

Training the physician for deployment

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RECENT AND PRESENT ADF deployments have not had a clearly defined posting for a physician. Present Timor deployments have had a role for an intensivist, and both anaesthetists and physicians have filled this role. Having a second anaesthetist deployed as intensivist may provide extended operating benefits, as two surgeons have often been deployed (general and orthopaedic), but the use of a physician in the intensivist posting or, better still, separately on operations regardless of surgical demand provides additional skills beyond intensive care alone.

In many of the ADF's campaigns disease has been a greater waster of personnel power than battle casualties. In the Boer War 251 Australian combatants were killed or died of wounds, and 267 died of disease. Gastrointestinal disease was a major public health medicine issue.¹ In Australia's first significant tropical deployment, in Rabaul (1914), malaria and dengue were problems; only on the initiative of Howse was quinine taken as stores. A microscope had to be specially requisitioned.² Later, in World War I, malaria proved to be a problem in Palestine.² In Australia's longest war (Vietnam), a specialist physician was needed (and hard to supply), but the extensive statistics provided by O'Keefe show full justification for this posting.³

Experience in East Timor has shown that the need has not lessened. Due to "mission creep", deployed medical facilities may need to treat civilians with a full range of medical problems and a large range of pre-existing comorbidity not seen in Defence personnel, or even commonly in the physician's usual civilian practice. As in East Timor, knowledge of tropical medicine, infectious diseases including tuberculosis and HIV, obstetrics, paediatrics, and nutrition may be needed, although elderly patients may be less common than in Australia. Particularly in United Nations missions and in so-called non-warlike deployments the deployed force may need to use its facilities for humanitarian reasons. In any case, local diseases affect local populations and without care these diseases can spread to military forces.

Together with the "media factor", these are cogent reasons for ADF medical officers to treat locals, refugees, civilian and UN personnel. In undertaking these non-military duties, ADF medical officers can derive the benefit of maintaining and developing skills and familiarising themselves with

Synopsis

- ◆ ADF physicians on deployment need broad skills to meet a wide range of mission objectives with limited resources.
- ◆ Current deployments are in tropical areas, and tropical or subtropical regions are the most likely area of future deployment. A good understanding of tropical medicine is required.
- ◆ In tropical regions, malaria, tuberculosis and HIV are relatively frequent infections with potential to affect military deployments.
- ◆ Reservist physicians need to prepare for deployment by bolstering their general medical skills and aptitude in basic emergency procedures.
- ◆ High-technology medical equipment is lacking on deployment, but physicians are supported by strong aeromedical evacuation capabilities and a range of specialist advice from military medical experts behind the lines (eg, Army Malaria Institute, Institute of Aviation Medicine).

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local diseases and the practicalities of medicine in the local conditions.

Due to subspecialisation, narrower focusing of physician training, public subspecialty demand within Australia and the loss or marginalisation of general medicine units from many large hospitals, the number of general physicians in Australia is declining. Many are to be found in outer urban, regional or rural areas and these physicians often have skills in high-dependency care, postoperative care and intensive care. All these skills are necessary for deployment in the intensivist posting.

Basic skills

Defence Force medical history is a valuable teacher and excellent publications are available that report experience in World War I, World War II and Vietnam. The documentary record of World War II includes good descriptions of the natural history of diseases in our region of military interest.⁴

General physicians can become capable in intensive care by ensuring that the appropriate reading is done and that all required skills such as endotracheal intubation, lumbar puncture, placement of chest drains, central lines and percutaneous cystostomy are practised before deployment.

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Cases on a peacekeeping deployment



1. A Timorese woman from Atauro Island had fever for about five days. Her conscious state diminished to a level where intubation was required before aeromedical evacuation. On admission, lumbar puncture analysis disclosed 26 red cells and 206 lymphocytes per nanolitre, consistent with the clinical diagnosis of Japanese encephalitis. Her condition deteriorated and it was decided that further intervention would be unhelpful. She was extubated, breathing through a nasopharyngeal airway while awaiting transport to her home, where she died.

Japanese encephalitis is a serious threat to the health of service personnel deployed in endemic areas. Vaccination, preventive medicine and antimosquito precautions are vital, as one in 300 people infected with the virus develop encephalitis.

2. A serviceman from the international peacekeeping force used accelerant to light a cooking fire and received burns to abdomen, chest, neck, face and hands. There was no evidence of respiratory tract burns. He received large quantities of intravenous fluids (sufficient to maintain a urine output of 1200–1500 mL/day) until he was able to feed himself with bandaged hands. He was repatriated to his own country.



3. A Timorese woman was brought by helicopter from the border district. She was pregnant (uterine fundus consistent with term pregnancy) and had lapsed into a fever and coma. She vomited and a chest x-ray confirmed aspiration pneumonia, with patchy consolidation along the right heart border. She was intubated and ventilated. Lumbar puncture was normal, but a film and immunochromatography card test were positive for *P. falciparum* malaria. The pneumonia (*S. aureus*) was treated with IV ceftriaxone and flucloxacillin, with five-day course of IV quinine days for the malaria. While ventilated in ICU, she spontaneously

delivered a live baby. By Day 10 the mother and baby were doing well, but the mother had difficulty remembering the names of her five children. Cerebral *falciparum* malaria normally carries a 30% mortality.

Physicians on deployment may encounter civilian patients with special needs outside the gamut of military medical practice or civilian practice in Australia.



The role of a deployed military intensive care unit (ICU) is quite different to that of an ICU in Australia. Provided that evacuation lines are intact, patient stay is very much shorter. The deployed physician must plan ahead — “What do we do if evacuation fails?”

Newly recruited physicians are unlikely to have encountered Propaq monitors and the Bird VS ventilator in civilian practice. They will find this equipment entirely suitable, robust and simple; adaptation will not be difficult. If possible, they should inspect and familiarise themselves with the equipment before deployment.

Reading and discussions with colleagues, followed by labour ward attendance for deliveries, serves to update obstetric knowledge. Antenatal care is not likely to be required or available. If neonatal respiratory problems are encountered the anaesthetist should assist, but military medical facilities are not equipped or deployed to support high level neonatal problems. The deployed surgeon will assist with complicated or operative obstetrics.

Non-government organisations and the media often focus on sick and injured children, and the physician should be able to assist in this area at the level of care given in an Australian emergency department, where suitable training, experience and handicraft skills can be obtained by arrangements with local hospitals. Strategic alliances between the Defence Health Service and civil hospitals will assist here with paediatric and obstetric care.

Public health responsibilities

The ongoing health services deployment to East Timor includes a public health physician assigned to Peace Keeping Force Headquarters. The role of the public health physician is to observe patterns of disease of public health significance and discuss these with the public health specialist, with the aim of preventing or ameliorating negative trends. On deployments without a public health posting, the general physician may need to fill the role, complete with epidemiology and basic descriptive statis-

tics. The deployed physician should be involved in aspects of public health and policy recommendation where necessary, as these may affect military operations.

When deployed with preventive medicine and pathology services, the physician will quickly learn the role of these capabilities with regard to vector-borne disease and water quality. Especially in the tropics, control of water quality and disease vectors, together with vaccination and prophylaxis, is the key to good health; however, pestilence can strike in many situations, including terrorist incidents and political strife.

Tropical medicine

As most ADF deployments are likely to be in near-tropical or tropical areas, a good knowledge of tropical medicine is required. This knowledge can be updated with books and journals, but the physician's first experience with most tropical diseases is likely to be on deployment. Most physicians will have seen at least a handful of cases of malaria (mostly vivax malaria) at home in Australia. In relation to malaria and a range of tropical diseases, the Army Malaria Institute at Enoggera can provide education and clinical support (telephone 07 3332 4801).

Suggested pre-deployment reading

1. Campbell S, Lees C. *Obstetrics by ten teachers*. 17th ed. London: Arnold, 2000. [Good on principle, short on specifics.]
2. Husum H, Ang SC, Fosse E. *War surgery field manual*. Penang, Malaysia: Third World Network, 1995. [Excellent.]
3. *Field surgery handbook (ADFP 708)*. RAAMC, 1996. [Wise and sensible.]
4. Walker AS. *Clinical problems of war*. Australian War Memorial, 1952. [Covers 1939–1945. Clinically excellent and still relevant.]
5. Rosenfeld JV, Walters DAK. *Neurosurgery in the tropics. A practical approach to common problems*. London: Macmillan, 2000. [Practical, contains a lot of neurology of use when technology is not available in the field.]
6. O'Keefe B. *Medicine at war*. Australian War Memorial, 1994. [Covers 1948–1975. Salutory lessons, but short on clinical details, unlike reference 4].
7. Cook GC. *Manson's tropical diseases*. 20th ed. Sydney: WB Saunders, 1996. [This edition weighs 3.725 kg; new edition every 5–9 years.]
8. *Aviation medicine for aircrew*. Adelaide: Institute of Aviation Medicine, RAAF, 1999.
9. Ernsting J, Nicholson AN, Rainford DJ. *Aviation medicine*, 3rd ed. Melbourne: Butterworth Heinemann, 1999.
10. Smith JMB, Payne JE, Berne TV. *The surgeon's guide to antimicrobial therapy*. London: Arnold, 2000.
11. McIntyre D Part 4.24. *Australian Army Medical Service in Korea*. In: O'Neill R. *Australia in the Korean War, 1950–1953*. Vol II. *Combat operations*. Australian War Memorial, 1985.

Career military physicians can benefit from a six-month course on tropical medicine conducted by the Mahidol University in Thailand. This course has good practical clinical content. ADF Reservists may find it hard to spare six months, but might consider a shorter tropical medicine course being offered by James Cook University in Townsville (this course is more accessible, but has the disadvantage of lacking extensive clinical content).

Aviation medicine

Many of the intensivist's military patients will need aeromedical evacuation (AME) to higher-level facilities. Although AME is not a primary role for a physician, relevant knowledge aids

Recommended references for deployment

Select what you need. All these references should be standard issue for deployable medical units.

1. Singer M, Webb A. *Oxford handbook of critical care*. Oxford University Press, 1997.
2. RamRakha P, Moore K. *Oxford handbook of acute medicine*. Oxford University Press, 1997.
3. Eddleston M, Pierini S. *Oxford handbook of tropical medicine*. Oxford University Press, 1999.
4. Fauci AS, et al. *Companion handbook. Harrison's principles of internal medicine*. 14th ed. New York: McGraw Hill, 1998.
5. Smart J, Nolan T. *Paediatric handbook*. The Royal Children's Hospital, Melbourne, Australia. 6th ed. Blackwell Science Asia, 2000.
6. Kemp C, McDowell J. *Paediatric pharmacopoeia*. Pharmacy Department, Royal Children's Hospital, Melbourne, Australia. 1997.
7. Chin J. *Control of communicable diseases manual*. American Public Health Association, Washington DC. 17th ed. 2000. [Bioterrorism references].
8. Shann F. *Drug doses*. Intensive Care Unit, Royal Children's Hospital. Melbourne Australia. 10th ed. 1998.
9. Kennedy M, Karipis H. *Emergency rapid reference*. Roche Products, Dee Why, Australia. 2000.
10. Sheory H, Walker J, Biggs BM. *Clinical parasitology*. Melbourne University Press, 2000.
11. Adler S, Gasbarra D, Adler-Klein D. *A pocket manual of differential diagnosis*. 4th ed. Lippincott, Williams and Wilkins, 2000.
12. Bartlett J. *Pocket book of infectious disease therapy*. Lippincott, Williams and Wilkins, 2000.
13. Dreisbach RH. *Handbook of Poisoning*. Lange Medical Publ., California. (New edition due 2001.)
14. Strickland GT. *Hunter's tropical medicine and emerging infectious diseases*. 8th ed. Sydney: WB Saunders Co., 2000. [Heavy but very valuable: if you take this, omit reference 3].

Note – Royal Children's Hospital publications are available from the Hospital. References 1–13 together weigh only 4.35 kg; reference 14 weighs 3.33 kg.

planning and preparation for AME. A knowledge of the principles of aeromedical evacuation and basic aviation medicine is needed. The Institute of Aviation Medicine at Edinburgh (SA) can assist with training. From time to time the RAAF offers an introductory five-day AME course, which is highly recommended to physicians before deployment.

Intensive care

As intensivist, the physician should be familiar with military wounds and surgery performed under military field conditions. Such experience is extremely difficult to obtain in Australia, but the *Field Surgery Handbook* contains established field doctrine and provides a good guide, including information on ballistic wound characteristics.

High technology diagnostic facilities are not available on deployment. Greater reliance must be placed on history-taking (sometimes with great patience, and the use of an interpreter) and on information available from physical signs. Physicians who are subspecialists at home may need to make a point of seeing general medicine cases before deployment, remembering that there are unlikely to be computed tomography or ultrasound facilities regularly available on deployment. Physicians require a sound knowledge of basic principles, and will need to be able to be guided by these.

Supporting role

Owing to the fitness of ADF personnel, technical and administrative medical issues are not a major problem on deployment, but a physician is of assistance in support of a General Duties Medical Officer (GDMO) in regard to diagnostic requirements, prognosis and return-to-duty issues.

The physician or intensivist must remember that, when faced with casualty or illness loads of unusual proportions, he or she will need to step forward as an extra pair of hands and should have sufficiently broad skills to do so — as well as perform usual duties.

On some missions it might be desirable for a physician to have primary care ability — relieving a GDMO, or assisting with GDMO duties at times of high workload: this might be needed when a mission provides aid to a civil population.

Continuing education

The continuing education of the military physician is important, and is presently facilitated by attendance at State Defence Health Service meetings and the Australian Military Medicine Association (AMMA) annual conference. Additionally, an ADF physicians' special interest group is forming, and it is hoped that this will meet annually to keep physicians abreast of relevant knowledge. Participation in this group by the Army Malaria Institute will focus on tropical diseases. However, more is needed, and the future development of the interest group may lead to the provision of special training courses.

On recruitment, each physician should have a Service mentor appointed to ensure and facilitate the acquisition of the relevant military skills and knowledge. Lest this article dissuade a physician from joining or deploying with the ADF, it must be remembered that satellite phone and teleradiology will keep the physician in contact with learned colleagues as needed.

At present the Royal Australasian College of Physicians and its specialist societies offer little to a military physician. Current undergraduate courses also do not contribute much of relevance in public health (most Australian courses focus on developed westernised countries). Should not the ADF provide training for physicians?

There are a number of different military environments in which a physician may need to deploy, and deployments provide different geographic and climatic conditions. In turn this affects the types and state of battle casualties and diseases encountered. While the purpose of the ADF is warfighting and winning, Health Services must be prepared to meet those goals and broader operations, including assisting in peacekeeping and aiding the civilian population.

A hundred years of military history suggest that Health Services must have competence in the following environments (historical examples in brackets).

- Cold weather, including snow (Gallipoli, France, Russia, Syria, Greece, Korea).
- Desert, heat and water shortage (North Africa, Tobruk).
- Maritime (North Seas, Southern Ocean, Pacific Ocean).
- Tropical (from Bougainville in 1914 to East Timor and Bougainville today).
- Airborne (AME within and from Vietnam).
- Vehicular (many uses since 1915).
- Nuclear, biological and chemical (Japan, Australia, Iraq).

Corporate ADF Health knowledge of the problems of these environments has been hard-won, and should be retained, remembered, updated and passed on.

The most likely scenarios for future ADF involvement are tropical. Bearing this in mind, it is possible to design a series of annual “deploying physicians” courses which could serve several goals. These could be held annually in different States, in conjunction with DHS or AMMA meetings and local training institutions, and could also update weapons training and provide field experience of different environments.

Only the experience of actual deployment provides the final training of a military physician, but the implementation of courses would certainly assist. Virtually all the ADF's physicians are Reservists: courses should be seen as desirable and, with careful planning, not as expensive luxuries.

References

1. Wallace RL. The Australian at the Boer War. The Australian War Memorial and the Australian Government Publishing Service, 1976.
2. Butler AG. Official history of the Australian Army Medical Services 1914–1918. Vol 1. Melbourne: Aust War Memorial, 1938.
3. O'Keefe B. Medicine at war. Australian War Memorial, 1994.
4. Walker AS. Clinical problems of war. Australian War Memorial, 1952.

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