The Editor's Page

CONTRIBUTIONS

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EDITORIAL COMMENT

It is that time of year again when all good public servants and politicians sit down and see how much and how they should spend next year's bucket of money. Times have been tough for many years, and this year one suspects (if the Press are giving any sort of accurate impression) that times will be even tougher.

For the Defence vote, this augers badly, since there are no votes in Defence, and, with the end of the Cold War, we must be easy pickings. Guidance for 93-94 was a decrease of 0.5 percent, but there must be a good chance that this will be even more in the current fiscal climate.

Of course, we all also know that within Defence, health is generally regarded as a 'soft option' for cuts. But we also all know that we will be expected to meet a greater number of requirements (OH & S particularly) and the usual contingencies. Although it is never generally admitted, this means, clearly, doing more with less.

Before we bemoan our lot, I would commend you to read Peter Day's review article on 'The Deming Management Method', a book which elucidates the management approach that has made Japan what it is today.

Those in the permanent and Reserve Defence Force will know about 'Quality Management'. We also know that it will take a long time to be fully implemented (particularly as the concept tends to cut right across conventional military hierarchical lines). But we need also to realise that it must be implemented or the Defence Forces will soon become ineffective in the face of fiscal constraints.

The Health Services Branches have a unique opportunity to be in the forefront of the change. We have never placed as much store on rank as other branches, as we intuitively appreciate that the person who does a task knows best how to do it, and we frequently have to take professional advice from our subordinates. We are thus best placed to grasp Quality Management and use it, first to our benefit (getting more things done with limited resources, and thus better preserving our capabilities), and second to the benefit of the rest of the ADF by clearly establishing the viability of Quality Management in the Military.

It is the way of the future.

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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.

ORIGINAL ARTICLES

Clinical problems in a military force in Somalia

Major Daryl Duncan RAAMC

Background

In late 1992, the Australian Government committed a battalion group to the United Nations-sponsored Joint Task Force in Somalia (UNITAF). The commitment was announced in December 1992 and became known as Operation Solace. The force deployed over the period 22 December 1992 to 19 January 1993.

The force comprised a headquarters (Headquarters, Australian Forces Somalia - HQ AFS), located in the capital Mogadishu and a Battalion Group based on the 1st Battalion Royal Australian Regiment (1 RAR) with combat support from the 4th Field Regiment (the battery commander and forward observer parties of the 107th Field Battery), B Squadron, 3/4th Cavalry Regiment (30 armoured personnel carriers), a troop of field engineers from the 3rd Combat Engineer Regiment, and administrative support from the 1st Battalion Support Group (1 BSG, an element of the 3rd Brigade Administrative Support Battalion [3 BASB]). The Battalion Group was located in Baidoa and had a strength of 930.

Health support was provided by the:

- regimental aid post (RAP), 1 RAR;
- treatment section 1 BSG (includes Level 2 care, road evacuation and preventive medicine);
- dental section 1 BSG;
- 159 Medical Company (air ambulance), a US Army Unit providing aeromedical evacuation (AME) using Blackhawk helicopters;
- the 86th Evacuation Hospital (US Army), located in Mogadishu;
- the Swedish Field Hospital, located in Mogadishu;
- the Joint Forward Laboratory (pathology services) in Mogadishu; and
- Staff Officer 2 Medical at HQ AFS as liaison with Mogadishu-based facilities.

Scope of Study

This study is a preliminary, retrospective review of attendances and admissions to the Level 1 and 2 assets (RAP 1 RAR and the Treatment Section of 1 BSG). It covers the first 10 weeks of the deployment (16 January to 27 March 1993).

The population covered by these assets included the 1 RAR Battalion Group, US Army Forces in the Baidoa area (primarily the HQ Company of the 43rd Battalion Engineers) and military and civilian convoys passing through the area. Care was provided to any Somali injured by coalition forces, those employed by the forces at Baidoa, and any locals detained by the force. HQ AFS was based in Mogadishu and used the US facilities based there for Level 1 care. They have not been included in this study. The average dependency for the period has been taken as 1,000.

Attendances

Figure 1 [all Figures are on pages 6 and 7] shows the total attendance (all reasons) at the Baidoa facilities for the period.

Figures 2 and 3 show attendances by category to the RAP 1 RAR, and 1 BSG respectively. The categories used are those laid down by the Joint Task Force Surgeon (the ranking US military medical corps person in theatre). The category 'GIT' includes diarrhoea. The category 'Orthopaedic' includes all injuries, no matter how severe, while URTI's are included in the 'Respiratory' category.

Admissions

Figure 4 shows the admissions to the Level 2 facility by category.

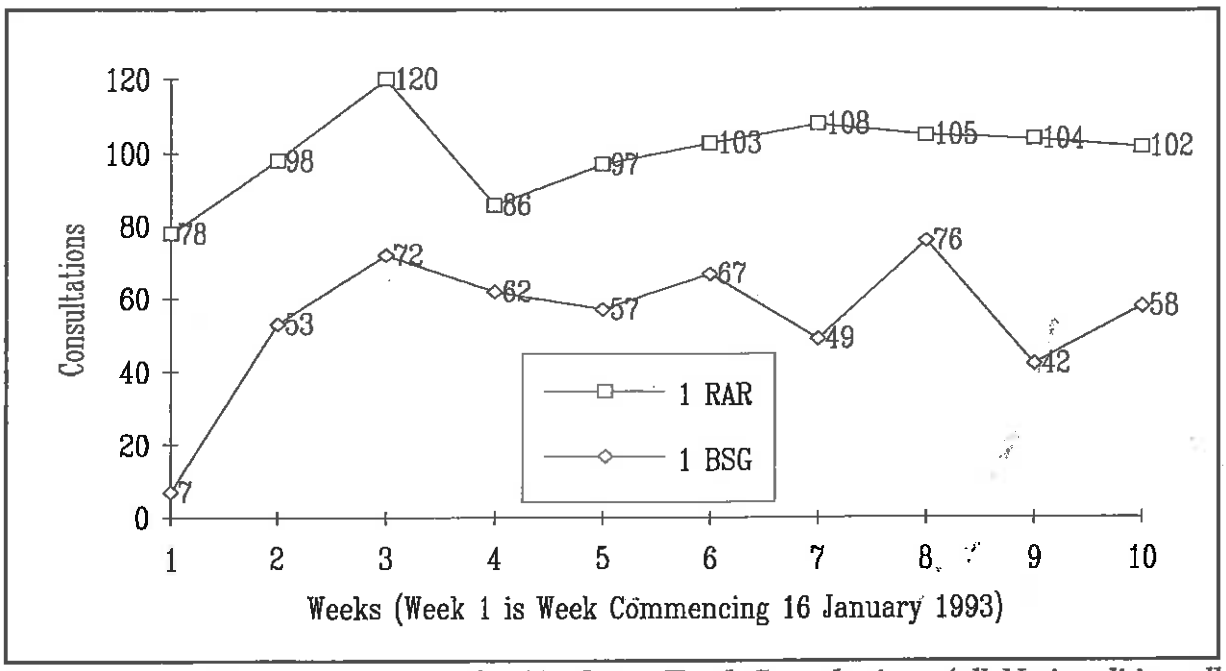

Figure 1 *Attendances at Level 1 Facilities: Total Consultations (all Nationalities, all Reasons)*

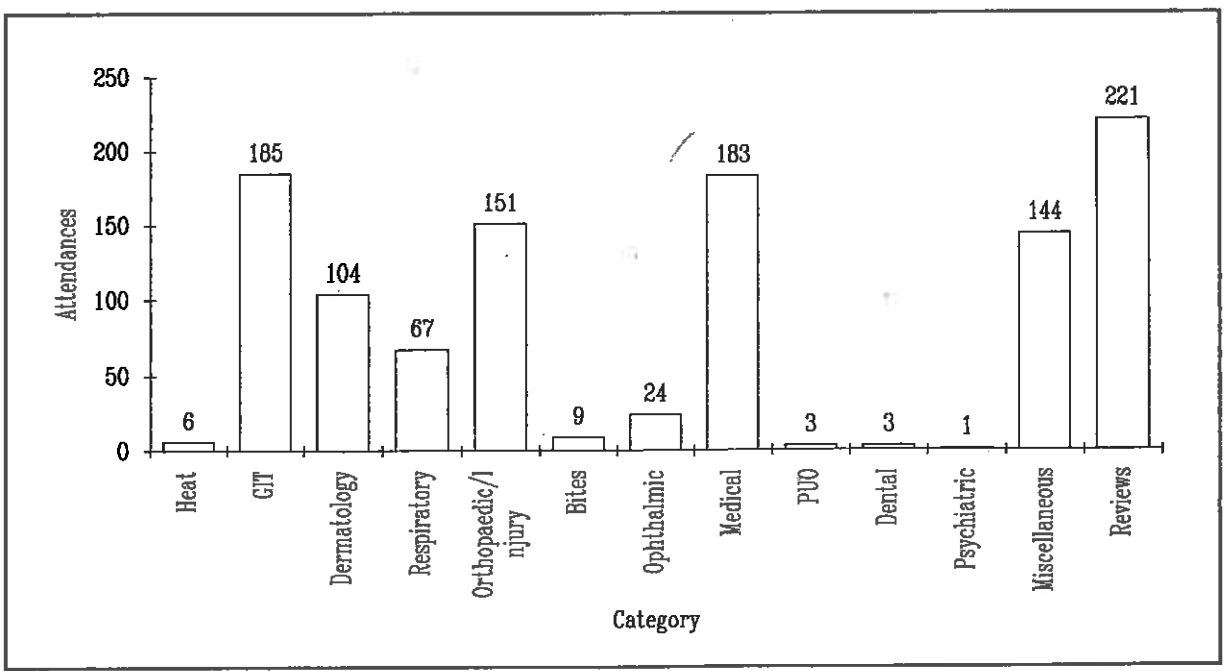

Figure 2 *Attendance at 1 RAR RAP by Category: 16 January to 27 March 1993.*

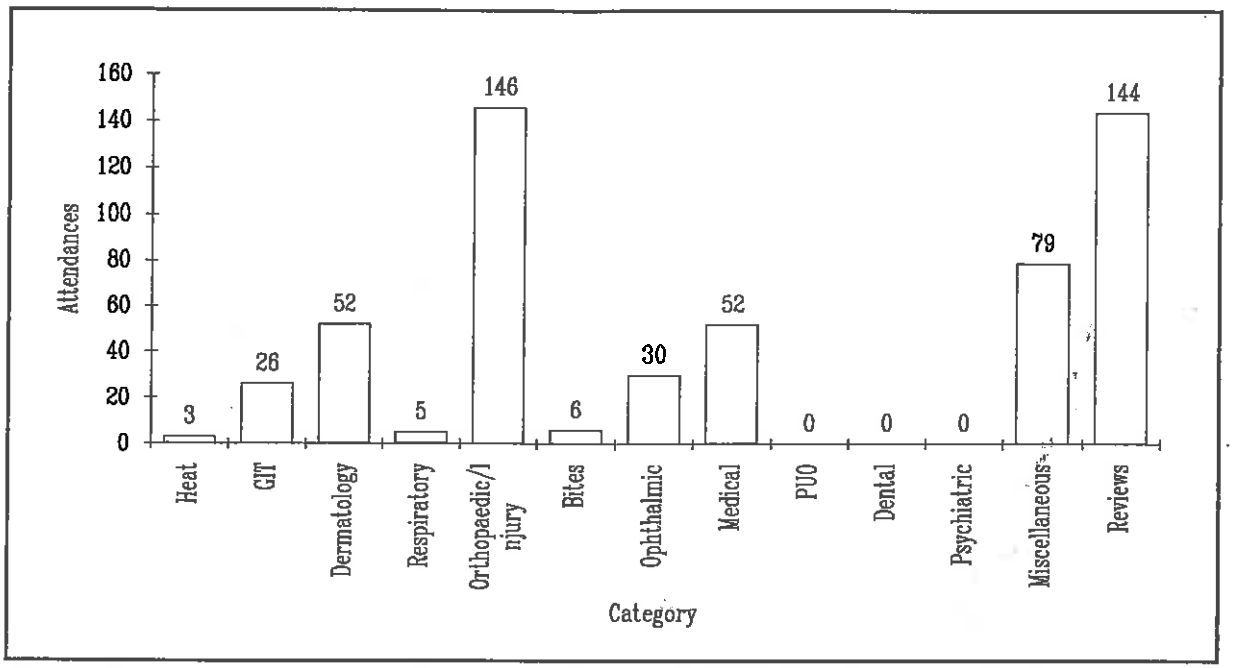

Figure 3 *Attendance at Treatment Section 1 BSG by Category: 16 January to 27 March 1993. [Note: Unit was co-located with Dental Section]*

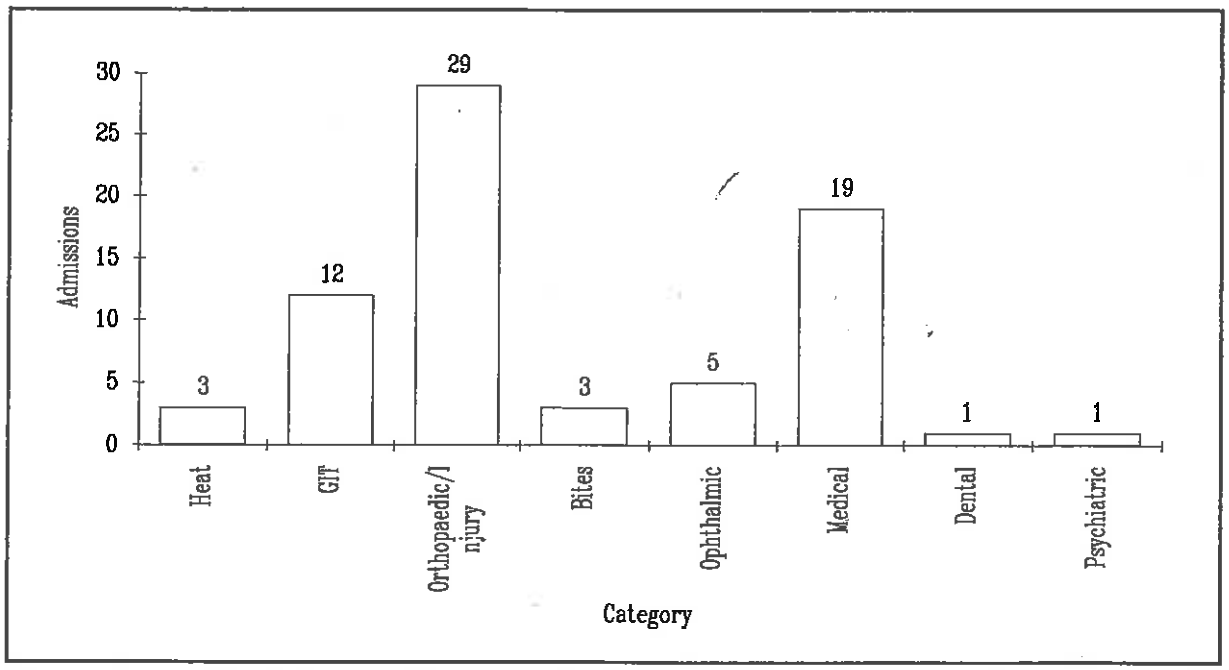

Figure 4 *Admissions to Treatment Section 1 BSG by Category: 16 January to 27 March 1993.*

Evacuations to Level 3

Only one Australian required inpatient care in a Level 3 facility. This was a member who developed a severe, bilateral keratitis, conjunctivitis and scleritis after some tree sap entered his eyes. He was admitted under the ophthalmologist at the 86th Evacuation Hospital.

Two US casualties were evacuated to the 86th Evacuation Hospital. One required cervical spine x-rays after a fall, and the other suffered a fractured femur in an MVA.

Two Somali battle casualties were evacuated for surgery. They were injured in a contact with an Australian patrol. One had a gunshot wound in his chest and left arm, while the other had a gunshot wound of his right knee.

Five other Somali casualties (three injured by bandit activity, one by Australian fire, and one in an MVA) were evacuated to the local hospital in Baidoa after stabilisation at 1 BSG.

Discussion

The dependency of the BSG was around 90 to 100 Australian troops, while 1 RAR RAP catered for 800. The US engineer elements were close to the BSG, and presented for Level 1 care while in the area (from early February to early March).

The high number of orthopaedic consultations is because members were encouraged to present early with all wounds so thorough cleaning with antiseptics could occur. The incidence of wound infection was low with this policy.

Of the 144 GIT cases, 78 were for diarrhoeal illness. All GIT admissions had diarrhoea as a component of their illness. One faecal specimen was positive for shigella (out of 15 specimens sent) although another five cases received norfloxacin because of bloody diarrhoea and failure to respond to 36 hours nil by mouth.

Malaria chemoprophylaxis was in the form of doxycycline 100mg daily. The majority of members found they could only tolerate this by taking it with meals. Eight people were changed to mefloquine (25mg weekly) because of adverse reactions to the doxycycline. Reasons were:

- known allergy to doxycycline 1
- photosensitivity rash on hands 5
- severe indigestion 2.

The consultation rate for the forces was 153 per week (15.3% of the dependency). This is consistent with the author's experience on major exercises in Australia. The admission rate to Level 2 was 7 per week, or 0.7% of the dependency. This is much lower than the admission rate Medical Company 3 BASB experienced during Exercise K92 (the total dependency for that exercise is not known, however the Company had 90 non-exercise admissions in 2 weeks). Possible reasons for this include:

- The environment in Somalia has been less harsh than that in Australia's 'Top End'.
- Most of the members of the Force live in Townsville and acclimatisation was not as difficult as it might have been.
- The longer duration of the deployment and a staged assumption of the Battalion Group's role allowed an adequate acclimatisation period. There was no frantic rush to get the most out of the 'training dollar'.
- There were very few members deployed on the operation with pre-existing, chronic health problems.

The admission rate to Level 3 care for the Australian Force was exceptionally low (one patient out of 930 in 10 weeks). Possible reasons for this include:

- A long holding policy for the Treatment Section (10 days).
- The lack of conditions requiring surgery. There were no battle casualties requiring surgery among the Australians, no significant non-battle casualty trauma, and no routine surgical problems (not even a hint of appendicitis).
- An excellent preventive medicine programme consisting of:
  - enforcement of preventive measures throughout the chain of command (long clothing after dark, closed footwear at all times except asleep, mosquito nets up at night);
  - early presentations of illness and injuries;
  - an aggressive vector control programme (which included permethrin impregnation, spot spraying of accommodation areas and area spraying); and
  - constant monitoring of water quality.

Conclusion

Operation Solace has six weeks to go at the time of writing. There is no significant reason to expect the attendance rate to vary significantly from that reported. A rate of attendance to Level 1 facilities of 20% and an admission rate to Level 2 facilities of 1% seems an appropriate rate for medical planning purposes for future similar activities.

This article has been cleared by the Surgeon General, Australian Defence Force, for publication

The Author

Major Daryl Duncan RAAMC was the Senior Medical Officer, 1 RAR Battalion Support Group Somalia during Operation Solace. He has just returned to Australia, taking up Command of the Medical Company, 3 Brigade Administrative Support Battalion

Hepatitis B vaccination in the Royal Australian Navy

Surgeon Lieutenant-Commander A.G. Robertson RAN

The Naval Health Services are responsible for the health care of all RAN personnel. The Naval Health Services' mandate includes the provision of preventive as well as curative health services with a primary aim of ensuring that a high percentage of Naval personnel are fit for operational duties, especially for seagoing duties.

Australia, apart from some high risk groups, has a low incidence of hepatitis B infection. The prevalence of HBV markers is 3 to 6 percent in the Australian population[1]. Naval ships, however, operate constantly throughout South East Asia and the South West Pacific where the prevalence of HBV markers may be over 80 percent in some populations[2] and there is a high prevalence of carriers. Additionally, other countries' military personnel have been shown to have an increased prevalence of hepatitis B markers. Although this increased prevalence has not been shown in Pavli's study of serological markers in RAN personnel[1], naval personnel have been involved in tattooing, accidents and unsafe sex in these areas, despite educational campaigns, with a consequential increase in risk.

History

Given these factors, the RAN has been developing policy in this area for nearly 20 years. Navy first issued policy in 1975 when routine screening of personnel was not recommended[3].

In April 1983, hepatitis B vaccine was released in Australia. Navy issued policy in August 1983 stating that the vaccine was not to be given without specific approval from Navy Office. Following the National Health and Medical Research Council recommendations on screening and immunisation of high risk groups in August 1983, and various supportive articles in late 1983 and 1984, the RAN policy was reconsidered. In June 1985, a Naval Health Circular[4] was issued requiring the screening of dental and laboratory personnel for hepatitis B and the offer of H-B-Vax to these personnel.

In November 1987, the NH and MRC recommended that Australians residing in endemic areas should be vaccinated against hepatitis B[5]. The Surgeon General, Australian Defence Force (SGADF) recommended that all Defence Department personnel with postings of three months or more in endemic areas be immunised.

With the introduction of Engerix B vaccine by Smith, Kline and Beecham in late 1987, SGADF introduced a Technical Policy Directive[6] requiring:

- HBsAg testing of all entrants
- HBsAg testing of at risk populations, including medical staff

- immunisation of at-risk populations.

By August 1988, the Director General, Naval Health Services (DGNHS) had questioned the rationale, on cost-effective grounds, of testing entrants and RAN policy throughout 1988 and 1989 was not to test entrants but to carry out the other requirements of the Directive. In addition, by May 1989, there were increasing operational requests from ships and patrol boats for the vaccination of their crews. The ensuing discussions considering operational demand, cost-effectiveness (based on Pavli et al's paper[1]), the requirement to maintain the integrity of the 'floating' blood bank, and the decreasing cost of the vaccine, led to a review. On 30 January 1990, SGADF notified his intention of introducing phased vaccination for all personnel, starting with entrants and health service personnel[7].

A Naval Health Circular was issued in March 1990 requiring the screening and vaccination of all new entrants and the vaccination of at risk groups. This was followed in August 1990 by the issue of an SGADF Technical Policy Directive[8] requiring:

- the screening for HBsAg of entrants and those personnel clinically suspected of having or carrying hepatitis B
- the immunisation of entrants
- the continued screening of HBsAg with routine HIV screening
- immunisation of the remainder of the Defence Forces progressively, without either pre- or post-vaccination screening.

The use of condoms and infection control procedures was also reinforced.

In 1991, a census was carried out to identify the effectiveness of the programme. Ships and establishments were directed again to have all vaccinations complete by 1 March. The SGADF policy was updated and refined[9] and in January 1993, the RAN carried out a further census of the vaccination programme.

Censuses

The census in 1991 showed different pictures between the fleet and the establishments.

In fleet, three quarters were vaccinated or in the process of being vaccinated (Figure 1). This was still of considerable concern because of fleet operations in South East Asia and the South West Pacific.

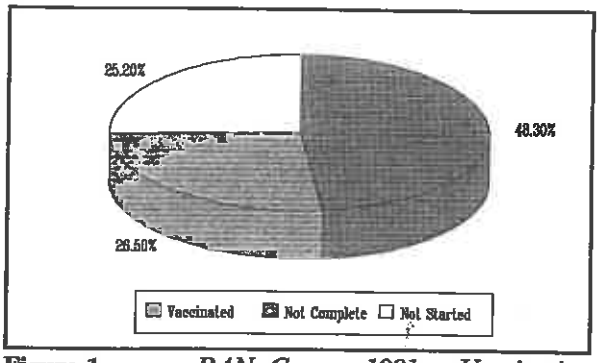

Figure 1 *RAN Census 1991 - Vaccination Status: Fleet*

The establishments, however, were of more concern, with 45 percent not yet commenced on the vaccination programme (Figure 2).

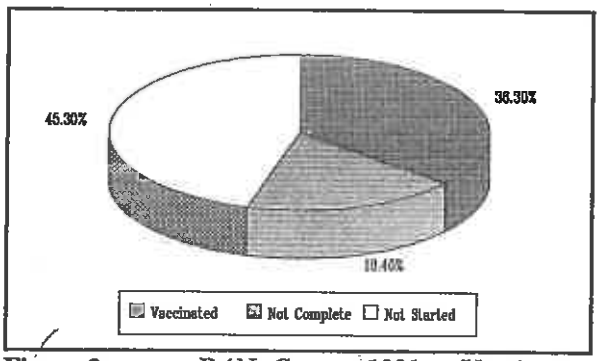

Figure 2 *RAN Census 1991 - Vaccination Status: Establishments*

The picture at the census in February 1993 was considerably different (Figure 3). Ninety-two point five percent of Fleet was now vaccinated with only 0.5 percent not yet started.

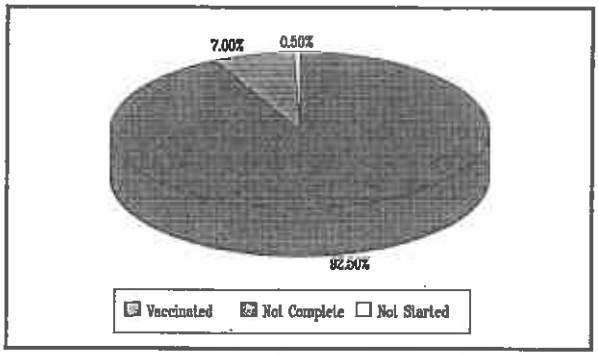

Figure 3 *RAN Census 1993 - Vaccination Status: Fleet*

Similarly, the majority of personnel at the establishments were now vaccinated (Figure 4).

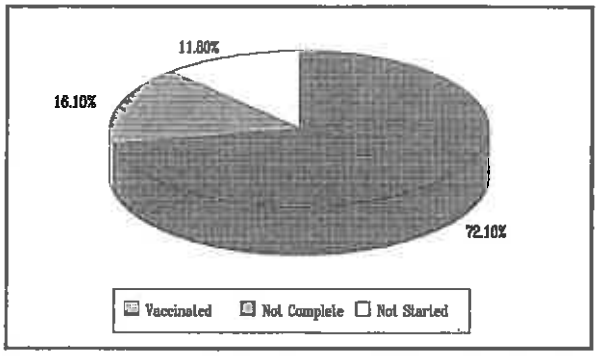

Figure 4 *RAN Census 1993 - Vaccination Status: Establishments*

The remaining high number of incompletely vaccinated personnel were primarily entrants undergoing their hepatitis B course. This percentage is unlikely to change markedly as new groups enter the RAN. Vaccinations are continuing, with the majority of personnel expected to be fully vaccinated by the end of 1993.

Discussion

Is the ADF doing the right thing? There is good evidence to support current policy.

Firstly, ADF methods. The ADF has elected to immunise all of its personnel, commencing with high risk groups. This is supported by Atler et al[10] who have found the percentage of hepatitis B due to heterosexual transfer is increasing and targeting only high risk groups may not be effective. Indeed, the rising incidence of hepatitis B has forced the US to reconsider its position and to broaden recommendations to include those with occupational and lifestyle risks[11].

The ADF also does not routinely do pre- or post-vaccination testing. Although advocated by some parties[12], such testing is not advocated by either Australian[13] or overseas authors, including the Immunisation Practices Advisory Committee (ACIP) of the Centre for Disease Control[14]. The ADF does, however, recommend the serological testing of those at high risk, a practice which is generally supported[14,15].

Secondly, we need to look at results. Pavli et al[1] estimated an attack rate in RAN personnel of less than one percent, which is similar in scale to the US military rate of 0.5 percent. Is vaccinating a population with such a low attack rate cost effective? Numerous studies have examined this question. Given the three to ten percent of adults who subsequently become carriers, and the reduced cost of vaccines, now only $21 for a Naval course, the literature would support this view. Indeed, Mauskopf et al[16] asserts that the vaccine programme would only have to avoid one or more cases per 6,517 low risk workers to be cost-effective.

Additional analysis, utilising vaccine at $7 a dose and strike rates of 0.35% to 2%, suggest that such a regime is both cost-effective and cost beneficial[17,18,19]. Even Pavli et al[1], who felt immunisation was not cost-effective in 1988, noted that it was likely to become cost effective as vaccine costs fell. With vaccine costs at one-third of their 1988 values, vaccination of populations with attack rates of less than one percent, using the Mulley model[20], is cost effective.

Effectiveness can be measured by calculating the effect of the programme on the incidence of new disease and of carriers. As between three and ten percent develop chronic carrier states, with the potential for chronic active hepatitis and hepatic cancer in the future, any regime ideally should prevent carrier states. Whittle et al[21] have found hepatitis B vaccination 97 percent effective in preventing chronic infections. The RAN's programme has already identified a number of chronic carriers and enabled their closer monitoring. Review in five years is anticipated to show a drop in carrier rates with associated long term benefits. Operationally, the integrity of the 'floating blood pool', now screened for hepatitis B, hepatitis C and HIV, will remain at a high standard.

Conclusion

Where to now? Research is continuing into the effectiveness of various immunisation strategies, and a combined hepatitis A - hepatitis B vaccination study has commenced at the Australian Defence Force Academy this year. Research into non-responders and the timing of booster shots is also planned.

Navy has implemented an effective hepatitis B immunisation programme that will stand it in good stead in the future. Mass programmes of this type can be useful in groups with occupational risks of HBV and should be considered as part of any overall vaccination strategy.

The Author:

Surgeon Lieutenant-Commander Andy Robertson RAN has contributed previously to AMM. He is about to proceed overseas for specialist training in NBC medicine in the United States and United Kingdom.

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REVIEW ARTICLES

Tularaemia

Sue Sharpe

Tularaemia is caused by the intracellular pathogen *Francisella tularensis*, a small, pleomorphic, aerobic, Gram negative coccobacillus which requires a complex cysteine-containing growth medium for laboratory cultures. Capsules may form in tissues.

The pathogen is not highly heat resistant but will survive freezing and drying. It survives well in the environment - especially in the cold with no direct sunlight, and can remain viable in dried blood. *F. tularensis* is highly virulent - only a few organisms are required to cause illness in humans.

Two antigenically homologous isotypes exist, Jellison types A and B, which are differentiated epidemiologically, biochemically and by virulence. Two other subspecies also appear to have been isolated in the former Soviet Union and Japan, but these have not been characterised fully.

Epidemiology

F. tularensis is found throughout North America, Continental Europe, Japan, China and the former USSR, and can be isolated from a number of animal and insect vectors including rabbits, deer, deerflies, mosquitos and ticks.

Jellison Type A (*Nearctica*) strain is present mainly in North America and is associated especially with wild rabbits, rodents, and blood-sucking arthropods. It is more virulent than Type B, and can produce clinical symptoms from an inoculum with as few as 10 organisms. If untreated, this strain may cause death in 5 to 10 percent of patients.

The ease of aerosolisation and the high virulence of Type A make it a serious biological hazard in laboratories.

Jellison Type B (*Palaearctica*) strain is found in the Northern Hemisphere (Europe, Asia and America), particularly in water and aquatic animals. Infections often require inocula of more than 100,000 organisms, and fatalities in untreated cases are usually less than 1 percent.

F. tularensis is most commonly transmitted to man by the bites of infected ticks or animals, inhalation of contaminated dust, ingestion of contaminated food or water, or direct contact with infected animal tissue. Man-to-man transmission is rare.

Pathology

Organisms which gain entry into the body may multiply at the site of entry, and spread to the regional lymph nodes, where they may disseminate via the bloodstream to other organs, especially the lungs, liver and spleen. Organisms may persist intracellularly via the reticuloendothelial system, causing granulomatous lesions which may caseate or form small abscesses. Aggregates of *F. tularensis* may form in the spleen and the liver with a dense surrounding of polymorphonuclear cells (PMN's). These may progress to hepatic and splenic nodules with necrotic foci.

F. tularensis is primarily an intracellular parasite and survives in monocytes and other body cells. It may generate a persistent immune response and has a tendency to relapse. Cell-mediated immune responses are dominant, although opsonising antibodies (which appear later in the infection) are required for phagocytosis and intracellular killing of PMN's. Early tissue response may involve focal necrosis, and the presence of neutrophils and macrophages.

Clinical Manifestations

Clinical manifestations may be inapparent to fatal. The clinical symptoms are determined by the route of entry. Six different presentations may occur.

Ulceroglandular (Cutaneous)

The ulceroglandular type is the most common natural manifestation of the disease (75 to 85 percent of cases), and usually results from direct contact with infected animals or tissues. The incubation period is usually three days.

A primary lesion develops at the site of inoculation, together with an abrupt onset of

influenza-like symptoms (headache, fever, vomiting, generalised aching, diaphoresis, chills, myalgia, prostration). The organisms may spread to the regional lymph nodes, which become tender and enlarged.

After approximately one week, a papular lesion appears at the site of inoculation, which then ulcerates and breaks down with necrotic debris in the centre.

The patient usually remains febrile for two to three weeks, although fleeting muscular pain may last from two weeks to one month (and may be intermittent for up to 12 months). Epistaxis and dizziness are common.

Glandular

The glandular form causes identical symptoms to ulceroglandular tularaemia, but without the associated skin lesion.

Typhoidal (Enteric)

The typhoidal form occurs in approximately 10 percent of cases. It may occur after the ingestion of contaminated food or water. The symptoms presented are very similar to those seen in typhoid fever, and may include fevers, chills, headache, anorexia and myalgia. No primary lesion is seen.

Necrotic ulcers form throughout the gastrointestinal tract, beginning with lesions and abscess formation around the mouth and pharynx. A severe sore throat, diarrhoea, abdominal pain, cough, shortness of breath, and ulcerative or exudative pharyngitis are characteristic. Gastrointestinal lesions may become haemorrhagic, and enlarged and tender lymph nodes may be seen. Toxaemia and death rapidly ensue if the patient is not treated promptly.

Oculoglandular (Conjunctival)

The oculoglandular form only occurs in 1 to 2 percent of cases. Symptoms are very similar to ulceroglandular except that the primary lesion occurs around the eye.

The entire conjunctiva becomes inflamed and congested, followed by lacrimation, inflammation and enlargement of the pre-auricular lymphatic glands. A granular condition of the eyelids, chemosis (oedema of ocular conjunctiva resulting in swelling around the cornea), may be observed. Serious ocular damage may develop if the patient is not treated.

Pharyngeal

The pharyngeal form may occur as a result of typhoidal or ulceroglandular tularaemia. It appears as an exudative pharyngitis with associated lymphadenitis.

Pulmonary

The pulmonary form may be either primary (from inhalation of aerosol or contaminated dust) or as a secondary infection following bacteraemia and dissemination of the pathogen throughout the body or inhalation of bacteria from pharyngeal tularaemia.

Clinical symptoms include coughing, fevers, chills, headache, pleuritic chest pain, dyspnoea, non-productive cough and haemoptysis. Chest radiographs may reveal parenchymal infiltrates, pleural effusion and hilar lymphadenopathy. Conversely, there may be no enlarged lymph nodes, and the condition may resemble caseous tuberculous lesions. A systemic illness often follows.

Man-to-man spread through inhalation of respiratory droplets is possible. Pulmonary tularaemia is often fatal in up to 60 percent of cases unless treated promptly[1].

All forms of tularaemia may result in systemic infection.

Although fatalities are uncommon, especially if the patient has been treated, a notable weakness and fatigue may remain for many months.

Diagnosis

Laboratory Diagnosis

Identification is generally made using clinical history, symptoms, and fluorescent antibody assays of smears from skin lesions, sputum or other specimens.

Positive identification can be made with isolation of the bacteria from blood or other tissues, although this can be hazardous (because of high infectivity of aerosols) and often unsuccessful due to the fastidious growth requirements of the organism.

Antibody detection is only useful as retrospective identification.

Antibodies can be detected using agglutination or ELISA, although significant titres usually do not appear in the first week, and may remain detectable for years. Therefore, diagnosis

cannot be made on single titres. A fourfold increase in titres of acute and convalescent sera, taken at least one week apart, is a positive indication of infection.

Recently, a microagglutination test has been developed which can detect serum IgM much earlier, and with a greater sensitivity than conventional agglutination methods[2].

Diagnosis of infection following BW attack may be difficult because of the nonspecific symptoms presented, and a lack of suggestive exposure history.

Differential Diagnosis

Differential diagnoses are:

- Ulceroglandular: plague, toxoplasmosis, cat-scratch disease, chancroid, lymphogranuloma venereum.
- Pharyngeal: EBV infectious mononucleosis, streptococcal pharyngitis, diphtheria.
- Typhoidal: typhoid fever, brucellosis, leptospirosis, atypical pneumoniae.
- Pulmonary: Other pneumoniae, may resemble caseous tuberculous lesions.

Treatment

Streptomycin is the drug of choice, although some virulent resistant strains have been reported. Gentamycin[3], erythromycin[4] and tobramycin also seem effective. *F. tularensis* can be controlled by chloramphenicol and tetracyclines in aminoglycoside-sensitive patients, but relapses occur in more than one third of the patients treated with these drugs.

Recommended therapy is as follows:

- Streptomycin 15-20 mg/kg/day intramuscularly for 10 to 14 days; or 30 to 40 mg/kg/day in two divided doses for three days, followed by half that dose for the next four to seven days; or
- Gentamycin 3-5 mg/kg/day parenterally for 10 to 14 days.
- Post-exposure prophylaxis: tetracycline (2g/day orally) or doxycycline (200mg/day orally) for 14 days.

A favourable clinical response should be evident within 48 hours of therapy.

Surgical drainage of fluctuant nodes should only be done after antibiotic therapy.

The patient requires bed rest for a prolonged period of time after pyrexia has subsided. A diet of high-calorie and easily digested foods is recommended. Convalescence is usually very slow and weakness may remain for many months.

Isolation is not usually necessary as human-to-human transmission is unusual.

Susceptibility of Population

All ages are vulnerable and there is no difference in susceptibility between males and females.

Prevention

Solid immunity is usually acquired after a natural infection. Several different vaccines are available. These are currently only administered to at-risk personnel.

A live attenuated vaccine (LVS) derived from Strain 15 of the Palaearctic isotype, and applied intradermally by multiple puncture has been used in the former USSR and to a limited extent in the USA. Side-effects appear minimal, usually only producing a mild local reaction with formation of a small papule. Approximately 25 percent of patients acquire minimal axillary lymphadenitis, which spontaneously subsides. One in ten patients will experience a slight rise in body temperature. More than 95 percent of vaccine recipients will exhibit antibody and cell-mediated immune responses. LVS has been shown to prevent laboratory acquired infections and experimental airborne disease[5]. Protection can be overcome with large infective doses.

An aerogenic tularaemia vaccine (developed at Fort Detrick, Maryland), and administered by inhalation appears to be more effective than injected vaccines.

Killed vaccines do not appear to be very successful.

A multiple BW agent vaccine is currently being developed in Canada.

Passive immune therapies for humans are probably not feasible because protection seems more cell-mediated than humoral.

Potential as BW

The most significant consequences of an attack of tularaemia are the debilitating effects rather than the mortality. The length of initial illness and long convalescence would strain medical resources and seriously deplete effective manpower.

The infectious dose in air is very low (10 to 50 organisms).

F. tularensis has a high persistence in the environment, on dry surfaces and in the wet.

A BW attack would most likely involve aerosols and cause pulmonary tularaemia, which could result in high morbidity and a possible mortality of 5 to 10 percent. Symptoms are often nonspecific and diagnosis may be difficult.

The Author:

Sub-Lieutenant Sue Sharpe RAN has contributed previously to AMM. She is a microbiologist who entered the RAN as an instructor officer.

Future Directions

Recent research has indicated that several other antibiotics may be useful in treating tularaemia. Orally administered fluoroquinolones (ciprofloxacin, norfloxacin, ofloxacin and perfloxacin) show some potential[6]; imipenum/cilastin sodium (Primaxin) may also be effective[7]. The efficacies of these drugs are being further studied.

Recombinant vaccines are currently being investigated. Recombinant techniques expressing the 17 kDa membrane lipoprotein have been shown to elicit a T-cell response in humans[8,9] although a combination of several proteins may be necessary for optimal protection.

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Medial tibial stress syndrome in military recruits

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Military basic, or entry level, training has been known to cause very high levels of injury in recruits. In some cases, 60 to 70 percent of trainees have been injured in an eight week period[1,2]. The majority of these injuries have been overuse injuries of the lower limbs - patellofemoral dysfunction, Achilles tendonitis, stress fractures, plantar fasciitis and shin splints (medial tibial stress syndrome) being the most prominent. Some of these injuries are well defined, clearly understood clinical entities; others, particularly patellofemoral dysfunction and shin splints, are often subject to quite different diagnostic criteria.

Shin splints have been described as 'pain and discomfort in the leg from repetitive running on hard surfaces or forcible, excessive use of foot flexors; diagnosis should be limited to musculotendonous inflammations, excluding fractures or ischaemic disorders'[3].

The confusion that surrounds just what does constitute shin splints is reflected in the multitude of alternative names for the condition: posterior tibial tendonitis, anterior (or medial) shin splints, soleus syndrome, tibial periostitis. It has often been equated, usually in lay athletic journals, with tibial and fibular stress fractures. A more precise definition is provided by Slocum[4]: 'a sterile mechanical inflammation of the muscle-tendon unit brought about by over exertion of the muscles of the lower part of the leg during weight bearing'. It is a descriptive, rather than diagnostic, term. It also appears that 'medial tibial stress syndrome' is becoming established as the appropriate term to use when considering shin splints, and will educe the ambiguity that has abounded.

The only prospective study on shin splints was undertaken on a US Naval Academy cohort of 2,777[5]. Out of this group, 97 suffered shin splints during training, a rate of 3.5 percent. On average, each patient had to stop running for 8 to 10 days. No prophylactic regimen was found to result in a significant reduction in incidence of shin splints. It was concluded that the major contributor to the causation of shin splints was over exertion without proper conditioning.

A retrospective study conducted on recruits at the RAAF Recruit Training Unit, Edinburgh[6], demonstrated that shin splints were not a major cause of significant injury, where the definition of significance was the loss of sufficient time from the course (usually greater than 5 days) to result in backcoursing of the recruit. Only 16 out of 8,644 recruits required physiotherapy and other treatment modalities for shin splints. It was generally possible to continue to function with the injury, but a large amount of morbidity was inflicted on the recruits.

Not all the studies looking at injury rates in military recruits identified shin splints as a separate entity. This further demonstrates the ambivalent attitude towards the syndrome.

Medial tibial stress syndrome has been found to have a distinctive scintigraphic appearance[7], with a 'diffuse linear uptake of technetium 99 in the delayed static phase' along the medial border of the tibia. Roentgenograms are invariably normal, as are, by definition, compartment pressures.

Clinical features are predominantly of pain over the medial tibia, more pronounced over the distal half, occurring on weight loading of the leg, and resolving on rest. There may be some swelling associated with the pain, and irregularity of the tibia may be noted.

The course of the disease is almost always self-limiting. Treatment should involve relative rest, ice packs, and NSAID's. Injections of the medial tibial border with corticosteroids have met with limited success[8].

Preventive methods can be divided into extrinsic and intrinsic, extrinsic being those factors associated with the training programme, and intrinsic those factors associated with the individual. The best defined risk factors for lower limb overuse injuries in general, and stress fractures in particular (there have been essentially no studies specifically dealing with the prevention of shin splints) are those intrinsic factors of female sex, high Body Mass Index, poor pre-training level of physical fitness, the presence of a lower limb deformity and a history of lower limb injury.

Extrinsic factors are also thought to have a major impact on injury, but have not been exclusively demonstrated in studies to date. They are inappropriate footwear, drilling on hard surfaces, inadequate warmups, a too rapid in-

crease in exercise demand, exercising in cold weather and a heavy work load in the third week of training when the bone is at its weakest. This last cause is because of bone remodelling in response to repeated microtrauma[9].

Specific causes of shin splints are generally very similar to other lower limb over use injuries. Training techniques must be addressed, with care to not be overly ambitious in the build up of training, and the improvement of leg musculature through exercises and stretching. Orthotics also have their role, and should be considered in patients before a return to a training programme.

Shin splints are thus a specific clinical entity, which generally respond to simple therapeutic measures. Shin splints are, however, painful, and may indicate that other overuse injuries could develop and that aspects of the individual and/or the training need to be reviewed. All cases of shin splints in basic military training are preventable, if recruits are adequately prepared for the physical demands of the course, and if courses are modified to minimise trauma to the lower limbs, without compromising terminal objectives.

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Squadron Leader James Ross RAAF is the President of AMMA and is currently working in the Office of the Surgeon General

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A PERSONAL VIEW

Would That the White Coat Were Purple

Wing Commander Tony Austin RAAF

A traditional Chinese curse goes something like this: 'May you live in interesting times'. If it be so, then we are all most certainly cursed for these are indeed very interesting times. Economic reality has hit the military hard - the buzz word for the 90's is 'downsizing' and the military medical empires have not been exempted. We are extolled to do more with less - our salaries compare poorly with the civilian colleagues who share our workplace yet each of us knows that the job we do is unique - the practice of military medicine encompasses so many exciting fields that no one individual can ever truly say that he is the master of them all. Yet all is clearly not well within our ranks - the vast majority of uniformed medical officers do not re-engage after the completion of their initial return of service obligation and our senior colleagues rarely remain to reach compulsory retiring age. Why is this so?

It would be facile to suggest that the answer to this question is easy - far greater minds than mine have sought solutions that have ranged from financial inducements to status through accelerated promotion. For every solution there has been a backlash - resentment of our pay scales from our non-medical brother officers through to erosion of the professional respect accorded to us as we have failed to formally develop our broader military officer qualities. The problem of medical officer retention has been ever present - no service has been spared at some stage or another and, clearly, there is no single

answer. Whilst remaining both intrigued and tantalised by the oft-stated concept that there are no new sins on the face of this earth, I must accept that there are no new problems and certainly no new solutions. Is there, then, something that the ADF has not yet tried? I think that there is - an integrated ADF medical branch.

It is an immutable fact of human life that we all seek to define ourselves by identifying with a sub-group within society. As members of a uniformed service we pledge allegiance to our Queen, our country and to our service. I suggest that the allegiance to our service is often the stronger in that it is this allegiance that often directs our interaction with our professional brothers within the ADF. This very allegiance can become destructive when it leads to an erosion of our mutual professional respect and to a fragmentation of the delivery of quality health care to the servicemen and women of the ADF. This need not be so, as I witnessed vividly whilst on a recent Defence Cooperation visit to Canada.

I am sure that you are all aware of the 'experiment' conducted in Canada in the late 1960's/70's when they fully integrated the three branches of the Armed Forces to form a single Canadian Defence Force (colloquially known as 'purple suiters' although, in reality, the uniform was based on that of the Army, i.e. green). We all know that this was considered an abject failure and that the CDF has reverted to the original three services with their own uniforms, rank and doctrine. What you may not know is that the CDF medical branch has remained fully integrated - they wear the uniform of the mother service but can occupy any billet for which they are qualified. As an example, the Air Command Surgeon is a Naval Captain whilst the doctor in charge of the G-awareness programme for Air Force fighter pilots is a Navy Lieutenant-Commander. I must add, for completeness, that they have a Surgeon General who is selected purely on merit (currently Air Force) and the next Surgeon General will be a female Air Force medical officer who was also the first Canadian female military pilot.

So - what are the advantages of such a system? Before listing the advantages of an integrated approach, we need to examine the reality of military medical practice within the ADF. We all share the doctrinal priority of enhancing operational health - of maintaining the fighting elements at peak efficiency. This often leads into our favourite specialist areas - aviation medicine, underwater medicine and battlefield resuscitation and transport. The reality is often very different - an endless stream of mundane 'unwelledness' that keeps us chained to our surgery desks. Even for those of us dedicated to a clinical career, this can become tiresome when your patient load comes from often very homogeneous populations. The job opportunities in military specialist areas are often limited and can ultimately lead to over-specialisation with the inevitable professional dead-end. The increasing emphasis on joint force operations has gone a long way to blur conventional roles and we must now have a far greater understanding of the needs of each component of the total force in combat. So what does this mean?

By integrating the medical branches of the ADF (whilst maintaining a single service identity) the potential employment pool is greatly expanded. This would then allow an individual medical officer to experience, by rotational postings, attachments etc., a much broader range of military medical specialities and thus remain professionally stimulated for a longer period of time. A larger medical pool would also permit specialisation across traditional single-service lines and thus increase the opportunity for postgraduate training and external accreditation. Hopefully, this would lead to a more natural matching of inherent interest and service needs thus creating a happier, more fulfilled medical officer population. The obvious flow-on from this would be greater retention of medical officers with enhanced corporate expertise and reduced training costs.

What then are the costs? The first casualty would have to be the traditional interservice antediluvian jingoism that has been the mainstay of military medical practice for generations. The second casualty would be selection by seniority rather than by ability. Are these costs too high? If the concept of a centralised Surgeon General is to be at all credible then the medical officers employed there need to have a realistic understanding of the needs of all three services. Most of the expensive postgraduate training programmes (e.g MPH, MHA etc.) are common to all three services and are equally valuable to each. Specialist courses, such as the Diploma of Aviation Medicine, can be justified for selected members of all three services on the basis that military aviation remains fragmented within the ADF. Similarly, the work conducted by ADF specialist

centres (e.g. School of Underwater Medicine, Institute of Aviation Medicine) already have relevance to the three branches of the ADF and would benefit from an injection of expertise from all branches.

In conclusion, I suggest that ADF medical practitioners need to critically assess the health of their own branches and seriously consider the merits of an integrated system staffed by open-minded, enthusiastic single-service members. I further suggest that this could open the way for a true profession of Military Medicine that would be satisfying and likely to encourage suitable people to devote the major portion of their professional lives to its advancement.

Wing Commander Tony Austin is currently the Commanding Officer of the RAAF Institute of Aviation Medicine at Point Cook. He has had postings to a variety of operational bases. He has undertaken the RAN Underwater Medicine Course in 1989, the USAF Flight Surgeon's Course in 1988 and the Army War Administration Course in 1992. He has been deployed to numerous joint force tactical exercises both within Australia and overseas during his career.

Wing Commander Austin has noted his fortuitous posting to the US which will see him out of country when this article is published!

FOR YOUR DIARY

EVENTS/CONFERENCES

Australasian College of Tropical Medicine Annual Scientific Meeting
Darwin, 16-19 June 1993. ACTM Secretariat, c/- Department of Public Health and Tropical Medicine, James Cook University of North Queensland, QLD, 4811

Australian Military Medicine Association Conference
Canberra, 20-22 August 1993. AMMA Conference Organiser, c/- CP4-7-36, Campbell Park Offices, Canberra ACT 2600

Third Course on Sexually Transmitted Diseases/AIDS
Bangkok and Songkla, Thailand, 1-21 November 1993. Dr Verapol Chandeying, The Secretariat, STD/AIDS Diploma Course, Department of Obstetrics and Gynaecology, Faculty of Medicine, Prince Songkla University, Hat Yai Songkla, 90112, Thailand

13th Scientific Meeting of the International Epidemiological Association
Sydney, 26-29 September 1993. Conference Secretariat, Fax (02)488-7496

15th International Congress on Nutrition
Adelaide, 26 September - 2 October 1993. CSIRO, Fax (08)224-1841

Australian Society for Parasitology
Heron Island, 28 September - 1 October 1993. Prof Peter Boreham, QIMR, Fax: (07)362-0105

7 Years and Counting: Health Beyond 2000
Sydney, 29 September - 2 October 1993. Public Health Association, Fax: (02)488-7496

Australian Tropical Health and Nutrition Conference "Diarrhoeal Diseases" and "From the Laboratory to the Community and Back Again"
Brisbane, 21 to 23 October 1993. University of Queensland, Wendy Gardiner (07)365-5408

AMMA Victorian Region Dinner Meeting
November 1993 (date to be announced).