia. Cost-benefit analysis be used suggests a cost of the sortie between 1982 and 1995 of US\$ 252000, less than one tenth the replacement cost of the least expensive in-service British Army helicopter. It would be hard to justify the purchase of a modern electro-*

mechanical demonstrator' such as the Advanced Spatial Disorientation Demonstrator in service with the USAF, in Australia where the throughput of students is much less.

Rosenfeld JV. Neurosurgery in Rwanda during a United Nations Peace-Keeping Mission. *Mil Med* 1997; 162(5):311-4

An analysis of the neurosurgical component of the medical support provided by a United Nations peace-keeping mission in Rwanda is presented. The Australian Defence Force contingent provided medical support to the United Nations and the civilian population. Eight hundred and thirty eight procedures were performed during 12 months. A wide range of surgery was encompassed, with neurosurgery accounting for 17 (2%) of the total operations: compound depressed fractured skull, 5; intracranial pressure monitor, 2; burr holes for acute head injury and chronic subdural haematoma, 2; skull osteomyelitis debridement, 1; rib-graft cranioplasty, 1; scalp rotation flap, 1; congenital myelomeningocele, 2; occipital meningocele, 1; craniofacial approach to Le Fort III fracture, 1. A broad range of neurosurgical procedures have

been performed. The overall numbers of neurosurgical operations were small, but they were successfully performed by general surgeons. Familiarity with neurosurgery is necessary in predeployment training of military surgeons working in a remote location with limited resources.

Comment: Further report on the Australian Defence Force experience in Rwanda. Probably the most interesting discussion is the utility of intracranial pressure monitoring and placement of ventricular drains. The argument put forward justifying repair of congenital defects: that it is 'a humanitarian pursuit that consumes minimal resources, requires a short hospital stay, saves lives, or offers the child a more normal life', I have considerable trouble with. There is the ever present problem of mission creep; who decides, and how is the decision reached, as to who can be treated, and who can't; what happens if there is a complication, or an escalation of conflict. Such policy must be clearly and definitively worked out beforehand. Teaching of local health personnel, as was also done, is a more productive and less fraught idea.

Conference Report

The Aerospace Medicine Association Conference. 11-15 May 1997, Chicago

WGCDR James Ross RAAF

Chief, Flight Medicine Operations, Langley Air Force Base, Virginia USA

A possibly newly reported aviation-related syndrome was described by Rich Williams, an Aerospace Medicine resident. It has long been known among civilian aerobatic performers that exposure to large amounts of -Gz can give rise to a phenomenon called 'the wobbles', which is a form of vertigo and can be debilitating for periods of up to 2 months. It may be simply benign position vertigo in another guise. We await further research.

The US military is embracing operational risk management (ORM) big time as the way to further reduce aircraft mishaps. The concept is excellent; prior to any flight, an assessment must be made of a multitude of factors involved in the flight - operator, aircraft, enemy, weather, etc. Each factor is assigned a score, and the total is then compared to a cut off. If it is above a certain level, it must go higher up the chain of command to get certification. Many problems exist with it, though. There is insufficient data on which to base reliable risk assessments. The scores are approximations

based on personal experience rather than objective evidence. The scores are open to manipulation. If you want to fly, there is generally a way to fudge the result. It is seen as another way to stop pilots from flying. More paper work. There needs a lot of work, and good reliable data, to sell this effectively. The US Army has been using ORM for a number of years. They are seeing a drop in the mishap rate which is being attributed, at least in part, to ORM. Germans put forward their intention to require cranial MRIs of all aircrew applicants, in order to identify congenital intracranial vascular anomalies. Such anomalies will cause unexpected incapacitation without warning. Cost benefit analyses were lacking. What is more the case is what to do about the multitude of other findings. Don't go looking for something if you don't know what to do with it once you find it.

The main lectures were of great contrast. Dr Mustard, former director of the Canadian Institute for Advanced Research was very brave,

and provoking, when he championed a more welfare-oriented society, and an increased role of government in many facets of life. Dr Dille, former chief of the Civilian aeromedical Institute (CAA-CAMI) of the USA, was conservative and benign in his review of major players in the history of aerospace medicine.

The trade display was impressive and bigger than ever. Shame I will be back in Australia next year. Now I will have to put my money up if I want to go to future meetings.

Book Reviews

by Andrew Robertson

SSN - Strategies of Submarine Warfare

Tom Clancy

Harper Collins: London 1996

This is a fiction work by Tom Clancy based on 'SSN', a CD-ROM game by Simon and Schuster Interactive. The book looks at 15 different submarine scenarios based on a limited regional war between China and the United States over the Spratly Islands in the South China Sea. The USS CHEYENNE, an SSN, is involved in a series of battles with both surface ships and other submarines in the different scenarios. Everything from engaging Chinese battle groups to hunting and destroying a Russian Typhoon class SSBN are covered. Whilst the continued survival of USS CHEYENNE through out the book

is a little difficult to believe, Clancy has written an enthralling and comprehensive review of submarine tactics. The various battles appear to be realistically displayed and Clancy has obviously researched the submarine warfare strategies well with help from US Navy and RN submariners. The Chinese and Russian diesel electric submarines do not survive well in this book and one hopes our own submarines will perform much better in such a scenario. Overall, a good thriller which both blends the principles of submarine warfare into a realistic techno-thriller format and gives the reader sufficient ammunition to at least stir up their favourite submariner.

Vic Jeffery

Few Survived. A History of Submarine Disasters

Edwin Gray

Since the first submarines of the 18th century through to 1995, some 1 761 submarines were lost world wide, 313 by accident or error, and the remaining 1 148 being war losses.

This is the first comprehensive account of every peacetime submarine disaster from 1774 to the present day. It is, however, very far from being just a list of what submarines sank where, when and why, for the author examines most of the major sinkings in considerable detail, analysing what went wrong and describing the attempts made at rescuing the crew and/or vessel.

The first recorded submarine loss was John Day's experimental MARIA with one death in Plymouth sound, England, on June 20, 1774. This was due to design fault.

Russia's nuclear powered KOMSO-MOLETS was the last, due to an onboard fire caused by a short circuit. She sank south west of Bear Island in the Barents Sea on April 7, 1989, losing 41 crew members with another 28 surviving.

Germany heads the submarine loss list with an incredible 1 000 boats, 75 through accident of error and the rest due to war. Britain comes next with 162 (55 by accident/error) followed by Russia 149 (38 by accident/error), Japan 137 (20 by accident/error), Italy 98, USA 75, and France 58.

Australia has recorded two losses along with Poland and France. Our two losses both being from World War One, AE1 (accidentally lost in 1914) and AE2 (enemy action) in 1915.

Collisions at sea claimed 36 submarines during World War Two, the worst loss being Germany's U-439 and U-659 colliding west of Cape Finisterre on May 4, 1943. Both boats sank with some 84 lives lost. There were 12 survivors.

The largest loss of life in a submarine was when the French submarine SURCOUF, armed with twin 8-inch deck guns, was lost in the Gulf of Mexico when it collided with the American merchantman SS THOMAS LYKES on February 18, 1942.

One of the most intriguing episodes in this book is the account of the loss of HMS AFRAY in the English Channel in April, 1951, with a number of clairvoyants, mediums and

other sources of para-normal phenomena all claiming to know where the submarine was located, all centring around one specific area outside the main search area.

The weight of evidence convinced the British Admiralty to investigate the position, immediately reporting very loud echoes on the Asdic, but further investigation revealed absolutely nothing in the area!

Then there was the Rear Admiral's wife who related strange manifestations the night AFFRAY was reported missing claiming that an engineer officer who had previously served with her husband in a cruiser appeared in her room dressed in normal submariner's uniform.

He spoke quite clearly and said: "Tell your husband we are at the north end of Hurd Deep, nearly 70 miles from the lighthouse at St Catherine's Point. It happened very quickly and none of us expected it". After that the speaker vanished.

The woman immediately telephoned her husband who pointed out that the Hurd Deep was well outside the main search area. He also implied politely that he had no intention of interfering with the search operation on the basis of a ghost story. And there the matter rested. When HMS AFFRAY was finally found in June it was where the ghostly apparition had described it. Food for thought . . .

A story of a wartime submarine accident which fortunately is included is the loss of the famous USN boat USS TANG which torpedoed herself with her last torpedo after decimating a Japanese convoy in the Straits of Formosa on 24 October, 1944.

One of the most successful submarines to operate in the Pacific, TANG was commanded by Commander Richard O'Kane. During her brief eight month career and on her fifth war patrol, TANG sank 24 ships totalling 93 824 tons before the rogue torpedo turned a half-circle and hit TANG in the aft torpedo room.

O'Kane was one of the 15 survivors, only none of whom returned home after the brutality

of Japanese POW camps. He was awarded the congressional medal of Honour in 1946.

This book is supported by an interesting series of six comprehensive and accurate appendices covering:

1. Pioneer and experimental submarines lost before 1900
2. Naval submarines lost by accident or error since 1961
3. Selected accidents which did not result in loss of the submarine
4. Analysis of submarine losses 1914-1918
5. Submarines sunk between 1 September 1939 and 2 September 1945
6. World submarine losses 1774-1995

I noted that a total of 338 submarines were lost to all causes in World War One and a staggering 1 280 were lost in World War Two, including 107 to accidents or error.

Author Edwin Gray has produced a most interesting book in *Few Survived*. First published in 1986, with this, the revised edition published a decade later by Pen & Ink Books Ltd of 47 church Street, Barnsley, South Yorkshire S70 2AS, England, including previously unknown submarine disasters suffered by the Soviet Navy.

Few Survived is distributed in Australia through Peribo Pty Ltd of 58 Beaumont road, Mount Ku-Ring-Gai, NSW, 2080. If unavailable in your bookstore, it can be ordered and retails at a very reasonable \$37-95.

This is an invaluable reference book for naval historians and also a most fascinating read for the layman, being packed with drama and suspense from beginning to end. hard to put down once you pick it up, *Few Survived* is highly recommended.

Editor's Note: *If, like the inquisitive Editor, you were wondering how many **were** lost in the worst disaster, the Guinness Book of Records reports that Le Surcouf lost 130 men when she sank.*

AMMA Update

News and information for members of the Australian Military Medicine Association

Successes

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

Members will note that, while these items are more accurate, they are not complete. The Assistant 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 on (08) 9553-2600 or e-mailed to: agrobert@perth.DIALix.oz.au

Queen's Birthday Honours

The following members of AMMA were honoured on the occasion of the Queen's Birthday:

- **Andy MacNeil** - CSC for "outstanding achievement in the management and delivery of health care to the Australian Army".
- **Helen Parsons** - CSC for "outstanding achievement in the field of alcohol rehabilitation and education".
- **Helen Doherty** - CSM for "outstanding service as the Staff Officer Health Operations, Headquarters Air Command".

Other Awards and Achievements

The following members of AMMA have received awards as shown:

- **LEUT Fabian Purcell**, RANR has successfully completed his anaesthetic training and has been provisionally granted his FANZCA

Defence Force Promotions

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

- **Tracy Smart** - to Wing Commander, RAAF and CO Institute of Aviation Medicine
- **Terry Lennard** - to Commander, RAN, and to continue as SO1 MOPHS in SGADF.
- **Suzanne Williamson** - to Lieutenant Commander, RAN, and Senior Nursing Officer, Balmoral Naval Hospital.
- **Carol Castles** - to Civilian and Ward Medical Officer at CAMU(D).
- **Dougal Watson** - to Civilian and Senior Research Officer, Institute of Aviation Medicine.
- **Karen Geisler** - to Squadron Leader and CAMU(R)
- **Steve Davis** - to Squadron Leader and RAAF Tyndal

- **Peter Krabman** - to Squadron Leader and RAAF Darwin

AMMA Conference

1997 Conference

The 6th AMMA Scientific Conference will be held at the Hotel Sofitel, Melbourne from the 29th to the 31st of August 1997.

We are still taking registrations, the inclusive fee is \$275. Please phone Paula Leishman on (03) 62471850 to register.

Internet

A few useful internet addresses are as follows:
Association of Military Surgeons of the United States
amsus@amsus.org
membership@amsus.org
Military Medical Mail
mikes@kjco.com.au

AMMA Contacts

For all general AMMA enquires contact the Secretariat:

Paula Leishman

*Tel: (03) 6247-1850
0412 875 390*

Fax: (03) 6247-1855

Research Grants

Details of the AMMA Research Grant programme for 1997 were included in the previous journal. Members are reminded that applications for the 1998 Research Grant must be received by 30 April 1998. Further details on the Grant can be obtained from:

Janet Scott:
Tel: (08) 272-7399

Journal

Journals for 1997/1998 will be published as follows:

Issue	Copy Deadline
November	30 September
March 1998	31 January
July 1998	31 May

All queries regarding the Journal should be directed to:
Russ Schedlich
Tel: (02) 9563-4504
(0412) 286-740
Fax: (02) 9563-4519
E-mail: tatsch@ozemail.com.au

Library

The Association's Library has moved to the Fleet Medical Officer's office, Maritime Headquarters Sydney. Any member who wishes to browse through the Library (and visit the Librarian for coffee) is welcome to call.

Books from the library are available for loan of up to 12 weeks. Contact:

Russ Schedlich
Tel: (02) 9563-4504
(0412) 286-740
Fax: (02) 9563-4519
E-mail: tatsch@ozemail.com.au

Conference and Meeting Calendar

Date	Conference	Venue	Contact No.
13-14 August 1997	Health Promotion in the 21st Century	Melbourne, VIC	03-93453262
27-29 August 1997	RACMA Conference	Melbourne, VIC	03-98535357
29-31 August 1997	6th AMMA Conference	Melbourne, VIC	
29 September - 3 October 1997	Basic Radiography for GP's	Adelaide, SA	08-82266255
30 September - 3 October 1997	RACGP 40th ASM	Hobart, TAS	03-62243773
1-3 October 1997	Advanced skills in therapeutic humour	Sydney, NSW	02-93519343
18-24 October 1997	Risk Management for Practice Managers	Adelaide, SA	02-9222022
1-5 September 1997	14th World Congress on Psychosomatic Medicine	Cairns, QLD	02-8436414
3-28 November 1997	7th STDs/AIDS Diploma Course	Bangkok, THAILAND	66-2-2863013
10-12 November 1997	Canadian National Defence Operational Medicine Conference	Vancouver, CANADA	1-202-6827772
10-21 November 1997	SUMU MO Underwater Medicine Course	Sydney, NSW	02-99600333
17-21 November 1997	Clinical Toxicology Short Course	Adelaide, SA	08-82324207
17-21 November 1997	International Hospital Federation Congress	Melbourne, VIC	03-96962779
1-5 December 1997	Basic Radiography for GP's	Adelaide, SA	08-82266255
11-12 December 1997	Legal and ethical issues for health professionals	Sydney, NSW	02-93519343
2-5 April 1998	Clinical Update	Hamilton Island, QLD	02-92565454

CONTRIBUTIONS

for the November issue should be sent to:

The Editor
Australian Military Medicine
PO Box 730
PYMBLE NSW 2073

Deadline is 30 September 1997

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.

Australian Military Medicine

Volume 6 Number 2

July 1997

The Australian Military Medicine Association
Patron
Air Vice-Marshal G.D. Moller
Surgeon General, Australian Defence Force

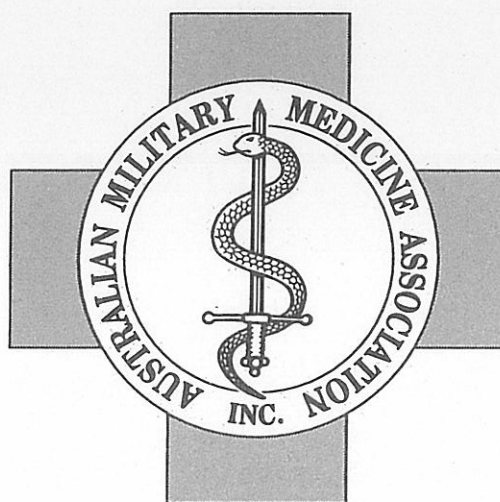
President: Nader Abou-Seif
Secretary: Marcus Skinner
Journal Editor: Russell Schedlich
Assistant Editor: Andrew Robertson

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DISCLAIMER

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



Australian Military Medicine Association

Annual Report
1997

Australian Military Medicine Association

June 1997

Patron

Air Vice-Marshal G.D. Moller
Surgeon General, Australian Defence Force

President

Nader Abou-Seif

Vice-President

Journal Editor and Librarian

Russell Schedlich

Council

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Treasurer	Bob Stacy
Public Officer	Geoff Robinson
Member	Andrew Robertson
Member	Lydia Stevens
Member	Janet Scott

Secretariat

Leishman & Associates

Auditors

Bruce Sainsbury

On behalf of Council, I am pleased to present the Annual Report of the Australian Military Medicine Association together with the Balance Sheet and related Accounts for the year ended 30 June 1997.

Nader Abou-Seif

President's Report

The Australian Military Medicine Association is approaching the end of its 6th year in a sound position. This last year has been one of consolidation in which a number of major issues have been addressed, or are in the process of being addressed.

Through this time our membership has continued to grow steadily and it is the hope of Council that this growth is maintained as AMMA keeps up with the needs of its members. To this end, Council have prepared a survey of its members as to the needs of the membership and therefore the direction Council has to take to maintain AMMA as an Association relevant to those active in, or with an interest in military medicine.

With the Notice of Motion for the Annual General Meeting is found a copy of a proposal to amend the constitution. This motion, regarding the election of Council, is part of an overall review of our constitution. Coun-

cil has sought legal advice to ensure that AMMA meet the legal requirements of both our incorporation as an Association and our status as a non-profit organisation. We must also ensure that our rules fairly reflect the different interests of our members, while maintaining the advantages of a scientific body representing the different disciplines of military medicine in Australia.

A further change, which I hope will be displayed at the National Conference, is the design of a new logo. This should reflect both the development of the Association and clearly show our separateness from the International Red Cross.

In the last 12 months, AMMA has presented a number of awards to members, the most significant being the Weary Dunlop Award to Annette Outtrim for her presentation at last year's meeting and plaques of appreciation to our past patrons, Air Vice Marshal

'Mick' Miller and Major General David Rossi as well as to our Life Members.

As in previous years, Council continues to meet 4 times per year, twice in person - once at the National Conference - and twice via teleconference. In addition the members of Council are in frequent contact throughout the year to discuss issues as they arise. Again, I would like to thank all members of Council for their efforts and support throughout the year.

AMMA remains an independent organisation which, I hope will remain a focus for all those with an interest in military medi-

cine. Your active participation and contribution in AMMA's activities remain an essential component in our continued growth and strength. In this way our ability to provide for and represent the interests of our membership will be guaranteed. With your support, we can have just cause for confidence as we look forward into the future. Once again, I thank you for your support.

Nader Abou-Seif
President

Finance

Fully audited financial statements and balance sheet will be presented to the Annual

General Meeting in Melbourne. The following interim statements are provided.

<i>INCOME</i>	
Annual Conference	9,590.00
Memberships	48,644.35
Merchandise Sale	1,212.00
From Deposit Account	11,976.06
TOTAL INCOME	71,422.41
<i>EXPENSES</i>	
Interest (reverse entry)	-127.93
Bank Charges	726.62
Interest Paid	1.23
Annual Conference (below)	50,556.15
Committee Meetings	2,106.40
Secretarial Expenses (below)	7,469.18
Postage/Telephone/Stationery	1,399.09
Journal	1,225.00
Miscellaneous	1,497.56
Merchandise	1,842.50
Awards	500.00
Sundries	5,153.00
TOTAL EXPENSES	72,348.80

SURPLUS

-926.39

Annual Conference Expenses

Secretarial	551.81
Other	50,004.34
TOTAL	50,556.15

Secretarial Expenses

Journals	686.92
Other	6,782.26
TOTAL	7,469.18

Bob Stacy
Treasurer

Journal

Australian Military Medicine, the official journal of the Association, continued to be published during the year:

August 1996	Vol 5 No 2	32 pages
December 1996	Vol 5 No 3	29 pages
March 1997	Vol 6 No 1	26 pages

A total of 13 articles were published, of which seven were original work. The remainder of the journal included editorials, other articles,

letters, abstracts and a variety of AMMA news and information.

The Editor continues to receive a trickle of papers and information for publication, however it cannot be too often stressed that the journal will only succeed through the active support of its members, and I would encourage contributions.

Russ Schedlich
Journal Editor

1996 Conference

The 6th Scientific Conference was held at the Hyatt Hotel Canberra from 6 to 8 September 1996. The Organising Committee consisted of:

Lydia Stevens
Andy Robertson

For the first time, the Association had to fully fund the cost of secretariat support, and this was provided by Leishman and Associates, AMMA's secretarial service, who provided the most competitive quote.

The major sponsors of the Conference were Smith Kline Beecham and Lederle Laboratories.

Other sponsors were:

- Acute Care Systems
- Astra Pharmaceuticals
- Boehringer Mannheim
- CSL
- EGO
- Janssen Cilag Pty Ltd
- Kimberley-Clark
- Laerdal Pty Ltd
- Medical Applications
- Medical Equipment Services
- Medicaft
- Sandoz

The Conference was officially opened by the Minister for Defence Industry, Science and Personnel, the Honourable Bronwyn Bishop MP.

There were approximately 120 registrants to the Conference. Registrants came from all states in Australia, and also from the United States.

There were 19 papers presented during the Conference, with a broad array of disciplines and fields of endeavour represented.

The keynote address was given by Ms Fiona Terry whose topic was "Primum non nocere - above all, do no harm", a discourse on some aspects of the role of non-government organisations in disaster relief.

A Cocktail Reception on the first evening of the Conference was hosted by the Chief Minister of the ACT, Ms Kate Carnell, MLA.

The Conference Dinner was addressed by the Deputy Chief of Naval Staff, Rear Admiral Chris Barrie, AM, RAN, who spoke of his vision of the future Australian Defence Force.

A most moving finale to the scientific programme was provided by Dr Rodney Franks and Mr Peter Stride who spoke on the response to the Port Arthur massacre of April 1996.

Following the scientific sessions, the new Surgeon General, Air Vice Marshal Graeme Moller spoke briefly on his view of the ADF health services, the AMMA, and military medicine in general.

Lydia Stevens
Andy Robertson
Organising Committee

“Weary” Dunlop Award

The 'Weary' Dunlop Award of \$500 is given annually for the best paper presented at the Scientific conference.

At the 1996 Conference, Annette Outtrim received the Award for her paper entitled

“The Role of the Nurse Practitioner in the ADF”.

Nader Abou-Seif
President

Research Grant

Every year, the Association awards a Research Grant of up to \$2,000 to a member who is undertaking suitable research in the field of military medicine.

In the year 1996-97, there were no applicants for the Research Grant.

Janet Scott
Council Member

Library

The Association's Library consists of 69 books. Loans are available for periods of up to 12 weeks, books being generally despatched by post to lenders. The full list of books is attached.

The Library is physically located at the Librarian's office in Sydney.

Borrowing of books has tended to be sluggish, probably because of the difficulties

associated with the loan process. Members are encouraged to use the borrowing facility, and any suggestions as to how the Library can be made more accessible will be welcomed.

Russ Schedlich
Librarian

AMMA on the 'Net

In early 1996, AMMA established a home page on the Internet as an initial experimental foray into 21st century communications.

The home page address is:

<http://www.ozemail.com.au/~dxw/amma.html>

Members are encouraged to communicate with AMMA through this facility.

Membership

As at 30 June 1997, the Association had a total 403 members of whom 83 were unfinancial.

The breakdown of membership by State is shown in the following table.

ACT	26	<u>Overseas</u>	
NSW	107	USA	6
NT	13	PNG	1
QLD	35	Singapore	1
WA	19	Malaysia	1
SA	39	Germany	1
TAS	7	UK	4
VIC	97		
Unknown	38		

New Members

During the year, AMMA welcomed the following new members:

N Broders	J Habersberger	J Pantumari	C Schramm
P Byleveld	R Hearder	G Paton	T Maddern
JW Cooke	EM Jones	L Pearsons	S Vrancic
KN Czoban	KT Farrell	DMM Poprawski	SM Williamson
AS Davidson	A Krstic	FE Purcell	BC Wright
E Eitzen	TJ Lyons	RC Reynolds Jr	
G Eaton	J Mateer	RP Kadlec	
R Green	J Norgrove	SB Robertson	

AMMA Library Books

Author	Title	Publisher	Year
Australian Military Medicine Association	Australian Military Medicine Association Membership Records to January 1995	Australian Military Medicine Association	1995
Australian Military Medicine Association	Council Minutes July 1991 to February 1995	Australian Military Medicine Association	1995
Australian Military Medicine Association	Newsletter, Vol 1 No 1 to Vol 3 No 3	Australian Military Medicine Association	1994
Australian Military Medicine Association	Proceedings of the AMMA 4th Annual Conference	Quickcopy Audio Recording Services (12 tapes)	1995
Australian War Memorial	H.M.A.S. Mk. III	Australian War Memorial, Canberra	1944
Australian War Memorial	Jungle Warfare. With the Australian Army in the South-West Pacific	Australian War Memorial, Canberra	1944
Australian War Memorial	Soldiering On. The Australian Army at Home and Overseas	Australian War Memorial, Canberra	1942
Australian War Memorial (ed)	As You Were. A Cavalcade of Events with the Australian Services from 1788 to 1947	Australian War Memorial, Canberra	1947
Australian War Memorial (ed)	As You Were. A Cavalcade of Events with the Australian Services from 1788 to 1948	Australian War Memorial, Canberra	1948
Benson CI	The Man with the Donkey. John Kirkpatrick Simpson. The Good Samaritan of Gallipoli	Hodder & Stoughton	1965
Brereton FS	The Great War and the R.A.M.C.	Constable and Company Ltd., London	1919
British Medical Journal	War Wounds and Air Raid Casualties	HK Lewis & Co, 1st Edition	1939
Caldwell, R	Military Hygiene	Bailliere, Tindall & Cox, London, 2nd Edition	1910
Clarke BL	Behind the Wire. The Clinical Diary of Major Burnett Clarke AAMC	Amphion Press, 1st Edition	1989
Cole M	Journey to the Fourth World	Lion Publishing, Tring, UK (autographed)	1981
Connolly R, Wilson R (eds)	Medical Soldiers. 2/10 Australian Field Ambulance 8 Div. 1940-45	2/10 Australian Field Ambulance Association	1985
Crouch J	A Special Kind of Service. The Story of the 2/9 Australian General Hospital	Alternative Publishing Co-operative Ltd, Chippendale, 1st Edition	1986
Deane-Butcher W	Fighter Squadron Doctor	Deane-Butcher (autographed)	1989
Deeter DP, Gaydos JC (eds)	Occupational Health. The Soldier and the Industrial Base	The Textbook of Military Medicine, Part III, Volume 2	1994
Department of the Army	50 Years of Accomplishments in Army Research and Development	Department of the Army, United States of America	
Dieuaide FR	Civilian Health in Wartime	Harvard University Press, Cambridge, Massachusetts	1942
Dixon P	Amazon Task Force	Hodder & Stoughton, London (autographed)	1984
Dixon R	On the Psychology of Military Incompetence		
Dunant, JH	A Memory of Solferino. (Un souvenir de Solferino)	Cassell & Co, Ltd, London	1947
Dunlop EE	The War Diaries of Weary Dunlop. Java and the Burma-Thailand Railway 1942-45	Viking Books, Ringwood, Aust	1990
Elliot G	Twentieth Century Book of the Dead	Allen Lane. The Penguin Press, London	1972
Fidlon PG, Ryan RJ (eds)	The Journal of Arthur Bowes Smyth: Surgeon, Lady Penrhyn 1787-1789	Australian Documents Library, Sydney	1979
Goodman RD	A Hospital at War. The 2/4 Australian General Hospital 1940 - 1945	Boolarong	1983
Goodman RD	A Hospital at War. The 2/4 Australian General Hospital 1940 - 1945	Boolarong	1983
Goodman RD	Hospital Ships	Boolarong, Brisbane	1992
Goodman, RD	Our War Nurses. The History of the Royal Australian Army Nursing Corps 1902-1988	Boolarong, Brisbane	1988

Author	Title	Publisher	Year
Gurner J	The Origins of the Royal Australian Army Medical Corps	The Hawthorn Press, Melbourne	1970
Halstead, Gay	Story of the RAAF Nursing Service 1940 - 1990	Nungurner Press, Metung, Aust, 1st Edition	1994
Halstead, Gay	Story of the RAAF Nursing Service 1940 - 1990	Nungurner Press, Metung, Aust (signed by the author, number 77 of 1000), 1st Edition	1994
Hamilton, T	Soldier Surgeon in Malaya	Angus & Robertson, Sydney	1957
Harrison A (ed)	Grey and Scarlet. Letters from the War Areas by Army Sisters on Active Service	Hodder & Stoughton, London	1944
Hayden R	Elementary Hygiene. General and Naval	US Naval Institute, Annapolis US	1939
Home Office	Medical Treatment of Gas Casualties, Air Raid Precautions Handbook No 3	LF Johnston, Canberra, 1st Edition	1937
International Committee of Military Medicine	International Review of the Armed Forces Medical Services	International Committee of Military Medicine, Volume 66 Nos 7/8/9	1993
James WD (ed)	Military Dermatology	The Textbook of Military Medicine, Part III, Volume 3	1994
James WD (ed)	Military Dermatology	The Textbook of Military Medicine, Part III, Volume 3	1994
Jones FD, Sparacino LR, Wilcox VL, Rothberg JM (eds)	Military Psychiatry: Preparing in Peace for War	The Textbook of Military Medicine, Part 1, Volume 3	1994
Jones FD, Sparacino LR, Wilcox VL, Rothberg JM (eds)	Military Psychiatry: Preparing in Peace for War	The Textbook of Military Medicine, Part 1, Volume 3	1994
Maisel AQ	Miracles of Military Medicine	Duell, Sloan & Pearce, New York	1943
Manson-Bahr PH	Manson's Tropical Diseases. A Manual of Disease of Warm Climates	Bailliere, Tindall & Cassell, London, 16th Edition	1966
Nash RW	Medical Stores	RW Nash, Bungendore Aust	1980
O'Keefe BG	Medicine at War. Medical aspects of Australia's involvement in Southeast Asia 1950-1972	Allen & Unwin, St Leonards Aust	1994
Pearce C	Beyond the Lagoon. Hoverdoctors to Papua New Guinea	Hodder & Stoughton, Rydalmere Aust	1993
Pearn J (ed)	Pioneer Medicine in Australia	Amphion Press, Brisbane, 1st Edition	1988
Quick CM (ed)	Conventional Warfare. Ballistic, Blast and Burn Injuries	The Textbook of Military Medicine, Part I, Volume 5, 1st Edition	1990
Quick CM (ed)	Conventional Warfare. Ballistic, Blast and Burn Injuries	The Textbook of Military Medicine, Part I, Volume 5, 1st Edition	1990
Revell AL	Haslar. The Royal Naval Hospital	The Gosport Society, Gosport UK, 2nd Edition	1984
Richards R, McEwan M	The Survival Factor	Kangaroo Press (presented to AMMA and signed by R Richards)	1989
Rogers L	Guerilla Surgeon. A New Zealand surgeon's wartime experiences with the Yugoslav Partisans	Collins, London (signed by the author)	1957
Royal Navy	Handbook of the Royal Naval Sick Berth Staff. BR 888	His Majesty's Stationery Office	1944
Seagrave GS	Burma Surgeon	Dymocks Book Arcade, 2nd Edition	1945
Seagraves GS	Burma Surgeon Returns	Dymocks Book Arcade Ltd, Sydney, 1st Edition	1946
Staines DR	Physical fitness, obesity and naval occupation	University of Sydney (MPH Treatise)	1984
Sarr A	Neville Howse VC. Biography of an Authentic Australian Hero	Les Baddock & Sons Pty Ltd, Sydney (signed by the author)	
Steward HD	Recollections of a Regimental Medical Officer	Melbourne University Press	1983
Strong RP, Swift HF, Opie EL et al	Trench Fever. Report of Commission. Medical Research Committee. American Red Cross	Oxford University Press, Oxford	1918
The War Office	Royal Army Medical Corps Training	Modern Printing company Pty Ltd, Melbourne	1941
Tyquin MB	Gallipoli: The Medical War. The Australian Army Medical Services in the Dardanelles Campaign of 1915	New South Wales University Press, Sydney	1993
Walker AS	Clinical Problems of War	Australian War Memorial, Canberra. (Australia in the War of 1939-1945, Series 5, Volume I)	1952
Walker AS	Middle East and Far East	Australian War Memorial, Canberra. (Australia in the War of 1939-1945, Series 5, Volume II)	1962
Walker AS	The Island Campaigns.	Australian War Memorial, Canberra. (Australia in the War of 1939-1945, Series 5, Volume III)	1957
Walker AS, et al	Medical Services of the RAN and RAAF	Australian War Memorial, Canberra. (Australia in the War of 1939-1945, Series 5, Volume IV)	1961
Walker RI, Cerveny TJ (eds)	Medical Consequences of Nuclear Warfare	The Textbook of Military Medicine, Part I, Volume 2	1994
War Office	Royal Army Medical Corps Training	Harrison and Sons, London	1914

NOTICE OF 6TH ANNUAL GENERAL MEETING

Notice is hereby given that the 1997 Annual General Meeting of the Australian Military Medicine Association will be held at the Hotel Sofitel, Melbourne, at 1700 on Saturday, 30 August 1997.

Any member desiring to bring any business forward at this meeting is to give notice in writing to the Honorary Secretary no later than 9 August 1997.

Marcus Skinner
Honorary Secretary

AUSTRALIAN MILITARY MEDICINE ASSOCIATION

6TH ANNUAL GENERAL MEETING

Hotel Sofitel, Melbourne
1700, Saturday 30 August 1997

AGENDA

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| 1. | Minutes of 5th Annual General Meeting | President |
| 2. | President's Address | |
| 3. | Secretary's Report | |
| 4. | Treasurer's Report | |
| 5. | 1998 Fees | Treasurer |
| 6. | 1998 Council | Secretary |
| 7. | 1998 Conference | President |
| 8. | General Business | Secretary |